



# 9th Africa Nutrition Conference 2024

Book of  
Abstracts

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African Nutrition Society  
Société Africaine de Nutrition  
الجمعية الإفريقية لعلوم التغذية



GHANA ACADEMY OF  
NUTRITION AND DIETETICS

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# 9<sup>th</sup> Africa Nutrition Conference 2024

University of Cape Coast, Ghana,  
October 7-11, 2024

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Organized by:  
African Nutrition Society  
Ghana Academy of Nutrition and Dietetics

# Welcome Message



On behalf of the African Nutrition Society, I wish to welcome you all to the 9th Africa Nutrition Conference (ANC2024) in the historic city municipality of Cape Coast, Ghana.

We salute all our partners and sponsors for their support and contributions to making this meeting a reality.

The Africa Nutrition Conference is the leading scientific conference on nutrition organized and run by Africans on African soil. However, this conference also attracts the support and participation of partner organizations and learned societies more broadly and global experts in the field of nutrition. Uniquely, the conference focuses on contemporary issues concerning nutrition in Africa and welcomes all stakeholders in the nutrition space from academics and researchers to nutrition programme leaders, policy makers, NGOs and advocacy groups. This year's conference is not different.

The Theme chosen: “Food and Nutrition in a Changing World: Implications for nutrition security and health in Africa” encapsulates major issues that this forum seeks to dialogue on. Under the tracks namely, “Food and Nutrition Security; Nutrition, Health and Wellbeing, Nutrition Training and Capacity-Building, the conference has received hundreds of abstracts of original communication which will be showcased over the conference period. Special Roundtables on nutrition governance and leadership in Africa; and the role of the Africa Diaspora in nutrition training and capacity-building also offer a platform for dialogues and perspectives from carefully chosen experts.

As with all Africa Nutrition Conferences, the pre-conference events have included a special continental workshop organised by the Africa consortium on school health and nutrition and a scientific writing workshop for students and young scientists. Similarly, a post-conference workshop has been developed for research and data management. Numerous special symposia have also been mounted to provide a broad range of choices for our participants.

It is pleasing to see a lot of students and young scientists at this year's conference. This provides an opportunity for them to meet and learn from the experts and global leaders as well as a networking opportunity as they build their careers in the field of nutrition and health.

We are honoured to be partnered and sponsored by several key global players in the field of nutrition. We are particularly grateful to the Eleanor Crook foundation, World Vision International , The International Atomic Energy Agency, Agriculture, Gioventu, Nutrition & Health Academy, Food and agriculture organizations and other UN agencies and our sister partner society – The Nutrition Society. We are especially grateful to our hosts -the University of Cape Coast, and the Ghana Academy of Nutrition and Dietetics who have proved to be true and genuine partners.

As we welcome you to the conference, we hope that you will find the scientific programme interesting and look forward to your participation. We also hope that you will enjoy our social programme and find time to explore the historic sites in Cape Coast while you are here.

On behalf of the ANS, I wish you all a successful conference.

**Professor Paul Amuna,**

**On Behalf of the Board of Trustees of ANS  
& The Scientific Committee for ANC2024**



It is with great pleasure that I, on behalf of the Governing Board (GB) of the Ghana Academy of Nutrition and Dietetics (GAND) and the Local Organizing Committee (LOC), welcome you to the historic city of Cape Coast, Ghana

As the world grapples with the far-reaching impacts of climate change, population growth, pandemics and shifting dietary patterns, it is imperative that we come together to share knowledge, foster innovative solutions and chart a path towards a more secure and equitable food future, particularly in Africa where the majority of the world's most vulnerable people live. Hence, the choice of our conference theme "Food and Nutrition in a Changing World: Implications for Nutrition Security and Health."

Joining us this year are renowned researchers, policymakers, industry leaders, and health professionals from around the world. For the first time, we have also introduced an online virtual participation option to increase the reach of this gathering. Together, we will delve into the multifaceted aspects of food and nutrition, exploring topics such as sustainable agriculture, nutrition-sensitive interventions, and improving food security research across the thematic tracks of food and nutrition security, nutrition and health, and capacity building.

During the course of this five-day conference, featuring more than 100 unique research presentations and rich lectures from our esteemed speakers, the entire ANC2024 Local Organizing Committee aims to deliver a successful and impactful event. We look forward to the active participation of all participants, especially of our younger delegates. There will also be regular events, including plenary lectures, lunchtime symposiums, exhibitions by sponsors, a complimentary tour to the iconic Cape Coast Castle, a gala dinner, and many others.

Together with our immensely experienced partners, the Africa Nutrition Society, we have endeavored to make ANC2024 filled with opportunities for participants to network and interact with each other, forge new collaborations, exchange cutting-edge ideas, and collectively shape the future of food and nutrition security. We are confident that the diverse perspectives and expertise assembled here will yield invaluable insights and inspire transformative action.

We are honored to have you and look forward to a stimulating and productive conference. We rely on the collective effort of our delegates, members, and sponsors to ensure the conference's success. Therefore, we extend our warmest welcome and look forward to your active participation and support. We ask for your patience and understanding should any shortcomings arise and we would appreciate your feedback on the event, which you can share with our organizing committee or secretariat.

Last but not least, this conference would not be possible without the generous support of our sponsors and various other organizations. We express our sincere appreciation to all the sponsors of our luncheon seminars, as well as our Corporate Sponsors, including the Eleanor Crook Foundation, World Vision Kenya, the Nutrition Society, InnoNext, the Food and Agriculture Organization, the ANH Academy, Gioventu and our media partners for the phenomenal support. We also acknowledge the Office of the First Lady of Ghana and the Former President of Ghana, H. E. John A. Kufuor and the Kufuor Foundation for the continued support. as well as the Ministry of Foreign Affairs/Immigration Service. We thank all our exhibitors for their presence.

We kindly request your continued assistance in making this conference an even greater success. Let us embark on this journey to address the critical issues facing our world and work towards a future where everyone has access to safe, nutritious, and sustainable food.

Thank you and welcome to the conference.

**Chair of the Local Organizing Committee**

**Percival Delali Agordoh, RD**

## International Scientific Programme Committee Members

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Prof. Anna Lartey  
Prof. Alan Jackson  
Prof. Paul Amuna  
Dr. Habiba Hassan-Wassef  
Rev. Dr. Tom Ndanu  
Prof. Basma Ellahi  
Prof. Robert Akparibo  
Prof. Steven Wootton  
Prof. Richmond Aryeetey  
Prof. Amos Laar  
Prof. Andrew Prentice  
Prof. Ali Dhansay  
Prof. Linley Karlton  
Prof. Mary Murimi  
Prof. Kingsley Pereko  
Prof Francis Zotor  
Dr. Frank Ekow Atta Hayford  
Ms Tamba Raye Stevenson  
Percival Delali Agordoh RD  
Dr Sinamo Sisay  
Prof Reginald Annan  
Dr victor Owino  
Mr Daniel Mensah  
Ms Alberta Seyram Adjoa Ananga Ayitey  
Mr Eric Anku  
Ms Annabel Yeboah



# International Scientific Programme

## Committee Members

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Prof Francis Zotor	Prof Christiana Nsiah-Asamoah	Dr Kassim Abdulai
Prof Stephen Wootton	Dr Matilda Asante	Dr Michael Wiafe Akenteng
Rev. Dr Thomas Ndanu	Dr Freda Ntiful	Dr Isaac Agbemaflle
Dr Laurene Boateng	Dr Frank Hayford	Dr Kingsley Pereko
Dr Marina Tando	Dr Keiron Auden	Prof Robert Akparibo
Dr Anna Amoako-Mensah	Dr Robert Fungo	Prof Reginald Annan
Dr Gloria Otoo	Dr Heather legodi	Dr victor Owino
Dr John Nsor-Atindana	Dr Adepoju oladejo	Prof. Ali Dhansay
Dr Anthony Wemakor	Prof Patricia Ukegbu	Dr Sinamo Sisay
Prof Francis Amgloh	Prof Johan Jerling	Prof. Linley Karlton
Mr Daniel Mensah	Dr Janet Carboo	Prof. Mary Murimi
Dr Faith Agbozo	Dr Rosemary Akolaa	Dr Phyllis Addo
Dr Isaac Amoah	Prof Paul Aryee	Dr Munsy Chibe
Dr Nana Ama Frimpomaa Agyapong	Prof Amos Laar	Collins Afiriye Appiah
Dr Fidelis Kpodo	Dr Isaac Agbemaflle	Prof Thomas Adepoju
Dr Justine Owusu	Mr Wise Letsa	Dr Ariyo Oluwaseun
Dr Esi Colecraft	Mr Percival Agordo	Dr mphoputu Nozipho
Dr Agatha Ohemeng	Dr Linda Gyimah	Dr Hayford Mawuli Avedzi
Prof Christiana Nsiah-Asamoah	Dr Charles Apprey	Dr Tonderayi Mathew Matsungu
Dr Harriet Okronipa	Dr Nana F Agyapong	Dr Michael Ojo
Prof Seth Adu-Afarwuah		



# Local Organizing Committee Members

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Agordoh Percival  
Kingsley Pereko  
Haruna Zaid  
Salome Agordoh  
Klomegah Senam  
Abdulai Kasim  
Anku Eric  
Hayford Frank  
Kusorgbor Emmanuel Kelly  
Franklin Etsey Hassey  
Kunutsor Bernice Worlali  
Amenu Emil Kafui  
Ananga Ayitey Alberta Seyram Adjoa  
Ambrose Mwimpuo  
Adjei Danso Felicia Kuuyong  
Gillette Valentina Sylvia  
Forfoe Wilfred Worlali  
Nti Helena  
Ayensu Jessica  
Eyison Belinda  
Nsiah-Asamoah Christiana  
Yeboah-Sapong Atta  
Bosu Rosemary



## Professor Anna Lartey

Anna Lartey is currently an adjunct Professor of Nutrition at the University of Ghana where she previously served as a full-time Professor of Nutrition for almost 30 years with a research focus on maternal and child nutrition. She served as Director of Nutrition at the Food and Agriculture Organization of the United Nations, Rome, Italy from October 2013 to December 2020, where she led FAO's work on Food Systems for Nutrition. She served as the President of the International Union of Nutritional Sciences (IUNS) from 2013-2017. She held the International Development Research Center (IDRC, Canada) Research Chair in Nutrition for Health and Socioeconomic Development in Sub-Saharan Africa (2009-2014). Prof Lartey was a Fulbright doctoral student (1994-1998) at the University of California, Davis, USA. She obtained her Master's degree in Nutritional sciences at the University of Guelph, Canada and BSc in Nutrition-Biochemistry from Ottawa University in Canada.

Prof Lartey has received several global awards: the University of Ghana's "Best Researcher Award for 2004", the Sight and Life Nutrition Leadership Award for 2014; African Nutrition Society Award for Distinguished Services to Nutrition in 2014; a Doctor of Science degree, *honoris causa*, by McGill University in June 2018; and in December 2022, the International Union of Nutritional Sciences Lifetime Achievement Award for outstanding contribution to nutrition of regional and global significance working in a developing country.



## **Professor Andrew M Prentice, PhD, FMedSci**

Andrew Prentice is Professor of International Nutrition at the London School of Hygiene & Tropical Medicine. Based in The Gambia, he is Head of the Nutrition & Planetary Health Theme at the MRC Unit The Gambia @ LSHTM. He has researched maternal & child health in low-income settings for over 45 years. Currently, his primary interests are in iron, infection and anemia

and in the effect of a mother's diet at conception on the baby's epigenome. His work has been recognised with national and international awards. He was recently elected as an International Member of the US National Academy of Sciences.



## **Professor Mary Murimi**

Mary Murimi is a professor of Nutrition in the College of Health and Human Sciences at Texas Tech University. She has mentored over 25 graduate students and 3 post doctorate fellows. Her research work focuses on low-income and low literacy populations in various countries including Malawi, Vietnam, Kenya, Bangladesh and Ethiopia. She has over 80 publications in peer reviewed scientific journals. Prof Murimi has served as several positions: consultant for

Nutrition Project for Schools in Grenada, associate editor of the Journal of Nutrition Education and Behaviour, President of the Society of Society for Nutrition Education and Behaviour and Chancellor of Daystar University 2016-2021 in Kenya. She has received several recognitions for her achievements including distinguished alumni by her graduate school, mid-career achievement award by the Society of Nutrition Education and Behaviour and the Helen Denning Ullrich Annual Award for Lifetime Excellence in Nutrition Education.



## **Professor Paul Amuna (*MB, ChB (MD), M.Med Sci; PGCHE, FRSM, FIUNS*)**

Paul is a physician scientist, academic, researcher and pedagogist. He holds Fellowships of the International Union of Nutritional Sciences and the Royal Society of Medicine. He has held various academic and research positions in three UK

Universities, Europe, the Arab Gulf and as Dean of Fred N. Binka School of Public Health at the University of Health and Allied Sciences, Ghana. He has served in the Nutrition Society (UK & Ireland), Association for Nutrition, and African Nutrition Society. His interests include health workforce capacity building and academic mentoring. He is a member of the CAPSTONE Project consortium, an EU Erasmus+ project on Capacity Development for Transdisciplinary Training in Non-communicable Diseases Prevention and Management in West Africa. His research focuses on maternal nutrition, birth outcomes and non-communicable diseases.



## **Dr. Habiba Hassan-Wassef**

An initial career in nutrition research took Dr. Hassan-Wassef to Paris University, then Columbia University where she was a Whitehall Research Fellow. Lifelong service with the World Health Organization ended with high level strategy and policy responsibilities in Geneva. Dr. Hassan-Wassef's knowledge and expertise in nutrition, food and health was further enriched through continued national and regional research projects and

expert services to multilateral, bilateral, and regional organizations in the Middle-East, Africa and Europe. A Trustee of the African Nutrition Society, she is also Vice-President of the African Society of Mycotoxicology. She is author of several scientific publications and laureate of regional and international awards and prizes, the last one being the IUNS award of the title "Living Legend" received at the Tokyo ICN in 2022.



## **Professor Barry M. Popkin**

Barry Popkin developed the concept of the Nutrition Transition and also that of the double burden of malnutrition. He is actively involved in work on the program and policy design and evaluation in an attempt to reduce demand for unhealthy food and increase that for healthy minimally processed and real food. He has published over 660 refereed journal articles and PLOS

rated him as one of the top cited scholars in the world among 7 million scholars in 2017 (rated number 203 out of 6.8 million or in the top 0.003% scientists in the world; H-194; citations 226,759).

# PLENARY SPEAKERS



## Professor Amos Laar

Amos Laar, a Professor of Public Health Nutrition at the University of Ghana, is recognized for his research on the nexus between food environments and diet-related non-communicable diseases, as well as the impact of social forces, commercial influences, and structural violence on health. He has co-led over 25 research projects valued at more than \$20 million and published over 150 peer-reviewed papers in top journals, including *The Lancet*, *Nature Foods*, *BMJ Global Health*, *PLOS One*, & *Food Policy*. Prof. Laar has played a significant role in food systems transformation research and advocacy, contributing to policy development with UNICEF, WHO, ECOWAS, Ghana and five other African countries. He was recently appointed by the African Union to facilitate the development of Africa's Food Systems Strategy for 2026 – 2035. He has served as an expert reviewer for four WHO guidelines and is currently a member of the WHO Guideline Development Group on optimal intake of animal-source foods. He served as President of the African Nutrition Society from 2016 to 2020, and currently convenes the Africa Food Environment Research Network (FERN). In 2019, he was spotlighted in *The Lancet* for his contributions to combating NCDs in Africa. He is a Fellow of the Ghana Academy of Arts and Sciences.





## Professor Kofi Amegah

Kofi Amegah is an Associate Professor of Environmental and Nutritional Epidemiology at the University of Cape Coast, Ghana with a strong research portfolio in nutrition and environmental health. He is Head of the Department of Biomedical Sciences and Vice-Dean of the newly established School of Public Health. His research focuses on the interface of nutritional and air pollution exposure effects on maternal, perinatal and cardiovascular health adverse health outcomes using modern and robust epidemiological and statistical methods and also leveraging emerging data science techniques. He leads the Ghana Urban Air Quality (GhanaAQ) and Breathe Accra Projects which seeks to bridge the air quality data gaps in Accra and other metropolitan areas of Ghana to create awareness of the air pollution problem for local action, and to conduct epidemiologic research to bridge the evidence gap. He has established a birth cohort in the Cape Coast Metropolitan Area (CAMAC) with the primary aim of unraveling the cellular and molecular mechanisms and identifying the social and nutritional modifiers of household air pollution health effects. He is a member of the International Society for Environmental Epidemiology (ISEE) and Nutrition Society UK, and collaborator of the Institute of Health Metrics and Evaluation (IHME) Global Burden of Disease (GBD) studies. He participated in the WHO expert meetings of the Global Platform on Air Quality and Health and is a member of the Exposure Working Group of the WHO Global Air Pollution and Health – Technical Advisory Group (GAPH-TAG). He is a renowned expert on air pollution and health in Africa with his views sought by both local and international media outlets on this and related issues, and was profiled in Scientific American October 2023 Edition in an article titled "*Changing the Environment*". He is a Deputy Editor of the Journal of Health and Pollution, and Associate Editor of Public Health Nutrition.





## **Pr Dr. Ing. Mady CISSE**

Mady CISSE, an engineer in Food Technology, holds a PhD in Agri-food Process Engineering from Montpellier SUPAGRO and a PhD in Food Science from Cheikh Anta Diop University in Dakar. His main areas of expertise are setting up agri-food businesses, technical and financial studies of agri-food facilities, studies of agri-food sectors, setting up and optimizing agri-food processes, food safety, quality audit and control, formulating new products. Pr Mady CISSE's research activities focus on adding value to local raw materials and membrane techniques. He has trained 8 PhDs and supervised more than fifty engineering and master's theses. He is the author of over 100 publications and two book chapters. Between 2017 and 2020, he was Director of Studies and Director of the Polytechnic High School at Cheikh Anta Diop University in Dakar. He is currently in charge of the Agri-food Industries Continuing Education Laboratory at the ESP, a special advisor to the Rector of UCAD; and Director of the UCAD LEADERSHIP FACTORY program.



## **Alan Jackson CBE, DSc, MD, FRCPCH, RNutr.**

**Professor Emeritus for Human Nutrition, University of Southampton**

Professor Jackson's major interest is the biological and social factors that enable optimal growth and development during childhood. He trained in paediatrics in Cambridge and London. He was Director of the Tropical Metabolism Research Unit, University of the West Indies, Jamaica, developing the evidence base for the WHO guidance on effective treatment of severe malnutrition. He has been a Senior Advisor on nutrition to the UK Government and advisor to the World Health Organization (WHO), Food and Agricultural Organization (FAO), and the European Union. He was recently Director for Nutrition Research, National Institutes for Health Research, England, Chair of their Cancer and Nutrition infrastructure collaboration and Chaired the Continuous Update Panel on

nutrition and cancer for the World Cancer Research Fund/American Institute for Cancer Research.



## **Professor Mary Ward**

Mary Ward is a registered dietitian and a Professor of Nutrition and Dietetics at Ulster University, Northern Ireland. Her research is focused on micronutrients, particularly B-vitamins in disease prevention from early life through to older age and the health impacts of transitioning to healthy diets from sustainable sources.

Mary sits on the Scientific Committee of the Food Safety Authority of Ireland, is Deputy Director of the Wellcome Trust-Wolfson NI Clinical Research Facility and is a member of the Life and Health sciences committee of the Royal Irish Academy. She is currently the UK President of the Nutrition Society.



## **Lindsey Mina Locks, ScD MPH**

Lindsey Locks is an Assistant Professor at Boston University (BU) in the Departments of Health Sciences (Sargent College) & Global Health (School of Public Health (BUSPH)). She is director of the BU Global Nutrition Lab and a member of the BU Tuberculosis (TB) Interdisciplinary Approach to Research Alliance (TIARA).

She is also the Chair Elect of the Global Nutrition Council (GNC) of the American Society of Nutrition (ASN). As the TB-Undernutrition Scientific Working Group of the International Union Against Tuberculosis and Lung Disease (the Union), she is particularly enthusiastic about integrating nutrition and TB programming.



## **Stephen Alan Wootton PhD FAFN OBE**

ORCID <https://orcid.org/0000-0002-9495-9719>

Dr Stephen Wootton is an Associate Professor in Human Nutrition within the Faculty of Medicine at the University of Southampton. He has played a leading role in the design and delivery of the principal national educational initiatives to improve the safety and effectiveness of doctors in delivering nutritional care and is acknowledged as one of the principal nutrition educators within the UK in the training of nutritionists, doctors and other health professionals. He has been a member of the International Malnutrition Task Force since its inception, an invited speaker at the Caribbean Health Research Council of the Federation of African Nutrition Societies and African Nutrition Congress, Quality Assurance Lead in the assessment of nutritional status for the International Collaboration on Nutrition in relation to Cancer (ICONIC). He led the development of nutrition within the undergraduate medical curriculum at Southampton and was a founding member of the Intercollegiate Group in Nutrition developing the national curriculum for nutrition in medical schools on behalf of the Academy of Medical Royal Colleges. He was made an Officer of the British Empire (OBE) in the 2018 Queens New Years Honours for services to nutrition. His current research focus is to understand how differences in nutritional state influence the risk of developing disease, the resilience to disease and the response to therapy.



## **Professor Reginald Annan**

Reginald Annan is a Professor of Public Health Nutrition at the College of Science Kwame Nkrumah University of Science and Technology in Kumasi, Ghana. He received his PhD from the University of Southampton in the UK. His research focuses on promoting sustainable food systems and policies to enhance health and nutritional well-being. He is currently the PI for KNUST's Periodic Table of Food Initiative Centre of Excellence for West Africa. The PTFI

CoE seeks to provide tools, data and training to empower a global ecosystem to better know our food and diets in order to develop food system solutions. He leads the Centre's demonstration projects on soil health, food composition and human health inter-linkages, the Food EDU fellowship programme, and the Bill and Melinda Gates Foundation funded project on Building Capacity for robust food quality and safety data to advance Human and Planetary Health in Ethiopia and Ghana. He also leads the KNUST Centre on Quality Assurance Framework and Nutrition for Africa (QAFANA), a Working Group of ICONIC tasked to develop a QAF and escalation at scale, initially for anthropometry, but eventually for other markers of nutrition in Africa. He is outgoing Chair of the Nutrition Professionals for Ghana Academy of Nutrition and Dietetics.



### **Dr Jacqueline Landman, FFAfN, Reg PHNutr, FRSPH**

Retired. Visiting Lecturer, University of Southampton. Born in South Africa. She finished her education in the UK and at the University of the West Indies Mona. She has a longstanding interest in professional education and regulation, the subject of a PhD she co-supervises. She has been a member of an ad hoc group working on school nutrition in Africa since 2017 and a longstanding member of ANS & NS (GB).



### **Professor Robert Akparibo**

Robert Akparibo is an Associate Professor in Public Health and Nutrition at the School of Medicine and Population Health, University of Sheffield, UK. He is also a visiting Professor at the Fred N. Binka School of Public Health, University of Allied Health Sciences and University for Development Studies School of Allied Health in Ghana. Prior to joining the University of Sheffield, Prof Akparibo worked with various governmental and non-governmental organisations in sub-Saharan Africa and Europe including Family Health International (FHI) in Senegal, Hellen Keller International (HKI) in Burkina Faso, the United

Nations Children Fund (UNICEF) in Ghana and the World Health Organisations (WHO) in Denmark. His research intersects public health and nutrition specially focusing on school age children and adolescents, and food security and food systems and policy. He currently chairs the Nutrition Community of Practice of the Global Research Consortium of School Health and Nutrition and is a member and co-chair of the Global Special Interest Group for School Health and Nutrition. Professor Akparibo has consulted for organisations such as the World Food Programme, the World Health Organisation, Oxfam GB, the UK Foreign and Commonwealth Office, World Vision International, the European Communicable Disease Control, and the UK National Health Service (NHS) including for the UK local government councils in the areas of public health and nutrition. He has been playing a lead role in developing and supporting capacity building of early career researcher in sub-Saharan Africa.



## **Ms Tamba Stevenson**

Tamba Raye Stevenson is the North American Representative of the African Nutrition Society and an advocate of nutrition and food systems transformation. She is completing her PhD in Communication at American University where she is a researcher and adjunct professor. Her academic focus explores how digital narratives shape public perception around food, nutrition and policy. She leads professional development workshops that empower culinarians and creatives to innovate, streamline operations, and enhance communications through generative AI. As the founder of Women Advancing Nutrition, Dietetics and Agriculture (WANDA), she has empowered a generation of women and girls across Africa and the Diaspora through education, advocacy and innovation. She is an advocate for a Food Bill of Rights, a campaign to secure access to nutritious food as a human right. Tamba's work has been recognized on prominent platforms such as National Geographic Traveler, TEDx, the World Food Prize, the U.S. Library of Congress, SOCAP Global, Uppsala Health Summit, and the Milken Global Summit and in outlets like Forbes, The Washington Post, Voice of America, and Eating Well. Tamba has held influential roles including executive committee member on the USDA's NAREEE Advisory Board, the Nutrition and Health Working Group for the D.C.



Food Policy Council and the Nutrition Security Co-Chair for the Tufts Food and Nutrition Innovation Council.



## **Professor Folake Samuel**

Folake Samuel is a Professor of Community Nutrition at the University of Ibadan, Nigeria. She has over two decades of multidisciplinary research collaborations and programmatic experience in micronutrient nutrition, child feeding and food systems innovations. An alumna of the African Nutrition Leadership Programme, Folake Samuel is dedicated to mentoring upcoming young nutrition professionals and is deeply engaged in recent efforts geared towards the strengthening of local leadership capabilities in nutrition and food systems in Nigeria.



## **Professor Kingsley Kwadwo Asare Pereko**

Kingsley Pereko is an Associate Professor of Public Health Nutrition and a Registered Nutritionist, at the Department of Community Medicine, School of Medical Sciences, College of Health and Allied Sciences, University of Cape Coast. Kingsley for the past 5 years have served as the founding President of the Ghana Academy of Nutrition and Dietetics. He also coordinates the Peoples Health Movement Ghana as the country coordinator and currently serves as the Vice-Dean of the School of Medical Sciences, University of Cape Coast. Since 2008, Kingsley has serves as an academic and a researcher. His areas of interest include nutrition and food security, nutrition programming and food environment. He is a mentor, advocate, a husband of one and a father.



## Dr Namukolo Covic

Namukolo Covic (Zambia) is [ILRI](#) Director General's Representative to Ethiopia, [CGIAR](#) Ethiopia Country Convenor, and CGIAR Regional Director for East and Southern Africa. She has served as a Senior Research Coordinator at the [IFPRI](#) on Agriculture for Nutrition and Health (A4NH) in different African countries.

Her extensive experience straddles the interface of policy, dynamics of agriculture and food systems, and related interventions. She has been involved in numerous activities, collaborating with national governments, regional and continental bodies, and various non-state actors to drive food systems transformation and nutrition initiatives.

Namukolo has worked extensively with the government of Ethiopia and other stakeholders on different fronts of food systems and nutrition, including the development of food-based dietary guidelines and their adaptation to pastoralist settings, and the development of Ethiopia's food systems transformation pathway. She has supported African Union's efforts on linking agriculture and nutrition in the [Africa Union – Comprehensive Africa Agriculture Development Program \(CAADP\)](#). She leads the Governance Working Group of an Independent Expert Group that emerged from the UNFSS.



## Professor Lauri Wright

Lauri Wright worked as a clinical dietitian at the Tampa VA Hospital for more than 15 years, specializing in infectious disease. She began and directed the dietetic internship at Bay Pines VA Hospital. After completing her doctorate degree, Dr. Wright directed the master's/dietetic internship program

at the University of North Florida and later, developed and directed the Doctorate of Clinical Nutrition program. Dr. Wright is the founding director of the UNF Center for Nutrition and



Food Security where she developed and directed the Meals on Wings, a food recovery-meal delivery program for underserved older adults. Dr. Wright joined the faculty at University of South Florida where she developed the MPH/Dietetic Internship. Her research focuses on food insecurity and its health impact as well as global malnutrition. She has worked extensively with malnutrition and the nutrition transition in India, Africa and Central America. Dr. Wright was the 2023-2024 President of the Academy of Nutrition and Dietetics.



## **Professor Paul Aryee**

Prof. Aryee is an Associate Professor of Public Health Nutrition at the Nutritional Sciences Department of the School of Allied Health Sciences, University for Development Studies (UDS), Tamale. He is well groomed in the Nutritional Sciences, Public Health and Human Physiology. Aside his passion for training and mentoring under-graduate and post-graduate students of biomedical and allied health sciences, he is also an astute researcher and advocate for public health issues. He is actively involved in nutrition and public health related research and policies, and currently has interests in studying the aetiological factors of non-communicable diseases (NCDs), especially, those of public health importance. As a student of DOHaD (developmental origins of health and disease), he has spent the last 2 decades working towards unravelling the factors that may be moderating the development of NCDs during the phases of plasticity, i.e. during the first 1000 days of life. Prof. Aryee's involvement in collaborative projects over the years with Governmental and NGOs in the area of maternal (pregnant/lactating women) and child nutrition and health, has been the bases for his current thrust in academia. Prof. Aryee has over 50 peer reviewed publications (including 2 books), and a number of other published submissions (abstracts, reports, contributions to brochures, newspapers, etc) to his name.



## Professor Robin Macleod

Robin has a PhD in Dietetics and is currently an Associate Professor and the Program Leader for Dietetics at the Centre of Excellence for Nutrition (CEN), North-West University (NWU).

Prior to becoming an academic in 2007, she worked as a clinical dietitian at the Charlotte Maxeke Johannesburg Academic Hospital. During her 11 years at the hospital, she mostly worked in the paediatric wards, gaining valuable experience in infant and young child feeding and in-house

training of dietetic students. She currently teaches therapeutic nutrition at the undergraduate and postgraduate levels at NWU. Her main area of research expertise is therapeutic nutrition, particularly in the critically ill and severe acute malnutrition. She has successfully supervised more than 17 MSc students and 3 PhD students. She is passionate about the capacity building of nutrition professionals and is a member of the African Nutrition Leadership Program (ANLP) organising committee. She is also the project leader for the Support Program for PhD Students, which CEN is hosting for the 4<sup>th</sup> time this year. She has been involved in various African capacity development projects, including the LEDA-NN project in Nigeria and, more recently, the Capacity Development of Nutrition Officers for Food Systems Governance in Malawi (CapDev Malawi) project. As program leader of the dietetics training at NWU, she is actively involved in embedding leadership capabilities in the undergraduate training of students.



## Professor Donald Bundy

Donald Bundy is Professor of Epidemiology and Development at the London School of Hygiene & Tropical Medicine. He is Director of the Research Consortium for School Health and Nutrition and Advisor to the UN World Food Programme, leading a global research effort to provide evidence-based guidance to the

95+ member states of the School Meals Coalition on strengthening national school meals programmes. Previously, Professor Bundy served as Senior Advisor to the Global Health Team of the Bill and Melinda Gates Foundation; Lead Education & Health Specialist to the World Bank's Africa Region and Human Development policy unit; and Deputy Director of the Epidemiology Centre, University of Oxford.



## **Dr Victor Owino**

Victor Owino is a Nutrition Specialist at the IAEA where he has served for the past 9 years, supporting Member States to use stable isotopes and related nuclear techniques in generating information needed to tackle malnutrition in all its forms. Mr Owino has over 20 years' experience in food and nutrition and has worked in industry, non-governmental organizations and as a professor and researcher at universities in Kenya. A fellow of the International Nutrition Foundation, Mr Owino holds BSc Food Science and Technology from University of Nairobi, MSc Food Science and Technology from University of Ghent, MBA Leadership and Management from York St John's University and a PhD in Nutrition from the University of London. He has over 50 publications in high impact journals.



## **Prof Kaleab Baye**

Kaleab Baye is a Professor of Human Nutrition, former Director of the Center for Food Science and Nutrition (2016-19) at Addis Ababa University. He holds a PhD in Nutrition and Health from the University of Montpellier, France. Prof. Baye's research interest is on maternal and child nutrition, micronutrients, and interventions to improve diet quality. Prof. Baye is Deputy Editor of the journal *Public Health Nutrition* and is a member of the editorial board of *Global Food Security*. Prof Baye served as member of

expert panels and advisory boards to institutions like the WHO, UNICEF and the Rockefeller Foundation.



## **Mr Arne Duebecke**

Arne Duebecke, born in Braunschweig, Germany, is environmental scientist and worked for several years in marine research before he changed to food sciences in 2008 by joining Quality Services International (QSI) laboratories in Bremen, Germany. There he took different roles in project management, R&D and QM. In 2013 he added authenticity of foodstuffs to his portfolio. Arne is Head of Tentamus Center for Food Fraud (TCF<sup>2</sup>) and was managing director of Tentamus chelab from 2022 to 2024, a lab specialized on analysis of fruit juices. He is member of AOAC International, IAFP and ACAFP (African Continental Association for Food Protection).



## **Professor Per Ole Iversen**

Professor Per Ole Iversen works at the Department of Nutrition, University of Oslo, Norway. In addition, he has a part-time consultancy as a medical doctor at the Cancer Clinic, Oslo University Hospital, and currently he is Guest Professor at Stellenbosch University in South Africa and Muhimbili University of Health and Allied Sciences in Tanzania. His main research centers around optimizing the nutritional status of vulnerable groups, in particular women of childbearing age and their small children. During the last 15 years much of his scientific work has been conducted in sub-Saharan Africa.



## **Prof Oladejo Thomas Adepoju**

Oladejo Thomas ADEPOJU is a professor of Human Nutrition from University of Ibadan, Nigeria with interest in food analysis and biodiversity. He has held different administrative positions in the University such as Departmental Representative in the Faculty of Public Health and College of Medicine committees; Sub-Dean undergraduate; and Acting Head of Department. He is past Vice President (South), Nutrition Society of Nigeria and immediate past Secretary General of African Nutrition Society. He is the Nutrition expert on harmonization of Nutrition Training Curricula for West Africa Health Organisation, and the Current Chairman, Nutrition Society of Nigeria Oyo State Chapter.



## **Prof. (Mrs.) Rosemond Boohene**

Rosemond Boohene is a Professor of Enterprise Development at the Centre for Entrepreneurship and Small Enterprise Development, School of Business, University of Cape Coast. She has held several positions including Director of the Centre for Entrepreneurship and Small Enterprise Development, former Head of Department of Management Studies, Vice-Dean of the School of Business, Dean for International Education, UCC and a Visiting Professor at the Bonn-Rhein-Sieg University of Applied Sciences, Germany. She has worked on projects funded by the EXIM Bank Ghana, Rainforest Alliance, European Union (EU), the German Federal Ministry for Economic Co-operation and Development (BMZ), and the United Nations Office of Project Services (UNOPS) on Small and Medium-Sized Enterprises, Electronic Waste Management and Entrepreneurship. She is also an Honorary Research Fellow of the University of Kwazulu Natal, School of Management, IT and Governance and Board Member of the African Network for Internationalisation of Education (ANIE). Prof. Boohene was a committee member for Strategic Plan (2018-2022) of the University of Cape Coast and University of Cape Coast 2016 Statutes Review committee. She had also assisted as a reviewer for various Journals, presented at conferences and published articles and book chapters in both local and international journals. Prof. Boohene is an external assessor and examiner for various Universities in Ghana and abroad.

## FOOD SYSTEMS AND NUTRITION IN AFRICA

### THROUGH THE LENS OF THE GHANA SCHOOL FEEDING PROGRAMME CATERER? A PHOTOVOICE STUDY

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The national Ghana School Feeding Programme (GSFP) is regarded as one solution to tackle poor educational outcomes and malnutrition (undernutrition, overnutrition and micronutrient deficiencies). GSFP caterers are responsible for all aspects of food procurement: including selecting, purchasing, transporting, preparing and distributing meals. However, their views and experiences are rarely considered during programme implementation, monitoring and/or evaluation. The study aims to better understand the lived experiences of GSFP caterers in order to identify context-specific challenges and solutions. A Photovoice study was conducted in March-April 2024. School caterers were selected from GSFP participating schools in three districts (Ashaiman, La Nkwantanang, Ningo-Prampram) in Greater Accra. Participants partook in group training, learning about Photovoice, basic photography skills, safety and ethics. Participants photographed three predefined themes: something that makes being a school caterer easy, challenging, and a way to address these challenges. Caterers identified additional themes in pairs and selected two as a group. In-depth individual interviews were conducted using the 'SHOWED' method. Data analysis using *a priori* and emergent themes is currently underway using NVivo14. A total of 25 participants



followed the training. Co-created themes include: delays in payments, financial limitations, food accessibility, stressful transportation and challenges within the school, kitchen and marketplace. Individual follow-up interviews were conducted with 19 participants. Preliminary findings show that caterers are faced with limited affordability and accessibility of food items, lack of infrastructure to purchase, store and prepare ingredients, financial precarity and debt with food vendors. This study provides insights into school food environments in urban Ghana and highlights the important role of school caterers in combating all forms of malnutrition. By better understanding everyday challenges and victories, the GSFP can better support programme implementation and ideally improve the provision of nutritious school meals alongside school caterer livelihoods in Ghana and beyond.

## **COMMUNITY-BASED PLATFORMS FOR DELIVERING NUTRITION INTERVENTIONS TO CHILDREN AND ADOLESCENTS BEYOND SCHOOLS: A SCOPING REVIEW**

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*Keywords: adolescents, community, delivery platforms, nutrition, school-aged children*

A research prioritisation exercise identified 'optimal delivery platforms' as one of the top 5 research priorities for adolescent nutrition. Schools are an excellent platform for delivering interventions, however, since 250 million children are not in schools, community-based delivery platforms are also important. This review aimed to showcase the range of possible community-based strategies for delivering nutrition interventions to school-age children and adolescents (5-19 years) outside of school settings, and highlight exemplars through diverse case studies. A scoping review using online databases of peer-reviewed articles and grey literature was undertaken using search terms which included health, nutrition and social protection. Global Adolescent Nutrition Network (GANN) members were also contacted to share resources. The data were analysed thematically, and one case study from each theme was identified. Case studies were explored through interviews with key informants. Thematic analysis identified five categories of delivery platforms, beyond schools: technology and media-based platforms, community members, facilities and spaces, groups/organisations, and



peer educators. Case studies were identified from Bangladesh, India, Senegal, the Philippines; and Mozambique. Including this age group in designing, developing, and delivering interventions made platforms more effective in meeting their needs. Leveraging existing structures such as community spaces and networks; and integration with other common community services, such as sexual and reproductive health (SRH) and mental health, improved sustainability and coverage. The inclusion of appropriate training, supervision, and resources were also found to be crucial. A high number of interventions were focused only on reaching girls, leaving a lack of documented delivery platforms for boys. This review provides insight into potential delivery platforms for reaching school-age children and adolescents with nutrition services, beyond schools. Continued investment in and adaptation of community-based platforms for effective and sustainable nutrition interventions for this group is essential, as well as better documentation of examples.

## **DIETARY ADEQUACY AMONG ADOLESCENT GIRLS IN RURAL NORTH-EASTERN GHANA: THE ROLE OF LOCAL FOOD-BASED APPROACHES, SCHOOL LUNCH AND MULTIPLE-MICRONUTRIENT FORTIFIED BISCUITS**

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*Keywords: Adolescent girls, Ghana., Optifood, dietary adequacy, food-based recommendations, multiple micronutrient fortified food, nutrient gaps, school lunch*

A local food-based approach, including school lunch and adding multiple-micronutrient fortified biscuits (MMB) as supplementary snacks, might significantly enhance dietary adequacy, though current data is sparse. This study evaluated nutrient gaps and developed food-based dietary recommendations (FBRs) for adolescent girls. We analysed data from 292 girls aged 10-17 in the Mion District, Ghana, as part of the Ten2twenty-Ghana study. The model parameters were defined using a quantitative 24-hour dietary recall and included non-condiment foods consumed by at least 5% of the girls, along with their median serving sizes,

consumption frequency, energy and nutrient content, and cost per 100g. Model constraints were based on estimated energy intake and population reference nutrient intakes defined by harmonised average requirements (H-AR). Usual energy and nutrient intakes and the prevalence of adequate micronutrient intake were estimated using the National Cancer Institute method. Optifood Linear Programming tool was then used for FBRs. The girls' mean energy intake was  $2350.8 \pm 66.4$  Kcal. Dietary inadequacies in calcium (99.8%), vitamin B<sub>12</sub> (99.8%), riboflavin (96.2%), vitamin A (91.5%), vitamin C (87.6%), iron (73.7%), folate (49.3%), and zinc (8.5%) were observed. The optimised diets achieved dietary adequacy for protein and most micronutrients, except calcium and vitamin B<sub>12</sub>, besides slightly lower folate and vitamin A for girls aged 10-14 and 15-17 years, respectively. School lunch (3 or 5 servings/week) alone met the H-AR for thiamine, niacin, and vitamin B<sub>6</sub>, but it did not enhance nutrient levels when added to the daily diet. Adding MMB to daily diet ensured dietary adequacy for vitamin C, riboflavin, and iron, with noticeable improvements in calcium besides vitamin A for girls aged 15-17. Integrating regular school lunch three times a week with specialised fortified foods or snacks on the remaining days may be a cost-effective strategy to enhance dietary adequacy for adolescent girls in rural areas.

## **OBESOGENICITY OF PRIVATE SECONDARY SCHOOL ENVIRONMENTS IN THREE URBAN LOCAL GOVERNMENT AREAS IN IBADAN, OYO STATE**

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*Keywords: Adolescent obesity, mapping framework, obesogenic environments, whole school environment*

Poor eating habits, increasing screen time and limited opportunity for school-based physical activity contribute to increasing prevalence of adolescent obesity. Addressing these drivers requires understanding of the existing conditions to promote necessary modifications in the school environments. This study assessed obesogenicity of private secondary school environments across three urban Local Government Areas (LGAs) of Ibadan, Nigeria. This cross-sectional study involved total sampling of 101 registered private secondary schools in Ibadan North, Ibadan North-West and Ibadan South-East LGAs. Data were collected using

interviewer-administered semi-structured questionnaire. Using Analysis Grid for Environments Linked to Obesity framework and Oyo state Ministry of Education Observational checklist for private secondary schools' approval, compliance to a 56-items school environment mapping framework was assessed across four domains: physical (25), economic (9), political (8) and sociocultural environments (12). Compliance levels across LGAs were determined using Kruskal-Wallis test and considered satisfactory at 60%. Respondents' mean age was 45.7±6.0 years, 92.1% had more than 11 years working experience, 67.3% had M.Sc. degree and 86.2% were either Principals or Vice Principals. Compliance to the physical (35.3%, 28.6%, 36.0%); economic (29.1%, 36.1%, 34.7%); political (33.3%, 31.8% and 34.9%); and sociocultural domains (33.3%, 33.2%, 33.5%) among private secondary schools was entirely unsatisfactory and varies across Ibadan North, Ibadan South-East and Ibadan North-West LGAs, respectively. Identified barriers to promotion of healthy eating and physical activity were majorly economic constraints, inadequate funding/resources, parental financial constraint and negligence, lack of parental support and compliance, and limited space. The school food environment across private secondary schools in Ibadan is largely unsatisfactory to promote health and prevent obesity among in-school adolescents. Implementation of multifaceted regulations to foster healthy dietary practices and create enabling environment with adequate space for regular physical activity is recommended.

## **DEVELOPMENT AND IMPLEMENTATION OF A QUALITY ASSURANCE FRAMEWORK ON SCHOOL HEALTH AND NUTRITION IN AFRICA: PRELIMINARY FINDINGS FROM STAKEHOLDER ENGAGEMENTS ON BARRIERS TO IMPLEMENTATION**

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*Keywords: Africa, Nutrition Stakeholders, Quality Assurance Framework, School Feeding, School Health Nutrition*

A quality assurance framework for monitoring the quality of school feeding programs and the nutrition of school-age children and adolescents is essential to ensure that these initiatives effectively meet their intended goals. This qualitative study was part of a large cross-sectional mixed methods survey aimed at assessing African countries' readiness to facilitate the development and implementation of a quality assurance framework (QAF) on School Health Nutrition (SHN). The quantitative findings have been reported elsewhere. 67 health and nutrition professionals and researchers working on SHN across Africa, from 19 countries, completed an online semi-structured questionnaire between September 2021 and March 2022. Completed qualitative data were extracted from the questionnaire and analyzed using a thematic analysis approach. The process involved, coding and categorizing the data, followed by identification of key themes. About half (50.7%) of the respondents were females. Health and nutrition professionals generally agreed that a QAF for SHN is needed in Africa and that such a framework would help address the problem of poor-quality data. The main barriers, identified by participants, that are likely to impact the implementation of the QAF include the absence of specific school feeding policies to guide implementation, lack of robust monitoring and evaluation systems and structures, inadequate capacity and skills of teachers or school managers involved in school feeding delivery, administrative bottlenecks, inadequate government funding for SHN including School Feeding Program (SFPs), the non-involvement of nutritionist in the implementation of SFPs, and the lack of appropriate age-specific indicators for assessing the nutrition of school-age children and adolescents. The study has identified the key barriers that should be considered and addressed to ensure the effective operationalization of a QAF for SHN in the African context. Further studies could explore the readiness of countries to use a QAF for the SHN in Africa.

## **ADDRESSING HUNGER AND FOOD INSECURITY IN THE COVID-19 PANDEMIC AND RECOVERY: USING FUZZY COGNITIVE MAPPING IN RURAL BAUCHI STATE, NIGERIA**

*by Mona Ziba Ghadirian / Ivan Sarmiento / Yagana Gidado / Hadiza Mudi / Anne Cockcroft / McGill University / McGill University / Federation of Muslim Women Associations in Nigeria / Federation of Muslim Women Associations in Nigeria / McGill University*

*Keywords: Covid-19 pandemic, Food insecurity, fuzzy cognitive mapping, participatory research, rural Nigeria*

The COVID-19 pandemic and the subsequent economic crisis continue to have profound indirect effects, particularly among rural populations. This participatory research study aimed to understand the factors that worsened the COVID-19 pandemic from the viewpoint of community members in rural northern Nigeria. In Bauchi State, Nigeria, we supported community members to create fuzzy cognitive maps to depict their perceptions of the factors that made the COVID-19 pandemic difficult for them. In 2023, stakeholder in small groups of four participants created 96 maps. Stakeholder groups included: men and women of different ages in peri-urban, rural, and remote communities; service providers, local government officers, and individuals with disabilities. Participants identified factors that worsened their experience of the pandemic. They used arrows to show perceived causal relationships and assigned weights for the perceived strength of each relationship. The local research team grouped 158 reported factors into 25 thematic categories and used transitive closure to calculate the net influence of each category. The five most influential categories contributing to a negative experience of the pandemic were hunger and lack of food, loss of businesses/jobs, household conflicts, lockdown, and stress and mental health problems. Deaths from COVID did not feature on the maps. There were some differences between stakeholder groups, but hunger and food insecurity was the most influential category for all stakeholders. Influences increasing hunger were loss of businesses and jobs and lockdown measures and hunger contributed to stress and household conflicts. Hunger and lack of food was the most important impact of the pandemic identified by community members in Bauchi. The study highlights hunger and lack of food in rural Nigeria and the need to address food insecurity in COVID-19 recovery strategies. Further research should explore the implications of the pandemic for food environments in rural Nigeria.

## **INVESTIGATING THE USE OF PLASTICS BY FOOD SERVICE PROVIDERS ON THE KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, (KNUST) CAMPUS**

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*Keywords: Food service providers, KNUST, Single-use plastics, Sustainability*

Single-use plastics (SUPs) in food services contribute significantly to environmental pollution and pose potential health risks. This study investigates plastic use among food service providers on the Kwame Nkrumah University of Science and Technology, (KNUST) campus, aiming to assess usage patterns, awareness, and attitudes towards SUPs, and propose sustainable policies. Two surveys were conducted: one for food service providers (n=80) and another for consumers (n=130). Questions covered types and frequency of plastic use, awareness of environmental and health impacts, attitudes towards plastic reduction, and preferences for sustainability initiatives. Descriptive analysis was performed on the survey responses. The study revealed that 97.5% of vendors use plastic wraps, 85% use food containers, and 61.3% use plastic cutlery, with 86.3% using plastic for hot foods/drinks 5-7 days/week. All vendors were aware of environmental impacts, but only 46.3% knew of health impacts. 58.8% of vendors agreed to reduce plastic use, while 69.2% of consumers strongly supported reduction. Education campaigns (70% vendors, 78.5% consumers) and promotion of reusable alternatives (47.5% vendors, 71.5% consumers) were the most supported initiatives. A gap exists between consumer willingness to choose sustainable options (80%) and vendor willingness to adopt them (62.5%). High plastic use among food service providers on KNUST campus presents significant environmental challenges. While awareness of environmental impacts is high, knowledge of health risks is lower, especially among vendors. There's a discrepancy between awareness and action, particularly for vendors. Effective policies should address practical concerns of vendors while leveraging consumer demand for sustainable options. Multi-faceted approaches combining education, promotion of alternatives, and gradual regulation are recommended.

## **INTEGRATING NUTRITION IN FARMER FIELD SCHOOLS (FFS)**

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*Keywords: Farmer field schools, Food Systems, Minimum Dietary Diversity, Nutrition*

The challenges of food system are compounded by the growing demand for nutritious and diversified foods that are brought about by population growth, increasing income and urbanization. Currently, programmes in Malawi integrate nutrition sensitive agriculture (NSA) in Farmer Field Schools (FFS) to ensure that the current food system is sustainable

and is producing maximum yields for nutrition outcomes. The research reviewed various elements of nutrition components imbedded within FFS on effectiveness and propositions to improve integration. Participatory research approaches were used to gauge and explain on the overall functionality, effectiveness, efficacy, short and long term nutritional benefit's of FFSs. Mixed and cross sectional approaches were used to collect qualitative and quantitative data through household surveys, key informant interviews and gender-disaggregated focus group discussions (FGDs) for FFS members and non FFS members. Participation in FFS is associated with an increase in receiving skills on nutrition related topics, high adoption of nutritional and WASH practices, having a backyard garden, livestock and fruit trees. It was perceived that preservation of food items like vegetables and fruits were intensified to meet households minimum dietary diversity requirements. Common nutrition topics covered in FFS included six food groups, water, hygiene and sanitation, integrated homestead farming and food processing. Some groups incorporated value addition of value chains like juice making from locally available fruits like baobab, making tomato puree and processing honey. However, no significant difference was found in knowledge of causes and effects of malnutrition between FFS and non- FFS participants. Furthermore, participation in FFS did not have a significant effect on food availability at household level rather yields volume, household income (for accessibility) and family size. Integrating nutrition in FFS significantly contribute to attainment of minimum dietary diversity but not nutrition outcome.

## **FOOD ENVIRONMENT, PURCHASE BEHAVIOR AND BARRIERS TO HEALTHY EATING AMONG IN-SCHOOL ADOLESCENTS IN ILE-IFE, OSUN STATE, NIGERIA.**

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*Keywords: , Food environment, adolescents, barriers, healthy eating, purchase behavior*

Nutritional intake during adolescence is crucial for growth, long-term health, and the establishment of lifelong eating habits. The school food environment (FE) plays a significant role in shaping adolescents' diets by determining the foods available to them. This study aimed at assessing the school food environment and its influence on purchase behavior of in-school adolescents. In a mixed-methods study, 390 in-school adolescents were randomly selected from two private and public secondary schools each. A semi-structured interviewer-administered questionnaire was used to collect respondents' information on purchase habits. A focus group discussion was carried out among the adolescents to determine the barriers to healthy eating in the school environment, while an observational checklist was used to assess FE within a 1km radius of the schools. Data was analyzed for descriptive, chi-square, and correlations using SPSS v.26 at  $p < 0.05$ . The mean age of the adolescents was  $13.81 \pm 2.24$  years, mostly females (57.9%), and they had a daily allowance of more than ₦200 (58.2%). Purchases were mostly carried out within the schools' canteen and tuck shops. Commonly purchased foods were rice (65.9%), flavored drinks (57.2%), sodas (50.3%), biscuits (82.6%), and puff-puffs (82.1%). Age was positively correlated with bringing food from home and purchasing different foods ( $p < 0.05$ ). Adolescents attending public schools significantly purchased local dishes at school and from retailers outside the school, compared to adolescents in private schools ( $p < 0.05$ ). Financial constraints, price, poor quality of foods, lack of varieties, and low value for money were some of the barriers to healthy eating identified by the adolescents. The FE checklist identified that the school environment allowed for marketing of unhealthy foods and drinks, and there were fast food restaurants, snack shops, and roadside street food vendors around 1 km. The food environment around schools plays a significant role in the food choices and purchases of in-school adolescents.

## COMPARISON OF NUTRIENT CONTENT OF MEALS SERVED BY TWO SCHOOL FEEDING PROGRAMME (SFP) IN GHANA

*by Rosario Abotiyuure Ayurizeme / University of Ghana*

*Keywords: Dietary Diversity, Food Safety, Ghana, Meal Conditions, Nutrient Composition, School Feeding Programs*

The inception of school feeding programs into Ghanaian schools have over the years played a crucial role in improving child health (hunger and nutrition), educational outcomes, and overall community well-being. While there are studies on the nutrient quality of meals, limited research exists on the conditions under which meals are served and their nutrient content. This study compared the nutrient content and meal conditions of food served in a Government-Sponsored School Feeding Program (GSFP) and Non-Government-Sponsored School Feeding Program (NSFP) in Ghana. Dietary diversity, nutrient composition, and meal conditions in GSFP and NSFP were assessed using direct observation and weighed food records. Independent T-test was used to assess the differences between diet served by GSFP and NSFP. GSFP provided GH¢1.20 per meal whereas NSFP allocated GH¢4.50. The NSFP offered more diverse meals (Dietary Diversity Score (DDS) = 5) than GSFP (DDS = 3.4). There were no significant differences in portion size (165g vs. 141g), energy (274 kcal vs 248 kcal), fat (9.1g vs. 7.7g), iron (1.55mg vs 1.77mg), zinc (1.07mg vs. 0.97mg), folate (76.91µg vs. 97.73µg), and vitamin A (15.494µg vs. 44.603µg) content of NSFP and GSFP meals. NSFP meals generally had higher protein content (8.2g vs. 5.9g) than GSFP. NSFP meals were served with clean utensils in a tidy, enclosed space, with clean running water for hand washing, and prepared in a well-equipped kitchen. Albeit, GSFP meals were prepared in homes of the caterers and served on the open school compound with no clean water for hand washing. The NSFP served higher protein and diverse meals compared to the GSFP. Cleanliness and hygiene were better observed in the NSFP however, both SFPs need improvements to meet nutritional standards and support child health.

## **NUTRITION EDUCATION AND PROMOTION OF SUSTAINABLE ANIMAL PRODUCTION INCREASES INTAKE OF BIOAVAILABLE ZINC AND IRON: A QUASI-EXPERIMENT**

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*Keywords Iron, Malawi, nutrition education, poultry, zinc*

The 2015/2016 Malawi National Micronutrient Survey showed zinc (Zn) deficiency of 60% in children to 69% in adolescent girls (10–14 years), and iron (Fe) deficiency of 1% in men to 22% in children <5 years. Overdependence on plant-based diets, which provide inadequate and poorly bioavailable supplies of Zn and Fe coupled with lack of knowledge are the primary causes of deficiencies. This study aimed to determine the effect of nutrition education (NE) and promotion of sustainable animal production on dietary intake of bioavailable Zn and Fe. A quasi-experiment of 206 pairs of women of reproductive age (WRA) and children 6 to 23 months in households participating in New Castle Disease Programme was conducted in Lilongwe and Dowa districts in central Malawi. The study had two arms: control group (CG) (n=100) and intervention group (IG) (n=106). In the IG, targeted NE that focused on improving consumption of animal source foods (ASFs) to increase intake of bioavailable Zn and Fe were conducted every two weeks for three months. Data were collected twice at baseline and endline using a semi-structured questionnaire. Dietary assessment was done using food frequency questionnaire and multi-pass 24-hour recall. The Difference-in-Differences (DiD) estimator was used to assess the effect of the intervention. Targeted NE significantly increased knowledge of Zn and Fe among caregivers in the IG ( $p<0.001$ ). There was improvement in the consumption frequency of ASFs among caregivers in the IG at endline. NE was associated with increased intake of Zn and bioavailable Zn in both WRA and children ( $p<0.001$ ). However, NE influenced significantly the increase in intake of Fe and bioavailable Fe in children ( $p<0.001$ ) but not among caregivers ( $p=0.855$ ). In a poultry improvement programme, NE can effectively improve knowledge of Zn and Fe and result in increased intake of bioavailable Zn and Fe.

## **HEALTH LITERACY OF CAREGIVERS AND NUTRITIONAL STATUS OF CHILDREN (0-59 MONTHS) AT A CHILDREN'S HOSPITAL IN GHANA**

*by Geoffrey Adebayo Asalu / Bernice Okine daɪn University of Health and Allied Sciences / Princess Marie Louise Children's Hospital*

*Keywords: Health Literacy, caregivers, children ( 0-59 months), nutritional status*

Adequate health literacy (HL) among caregivers is linked to better nutritional status in children under five, especially in low-resource settings. This study assessed the HL of caregivers with children aged 0-59 months and the corresponding nutritional status of these children. This cross-sectional study sampled of 403 caregiver-dyads receiving health services at the Princess Marie Louise Children's Hospital in Accra. The data were collect using a structured questionnaire on kobo-collect and an adapted Food Nutrition Literacy (FNLIT) scale was used to assess the health literacy of caregivers. Additionally, MUAC was employed to determine the nutritional status of the children. The study data was refined and analyzed with STATA version 16.0. Out of 403 participants, 43.2% of caregiver-child dyads were aged 21-30 years. Majority of the children (83%) had adequate nutritional status. The study found that only 41.9% of mothers and caregivers possessed adequate HL. Factors such as educational level, age of the child in months, and parity of caregivers were statistically associated with adequate HL levels. Despite the study indicating that a significant proportion of caregivers possess inadequate health literacy, the majority of children exhibited normal nutritional status. This suggests that public health services, including child welfare clinics, are effectively mitigating malnutrition in children. However, there remains a pressing need to improve the health literacy levels of caregivers in Ghana.

## **ANALYSIS OF SCHOOL HEALTH AND NUTRITION LANDSCAPE IN AFRICA: REGIONAL SURVEY OF SELECTED AFRICAN COUNTRIES**

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*Keywords: Africa, School Feeding, School Feeding Environment, School Health Nutrition*

Understanding Africa's school health and nutrition (SHN) environment is important for targeted school feeding interventions for improved nutritional well-being of school-age children and adolescents. This study presents preliminary findings from a regional survey of school feeding programmes (SFP) implementation in some selected African countries. We conducted a cross-sectional, web-based, regional survey online between September 2021 and March 2022. Overall, 67 health and nutrition experts from 19 countries were recruited through network mapping. Data collection focused on guidelines for SFP implementation, legal frameworks, regulations, monitoring and evaluation (M&E) of school meal delivery, and the school food and health environment. The data were analysed descriptively using IBM SPSS version 22. Of the 67 respondents, 50.7% were females. Participants' ages ranged from 25-65 years, of which 37.3% were academics, 34.3% nutritionists, 6% dietitians and 7.5% researchers. A significant proportion (95.5%) of African countries provide school meals through national SFP to children and adolescents between 2 and 20 years old. For most countries, food items for SFP were sourced through administrative (34.3%) and central levels (7.5%). The results show that 54% of African countries operate SFP all year round, and for most countries, SFP is hosted by the Education ministries (53.9%), Gender and Social Protection ministries (26.9%), multidisciplinary ministries (7.5%) and the health ministries (1.5%). Seven countries (37.3%) have Food-Based Dietary Guidelines, and 17.9% use them to guide SFP implementation. Only 40% of African countries have M&E systems for tracking school meal delivery. Only 16% of school pupils from the selected countries have access to safe drinking water and 20% have access to basic handwashing facilities. The findings contribute to our understanding of Africa's SFP delivery in Africa. However, further robust research is needed to effectively analyse the school food landscape and capacity to deliver school meal programmes on the continent.

## **NUTRITIONAL QUALITY AND DIETARY DIVERSITY IN GHANA'S SCHOOL FEEDING PROGRAMME: REGIONAL DATA AND CATERER INTERVIEWS**

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Since 2005, the Ghana School Feeding Programme (GSFP) provides public primary school pupils a free daily meal. Meals are planned to provide 30% of recommended dietary allowance for children (6-12y). This study assesses the nutritional quality and diversity of GSFP meals planned, alongside caterer interviews to explore implementation. A multistage sampling approach selected 129 GSFP schools in six districts of the Greater Accra Region. GSFP district menus were analysed alongside individual caterer interviews. Nutritional quality was evaluated based on nutrient profiling methods: energy density (low<125kcal/100g;medium 125-225kcal/100g;high>225kcal/100g) and nutrient density (low<5%;medium 5-10%;high>10%). Meal diversity was assessed by a simple 5-food group count: cereals, pulses/nuts/seeds, vegetables, fruits, animal-source food. Caterers' views on programme facilitators and barriers were also explored. Planned menus included 14-20 weekly options, composed of eight minimally processed traditional dishes. Energy density was varied (low, n=2; medium, n=2; high, n=4), but all meals, except white rice, had a high nutrient density/100g. Most meals were based on a starchy staple, with one additional food group, such as pulses/nuts/seeds included. Fruit was never reported. Caterers deviated from planned menus: 11.7% served alternative meals, with some including animal-sourced food (17%) and 39.4% repeated meals during the week, often based on starchy staples, influencing overall nutritional quality. Most caterers reported barriers (e.g., food item cost) and facilitators (e.g., food safety training) to providing school meals. While the planned menus comprise minimally processed local dishes, there are notable gaps in meal diversity and compliance as reflected in the served meals. On-the-ground realities, such as food price, high



inflation, and delayed payments, need to be considered, alongside programme monitoring to achieve GSFP nutritional objectives. Upwardly adjusting the current meal allocation of 1.2 cedis (0.22USD) per child/day) could enhance access to affordable and nutritious school meals.

## **THE EDIBLE INSECTS OF TANZANIA; LEVERAGING ON TRADITIONAL FOOD SYSTEMS**

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*Keywords: Edible Insects, Innovation, Nutrition, Senene, Stunting, Tanzania, Technology*

Traditional complementary foods in most sub-Saharan African countries are deficient in protein, essential minerals and vitamins resulting to sub-optimal growth and increased premature deaths among children below five years of age. This calls for action to develop home based enrichment of traditional complementary foods through advances in available low cost animal protein like edible insects. Longhorn grasshopper (*Ruspolia differens*) commonly known as *senene* in Tanzania is among most consumed edible insects by societies around Lake Victoria crescent. This study was aimed at developing a nutritious, shelf stable and acceptable complementary food from soybean, sweet potatoes and longhorn grasshoppers *Senene*-based complementary flour product was formulated from germinated, dried, roasted soybeans flour mixed with toasted *senene* and sweet potatoes flour at different ratios. The ratios focused on meeting the RDA for the age group of 6-23 months. The formulations were: Complementary Flour 1(CF1) with 25% *senene*: 35% soybeans: 40% sweet potato, Complementary Flour 2 (CF2) with 20% *senene*: 40% soybeans: 40% sweet potato and Complementary Flour 3 (CF3) with 15% *senene*: 35% soybeans: 50% sweet potato. Proximate composition, minerals (calcium, iron and zinc), vitamin A, phytic acid (PA) analyses and microbial analysis were done using standard methods. Data analysis was done

using SPSS for interviews and R Commander Software. All three formulations had nutrients and energy levels superior to commonly used flour from the market and contained ideal composition, meeting Codex standards and above World Health Organisation (WHO) recommendations for complementary foods( $p<0.05$ ). Flour samples were free from *E. coli* and *Salmonella* spp. contamination as required by Codex and East African standards (EAS). All flours were shelf stable for five months. Exploitation of *senene* as a source of nutrients for complementary food formulation will be useful for the resource-poor farmers.

## **ADOPTION OF VITAMIN A BIOFORTIFIED CASSAVA AND PRODUCTS AMONG END USERS IN SELECTED LGAs IN IBADAN, NIGERIA**

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*Keywords: Adoption, Awareness, Biofortified cassava, Knowledge, Provitamin A*

Agricultural transformation is key to ensuring food security. Despite increasing access to sufficient food for all, vitamin A deficiency (VAD) remains a significant public health problem in developing countries. Biofortified cassava, enriched with provitamin A, offers a potential solution and an evidence-based strategy in addressing VAD. This study aimed at assessing awareness, knowledge and readiness of end-users in selected Local Government areas (LGAs) in Ibadan, Nigeria, to adopt and utilize biofortified cassava and its products. A semi-structured interviewer-administered questionnaire was used to assess socio-demographic characteristics, awareness, knowledge, and readiness to adopt biofortified cassava and its products among respondents in selected LGAs. The respondents were end-users (farmers, consumers, processors) and vendors of both regular and biofortified cassava, plus their products. Data were analyzed using IBM SPSS version 27 for frequency, percentage and Pearson's chi-square association of variables at  $p<0.05$ . About 25.1% of respondents were between 50-59 years, 52.8% had tertiary education, 59% were females while 74.2% were Christians. About 33.1% were consumers, majority processed, sold, or consumed *garri* made from biofortified cassava. Only 36.8% of respondents have high level of awareness, 23.6% have good knowledge and 53.7% have good level of readiness to adopt biofortified cassava

and its products which was higher among respondents with greater awareness and knowledge, indicating a positive correlation between these factors. Conclusively, respondents had good readiness for adoption with a significant difference in the level of awareness and knowledge. However, there is a need for enhanced educational campaigns to increase awareness and knowledge of Vitamin A biofortified cassava which can improve the readiness of end users to adopt these biofortified products, thereby reducing VAD prevalence in the region. Policymakers and stakeholders should focus on targeted interventions to promote the benefits and use of biofortified cassava to improve public health outcomes in Nigeria.

## **EFFECT OF TEFF (ERAGROSTIS TEFF) FLOUR PARTICLE SIZE AND DOUGH KNEADING TIME ON THE QUALITY ATTRIBUTES OF INJERA**

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*Keywords: Dough, Injera quality, Kneading time, Particle size, Teff flour, phytochemicals, sensory quality*

Injera is a sourdough traditional flatbread that is staple in Ethiopian cuisine. The quality issues of injera are typically caused by inadequate process parameters. This research was aimed to investigate the effect of flour particle size and dough kneading time on the quality of injera. The experiment was conducted in factorial design arranged in completely randomized design (n=3). The flour particle sizes (fine (0-180µm), medium (181-355µm), coarse (356-500µm) and whole flour commonly used by the community as control and dough kneading time (4, 8 and 12 minutes) with constant and moderate kneading speed of #K2 (164rpm) are considered. The physicochemical, microbial and sensory qualities of injera samples were determined using standard methods. The results showed that flour particle size and dough kneading time had a significant effect ( $p<0.05$ ) on injera quality parameters. Accordingly moisture, protein, fat, fiber, ash, carbohydrate content and total energy of all treatment samples ranges from 5.90-6.45%, 10.32-12.82%, 1.18-1.73%, 2.01-3.37%, 2.40-2.73% 73.68-77.66% and 356.81-364.25%, respectively. Significantly higher contents of phytochemicals and minerals were perceived on coarse flour particle size injera than fine due to the presence of higher concentration of outer layers in coarse flour. The highest bacterial load of injera was detected in samples of fine flour kneaded for 12 minutes on day five of storage with a value of 4.54log cfu/g. Injera samples had yeast/mold load that ranges from 1.77 to 5.08log cfu/g from day one to day five storage. The highest overall acceptability of injera was formulated from fine flour

particle size at 12 minute dough kneading time. In general, fine flour particle size for 12 minute dough kneading time resulted in most consistent injera quality.

## **NUTRITIONAL CHARACTERISTICS OF AN ETHIOPIAN TRADITIONALLY FERMENTED DATTA/ QOCHQOCHA IN ETHIOPIA, 2023**

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*Keywords: Ethiopia, Keywords: Antioxidant, Micronutrients, Traditionally fermented, Datta/Qochqocha*

Datta/Qochqocha/ is among naturally fermented Ethiopian cultural diets (spices). It has been claimed to have an appetizer effect and to treat some diseases. Besides, the ingredients of datta/qochqocha are good sources of immune boosting, anti-inflammatory, and antioxidant micronutrients. However, the Antioxidant properties, percent of inhibition, and immune-boosting potential of Ethiopian data/qochqocha are not yet characterized. A snowball technique was used in 2023 to choose 47 study sample sources, from which 250gm of traditionally fermented datta/qochqocha were collected. Solid-phase extraction was carried out using distilled water, ethanol, and methanol as needed. A flame atomic absorption spectrometer (AAS) was used to examine the concentrations of zinc, manganese, and magnesium of datta/qochqocha using zinc, manganese, and magnesium AAS standard solution respectively. Whereas, the concentration of vitamin A, Vitamin D, and Vitamin E were analyzed using HPLC Agilent1260. The lambda 950 UV/VIS/NIR Spectrometer was used to determine the concentrations of phenol and flavonoid by Folin Ciocalteu colorimetric and aluminum chloride colorimetric assays using gallic acid and quercetin as standards respectively. While free radical scavenging DPPH assay was used to determine the antioxidant capacity of datta/qochqoch using ascorbic acid as standard. This study found 100gm of extracted traditionally fermented Datta/Qochqocha contain 0.0042mg of vitamin D, 5.72mg of vitamin A, 16.11mg of Vitamin E, 6.65mg of Magnesium, 9.25mg of Manganese, and 1.55mg of Zinc. The average concentration of phenol and Flavonoid was  $47.36 \pm 21.52$  GAE mg and  $116.75 \pm 52.54$  QUEmg per 100g of extract of datta/qochqocha respectively. The average percentage of inhibition of traditionally fermented datta/qochqocha is  $40.67\% \pm 10.01\%$ . The IC<sub>50</sub> value of datta/qochqocha was identified to be lower than 10µg/ml. Traditionally fermented Datta/Qochqocha has strong Radical Scavenging Activity. It is a good source of micronutrients that have anti-inflammatory,

antioxidant, and immunity-boosting effects.

## **PREVAILING RISK OF SELENIUM DEFICIENCY AND COST- EFFECTIVENESS OF SELENIUM AGRONOMIC BIOFORTIFICATION OF STAPLE CEREALS IN ETHIOPIA**

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*Keywords: cost-effectiveness; DALY; selenium; selenium agronomic biofortification; Ethiopia*

Selenium (Se) deficiency among populations in Ethiopia is consistent with low concentrations of Se in soil and crops that could be addressed partly by Se-enriched fertilizers. This study examines the disease burden of Se deficiency in Ethiopia and evaluates the cost-effectiveness of Se agronomic biofortification. A disability-adjusted life years (DALYs) framework was used, considering goiter, anemia, and cognitive dysfunction among children and women. The potential efficiency of Se agronomic biofortification was calculated from baseline crop composition and response to Se fertilizers based on an application of  $10 \text{ g ha}^{-1}$  Se fertilizer under optimistic and pessimistic scenarios. The calculated cost per DALY was compared against gross domestic product (GDP; below 1-3 of national GDP) to consider as a cost-effective intervention. The existing national food basket supplies a total of  $28.2 \mu\text{g}$  of Se for adults and  $11.3 \mu\text{g}$  of Se for children, where the risk of inadequate dietary Se reaches 99.1%–100%. Cereals account for 61% of the dietary Se supply. Human Se deficiency contributes to 0.164 million DALYs among children and women. Hence, 52%, 43%, and 5% of the DALYs lost are attributed to anemia, goiter, and cognitive dysfunction, respectively. Application of Se fertilizers to soils could avert an estimated 21.2–67.1%, 26.6–67.5%, and 19.9–66.1% of DALYs via maize, teff, and wheat at a cost of US\$129.6–226.0, US\$149.6–209.1, and US\$99.3–181.6, respectively. Soil Se fertilization of cereals could therefore be a cost-effective strategy to help alleviate Se deficiency in Ethiopia, with precedents in Finland.

## NUTRITIONAL, ANTINUTRITIONAL AND SENSORY CHARACTERISTICS OF INSECT LARVAE FLOUR ENRICHED PUFF-PUFF

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**Keywords:** *Cirina forda*, Edible insects, Puff-puff, Snacks, Young adults

Snack intake is high among young adults and substantially contributes to their energy intake but is nutrient poor. Due to budgetary and lifestyle constraints, young adults are nutritionally vulnerable; hence, there is need to enrich existing snacks. Studies have focused on improvement of nutrient content of cakes, cookies, biscuits, and crackers using plant sources, however, few studies have investigated the enrichment of puff-puff. Edible insects are nutrient dense and safe for consumption; therefore, this study was designed to develop and determine the nutrient, antinutrient content, and acceptability of insect-larva enriched puff-puff. Pastry ingredients were purchased from Bodija market in Ibadan. Three samples were prepared (100:0 (control), 95:5 and 90:10 of wheat flour to *Cirina forda* powder) using standardized recipe verified by experienced bakers in the Dietetics kitchen of Department of Human Nutrition and Dietetics, University of Ibadan, Nigeria. Proximate, minerals, vitamins and antinutrient contents of the samples were analyzed using AOAC (2005), flame photometry, atomic absorption spectrophotometry, and spectrophotometric methods, respectively. Sensory evaluation was conducted on 9-point hedonic scale using 30 semi-trained panelists among undergraduates at University of Ibadan. Results were compared using ANOVA at  $p < 0.05$ . Samples 90:10(7.83%) and 95:5(7.33%) had higher protein content compared to control(1.93%) ( $p < 0.05$ ). The control had highest fat content(19.25%). Sample 90:10 provided 110mg, 2.19mg, 1.75mg, 22.15 $\mu$ g; sample 95:5 provided 100mg, 2.09mg, 1.65mg, 21.04 $\mu$ g; while sample 100:0 provided 60mg, 1.66mg, 1.34mg, 16.53 $\mu$ g of calcium, iron, zinc and vitamin A, respectively. Antinutrient values were negligible. Sample 100:0 had highest sensory scores while Sample 90:10 scored lowest. Sample 95:5 had favourable scores: colour(5.43), taste(5.67), aroma(5.70), mouthfeel(6.13) and overall acceptability(5.80). Inclusion of *Cirina forda* powder into puff-puff at 5% level produced a nutritious snack accepted by young adults, hence, increased awareness needs to be created on the use of edible insects in improving nutrient content of snacks.

## **EATING OUT OF HOME INCREASES BOTH THE ODDS OF ACHIEVING DIETARY GUIDELINES AND NON- COMMUNICABLE DISEASE RISK SCORE AMONG WOMEN IN LAGOS, NIGERIA**

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*Keywords: Diet quality, eating out of home, food environment, food systems transformation*

Consumer food behaviour and choices about where and what foods to acquire, critically links food environments and diets. Given the importance of healthy diets for optimal nutrition and health outcomes, understanding factors that influence dietary intake is necessary. This study assessed the relationship between eating out of home (an important food choice behaviour) and diets among women of reproductive age in Lagos, Nigeria. The study used mixed methods, cross-sectional design. Survey data was collected from 1,107 women selected using stratified cluster sampling. Eating out was defined as purchasing already cooked meals at least once in seven days preceding the survey. Diets were assessed using standardized diet quality questionnaire. Consumption of all five recommended food groups in dietary guidelines and non-communicable diseases risk (NCD- risk) score (0–9) were assessed. Qualitative data was collected through in-depth interviews with 30 of the women. Survey data were analysed using descriptive statistics and logistic regression at  $\alpha 0.05$  in Stata 18.0, while qualitative data was analysed thematically. Mean age of the women was  $31.91 \pm 9.52$  years and 81.6% had secondary/tertiary education. Eating out prevalence was 63.0%, 11.7% of the women achieved dietary guidelines, and average NCD-risk score was 1.5. The least consumed recommended food groups were fruits (30.2%) and legumes/nuts/seeds (42.3%). The most consumed NCD-risk food groups were unprocessed red meat (45.3%), soft drinks (36.9%), and baked sweet foods (27.8%). Eating out of home increased the adjusted odds of achieving dietary guidelines by 2.1 times ( $p=0.001$ ). NCD-risk score also increased when women ate out ( $\beta=0.50$ ,  $p<0.001$ ). Women's reasons for eating out of home included convenience, time constraints, and limited finances (cooking required higher upfront payments). Eating out of home is pervasive among women in Lagos. There is need to increase



healthy food choices in food environments and educate women about benefits of consuming healthier diets.

## **NUTRITION-SENSITIVE CHILD-OWNED POULTRY INTERVENTION IMPROVED HEALTH, NUTRITION AND GROWTH OF INFANTS AND YOUNG CHILDREN IN SOUTHERN ETHIOPIA: A CLUSTER-RANDOMIZED COMMUNITY TRIAL**

*by Anteneh Omer / Dejene Hailu / Susan J. Whiting / Nutrition and food systems consultant / Hawassa University / University of Saskatchewan*

*Keywords: Egg, anemia, motor skill, poultry, underweight*

Cereal-based diets with very low animal-source foods (ASF) intake contribute to malnutrition among under-two Ethiopian children. We hypothesized a nutrition-sensitive child-owned poultry intervention would increase egg intake and improve health, nutritional and developmental status of young children. Targeting 6-18 months-old-children, a community trial was conducted in Halaba district from May-Nov 2018. Intervention children (N=127) received two hens with caging materials in a cultural ceremony where religious and community leaders declared children's chicken ownership. Parents promised to present at least two hens, replace if birds died and not sell/share the eggs; rather feed the chicken-owning child an egg daily. Community workers promoted egg feeding and proper poultry husbandry including cage utilization and environmental sanitation. Controls (N=126) received the existing nutrition-agriculture training. At baseline, groups were comparable in socioeconomic, nutrition, growth and anemia status. The intervention increased weekly mean eggs [SD] intake (4.85 [2.41] vs 0.4 [0.61]) (b=2.20; 95% CI= 1.97-2.43). Weight-for-age and weight-for-height z-scores increased by 0.38 (95% CI= 0.13-0.63) and 0.43 (95% CI= 0.21-0.64) respectively. Underweight (Odds ratio [OR]= 0.46; 95% CI= 0.26-0.84) and stunting (OR = 0.58; 95% CI= 0.37-0.91) decreased among intervention children compared to controls. Hemoglobin increased by 0.52 g/dl (95%CI=0.26-0.77). The odds of anemia and concurrent anemia and stunting decreased by 64% (OR= 0.36; 95% CI = 0.24-0.54) and 57% (OR = 0.43; 95% CI= 0.23-0.80) respectively. Intervention children attained motor skills of running (Adjusted hazard ratio[AHR]=1.43; 95% CI= 1.05–1.95), kicking a ball (AHR=1.39; 95% CI= 1.04–1.87) and throwing a ball (AHR=1.37; 95% CI= 1.01–1.86) earlier than controls. We recommend integration of this model with existing malnutrition prevention interventions, particularly in settings where ASF intake is low

and undernutrition is high.

## **THE DESIGN AND DEVELOPMENT OF A CULTURALLY APPROPRIATE DIET AND FITNESS APPLICATION TO PROMOTE NUTRITIONAL HEALTH.**

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*Keywords: Diet and Fitness Application, health, mHealth, physical activity, Nutrition*

Physical inactivity, poor eating habits and lifestyle are major contributors to morbidity and early death through emerging noncommunicable diseases (NCDs) in developing countries. The surge in NCDs such as diabetes and obesity in Nigeria is a major public health concern posing a significant threat to the population. Effective interventions require addressing individual choices related to nutrition and physical activity. Various empirical studies have highlighted the effectiveness of mHealth interventions in addressing health needs, such as behavioural weight loss therapy, with the potential to provide individuals with tools to track dietary intake, monitor physical activity levels, and set personalized goals in making healthier lifestyle choices. This study designed and developed a culturally appropriate diet and fitness application for Nigerian users. The design and development of the application was based on the design science research methodology. One hundred and ten (110) common foods consumed in Southwestern Nigeria were identified, typical portion sizes measured, and their nutrient content calculated to create a food diary for the App. The app's performance and usability were assessed using a questionnaire with System Usability and mHealth App Usability scales (n=117). Dietitian interviews provided qualitative insights on the app's suitability (analyzed with Nvivo). NutriHealthHub application had high acceptability and usability among Nigerian adults, with the majority finding it easy to learn and use, acceptable for tracking dietary intake, and aligned with their nutritional habits. Compared to traditional Total Dietary Assessment methods, significant disparities were observed in energy and protein intake. Dietitians' comments highlighted the app's benefit in monitoring dietary consumption, promoting physical activity and managing health parameters. The application showed promising results in capturing and tracking essential nutrient intake. The App's food database must be expanded to include diverse traditional and regional foods to enhance nutrient intake estimations.

## **PATHWAYS TO STRENGTHEN FOOD DEMONSTRATION IN SELECTED PRIMARY HEALTHCARE CENTRES IN AKINYELE LOCAL GOVERNMENT AREA, IBADAN**

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*Keywords: Food Demonstration, Lactating Mothers, Pregnant women, Primary Healthcare Centre, Qualitative Study*

Food demonstration offers practical knowledge and skills crucial to promote optimal dietary practices for maternal and child health and well-being. The paucity of resources has impacted the frequency and quality of food demonstration sessions in Nigeria's primary health facilities. Understanding the strategies to strengthen these sessions could promote a healthy diet and reduce malnutrition. This study was designed to explore pathways to strengthen food demonstrations in primary health centres (PHC) in Akinyele Local Government Area, Ibadan, Nigeria. This qualitative study involved purposive sampling of four health facilities, 11 health workers, four community leaders and 60 pregnant/lactating women. Using focus group discussions for pregnant/lactating women, and in-depth interviews with health workers and community leaders, perspectives, barriers and opportunities to strengthen food demonstration in PHCs were explored using the structured guide. Interviews were recorded, translated, transcribed verbatim and analyzed thematically to identify patterns and insights. Seventy-five participants were sampled in three IDIs, six FGDs, and 12 KIIs. Identified barriers to effective food demonstration sessions in sampled PHCs include inadequate funding/financial limitations, insufficient infrastructure, high cost of food items, lack of collaboration and partnership with multiple sponsors, and lack of awareness and involvement of local stakeholders. Existing opportunities include mothers' willingness to participate in the programme, inclusion of food demonstration funding in the basic health care provision fund, availabilities of some partners and availability of manuals/recipe books in the state. Possible strategies to strengthen food demonstration include involvement of community leaders, complementing food demonstration with home gardening and animal rearing, creation of nutrition units in

PHCs, intensified awareness creation, instituting regular capacity building schemes, and increased commitment of governmental and non-governmental Organizations. Efforts to improve food demonstration sessions include intensified awareness creation, advocacy and community involvement, institute capacity-building schemes, creation of a nutrition unit, and adequate resource allocation.

## **FOOD SYSTEMS MONITORING IN NIGERIA PROVIDES AN OPPORTUNITY TO IMPROVE ALIGNMENT BETWEEN NUTRITION INFORMATION NEEDS AND DATA AVAILABILITY**

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*Keywords: Nutrition, data, food systems, information systems, dashboards*

Since the 2021 United Nations Food Systems Summit, several food systems and nutrition-related monitoring tools have been developed in addition to existing frameworks. Yet, it is not clear that the data needs of decision makers are being met. This study assessed multisectoral information needs and availability for food and nutrition decision making in Nigeria. Information needs were assessed using content analysis of 12 national policies/strategies developed by food systems and nutrition-related sectors. Documents were coded in Dedoose 9.2.12, and included food and nutrition indicators were extracted. Data availability was assessed by examining indicators in food systems and nutrition monitoring tools, such as the Nigeria Subnational Food Systems Dashboard, Federal Ministry of Budget and Economic Planning Performance Management System, National Nutrition Dashboard prototype, and Nigeria Governors' Forum Scorecard. Information needs and data available were compared to determine gaps in data availability and frequency of data collection/reporting. Six policies had explicit objectives and indicators related to food systems and nutrition. Data sources intended to track many indicators across the policies/strategies

were limited. Examined monitoring tools addressed key food systems' components, determinants of nutrition, and nutrition enabling environments. While some indicators across tools overlapped, each tool had unique indicators reflecting their distinct purpose/use. Inadequate overlap between indicators in monitoring tools and those in policies/strategies imply limited opportunities for the tools to be used for tracking progress in achieving national policy objectives. There is need to improve coherence between food systems and nutrition monitoring tools in Nigeria and national multisectoral policies/strategies. The current focus on strengthening food systems monitoring can be harnessed to achieve this coherence through stakeholder consultations to better understand data required by decision makers to act and track outputs/outcomes; and a multisector data coordination framework that harmonizes indicators for reporting, monitoring and evaluating progress.

## **FOOD SAFETY PRACTICES AND HYGIENE OF FOOD HANDLERS AND VENDORS IN SELECTED HEALTH INSTITUTIONS IN IBADAN, SOUTH WEST, NIGERIA**

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*Keywords: Dietetic kitchen, Food handlers, Food safety, Food vendors, Health institutions*

Consumption of unsafe food resulting to significant health issues has been a public health challenge. Patients on recovery are at high risk of foodborne disease from consuming contaminated foods bought by relatives from available vendors around the health institution environment. This study assessed safety practices of food handlers in dietetic kitchens and vendors around selected health institutions in Ibadan, Nigeria. A cross-sectional study was conducted among 333 food handlers in dietetic kitchens and vendors around selected health institutions using self-administered questionnaire to assess social-demographic characteristics, food and personal hygiene, food safety and environmental sanitation practices of respondents. Data was analyzed using IBM SPSS version 20 and chi-square test for association of variables at  $p < 0.05$ . About 37.5% and 62.5% of the respondents handles food in tertiary and secondary health institutions respectively with only 11.7% from dietetic

kitchens. Majority (65.2%) were females, 30.9% and 50.5% have secondary and tertiary education respectively with 8.4% having no formal education. About 42.9% have spent <5 years in food business, 30%, 26.1%, 15.9% and 14.4% are business owners, cooks, servers and sales representatives respectively. Majority (63.4%), (75.4%) and (87.4%) had good food and personal hygiene, food safety and environmental practices. Association exist between respondents' role, education and chewing/talking while cooking/serving ( $p=0.030$ ,  $0.000$ ), washing and sanitizing knife after chopping raw meat/food ( $p=0.028$ ,  $0.000$ ), reuse of oil ( $p=0.000$ ,  $0.000$ ) respectively, in addition to education and washing hands before and after touching unwrapped raw foods ( $p=0.003$ ). The food handlers had good food hygiene, safety and environmental sanitation practices. However, some of the food safety practices are unhealthy and can be detrimental to patients' health recovery. Government should ensure health institutions have standard dietetic kitchen with regularly trained, fitness-screened food handlers.

## **LOCALLY AVAILABLE FOOD CROPS TO IMPROVE NUTRIENTS IN COMPLEMENTARY FOOD PRODUCTS**

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*Keywords: Food security, Infants, Local crops, Nutrition, Value addition*

Infancy and childhood are characterized by rapid growth and significant developmental milestones. Nutrition during this period plays crucial roles in growth, cognition, and vision, which are largely linked to the intake of dietary essential fatty acids and carotenoids. The study aimed to identify local crops that could be transformed into nutrient-rich complementary food products for children in the Savelugu municipality, specifically targeting essential fatty acids and carotenoids and also assessed the communities' readiness for such innovations. A qualitative study was conducted across three communities in the Savelugu municipality of Northern Ghana: Mogla, Pong-Tamale, and Bunglung. Six gender-based focus group discussions and four key informants' interviews were conducted using semi-

structured interview guides. The results indicated the communities' readiness and a strong potential for adopting value-added processing for maize, soybeans, rice, and groundnuts, which are integral to their dietary habits. There is a broad base of possibilities regarding food use and novel product development, as there are no dietary restrictions. “*We eat everything*”, discussants intimated. Respondents indicated organoleptic properties as a major deciding factor in acceptance. The need for convenience was another important element of acceptance. For example, “*We will use the rice, the groundnut and soybeans into winimix for the kids*”, was the response from female discussants. This showed a deep concern for the food needs of their children and emphasized the potential acceptance of novel complementary food products. The respondents further showed a high awareness of the special food needs of children, although there is a limited understanding and know-how to achieve this in novel forms suitable for children's nutritional needs. The dietary significance of these crops and the communities' readiness for novel product development interventions suggest an urgent need for policy directives that provide tailored training on processing techniques to sustain value-addition initiatives.

## **SECURING SUSTAINABLE GOOD NUTRITION IN THE FIRST 1000 DAYS: THE SYNERGY OF LOCALIZATION, SOCIAL BEHAVIOUR CHANGE COMMUNICATION AND MARKETS**

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*Keywords: First 1000 Days, markets, protein and micronutrients powder (PMNP), social behaviour change communication (SBCC), stunting, undernutrition*

The First 1,000 days of life is considered a crucial, nutrition-sensitive developmental stage during which gains in general and cognitive development can be made or irreversibly lost. Consequently, several partnerships are focused on preventing malnutrition during this period. In Ghana, such partnerships resulted in a reduction in stunting from 33% in 1999 to 18% in 2022. From 2009, the Ghana Nutrition Improvement Project (GNIP) was launched to contribute to such efforts. GNIP used an innovative approach to sustainably fight post-weaning undernutrition through: (a) the development of a protein and micronutrient powder (PMNP) based on the local food culture and the World Health Organization recommended intakes for micronutrients, protein and amino acids at 6-24 month; (b) an efficacy study to



verify the impact of the product on undernutrition and stunting; (c) social behaviour-change communication (SBCC) for optimal infant and young child feeding (IYCF) practices; and (d) market-based distribution of the PMNP. The product was shown to supply 35-55% of essential amino acids and 50-150% of the RNI of micronutrients based on WHO total daily requirements and has been accepted by the World Food Programme for their Ghana food basket. The efficacy study showed significantly higher length-for-age Z-scores (LAZ), reduced acute infection, and improved Hb among children fed the product from 6 to 18 months. The SBCC showed that caregivers record more knowledge of optimal IYCF practices than at baseline; children of caregivers who received IYCF information through SBCC were 15% less likely to have anaemia at follow-up; and caregivers recorded a higher purchase of PMNP (81.3% post- intervention vs. 60% at baseline). The findings highlight GNIP as a successful example of sustainable nutrition improvement through a combination of science-based, context-driven nutritious food product development, social behavior change communication (SBCC), and market-based distribution of the product.

## **IMPACT OF PRODUCTIVE SAFETY NET PROGRAM ON HOUSEHOLD FOOD SECURITY IN KENNA DISTRICT, KONSO ZONE, SOUTHERN ETHIOPIA**

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*Keywords: Kenna District, Productive Safety Net Program; Household; Food Security; Propensity Score Matching, logit regression*

Chronic food insecurity is one of the problems, that has affected millions of Ethiopians for centuries. In 2005, to solve this problem, the Ethiopian government, in collaboration with development partners, launched a social protection program called the Productive Safety Net Program. This study evaluated the impact of a productive safety net program on household food security in Kenna District, Konso Zone, Southern Ethiopia. Data was collected from a total of 264 households selected using multi-stage sampling techniques. Propensity score matching (PSM) was used to evaluate the impact of the program on household food security. A Logit model was used to analyze potential covariate variables affecting household participation in the Productive Safety Net Program. The study result indicated participation in the productive safety net program was negatively influenced by livestock holding, credit, and cultivated land size. Whereas, positively influenced by shock experience and agricultural

extension. The Propensity Score Matching (PSM) resulted in matching 125 control households with 130 treated households. In other words, matching comparisons based on outcome variables were performed on these households that shared similar pre-intervention characteristics except for participation in the program. The PSM result shows that, as compared to non-beneficiary households, the program intervention increased the beneficiary households' calorie intake and total income by 14.23 percent (277.31 Kcal per capital /AE/Day) and 33.85 percent (1789.42 ETB), respectively. This study showed that the program has brought significant changes in household calorie intake and total income. Therefore, the development intervention should emphasize the improvement of the program.

## **A REVIEW OF THE IMPACT OF SUGAR-SWEETENED BEVERAGE TAXES ON HEALTH OUTCOMES IN LOW AND MIDDLE-INCOME COUNTRIES: IMPLICATIONS FOR FOOD- RELATED FISCAL POLICIES IN GHANA**

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*Keywords: Health outcomes, SSB taxation, Sugar-sweetened beverages (SSBs), non-communicable diseases (NCDs), policy-related implications*

Sugar-sweetened beverages (SSBs) are a major contributor to non-communicable diseases (NCDs) globally, particularly in low- and middle-income countries (LMICs). Despite decreasing trends in some regions, SSB consumption remains high among vulnerable populations, exacerbating health risks and economic burdens associated with obesity and other diet-related conditions. This review aimed to evaluate the impact of SSB taxation on health outcomes in LMICs and to discuss the implications of these findings for the implementation of food-related fiscal policies in Ghana. A scoping literature search was conducted across multiple databases adhering to the PRISMA guidelines. Studies were

included if they reported on the health impacts of SSB taxation and were conducted in LMIC, focusing on morbidity and mortality from NCDs. The synthesis was narrative, considering the heterogeneity of the studies involved. The review included 18 studies, revealing that SSB taxation has a great potential of reducing SSB consumption, improvements in public health metrics like body mass index, and decreases in NCD prevalence. In various LMICs, increased SSB prices have been correlated with reduced obesity rates, and policy modeling studies suggest similar health benefits. Despite the potential public health benefits, challenges such as industry opposition, cultural factors, and economic concerns remain significant barriers to the adoption of SSB taxes. However, the experiences from different countries highlight the importance of evidence generation, stakeholder engagement, and flexible policy implementation in overcoming these challenges and maximizing the positive impact of SSB taxation on public health. SSB taxation appears to be a viable policy tool for reducing NCDs in LMICs such as Ghana. Effective implementation of these taxes can alleviate the healthcare burden by reducing the prevalence of obesity and related diseases. Nonetheless, success depends on comprehensive strategies that involve all stakeholders and addressing potential barriers such as public resistance and industry opposition.

## **PERCEIVED CLIMATE CHANGE IMPACTS AND AUTONOMOUS ADAPTATION STRATEGIES AMONG FISHERFOLKS ALONG THE LAKE VOLTA REGION, GHANA**

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*Keywords: Climate Adaptation, Climate Change, Coping Skills, Fishing, Ghana, Poverty*

Climate change poses manifold risks to life and is presently a crucial determinant of well-being. Vulnerable populations whose livelihoods are climate-dependent experience greater

effects of climate risk vulnerabilities widening social and health inequities. We assessed the effect of climate vulnerabilities on food security and livelihoods and the coping strategies adopted. This cross-sectional survey comprised 521 randomly selected household heads predominately involved in fishing-related activities on the mainland and island communities of the Ghana Volta Lake basin. Using validated instruments, we measured indices for climate vulnerability and coping strategies as key exposures. Data was thematized per vulnerability intensity and differences were determined descriptively. Predictors for poverty as an outcome was tested using ordinal regression and the adjusted odds ratio (OR) reported at 95% confidence intervals (CI). Overall, 13.2% experienced critical climate vulnerabilities. Stressed (51.1%), crisis (27.8%), and emergency coping methods (19.2%) were adopted in response. Concerning poverty, 53.9% were extremely poor while 3.1% were least poor. Key adaptation measures were fishing in deeper/dangerous areas of the lake (36.1%), migration (31.7%), harvesting immature fish (25.9%), and postharvest storage (24.9%). Independent fishing-related factors associated with experiencing critical climate vulnerabilities were using a motorized canoe (OR:4.13, 95% CI:1.77-9.66), fishing experience (OR:0.94, 95% CI:0.91-0.98), and knowledge on climate mitigation (OR:16.59, 95% CI:7.68-35.86). Poverty was associated with critical climate vulnerability (OR:3.63, 95% CI:1.16-11.30), part-time fishing (OR:4.77, 95% CI:1.03-22.03), towed dredged net (OR: 2.75, 95% CI:1.01-7.49), selling processed fish (OR:2.81, 95% CI:1.05-7.47) and adopting emergency (unhealthy) coping mechanisms (OR:2.81, 95% CI:1.05-7.47). One-fourth of fisherfolks on the Ghana Volta Lake are experiencing extreme to critical climate vulnerabilities leading to unhealthy coping strategies that further exacerbate their poverty levels. In the absence of climate-smart support actions, the fisherfolks are likely to adopt climate-insensitive adaptation measures thus worsening climate change and its impact on livelihoods and poverty levels.

## ENHANCING INCLUSIVE NUTRITION AND FOOD SECURITY IN BURUNDI: A MID-TERM REVIEW OF THE B4MCN PHASE-II PROJECT

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*Keywords: Bio-fortified foods, dietary diversity, gender equality., local value chains, women's empowerment*

In Burundi, over 60% of the population grapples with food insecurity, exacerbated by climatic changes. The Bio-Fortified Value Chains for Improved Maternal and Child Nutrition Phase-II (B4MCN) Project by World Vision addresses these challenges in Muyinga, Karusi, and Kirundo provinces, focusing on improving dietary practices, diversifying income, and boosting bio-fortified food production. The project also promotes gender equality and social inclusion, particularly among Batwa, women and people with disability. A quasi-experimental mixed-methods approach was employed for the mid-term review, with comparisons made to baseline data. Household survey data was collected from a stratified random sample of 1,015 participants, including 765 project beneficiaries, 150 people with disability, and 100 Batwa women. Dietary diversity among women and children aged 6-23 months has increased by 9.5% and 7.6% respectively. Households consuming nutrient-dense foods have risen by 10%. A third of the households reported increased income which is attributed to the sale of agricultural surplus due to the use of improved seeds and best farming techniques. All surveyed beneficiaries (100%) reported growing a variety of nutrient-rich crops, including bio-fortified beans, maize and orange flesh sweet potatoes, compared with 84.0% at baseline. The project has also supported equitable decision-making in both productive and domestic spheres, particularly in female-headed households. The B4MCN Phase-II Project has demonstrated substantial progress in improving nutrition, income, and gender equality in the targeted communities. The project's interventions have led to improved dietary outcomes and increased production of nutrient-dense foods. However, further efforts are needed to enhance equitable decision-making among Batwa communities and people with disability. The insights from the findings validate the project's progress and guide future programming decisions.

## **SUSTAINABLE SOIL FERTILITY IMPROVEMENT FOR HEALTHY CROP PRODUCTION; A PANACEA FOR FOOD SECURITY**

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*Keywords: Chlorophyll, Compost, Inorganic fertilizer, Maize Yield, Nutrient uptake*

Food insecurity can be tackled by boosting agricultural productivity through improved soil fertility. However, conventional farming unlike organic agriculture is not sustainable due to its health and environmental implications. It also promotes ‘hidden hunger’ due to nutrient imbalance. This study compared the effectiveness of compost, compost tea and inorganic fertilizer (NPK) on the growth, yield, micro and macro-nutrients uptake of two varieties of maize (*Zea mays* L.) (SWAN Y-X2 and DTMRY). Compost at different levels (0, 5, 10 and 15 ton/ha), compost tea at (200m<sup>3</sup>/ha, 400m<sup>3</sup>/ha and 600m<sup>3</sup>/ha) and N.P.K (15:15: 15) fertilizer at 0, 100 and 150 kgN/ha were compared in both pot and field experiments. Effective application rates were selected in the pot experiment and tested on the field. Data were collected on growth and yield parameters of maize as well as nutrient uptake, chlorophyll and carotenoid contents and biochemical compositions. Compost application generally increased the concentrations of the essential nutrients in the soil compared to inorganic fertilizer and control treatments. In terms of nutrient uptake by the maize crop, soil amendment with compost also enhanced nutrients accumulation most especially, essential micronutrients like Fe and Zn. compost treatments at 10 and 15t/ha enhance maize growth. On the field, 15t/ha of compost increased the dry matter yield, leaf chlorophyll and carotenoid contents compared to control and inorganic fertilizer treatments. Higher compost tea treatment (600m<sup>3</sup>/ha) also had a significant influence on growth and yield parameters compared to other compost tea treatments, but these were not as effective as dry compost. Compost compared favourably with inorganic fertilizer with 15t/ha being superior. Compost improved soil fertility, maize yield, and nutrient uptake.

## CONTRIBUTION OF PROXIMITY MARKET ACTORS TO IMPROVING ACCESS TO MICRONUTRIENT-DENSE FOODS (MDF)

*by Melley Bienvenu Adèle / Helen Keller INTL, Tom Van Mourik, Jennifer Nielsen, Idrissa Oumarou Kandagou, Alex Marco Ongla*

*Keywords: affordability, availability, food promotion, micronutrient-dense food*

Increasing consumption of MDF via improved availability, affordability and desirability in rural and semi-urban Niger requires contribution of many sectors. Nutrition programs have not engaged with food retailers and vendors as potential allies. There is great potential for collaboration with them to develop sustainable food system interventions. USAID Yalwa (UY) performed research and identified prioritized market-to-nutrition pathways and interventions to encourage positive changes in the food system. UY is five-year Niger project whose objective is to sustainably improve the income and nutritional status of vulnerable populations and households. One of the approaches, is the establishment, capacity building and monitoring support of nutritious food promotion committees (NFPC) including local food retailers. They aim to motivate and increase the availability and access to NF. Using Human centered design approach, local market actors (sellers of fresh, dry, processed, prepared foods) are selected in a village assembly for dynamism, community interest... 133 NFPCs of 10 members have been established. Capacity building is carried out for 2 representatives per committee on the list of NF, conservation, hygiene, packaging foods into small piles and marketing. Evaluation shows customers surveyed 96.21%, 65.18% mentioned improved knowledge of MDF (Zinder Maradi). 66.66% noticed new or improved nutritious products at points of sale. NF such as meat are more accessible through displaying, offering, and selling them in smaller heaps or quantities. Increased accessibility was confirmed by 100% and 89% of customers. Several NF were promoted, and seasonality considered by proposing substitutions based on foods availability. Engaging with retailers on the promotion of MDF, nutrition and food hygiene and safety allows them to play active and positive role in improving the food environment for a more nutrition-sensitive and inclusive market.



## THE PREVALENCE OF NEURAL TUBE DEFECTS IN GHANA

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*Keywords: Folate, folic acid, neural tube defects*

Neural tube defects (NTDs) are serious birth defects affecting the brain and spinal cord, with significant public health implications. Folate, a crucial B vitamin found in food, is essential in preventing these defects. Numerous studies have strongly linked insufficient folate levels to an increased risk of NTDs. This study assessed the prevalence of neural tube defects in Ghana. The assessment of NTDs in this study was based on clinical diagnoses recorded in health facilities across the country. NTD cases were identified through a review of medical records, with diagnoses confirmed by trained healthcare professionals using standardized criteria. The data source for this national study was the District Health Information Management System (DHIMS2) of the Ghana Health Service. This secondary data encompassed all 16 regions of Ghana over 5 years (2017-2021). Ethical approval for the study was obtained from the Noguchi Memorial Institute of Medical Research, and permission to use the DHIMS2 data was granted by the Institutional Care Division of the Ghana Health Service. Prevalence estimates were made by dividing aggregated case counts by the corresponding live births. The analysis of variance test was employed to evaluate variations in NTD cases over five years in the sixteen regions. SPSS software version 27 and Microsoft Excel were used for the data analysis. From 2017 to 2021, the average prevalence of NTDs was 0.63 per 1000 live births. The prevalence estimates and case count of NTDs varied by region. The regions with a higher prevalence of NTDs than the national average was the Savannah, Upper East, Volta, Oti, Ahafo, Bono, and Bono East. The prevalence of NTD

among newborns in Ghana has remained consistent from 2017 to 2021. The national average NTD prevalence was 0.63/1000 live births. This has health and economic implications for maternal and child health.

## **RELATIONSHIP BETWEEN MATERNAL PERICONCEPTIONAL DIET AND OROFACIAL CLEFTS IN GHANA**

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*Keywords: Dietary Patterns, Folate, Nutrient Intake, Orofacial Clefts, Periconceptional Nutrition*

Orofacial clefts (OFCs) are congenital anomalies involving the face and upper lip and/or palate. This study aimed to determine the association between dietary patterns and nutrient intake during the periconceptional period and risk of OFC in Ghana. A case-control study involving 103 case-mothers with children having OFCs and 103 control- mothers of children without OFCs used triplicate 24-hour dietary recall and a targeted food frequency questionnaire to obtain dietary information, with principal component analysis identifying dietary patterns. The study identified three dietary patterns: Traditional Ghanaian, High Protein and Fat, and Fruits and Vegetables. The Fruits and Vegetables Diet was associated with higher intakes of folate (250 µg/day,  $p < 0.01$ ). The Traditional Ghanaian Diet had lower amounts of folate (150 µg/day,  $p < 0.05$ ) while the High Protein and Fat Diet showed higher intakes of protein (75 g/day,  $p < 0.01$ ) and fat (85 g/day,  $p < 0.01$ ) but the lowest folate (130 µg/day,  $p < 0.01$ ) levels. Dietary diversity scores significantly differed across patterns, with the Fruits and Vegetables Diet having the highest scores ( $p < 0.001$ ). About 40% of the case group and 20% of the control group were food insecure ( $p < 0.05$ ). The Traditional Ghanaian Diet and High Protein and Fat Diet were associated with a higher risk of OFCs (OR = 2.5, 95% CI: 1.8-3.2,  $p < 0.001$ ) compared to the Fruits and Vegetables Diet (OR = 0.8, 95% CI: 0.6-1.1,  $p < 0.05$ ). Our findings suggest that diets rich in fruits and vegetables contain the highest folate associated with the lowest risk of orofacial clefts, highlighting its potential role as a viable tool against OFC risk.

## **EFFECT OF PRE- AND POST-NATAL SMALL-QUANTITY LIPID-BASED NUTRIENT SUPPLEMENTS (SQ-LNS) ON AUTONOMIC NERVOUS SYSTEM REGULATION**

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*Keywords: autonomic nervous system, lipid-based nutrient supplement, multiple micronutrients, parasympathetic activity, sympathetic activity*

The autonomic nervous system (ANS) comprising parasympathetic and sympathetic branches enables the body to maintain homeostasis and adapt to environmental challenges. Nutritional impairments during the “first 1000 days” can lead to poor autonomic development and regulation in the child, translating into varying mental and physical health problems across the life course. We aimed to determine whether pre- and post-natal SQ-LNS providing additional macro- and micronutrients have longer-term effects on children’s ANS regulation beyond the reported positive effects on growth, micronutrient status, and survival. Participants were children born to women in the iLiNS-DYAD trial in Ghana (2009–2014) in which 1320 women  $\leq 20$  weeks gestation were randomized to receive daily, either iron and folic acid until delivery and placebo during 6 months postpartum (IFA), or multiple micronutrients providing

19 vitamins and minerals during both periods (MMN), or SQ-LNS during both periods (SQ-LNS); only the infants of SQ-LNS mothers received child SQ-LNS from 6-18 months. We measured parasympathetic and sympathetic activity of 965 children at 9-11 years via heart rate. We used analysis of covariance and Tukey-Kramer post-hoc pairwise comparisons to examine differences in parasympathetic and sympathetic activity between the SQ-LNS, MMN, and IFA groups. Children in the MMN ( $-2.54 \pm 4.45$ ,  $P=0.016$ ) and SQ-LNS groups ( $-2.31 \pm 4.94$ ,  $P=0.093$ ) had significantly or marginally significantly higher (absolute number) sympathetic reactivity (suggesting better sympathetic activity and ability to modulate arousal in response to environmental challenges) compared to those in the IFA group ( $-1.57 \pm 3.51$ ). Prenatal micronutrient supplementation appears to increase sympathetic reactivity.

## **HISTOPATHOLOGICAL EFFECT OF SHEA BUTTER EFFLUENT ON AFRICAN CATFISH (CLARIAS GARIEPINUS): IMPLICATION ON AFRICAN FOOD ENVIRONMENT**

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*Keywords: food environment, toxicity, waste discharge*

Malnutrition is one of the major problems across the globe today. Promotion of dietary diversity has been identified as one of the major ways of tackling malnutrition, hence the need to protect the food environment. The study was carried out to examine the effect of Shea butter effluent on *Clarias gariepinus* (African catfish). The histopathological effect of Shea butter effluent was investigated using African catfish of a mean weight of 17g and standard length of 10cm. Range finding bioassay was carried out to determine the toxicity level of Shea butter effluent. The fishes were exposed to lethal concentrations of Shea butter effluent (0.045, 0.050, 0.055, 0.060 part per thousand (ppt)), for 96 hours. Also, sub-lethal toxicity for 28 days in a renewal bioassay was carried out. The median lethal concentration (LC<sub>50</sub>) was 0.058ppt at 96 hours of exposure. Behavioural reactions exhibited by the fish after exposure to the effluent were: erratic swimming, air gulping, and loss of balance. The observed pathological lesions of the gills included primary and secondary lamellae distortion,

epithelial necrosis, lamellae aneurism, curling of secondary lamellae, and epithelial lifting. Necrosis, nuclear alteration, fatty degeneration, and congested central vein were observed in the liver of the fish exposed to effluent. All the fish held in the control stock showed inappreciable histological degradation. Shea butter effluent was highly toxic to *Clarias gariepinus*, therefore indiscriminate discharge of shea butter effluent into water bodies should be abolished to avoid contamination and food poisoning when such fishes are consumed.

## **EFFECT OF THE CONSUMPTION OF POWDERED MIXTURE OF PUMPKIN, SESAME, AND FLAX SEEDS ON THE HAEMOGLOBIN, SERUM IRON AND SERUM ZINC LEVELS OF WISTAR RATS.**

by David Ibrahim / Department of Nutrition and Food Science. University of Ghana, Legon [idauid@st.ug.edu.gh](mailto:idauid@st.ug.edu.gh) Keywords: Fortified maize meal porridge, flax seeds, micronutrients, pumpkin seeds, sesame seeds

Maize-meal porridge, known as “Koko” in Ghana, is a common complementary food consumed by infants. It’s energy-dense, but has low-quality protein and minerals. To improve the iron and zinc content, treated and processed sesame, flax and pumpkin seeds, can be used to fortify the porridge. This research determined whether the consumption of fortified Maize-meal porridge could lead to improved haemoglobin. Serum Iron, and zinc levels of Wister rats. 15 albino Wister male rats of weaning age 21-28 days and average weight  $67 \pm 13$ g, were stratified by age and then randomized to receive the feeds. The Base Feed was 100% fermented-dried maize dough, the intervention feeds had 85% Base Feed and 15% of Roasted Seed mix and Soaked-Cooked seed mix. Haemoglobin was measured using Mission Hb test strip and metre. Serum iron and zinc were examined using the Flame Atomic Absorption Spectrometer. Data were captured using Minitab version 17 and analysed using paired t-test and one-way ANOVA. Rats that consumed Roasted Seed-mix and Soaked-Cooked seed-mix had higher mean Haemoglobin levels, 13.60 g/dL and 15.15g/dL respectively, compared to 12.74g/dL in Base Feed (P-Value 0.048). Mean serum zinc levels were higher in Roasted Seed-mix and Soaked-Cooked seed-mix (0.200mg/L and 0.370mg/L), compared to Base Feed, 0.1mg/L (P- Value 0.000). However, serum iron levels had no observable significant intervention effect (P-Value 0.463). Consumption of the fortified Base Feed resulted in a significant increase in haemoglobin and serum zinc levels in Wister rats. There was no intervention effect on serum iron levels.

### COMPLEMENTARY FOOD AND NUTRIENT GAPS IN INFANTS AND YOUNG CHILDREN BORN TO ADOLESCENT MOTHERS IN CENTRAL MALAWI

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*Keywords: Adolescent mothers, Malawi, food gaps, nutrient gaps*

Complementary feeding practices of adolescent mothers in Malawi are unknown as studies have combined all women of reproductive age into one group. This study aims to identify food and nutrient gaps in complementary foods of children aged 6-23 months belonging to adolescent mothers in Kasungu urban and rural areas. We conducted a cross-sectional study among 198 adolescent mothers with children aged 6 to 23 months to identify existing food and nutrient gaps. Dietary intake was assessed using a 24-hour recall method and semi-quantitative food frequency questionnaire (SQFFQ). Chi-square test was used to compare different categories, and an independent t-test was used to evaluate differences between means. Our results reveal that 63% of children met the minimum acceptable diet, with gaps in the daily consumption of animal-source foods, fruits, and dark green leafy vegetables. Energy, protein, vitamin A, B9, B12, calcium, iron and zinc intakes were inadequate. Consumption of sweetened beverages and unhealthy foods was 31.3% and 33.3%, respectively. Knowledge on complementary feeding practices was often sought from family and friends as opposed to healthcare workers. The study reveals suboptimal complementary feeding practices leading to the identified food and nutrient gaps. We suggest continued and collaborative engagement of healthcare workers in providing nutrition education that focuses on diversified foods, and interventions targeting adolescent mothers to decrease the consumption of sweetened beverages and unhealthy foods for their children.

### CORRELATES OF BODY COMPOSITION AMONG CHILDREN WITH STUNTING: A CROSS-SECTIONAL STUDY IN UGANDA

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*Keywords: bioelectrical impedance analysis, body composition, micronutrient, stunting*

Development of body composition (BC) may be disrupted in children with stunting. Such disruption may affect later risk of excess adiposity and metabolic health, yet few studies have investigated correlates of BC in stunted children. We investigated nutritional status, infection and inflammation, breastfeeding behaviors and other factors as correlates of BC in children with stunting. Among Ugandan children with a height-for-age z-score <-2, BC was estimated using bioelectrical impedance analysis and compared to UK reference data. We used multiple linear regression analysis to identify correlates of fat mass (FM), fat-free mass (FFM), FM-index (FMI), and FFM-index (FFMI) and height, adjusting for age and sex. In 750 children aged 1-5 years, while FMI was -1.01 [95%CI: -1.09, -0.93] z-scores lower than UK references, FFMI was 0.41 [0.37, 0.45] higher. Elevated serum  $\alpha_1$ -acid glycoprotein was associated with 1.14 [0.76, 1.52] cm lower height and 0.15 [0.07, 0.23] kg/m<sup>2</sup> less FFMI, while similar weaker associations for elevated serum C-reactive protein were detected. A positive malaria rapid test was associated with 0.64 [0.25, 1.02] cm shorter height, but 160 [40, 280] g greater FM and 0.27 [0.09, 0.44] kg/m<sup>2</sup> greater FMI. Depleted iron stores and anemia were associated with 0.25 [0.07, 0.43] kg/m<sup>2</sup> less FMI and 0.67 [0.28, 1.06] cm shorter height, respectively. Prolonged breastfeeding was associated with 0.10 [0.06, 0.13] cm greater height and a trend for greater FMI by 0.01 [-0.00, 0.03] kg/m<sup>2</sup> per month. Although these children were stunted, FFMI was relatively protected compared to UK references. Systemic

inflammation correlated inversely with linear growth and fat-free but not fat mass, making it an interesting target for intervention where fat-free tissue accretion is desirable. Prolonged breastfeeding may offer some protection to linear growth and FMI but findings for micronutrients were less clear. Longitudinal studies are warranted to support these findings.

## **A NUTRITION EDUCATION INTERVENTION IMPROVED CAREGIVERS' KNOWLEDGE AND CHILD FEEDING PRACTICES IN TURKANA, KENYA**

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*Keywords: Nutrition education, child feeding practices.*

To evaluate the effectiveness of a nutrition education intervention (NEI) on caregivers' nutritional knowledge and child feeding practices. This was a two-month long quasi-experimental design with three time points. In total 246 child-caregivers' pairs were recruited for the study. The intervention group (IG) received 30-60 minutes daily NEI sessions, there were four modules in total covering breastfeeding practices, complementary feeding practices, and hygiene practices. The last module was a recap of all the previous modules. The control group (CG) did not receive any intervention. The Theory of Planned Behavior (TPB) constructs guided the development of the NEI modules. In each module we addressed both attitudes, subjective norms and self-efficacy of the caregivers in relation to proper complementary feeding practices. Additionally, various health literacy principles were employed to accommodate the low health literacy of the participants. Knowledge was assessed using a validated questionnaire. Children's dietary intake was assessed using a 24-hour dietary recall. Linear mixed effects models were used to assess the effect of the intervention. Majority of the caregivers were illiterate (83.3%) and were young adults (29.4%). The mean age of children at baseline was 32.1 months. At the end of follow-up, the IG had a significant improvement in nutritional knowledge (CG: 7.5 vs IG: 9.7,  $P = 0.016$ ), children's dietary diversity (CG: 1.8 vs IG: 3.7,  $P < 0.001$ ), and children's meal frequency (CG: 2.1 vs IG: 3.4,  $P = 0.003$ ). After adjusting for both child and caregivers' characteristics, the significant improvement in both nutritional knowledge, children's dietary diversity scores and meal frequency among IG compared to CG persisted. Results of this study suggest that employing health literacy principles and providing sufficient dosage when conducting NEI among low literacy principles is effective in improving caregivers' child feeding practices.



## **ASSOCIATION BETWEEN MATERNAL DEPRESSION, FEEDING PRACTICES, AND NUTRITIONAL STATUS OF CHILDREN UNDER TWO YEARS IN SAGNARIGU MUNICIPALITY IN THE NORTHERN REGION OF GHANA**

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*Keywords: Association., Children, Feeding practices, Maternal depression, Nutritional Status*

Undernutrition in children under 2 years is one of the public health problems affecting most developing countries. Maternal depression influences infants and young child feeding practices which may consequently affect the nutritional status of children under 2 years. This research sought to assess the depression status of mothers with children less than 2 years of age and its association with feeding practice and the nutritional status of their children in the Sagnarigu Municipality. An analytical cross-sectional study was conducted among 357 mothers with infants under 2 years. Maternal depression status was assessed using the Centre for Epidemiologic Screening Scale questionnaire. Infant and young child feeding practices were evaluated based on the WHO infant and young child feeding questionnaire and nutritional status was also determined using Who Anthro software (z score). Chi-square or Fisher's exact test was used to determine if maternal depression was associated with feeding practices and the nutritional status of the children. The prevalence of maternal depression and early initiation of breastfeeding was 31.5 % and 56.6 % respectively. Prevalence of exclusive breastfeeding (EBF) was 53.3 %, timely initiation of complementary feeding (TICF) was 59.2 %, minimum dietary diversity (MDD) was 38.2%, minimum meal frequency (MMF) was 60.2 %, minimum acceptable diet (MAD) 32.9 % and bottle feeding (BF) was 18.4 %. The prevalence of stunting, wasting, and being underweight were 31.4 %, 9.0 %, and 14 % respectively. There was an association between maternal depression and EBF ( $p = <0.001$ ); TICF ( $p = 0.019$ ); MMF ( $p = <0.001$ ); MDD ( $p = <0.001$ ); MAD ( $p = <0.001$ ), and BF ( $p = 0.031$ ). Also, maternal depression was associated with stunting ( $p = <0.001$ ) and underweight. This study showed that feeding practices among mothers and the nutritional status of their young children can be affected by maternal depression.

## EXPLORING INFANT AND YOUNG CHILD FEEDING AND EARLY CHILDHOOD DEVELOPMENT PRACTICES AMONGST CAREGIVERS IN MOZAMBIQUE

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*Keywords: early child development, infant and young child feeding, mass media, social and behaviour change*

In Mozambique, 38% of children under five are stunted. A sufficient and diverse nutrient-rich diet is important to promote growth, prevent stunting and reduce the risk of poor cognitive and educational outcomes in childhood. Development Media International (DMI) is currently implementing a social and behaviour change (SBC) campaign, using mass media to promote infant and young child feeding (IYCF) and early childhood development (ECD) behaviours amongst caregivers of children aged 0-3 years. To inform content for the campaign, formative research was conducted to assess caregivers' current knowledge, attitudes, and practices related to IYCF and ECD. This exploratory qualitative study was conducted in Nampula, Zambezia, and Manica provinces in Mozambique. Using saturation sampling, caregivers of children aged under three years were recruited to 14 focus group discussions, 11 in-depth interviews, 13 observations of child-caregiver interactions, and 11 key informant interviews. Findings were analysed using a deductive-inductive exploratory thematic approach. Caregivers understand the importance of breastfeeding and mothers generally exclusively breastfeed until 6 months. Most caregivers are aware that foods should be introduced to children from 6 months and recognise the importance of providing different types of food. Despite this knowledge, caregivers' practices are limited by lack of time, being unable to afford and refrigerate certain food types, and not wanting children to get used to foods that they can only buy intermittently. Simple porridge is often fed to children, which does not provide sufficient nutrients for growth. Caregivers sometimes buy foods with low nutritional value (such as sweets and cookies) because buying these foods is a status symbol. Despite good knowledge and positive attitudes towards recommended IYCF practices, caregivers' limited time, food affordability and knowledge mismanagement, remain barriers to improved nutrition among young children in Mozambique.

## **PERCEPTIONS OF STAKEHOLDERS ON THE USE OF A SIMPLIFIED, COMBINED PROTOCOL FOR TREATMENT OF ACUTE MALNUTRITION IN CENTRAL AFRICAN REPUBLIC**

*by Francis Nguire / International Rescue Committee*

*Keywords: Acute malnutrition, Central African Republic, Ready-to-use therapeutic food (RUTF), Simplified, Stakeholders, Treatment, combined protocol*

Acute malnutrition treatment requires novel approaches to improve coverage, reduce costs and improve the efficiency of standard protocols that separate the management of moderate and severe acute malnutrition (MAM and SAM). The use of simplified, combined protocols to treat both MAM and SAM has sparked interest among global, regional, and national stakeholders. However, the perspectives of local communities and healthcare workers on the use of such protocols to treat acute malnutrition in routine healthcare systems are generally lacking. We conducted a cross-sectional mixed methods study to assess the perceptions of different stakeholders on the use of a simplified, combined protocol in two districts of Central African Republic (CAR). Stakeholders included caregivers and guardians of acutely malnourished children, healthcare workers, local healthcare authorities and implementing partners, all having benefitted from or implemented the simplified, combined protocol in the past 10 months. Over 90% of the healthcare workers preferred the simplified, combined protocol over the standard protocol. They agreed the protocol was easy to understand, allowed more children to receive treatment and was effective in treating acute malnutrition. The protocol modifications were well received by various stakeholders; including the expanded admission criteria, use of mid-upper arm circumference (MUAC) only for admission and discharge criteria, reduced and simplified ready-to-use therapeutic food (RUTF) quantity to treat MAM and SAM, the weekly frequency of treatment visits and the overall duration of treatment. However, some caregivers expressed concern with the use of MUAC only to declare child's recovery, since underlying illnesses could still be present. Caregivers and healthcare workers supported the idea of training community health volunteers (CHVs) to treat acute malnutrition. The use of the simplified, combined protocol to treat acute malnutrition in the two districts in CAR was positively perceived and well supported by most implementing healthcare workers and caregivers.

## DIETARY DIVERSITY AND MICRONUTRIENT ADEQUACY OF PREGNANT WOMEN IN OSHIMILI LOCAL GOVERNMENT AREA OF DELTA STATE, NIGERIA

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*Keywords: Dietary diversity, Micronutrient Adequacy, Pregnant women*

High quality and optimum Dietary Diversity Score (DDS) is a proxy indicator for measuring nutrient adequacy. Ensuring this during pregnancy could facilitate a healthy childbirth outcome. This research assessed the dietary diversity and micronutrient adequacy of pregnant women in Oshimili Local Government Area of Delta State, Nigeria. A cross-sectional survey which employed convenience sampling of 382 pregnant women from Asaba Specialist Hospital. The respondents satisfied the inclusion criteria (across all gestation periods). A structured questionnaire was used to gather data on sociodemographic attributes and 24-hour dietary recall for micronutrient intake and dietary diversity. Most (78.0%) of the pregnant women were married, under 30 years of age (74.1%), educated to tertiary level (62.6%), and Christians (90.1%). The majority (79.0%) had a high dietary diversity score where most were found in cereals and grains, with a mean DDS of  $10.02 \pm 1.72$ . Micronutrients (Calcium, vitamin A, C, and folate) intake was inadequate. Vitamin A and DDS had a positive correlation ( $r = 0.274$ ,  $p < 0.05$ ), whereas vitamin B1, B2, and folate were negatively correlated with DDS ( $r = -0.261$  and  $-0.259$ ,  $p < 0.05$ ) respectively. Statistically significant effects ( $p < 0.05$ ) of age and number of children on DDS were found using regression analysis. Despite a high dietary diversity score, inadequacy of some micronutrient intakes was identified among pregnant women. Maternal and fetal health outcomes in this population can be improved by targeted interventions that emphasize nutritional education to ensure optimum and quality intake of diverse diets.

## **NUTRITION INDICATORS AND HEALTH DETERMINANTS ASSOCIATED WITH THE NUTRITION KNOWLEDGE, ATTITUDE AND PRACTICE OF CAREGIVERS OF CHILDREN WITH AUTISM IN THE GREATER ACCRA REGION OF GHANA.**

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*Keywords: Nutrition, attitude, dietary diversity., knowledge, practice*

Poor food intake is a common issue among children with autism partly due to sensory issues that prevail among them. The nutrition knowledge, attitude and practices (KAP) of their caregivers may influence their food intake. Health determinants like age, eating behaviour, and household income may influence the nutrition attitude and practices of caregivers. This research investigated the relationship between the nutrition KAP of caregivers and some nutrition indicators and health determinants among children with autism living in the Greater Accra Region of Ghana. Dietary intake data was collected using a 24-hour dietary recall and dietary diversity was assessed using the Food and Agriculture Organisation's 10-Item Minimum Dietary Diversity Score (MDDS) questionnaire. Nutrition KAP was assessed using structured questionnaires. Weight-for-height, BMI-for-age, serum iron, and folic acid were used to assess their nutritional status. Descriptive statistics were used to analyse socio-demographic data while multivariate binary logistic regression was used to analyse relationships between predictor variables and dichotomous response variables like knowledge, attitude, practices, dietary diversity and nutritional status indicators. A total of 36 caregivers and 37 children were included in the study and the mean age of the children was  $7.1 \pm 0.8$  years. About 44% of the children had poor dietary diversity. Our data show that 88%, 82% and 62% of caregivers had good nutrition knowledge, attitude, and practices, respectively. Having a child with good eating behaviour, significantly increased the odds of the caregiver having good nutrition practice [AOR = 0.007, 95% CI; 0.003-0.544,]. And Nutrition practices of caregivers was a predictor of the child's weight [AOR = 5.8, 95% CI; 1.139-37.466]. A third of the children with autism had poor dietary diversity which may be attributed to the poor nutrition practice of their caregivers. Weight-for-height/BMI-for-age and eating behaviour were found to be associated with the nutrition practices of a caregiver.

## UNHEALTHY WEIGHT CONTROL PRACTICE AND ASSOCIATED FACTORS AMONG POSTPARTUM WOMEN IN ETHIOPIA

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*Keywords: Ethiopia, Unhealthy weight control, eating disorder, postpartum women*

Women in the postpartum period are more concerned about their weight and frequently use unhealthy weight-management techniques. A major risk factor for long-term weight gain is postpartum weight retention. Breastfeeding women may lose weight if their diet does not compensate for the extra calories and nutrients required for milk production. This research aimed to assess the prevalence of unhealthy weight control practices and associated factors during the postpartum period among women in Ethiopia. An institutional-based cross-sectional study was conducted among 8604 postpartum women from 6-9 months postpartum from randomly selected public health centers and private maternal and child medical centers. Unhealthy weight control practices were assessed by using the 12-item self-reporting tool with a reference period of 30 days. Body image dissatisfaction was measured using the Evan & Dolan Body Shape Questionnaire. Bivariable and multivariable logistic models were fitted to identify predictors of unhealthy weight control practices while controlling for possible confounders. The results were presented using the AOR with the respective 95% CI. In this study, unhealthy weight control practices among postpartum women in the past 30 days was 38.3% (95% CI: 34.4–42.2). Factors significantly associated with unhealthy weight control practices were perceived overweight (AOR = 3.68; 95% CI: 2.01-9.38), being overweight (AOR = 5.48; 95% CI: 3.86-10.53), having only one child (AOR = 2.98; 95% CI: 1.63-5.45), being a single mother (AOR = 4.94; 95% CI: 2.13-8.55), and having body image dissatisfaction (AOR = 2.16; 95% CI: 1.11-6.21). Further reported peer (AOR = 2.96; 95% CI: 1.56–5.62), and husband/dating partner (AOR = 2.63; 95% CI: 1.44–4.82), influences were associated with unhealthy weight control practices. Unhealthy weight control practices are common among postpartum women in Ethiopia. To address the problem, programmatic and severe provision-related attention should be given.

## **WEIGHT PERCEPTION AND ITS INFLUENCING FACTORS AMONG WOMEN LIVING IN ACCRA METROPOLIS**

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*Keywords: Ghana, Weight perception, diabetes, hypertension, obesity, women*

The subjective account of how individuals view and interpret their weight or weight perception directly influences their health-related behaviors. Accurate weight perception is essential for informed diet, physical activity, and weight management decisions. This study investigated weight perception and its influencing factors among women living in the Accra metropolis. A cross-sectional design was employed to survey 378 participants. The study population was female adults aged 18 to 65 years and residing in the Accra Metropolis. Weight perception was assessed using the Feel-weight-status minus Actual-weight-status Index (FAI), thus self-reported weight status (underweight, normal weight, overweight, and obese) compared to their measured body mass index (BMI) based on the World Health Organization (WHO) cut-offs. A semi-structured questionnaire was used to collect sociodemographic information. A logistic regression model was used to determine the association between weight perception, and its influencing factors. The majority of the respondents, 256 representing 67.7% exhibited inaccurate weight perception (FAI scores were positive), where they were heavier than they thought. Conversely, only 2.4% were lighter than they thought (FAI scores were negative). The prevalence of overweight and obesity was 38.1% and 29.9% respectively. Almost half (49.5%) of the respondents recorded a high waist-to-hip ratio (WHR). The average age of the respondents was  $42.1 \pm 13.2$  years. Increasing age was significantly associated with inaccurate weight perception (AOR= 1.025, 95% CI: 1.006-1.044). These findings show the need for targeted public health interventions that promote accurate weight perception among older female adults. This will potentially enhance weight management behaviors and reduce the risk of metabolic disorders among women in the study population.

## **FEASIBILITY AND EFFECTIVENESS OF USING MOBILE PHONE AI-ASSISTED DIETARY ASSESSMENT AND NUDGING TO IMPROVE DIETS IN FEMALE YOUTH AGED 18-24 YEARS: EXPERIMENTAL EVIDENCE FROM URBAN GHANA.**

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*Keywords: Diet quality, Food choices, Low- and middle-income countries, Nudging, Youth*

Rapid urbanization, increased consumption of processed foods, and reductions in physical activity have exacerbated diet-related diseases in low- and middle-income countries (LMICs). An artificial-intelligence-based phone application – Food Recognition Assistance and Nudging Insights (FRANI) – has been validated for diet assessment in Ghana. FRANI was developed to also provide gamified nudges and personalized feedback to promote healthy food choices. We measured the feasibility of FRANI and its effectiveness in improving diet quality among female youth in Accra, Ghana. Sixty women aged 19-24y were randomly allocated into two groups: (1) FRANI-Nudge, which received FRANI with gamified nudges to encourage healthier food choices, and (2) FRANI-Control, which received FRANI without the nudges. In both groups, women tracked their food and beverages for 55 days using FRANI. The feasibility of using FRANI was assessed by measuring adherence (number of days FRANI was used), and self-reported acceptability (usability, likeability) at the end of the study. Daily diet quality was assessed using the Minimum Dietary Diversity for Women (MDD-W) indicator, the EAT-Lancet diet quality score, and the Global Diet Quality Score (GDQS). Treatment effects were estimated using multi-level regression models adjusted for age and asset ownership, accounting for repeated measures. Out of 3,300 possible person-days, we included 2,614 person-days (79% adherence) reporting on 14,579 individual foods. All participants who received FRANI with nudges found it to be likeable and usable. After eight weeks, relative to FRANI-Control, FRANI- Nudge improved dietary diversity scores, EAT-Lancet Scores, and GDQS. FRANI with nudges may be an effective strategy to influence healthy food choices in female youth in Ghana, consistent with evidence from other LMICs. More research is needed to test the cost-effectiveness of FRANI in different contexts and at scale.

## **NUTRITIONAL STATUS OF THE ELDERLY IN THE BOSOMTWE DISTRICT, ASHANTI REGION, GHANA: DETERMINANTS AND THE EFFECTS ON GENERAL HEALTH.**

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*Keywords: Elderly, Geriatric Nutrition, Malnutrition, Nutritional status*

Malnutrition among the elderly, particularly in developing countries, poses significant public health challenges exacerbated by age-related medical, psychological, social, and economic factors. The study aimed to investigate the nutritional status of 250 individuals aged 60 and above in the Bosomtwe District, Ashanti Region, Ghana. The Nestle Mini Nutritional Assessment (MNA) and anthropometric measurements were used to assess nutritional



risk. Results revealed 26.9% malnourished, 57.0% at risk of malnutrition, and 16.1% with normal nutrition status. The Body Mass Index (BMI) emerged as the sole significant predictor of nutritional status. Despite high independence (99.6%) and mobility (94.0%), fruit and vegetable consumption were low (83.5% did not consume daily). These findings underscore the pressing need for health policies targeting older individuals, emphasizing nutritional improvement and healthcare accessibility. Moreover, there's a call for enhanced tools to monitor their nutritional status. The Ministry of Health, Ghana, should prioritize funding for large-scale public health nutrition studies to address these challenges. Caregivers are urged to vigilantly monitor older individuals' health to mitigate nutritional decline. Collectively, concerted efforts are essential across public health sectors to meet the nutritional needs of older populations in Ghana, both in this study setting and nationwide.

## **EXPOSURES DURING INFANCY AND THEIR ASSOCIATION WITH DEVELOPMENT AT 8 YEARS OF AGE: SECONDARY ANALYSIS OF DATA FROM A CLUSTER-RANDOMISED MATERNAL EDUCATION TRIAL IN RURAL UGANDA**

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*Keywords: Children, Development, Maternal Education, Randomized Trial, Uganda*

Links between child development and gender, anthropometric, and socio-demographic variables are insufficiently explored in low-income countries. We here explored such data from a previous randomized controlled maternal trial in rural Uganda. We conducted a randomized maternal education trial among 511 mothers of children aged 6-8 months in 2013 (baseline). The intervention was on nutrition, hygiene and child stimulation. Endpoint was various developmental outcomes. In this follow-up study of the children, now aged 8 years, data from 361 mother-child pairs was available to assess the association between baseline characteristics and development at child age 8 years. Development was measured using two neuropsychological tools: Kaufman Assessment Battery for Children Second Edition (KABC-II) and Test of Variables of Attention (TOVA). Compared with the average KABC-II scores at child age 8 years, at child age 6-8 months the adjusted (for intervention affiliation) odds ratio (aOR) was lower among those with higher weight-for-age z-scores (aOR: 0.74; 95% CI: 0.53,0.98; p=0.04), mothers with higher education (aOR: 0.86; 95% CI:0.78,0.96; P=0.03) and living with household heads with higher education (aOR: 0.86; 95% CI:0.78,0.96; p=0.03). At child age 6-8 months, motor composite scores and maternal parity were positively associated with auditory TOVA scores (all p-values <0.05) at child age 8 years. At child age 6-8 months, similar findings were obtained for visual TOVA scores (all p-

values  $<0.05$ ) in addition to cognitive composite scores. In contrast, weight-for-length z-scores and household head age were negatively associated with both auditory and visual TOVA scores ( $p<0.05$ ). Notably, being a female child was associated with lower auditory and visual TOVA scores ( $p<0.05$ ). At child age 6 to 8 months, improved growth, maternal education and household head education were associated with better development at child age 8 years. Interventions emphasizing parental educational attainment are thus needed to improve long-term developmental outcomes.

## **DIETARY DIVERSITY AND NUTRITIONAL STATUS OF CHILDREN AGED 6–59 MONTHS FROM RURAL FISHING AND NON- FISHING COMMUNITIES IN ZAMBIA**

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*Keywords: Fish, Nutritional status, Children, Dietary diversity, Zambia*

Low-quality complementary foods combined with inappropriate feeding practices put children under the age of five in developing countries at high risk for undernutrition. This study explored dietary diversity, fish consumption patterns and nutritional status of children in Luapula, a rural province in Zambia, where households rely on capture fisheries for their livelihoods. In the cross-sectional study, households with children aged 6–59 months were enrolled in the study. A semi-structured questionnaire was utilised to collect socioeconomic characteristics, dietary intake and anthropometric data. Descriptive statistics and bivariate associations were conducted. 23% of children aged 6–23 months met the minimum dietary diversity. About 49% and 41% of the children were fed on fresh small pelagic fish and large dried fish once to twice a week, respectively. Imbilya (*Serranochromis mellandi*), Chisense (*Poecilothrissa moeruensis*), and amatuku (*Tilapia sparrmanii*) were the most preferred fish species due to their availability and affordability. Only 3.5% of children consumed porridge to which fish powder had been added. There was a significant difference in the height for age z scores of children in the two communities ( $\chi^2 = 12.404$ ;  $p = 0.002$ , d.f = 2). Low dietary diversity was observed across the fishing and non-fishing communities and less than half of the children consumed fish despite proximity of the study sites to one of the largest water bodies in Zambia. Better

nutrition outcomes were observed among children in capture fisheries dependent households. Nutrition education in growth monitoring and promotion centres should address the issue of adequacy of diets with regard to frequency and diversity.

## **FATHERS INVOLVEMENT IN INFANT FEEDING: PERSPECTIVES FROM A QUALITATIVE STUDY**

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*Keywords: Accra, IYCF, fathers, roles, support*

Research on infant feeding typically emphasizes maternal roles however fathers' involvement in infant and young child feeding (IYCF) is increasingly being recognized as valuable for the growth and development of children. The main objective of this study was to explore fathers' involvement in infant feeding from the paternal perspective in Accra Ghana. This was a qualitative study, utilizing focus group and in-depth interviews (IDI). Convenience sampling was used to select two health facilities in Accra and recruit a total of 17 fathers with children 0-24 months old for this study. One focus group discussion (FGD) was conducted with 5 participants and 12 IDI were conducted. Interview guides centered on responsibilities of fathers during infant feeding, perceived factors that affect paternal involvement and avenues for improvement were developed to guide the discussion and interviews. Data collected was analyzed using thematic analysis. The mean age of fathers was  $36 \pm 5$  years. Participants in both FGD and IDI identified their main roles in IYCF as providing support to mothers. Support from fathers included financial, physical, and or emotional. The fathers indicated that cultural perception of men's roles, tiredness from work, and financial difficulties were barriers to their involvement in infant feeding. They also indicated that being available for their children, education in schools, advertisements, improvement of services at health centers, and policy change would help in overcoming their barriers towards IYCF involvement. This study gives an insight into the perception men have about their contribution to the well-being of their children in terms of nutrition. It highlights areas policymakers and other stakeholders can support to improve the involvement of men in infant and young child feeding.

## **INFLUENCE OF FEEDING PRACTICES ON NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN IN SCHOOLS IN LUANDA SUB-COUNTY, KENYA**

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*Keywords: Kenya, Pre-schools, children, feeding, practices*

According to Kenya's nutrition profile (2022), nearly 1.2 million children are suffering from chronic malnutrition and 631,196 children are underweight. Kenyan rural county governments have made little effort to develop school feeding programs for children in pre-schools in other areas other than the arid and semi-arid areas. The specific objectives of the study are, to establish the demographic and socio-economic characteristics of the caregivers, assess the feeding practices of pre-school children, assess the nutritional status of pre-school children and determine the relationship between feeding practices and nutritional status of pre-school children. This study employed the cross-sectional study design. Stratified random sampling was used to select a sample population of 40 households. The sample included children aged 6 years and below attending preschools whose guardians consented in their involvement in the research. The data collection tools used included questionnaires, food frequency questionnaire, 24-hour dietary recall, and anthropometric measures. Nutrition data was entered into Nutri survey software for analysis. Descriptive and inferential statistics was used to analyze the relationship between feeding practices and nutritional status. The study showed that the prevalence of malnutrition among preschool children was 25%. All the children did not meet the recommended dietary allowance (RDA) for vitamin A, folate, and calcium. 37.5%, 82.5%, and 27.5% did not meet their RDA for proteins, carbohydrates and fiber respectively. Compromised nutritional status was strongly associated with type of school, mother's education level, presence of school-feeding programs and family size. It is important that the feeding practices at home and school be carefully considered to ensure adequacy in the promotion of the nutritional status of preschool children. The findings from this study can inform policymakers in the Ministry of Education and Ministry of Health in designing more effective, efficient, and affordable school feeding programs for schools.

## DAILY ENERGY INTAKE AND BMI-FOR-AGE OF SCHOOL- AGED CHILDREN IN PRIVATE VERSUS PUBLIC SCHOOLS IN A MIXED INCOME COMMUNITY IN ACCRA

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*Keywords: BMI-for-age, daily energy intake, overweight, school age, wasting*

School-age is a period of physical growth and mental development requiring optimal nutrition. Evidence suggests lapses in the attainment of recommended daily nutrient intakes increasing the risk of malnutrition especially among children from low-income homes. To estimate the mean daily energy intake (MDEI) and BMI-for-age of SAC in a mixed income community. Study design was cross-sectional, involving 160 SAC. They were multistage-sampled from 2 private and 2 public schools at the Ledzokuku Constituency. Parental sociodemographic information was obtained. Weight and height of SAC were measured to compute BMI for age using WHO reference data. MDEI of SAC was obtained from a two-day 24-hour dietary recall interview assisted by their parents and teachers. Data were analyzed using SPSS ver. 21 at a 95% confidence interval. SAC from public versus private schools were 45.6% and 54.4% respectively, mean age  $10.4 \pm 1.7$  years. Significantly more parents (86.2%;  $p < 0.001$ ) of children in private schools had tertiary education compared to those in public schools (17.8%). MDEI was significantly higher among children from private schools compared to those from public schools ( $2011.0 \pm 543.0$  versus  $1601.7 \pm 393.2$  kcal;  $p < 0.001$ ). Wasting was significantly higher among SAC in public compared to private schools (15.1% vs 6.8%;  $p = 0.001$ ) respectively. Conversely overweight and obesity were significantly higher in SAC from private compared to public schools (25.3% vs 13.7% and 6.8 vs 0;  $p = 0.001$ ) respectively. Parental education was the only socioeconomic indicator that correlated significantly with BMI for age and MDEI of SAC ( $r^2 = 0.23$ ,  $p = 0.003$ ;  $r^2 = 0.299$ ,  $p < 0.001$ ) respectively. MDEI and BMI for age of SAC was significantly influenced by parental education. Public health interventions to prevent over and undernutrition in this group is strongly recommended.

## DIETARY HABITS OF MUSLIM STUDENTS IN THE UNIVERSITY OF GHANA DURING AND AFTER RAMADAN

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*Keywords: Muslim students, Ramadan fasting, dietary habits, physical activity, university students*

Individuals' dietary patterns can be directly influenced by their religious beliefs. Ramadan Intermittent Fast is a mandatory fast that Muslims observe once a year during the month of Ramadan. There are limited studies on changes in the dietary patterns of Muslim students at the University of Ghana (UG) during and after Ramadan. A descriptive retrospective study utilizing semi-structures questionnaires was used to collect information from 111 Muslim students at UG. Pearson's chi-square test and independent t-test were used to find the association between participants' eating habits, energy levels, and physical activity during and after Ramadan. The mean age of the students was  $22 \pm 2$  years. This study revealed that 21.6% of participants could not fast throughout Ramadan, of which 91.7% were females ( $p = 0.006$ ), due to their menstrual cycle (79.2%). Despite no significant difference, females' food intake was higher than males. Muslim students consumed healthier foods after Ramadan (70.2%) than during Ramadan (54.2%). Frequency of consumption of fruit juices (47.8% vs 28.5%,  $p = 0.006$ ), cheese/wagashi (33.6% vs 14.6%,  $p = 0.043$ ), biscuits (70.8% vs 45.4%,  $p = 0.031$ ) and bofrot (36.3% vs 21.5%,  $p = 0.043$ ) increased. Most of the participants ate Suhoor (97.3%) due to religious beliefs (61.3%) which made them moderately energetic during a fasting day. More participants engaged in physical activities after Ramadan (60.4%) than during Ramadan (55.9%). About 36% of the participants felt they lost weight after Ramadan. The sample of Muslim students at UG were found to consume less healthy foods during than after Ramadan. A shift in dietary patterns regarding gender was not noticeable, rather a lower modification in physical activity, snacking, and sleep patterns during Ramadan as compared to after Ramadan. This calls for educating students on optimal dietary habits and physical activity during Ramadan.

## ASSOCIATION BETWEEN DIETARY PATTERNS AND QUALITY OF LIFE IN ADULTS LIVING WITH TYPE-2 DIABETES MELLITUS IN ACCRA, GHANA

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*Keywords: Adults, Dietary patterns, Ghana, Quality of life, Type-2 diabetes mellitus*

Diet plays a key role in the management of type 2 diabetes mellitus and good management of the condition can positively impact quality of life. The study aimed at determining the association, if any, between dietary patterns and quality of life in individuals living with type-2 diabetes in Accra, Ghana. A cross-sectional study design was employed. Two-hundred outpatients with type-2 diabetes attending the Greater Accra Regional Hospital were recruited. A pretested questionnaire was used to collect socio-demographic, medication-adherence, dietary patterns, and quality of life (WHOQOL-BREF) data of participants. Data was analyzed using SPSS Version 22. Kruskal-Wallis' and correlation tests were used to analyze the relationship between variables ( $p \leq 0.05$ ). Study participants had a high psychological quality of life. However, quality of life was moderate overall, and in the physical, social, and environmental domains. Age, socioeconomic status, and duration of diabetes were some of the sociodemographic and clinical factors that were inversely related with overall quality of life. Three dietary patterns were identified in descending order of consumption: High energy, Vegetables and Fruits, and Animal Products. The high energy pattern contained many traditional, high carbohydrate Ghanaian foods, sweets, artificial spices, processed and cured meats/fish. The vegetable and fruits pattern contained foods like green leafy and other vegetables and fruits. The animal product pattern comprised of poultry, red meat, fish and alcohol. This vegetables and fruit pattern was positively associated with the psychological, environmental and overall quality of life. Age, socioeconomic status, and duration of diabetes were inversely related with overall quality of life. High carbohydrate foods were consumed by the study population. The 'Vegetables and Fruit' dietary pattern was positively associated with higher overall.

## ENERGY DRINK CONSUMPTION AND NUTRITIONAL STATUS AMONG COMMERCIAL DRIVERS IN SUNYANI, GHANA.

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*Keywords: Commercial drivers, Energy drinks, Nutritional status, Weight*

Energy drinks are beverages that increase consumers' alertness, concentration, attention, and energy. The activities of road transport drivers make them prone to consuming energy drinks. The typical high sugar content makes energy drinks more calorific and impedes fluid absorption. Therefore, a prolonged intake of these beverages will substantially elevate the chances of diabetes mellitus, hypertension, weight gain, and obesity altering an individual's nutritional status. This current study assessed the prevalence of energy drink consumption and its relation to the nutritional status of commercial drivers in the Sunyani municipality, Ghana. This study employed a descriptive cross-sectional design involving 278 commercial drivers. Drivers were sampled according to the type of vehicles commonly used in Sunyani using a stratified sampling technique. Vehicles were grouped into Urvan, Buses, Taxi, Tipper Trucks, and Tuk-tuk (Okada) drivers. Data was collected using a questionnaire through simple random sampling. Data was imported into SPSS. Pearson Chi-square test was used to test for the association between individual energy drinks and the nutritional status (BMI) of participants. In this study, 104(37.5%) respondents stated that they do not consume energy drinks. However, 174 (62.5%) respondents indicated that they consume energy drinks. Out of 230 whose weights and heights were measured, 117(50.9%) were overweight, 6(2.6%) were underweight, 6(2.6%) were obese and 101(43.9%) drivers were normal according to the WHO BMI classification. Out of the 123 participants who were overweight and obese, 114(92.7%) were regular consumers of Energy Drinks. Not all the energy drinks discussed were associated with participants' nutritional status. However, there was a strong association between Storm ( $p=0.01$ ), Adonko Next Level( $p=0.000$ ), Lucozade energy drinks ( $p=0.000$ ), Rush( $p=0.018$ ), and Energy drink + bread ( $p=0.023$ ). Regular consumption of certain energy drinks is significantly associated with an increased likelihood of being overweight or obese which ultimately affects the nutritional status, quality of life, as well as the psychological and environmental quality of life domains in patients with type 2 diabetes.



## IMPLEMENTATION OF MICRONUTRIENT POWDER PROGRAMME IN NIGERIA IS ENABLED BY SUPPORTIVE KNOWLEDGE AND HINDERED BY SUPPLEMENT UNAVAILABILITY

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*Keywords: Micronutrient powder, implementation research, nutrition education, supply chain*

Dietary intakes of micronutrients are inadequate in Nigeria and other African countries, even though consequences of micronutrient deficiencies in children can be very severe. The World Health Organization has recommended use of iron-containing micronutrient powders (MNP) in countries where child anaemia is  $\geq 20\%$ , and identified the need for implementation research around MNP use. This study aimed to understand implementation of MNP programmes in Nigeria to support scale-up efforts. The study used a mixed-methods design. Two-stage, cluster randomized sampling was used to select 476 caregivers who had children 6–59 months old across North-East Adamawa and South-West Ondo States in Nigeria. Caregivers were surveyed using an interviewer-administered, electronic questionnaire and in-depth interviews were additionally conducted with 36 caregivers. Survey data were analysed in Stata 18.0. Interviews were coded and analysed in Dedoose 9.0.107 following transcription of audio-recordings. Although 75% and 63% of children in Adamawa and Ondo, respectively, had received iron-containing micronutrient supplements in the 12 months preceding the survey, 16% and 7% respectively, had been given MNP. Factors that significantly enabled MNP use ( $p < 0.05$ ) included advice from health workers, knowledge about benefits of MNP, desire for healthy/good looking children, and perception that social networks approved of MNP use. Another supportive factor, highlighted in interviews, was physical evidence of improved health in children given MNP, such as healthier-looking skin. The survey and interviews both highlighted that MNP use was hindered primarily by caregivers' inability to obtain MNP. Interviews further identified misconceptions about MNP, such as perception that it is only necessary for ill or malnourished children, and concerns about MNP's side effects (e.g., loose stools), as other barriers. The major MNP implementation challenge in Nigeria is inadequate supplies/stockouts. Increasing education and support to avoid misconceptions and manage side effects are also key to improving MNP

uptake.

## **INTEGRATING THE NUTRITION-FRIENDLY SCHOOL INITIATIVE INTO THE GHANA SCHOOL FEEDING PROGRAMME: IMPACT ON DIETARY INTAKE, PHYSICAL ACTIVITY AND NUTRITIONAL STATUS OF PRIMARY SCHOOL CHILDREN**

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*Keywords: Healthy Eating, Nutritional Status, Physical Activity, School Children, School Health Intervention*

The Ghana School Feeding Program (GSFP) complemented by the Nutrition- Friendly School Initiative (NFSI) is expected to enhance school nutritional quality through education, healthy dietary habits, and physical activity. We assessed the synergistic effect of the GSFP alone (single intervention) or complemented by the NFSI (multiple interventions) on students' nutritional status, dietary intake, and physical activity. A cross-sectional survey was piloted among 391 primary students from four public schools implementing the GSFP alone (n=205) or in combination with the NFSI (n=185) in Hohoe, Ghana. Anthropometric and food frequency questionnaires captured participants' nutritional status and minimum dietary diversity. Physical activity was determined using the WHO physical activity questionnaire recording the type, intensity according to the metabolic equivalent task (MET), frequency, and duration per week. Adjusted odds ratios (OR) for the outcomes were tested through logistic regression. Participants' mean age was  $9.8 \pm 1.8$  years with more females (61.4%). Dietary adequacy was higher in single than multiple intervention schools (46.7% vs 18.3%,  $p < 0.001$ ). However, stunting (9.0%) was significantly prevalent in the single intervention schools (13.4% vs 4.5%) but with no differences for underweight (8.8%), thinness (10.8%), and overweight (1.8%). PA was significantly lower in single than multiple intervention schools (14.6% vs 53.8%). Running, dancing and football were the most common vigorous-intensity activities ( $\geq 6.0$  METs). Enrollment in schools implementing the multiple interventions dependently increased the odds for PA (OR=10.05, 95% CI: 4.76-21.21) and decreased stunting (OR=0.26, 95% CI: 0.07-0.96) but the odds for unhealthy dietary intake was higher (OR=2.20, 95% CI: 1.08-4.48). Receipt of multiple interventions was protective against physical inactivity and stunting but not diet quality suggesting its impact on immediate and long-term lifestyle outcomes when complemented with other existing school-based interventions. To optimize the effect, the influence of external factors beyond the school environment is crucial.

## TARGETING ANEMIA IN REGIONS OF HIGH RISK OF MALNUTRITION: A CROSS-SECTIONAL STUDY OF ADOLESCENT GIRLS IN CAMEROON

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*Keywords: Adolescent girls, Anemia prevalence, Cameroon., Nutritional deficiencies, Preventive health services*

The high prevalence of anemia among adolescent girls in Cameroon, exacerbated by insufficient preventive services, necessitates urgent and targeted interventions, particularly in regions plagued by severe malnutrition. This study aims to assess the prevalence of anemia and its determinants among adolescent girls aged 10 to 19 years in the Far North, North, Adamawa, and East regions of Cameroon. This research utilized a two-stage cluster cross-sectional survey that enrolled 2798 adolescent girls, measuring hemoglobin levels and collecting anthropometric data. The study focused on preventive measures including malaria prevention through impregnated mosquito nets, semi-annual deworming for intestinal parasitosis, and iron tablet supplementation to combat anemia. Dietary diversity was evaluated using a 24-hour recall. The analysis revealed that 61.2% of the adolescent girls were aged 10 to 14 years, and 38.8% were aged 15 to 19 years. Ownership of mosquito nets was low at 51.4%, with only 25.1% of the girls having received deworming medication in the past six months, and a mere 6.7% receiving iron supplementation. Awareness of anemia was limited to 18.2%, with just 31.3% able to identify an iron-rich food. Only 52.6% achieved minimum dietary diversity. The overall prevalence of anemia was 48.1% (95%CI 46.2%-50.0%), with higher rates in the North (57.9%) and East (54.7%) regions, urban areas ( $p<0.001$ ), among younger girls ( $p<0.001$ ), single girls ( $p=0.003$ ), non-pregnant girls ( $p<0.001$ ), those who had not commenced menstruation ( $p<0.001$ ), those without iron supplementation ( $p=0.016$ ), and those aware of iron-rich foods ( $p=0.007$ ). Conversely, overweight girls were less likely to be anemic ( $p=0.001$ ). This study uncovers a significant prevalence of anemia among adolescent girls, highlighting major gaps in nutritional awareness and preventive health services. To address this, targeted interventions should enhance nutritional education, increase access to iron supplementation, and improve the coverage of preventive health services in the most affected regions.

## ASSOCIATIONS BETWEEN DIETARY PATTERNS AND INTESTINAL INFLAMMATION AMONG HIV-INFECTED AND UNINFECTED ADULTS: A CROSS-SECTIONAL STUDY IN TANZANIA

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**Keywords:** Diet, HIV, adults, intestinal inflammation

The increased burden of non-communicable diseases is fueled by lifestyle factors including diet. This cross-sectional study explored among Tanzanian adults whether a potential mechanism for increased diabetes risk is dietary patterns which lead to low-grade intestinal inflammation, bacteria translocation, and systemic inflammation, a risk factor for insulin resistance. The study included 574 participants, with both diet and inflammatory markers data. Dietary patterns were derived using principal component analysis and reduced rank regression, revealing three main patterns: vegetable-rich, vegetable-poor, and carbohydrate-dense diets. Fecal myeloperoxidase (MPO) and neopterin (NEO) and plasma lipopolysaccharide-binding protein (LBP), and C-reactive protein (CRP) were assessed as markers of intestinal and systemic inflammation. Ordinal logistic regression was used to assess associations between quintiles of the inflammatory markers and terciles of dietary patterns adjusting for potential confounders. High adherence to a vegetable-poor dietary pattern was associated with elevated MPO (adjusted OR, 1.7 95% CI 1.1, 2.8). NEO tended to be higher in people with high adherence to both vegetable-poor (adjusted OR, 2.6 95% CI 1.0, 6.4) and vegetable-rich patterns (adjusted OR, 2.7, 95% CI 1.1, 6.5). No associations were found between dietary patterns and systemic inflammation markers (LBP and CRP). We found links between dietary vegetable intake and intestinal inflammation but not systemic inflammation. These findings suggest that diet impacts non-communicable diseases through pathways other than the intestinal inflammation-intestinal permeability-systemic inflammation axis. However, the cross-sectional nature of the study limits establishing causality, emphasizing the need for further studies to understand how dietary habits influence diabetes in this population.

## GLYCEMIC RESPONSES TO STIFF AND THIN WHOLE PEARL MILLET FLOUR PORRIDGES AMONG PEOPLE WITH TYPE 2 DIABETES MELLITUS

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*Keywords: Glycemic Index, Pearl millet., Post-prandial glycemia, Type 2 Diabetes Mellitus*

Glycemic Index (GI) assesses the carbohydrate content of foods through its effect on postprandial blood glucose concentration. Low GI foods have been associated with reduced glycated hemoglobin and post meal blood glucose in people with type 2 Diabetes Mellitus (T2DM). Data on low GI foods such as Pearl millet is lacking despite evidence on its potential on reducing Postprandial Prandial Glycemia (PPG), fasting blood sugar (FBS) and glycated hemoglobin. We investigated the PPG and GI of stiff and thin whole Pearl millet porridge in 19 female and 2 male patients with T2DM. Using a repeated measures factorial design, we conducted a study in 19 female and 2 male patients with Type 2 Diabetes Mellitus at African Bible College Clinic in Lilongwe. Data were analyzed using IBM SPSS for MacOS version 25 to derive descriptive statistics while Graphs, Incremental Area under Blood glucose response curve and Glycemic Index were generated in Excel. Consumption of whole stiff and thin Pearl millet was associated with PPG of  $8.4 \pm 0.4 \text{ mmol/L}$  and  $7.5 \pm 0.5 \text{ mmol/L}$ , respectively. The whole stiff Pearl millet porridge had a low Glycemic Index ( $67 \pm 11.9\%$ ) compared to thin millet porridge ( $69 \pm 8.73\%$ ). However, the difference in GI between the two porridges was not statistically significant ( $P=0.89$ ). Using the GI classification of Low ( $<50$ ), Medium (56-69) and High ( $>70$ ), the flour porridges in our study fall within medium GI foods. The stiff and thin Pearl millet porridge had medium GI with stiff millet porridge showing a low postprandial glucose response than thin millet porridges in comparison to the reference (glucose). Incorporating Pearl millet flour into diets of people with diabetes can help prevent rapid spikes in blood glucose and ensure optimum glycemic control.

## **INFLUENCE OF A DESIGNED FOOD PORTION CONTROL TOOL IN IMPROVING GLYCEMIC CONTROL AND DIETARY PATTERN AMONG DIABETIC PATIENTS ATTENDING UNIVERSITY HEALTH SERVICES, IBADAN**

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*Keywords: Blood Glucose Monitoring, Diabetes Mellitus, Dietary Patterns, Lifestyle modification, Portion controls*

Portion control education is an essential aspect of diabetes management. As part of a more extensive study, a pilot test was conducted to evaluate the influence of a designed food portion control tool on improving dietary patterns and glycaemic control among diabetic patients attending university health services in Ibadan, Nigeria. A pre-and post-study was conducted within a two-month study period among 41 purposively selected diabetic patients on treatment. At pre-intervention, a self-administered questionnaire, including socio-demographics and a modified semi-quantitative FFQ assessment, was performed at contact, and a record of Fasting blood sugar (FBS) was extracted from clinic records. The designed portion control education tool (based on the health belief model) was delivered as a video, and take-home handbills and self-monitoring logbooks were given to each patient. Key intervention messages were reinforced with weekly short message systems for six weeks. Post-intervention assessments were performed at two months. Data was analysed using SPSS results presented as the frequency of serving sizes, mean FBG, and student t-test differences at  $p < 0.05$ ). The dietary pattern showed pre-intervention frequency of serving sizes (fruits & veg, carbohydrate, protein, nuts, water, salt and bouillon cubes) were 2.5, 2.2, 1.5, 1.5, 3.0, 0.5 and 1.0 servings, while post-intervention frequency was 2.5, 1.8, 1.5, 1.5, 3.0, 0.5 and 1.0 servings. There was a significant reduction in the frequency of servings of carbohydrates consumed  $p = 0.000$ . Mean pre and post-FBS was  $120.8 \pm 25.1 \text{ mg/dl}$  and  $112.9 \pm 24.0 \text{ mg/dl}$ ,  $p = 0.240$ . There was no significant reduction in the FBS of respondents after the intervention,  $t = 1.753$ ,  $p = 0.087$ . The tool produced some positive behavioural and dietary changes (decreased carbohydrate servings), but it did not further reduce fasting blood sugar levels within the short study period among the controlled diabetic patients. Therefore, long-term effects should be considered with HbA1c monitoring.

## ASSOCIATION OF ENVIRONMENTAL ENTEROPATHY WITH PREDIABETES AND DIABETES: A CROSS-SECTIONAL STUDY AMONG TANZANIAN ADULTS WITH AND WITHOUT HIV

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*Keywords: Environmental enteropathy, HIV, body mass index, insulin resistance, prediabetes and diabetes,  $\beta$ -cell function*

Environmental enteropathy (EE) may increase the risk of diabetes but data are limited. We assessed the role of EE on markers of glucose metabolism. Cross-sectional study linking EE and diabetes in Tanzania. Data on demography, body mass index (BMI), HIV, EE (i.e. fecal myeloperoxidase, lipopolysaccharide binding protein, and markers of intestinal permeability), and glucose and insulin during oral glucose tolerance test (OGTT) were collected. Data reduction using principal components analysis came up with two components: permeability and inflammatory enteropathy and the upper tertile of each component was defined as enteropathy. The main outcome, combined prediabetes and diabetes, was defined as 2-hour OGTT glucose  $\geq 7.8$  mmol/L. Low homeostatic model assessment (HOMA)- $\beta$  and insulinogenic index, high HOMA-insulin resistance (HOMA-IR), and low Matsuda index were secondary outcomes. Logistic regression assessed the associations; HIV and BMI groups were tested as effect modifiers. 612 participants were included. The mean age was 42.0 ( $\pm 11.6$ ) years and 57.2% (350) were females. Eighty (13%) were underweight, 367 (60%) normal weight, 165 (27%) overweight, and 257 (58%) were HIV-infected. We found no overall association of EE on the main outcome but HIV and BMI modified associations. Permeability enteropathy was associated with higher odds of prediabetes and diabetes (OR=2.1(95% CI: 0.9, 4.6; P=0.07) and HOMA-IR (OR=2.6 (0.9, 7.1, P=0.05) among overweight participants. Inflammatory enteropathy was associated with higher odds of prediabetes and diabetes (OR=2.0 (1.01, 3.9; P=0.04) among HIV-uninfected participants, whereas among HIV-infected participants it was associated with a higher odds of lower Matsuda index (OR=2.6 (1.2, 5.7, P=0.01). EE may increase the risk of dysglycaemia among individuals without HIV and those who are overweight. Longitudinal studies on the role of EE on diabetes are needed to confirm these results to lay the basis for testing novel interventions to combat diabetes in Africa.

## EVIDENCE SYNTHESIS EVALUATING THE EFFECT OF ANTIRETROVIRAL THERAPY ON BMI AND OVERWEIGHT/OBESITY AMONG PEOPLE LIVING WITH HIV IN LMIC: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Keywords:** HIV/AIDS, Low- and Middle-Income Countries (LMIC), antiretroviral treatment, overweight and obesity

The global HIV epidemic, particularly in Low- and Middle-Income Countries (LMICs), presents unique challenges, with antiretroviral therapy (ART) significantly altering the health outcomes of people living with HIV (PLHIV). While ART has improved life expectancy and reduced morbidity, its association with metabolic changes, including overweight and obesity, is a growing concern. This meta-analysis aimed to quantitatively synthesize data from various studies to assess the prevalence of overweight/obesity and the impact of ART among people living with HIV (PLHIV) in LMICs. PubMed, Scopus, Cochran, and Google Scholar electronic databases were used to perform a systematic literature search. Two authors independently extracted all the necessary data using a structured data extraction format. Data analysis was done using Review Manager 5.4 software. The heterogeneity of the studies was assessed by using  $I^2$  test. A standardized mean difference was used to summarize the mean BMI, while a random effects model was used to estimate the pooled prevalence. Study quality and publication bias were checked using the Newcastle-Ottawa Scale and Funnel plot respectively. The prevalence of overweight/obesity among PLHIV was 28.97%, with a higher rate in ART-positive individuals (31.58%) compared to ART-negative individuals (22.27%). The analysis revealed a significant higher standardized mean difference (SMD = 0.37) in BMI for ART-positive individuals and a higher likelihood of overweight/obesity (pooled OR = 1.63). Despite substantial heterogeneity, the analysis supports a robust association between ART use and increased overweight/obesity. The meta-analysis indicates a significant association between ART use and increased prevalence of overweight and obesity among PLHIV in LMICs, highlighting the need for tailored management strategies to mitigate rising health risks associated with weight gain. These findings are essential for enhancing long-term health outcomes for PLHIV on ART in LMIC settings.



## **ASSOCIATION BETWEEN ANTHROPOMETRIC INDICES AND DIETARY PATTERNS OF OLDER ADULTS WITH PERIODONTAL DISEASE; A CROSS-SECTIONAL STUDY.**

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*Keywords: Anthropometric indices, Dietary Patterns, Older Adults., Periodontal Disease, Principalcomponent Analysis*

Periodontal disease (PD) impacts around 743 million people worldwide, significantly affecting the quality of life and causing tooth loss in older adults. Despite its prevalence, the link between dietary patterns and body measurements in older adults with PD remains unclear. Investigating these connections is crucial for public health. Socio-demographic and dietary data were collected via structured and validated qualitative food frequency questionnaires. Height was measured with a stadiometer, and weight, BMI, body fat, visceral fat, and muscle mass were assessed using a bioelectric impedance analyzer. Dietary patterns were identified through Principal Component Analysis (PCA). Pearson's correlation and independent T-tests determined relationships, with statistical significance set at  $p \leq 0.05$ . Nine dietary patterns were identified using the frequency of dietary intakes out of the 57 food items investigated. Cereals and grains were mostly consumed (31.4%) with majority (23%) being males. Similarly, vegetables (47.5%), legumes and nuts (56.9%), animal and animal products (37.3%) and high sugary foods (75.5%) were consumed on a weekly basis. The dietary Pattern of participants was more of the "Sweets and Alcoholic Beverages". A weak positive relationship ( $r = .283$ ,  $p = 0.000$ ) between muscle mass and "sweets and alcoholic beverages patterns" was established, and a weak negative association ( $r = -.188$ ,  $p = 0.007$ ) between body fat and "shellfish dietary pattern". "The shellfish dietary pattern" had a weak positive association ( $r = .205$ ,  $p = 0.003$ ) with muscle mass. "High Protein dietary Pattern" had a weak negative association ( $r = -.171$ ,  $p = 0.014$ ) with muscle mass. The research revealed that older adults with Periodontal Disease (PD) tend to consume more sugary foods and alcoholic beverages, indicating a "sweets and alcoholic beverages dietary pattern." In contrast, a "high protein dietary pattern" showed a weak negative association with muscle mass. Dieticians should counsel these individuals to adopt healthier eating patterns and achieve healthier body weights.

## DIETARY QUALITY AND ITS IMPACT ON ANAEMIA PREVALENCE AMONG 12-19-YEAR-OLD GIRLS IN DAR ES SALAAM : A CROSS-SECTIONAL STUDY

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**KEY WORDS:** *anaemia, dietary quality, adolescent girls, adolescence, Tanzania*

Anaemia is a major public health issue among adolescents in Dar es Salaam. Adolescent girls are particularly vulnerable due to menarche and poor diets and yet they are under-researched. This study aims to determine dietary quality and its impact on anaemia in Dar es Salaam. A cross-sectional household survey was conducted among 282 adolescent girls aged 12 to 19 in Dar es Salaam, Tanzania. Dietary quality was assessed using the Global Dietary Quality Score and dietary intake was collected via a 7-day food frequency questionnaire. Sociodemographic information and self-reported health status were also collected. Data was cleaned and analysed using Stata version 18, including modified Poisson regression and ordinal logistic regression. The prevalence of anaemia was 45.4%, and 44.7% of the adolescent girls were at high risk of poor diet quality. Among anaemic girls, 22% had a high risk of poor diet quality. Menarche was associated with increased risk of having anaemia ( $p=0.009$ ). Adolescents attending the secondary/higher level of education had higher risk of poor dietary quality compared to those in primary school ( $p=0.096$ ). Adolescents from households with 5 or more people had increased risk of poor dietary quality ( $p=0.022$ ) compared to those from smaller households. Adolescents who consumed legumes 2-4 times a week had reduced odds of being anaemic compared to those who had them 0-1 times ( $p=0.014$ ) while those who consumed sweets and ice cream 2-4 times a week had increased odds of being anaemic ( $p=0.001$ ). Our findings highlight a high prevalence of anaemia and poor diet quality among adolescent girls in Dar es Salaam. Interventions to improve dietary diversity, nutrient intake and access to micronutrient rich foods are essential for improving the diet quality and associated health outcomes.

## **EFFECT OF THE CONSUMPTION OF HEARTY'S LACTATION COOKIES AND GRANOLA ON BREAST MILK OUTPUT OF LACTATING MOTHERS WITH PRETERM INFANTS: A RANDOMIZED CONTROL TRIAL.**

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*Keywords: breastmilk, fenugreek, galactagogue, moringa, preterm infants*

Breastmilk is the baby's first meal and vaccination. Fenugreek, moringa and fennel have been used as galactagogues and resulted in changes in the infant weight and breastmilk output, but little is known about their effect on breastmilk output in Ghana. The study aimed to determine differences in breastmilk volume and infant weight in mothers of preterm infants who consumed Hearty's Lactation cookies and granola and those who took the placebo. The study was conducted at the Neonatal Intensive Care Unit (NICU) at 37 Military Hospital. Mothers with preterm infants (below 2500 g) who had breast milk supply (below 500ml daily) were enrolled. There were two treatment groups for granola and cookies and two placebo groups for granola and cookies. The placebo did not contain fenugreek, moringa and fennel that stimulated breastmilk production. 32 participants were recruited, but 26 participants completed the study. The breastmilk output of mothers and their infant weight were recorded daily for seven days. There was a significant increase in the breast milk volume with the highest mean difference of 450 ( $\pm 70.71$ ) ml for the granola group and the lowest mean difference of 227.14 ( $\pm 124.86$ ) ml for the placebo cookies group. P-value of  $< 0.001$  for granola and cookies group showing significant differences in their volumes. The breast milk volume between the granola group was significantly different ( $p = 0.04$ ) but not so in the cookies group ( $p = 0.092$ ). The infant weights were not significantly different in the 4 groups except for the placebo granola group, with a mean difference of 0.12 ( $\pm 0.06$ ) kg and  $p = 0.002$ . The study's findings suggest that galactagogues can significantly enhance the quantity of breast milk produced by breastfeeding mothers hence, potentially supporting the 6-month exclusive breastfeeding in Ghana and improved neonatal care.

## **CAREGIVERS' PERCEPTIONS OF SEVERE ACUTE MALNUTRITION AMONG CHILDREN AGED 6-59 MONTHS ADMITTED TO OUTPATIENT THERAPEUTIC FEEDING PROGRAMME IN KARAMOJA, UGANDA**

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*Keywords: Severe acute malnutrition, caregivers, children, outpatient therapeutic feeding programme*

Severe acute malnutrition (SAM) treatment protocol is effective for reducing child mortality, however, few children receive prompt and optimal treatment. We explored caregivers' perceptions of SAM among children aged 6-59 months admitted to outpatient therapeutic feeding programme in Karamoja Region, Uganda. The study design was exploratory qualitative study. We conducted 14 in-depth interviews and 6 focus group discussions with caregivers of children with SAM admitted to three outpatients therapeutic care in Kaabong and Moroto districts in Karamoja. We explored caregivers' conceptualizations and perceptions of SAM, perceived causes of SAM, healthcare-seeking behaviour and perceptions of therapeutic feeding programme. The data was coded inductively using the OpenCode Software (Version 4.0.2.3). Codes were grouped into categories based on emerging themes. SAM in children was locally referred as thinness due to hunger. Hunger, food scarcity, poor feeding practices and diseases were some of the perceived causes of SAM. Caregivers' frequent absence from home in search of food for their families affected their ability to interact with their children, feed them, and detect illness. Food scarcity necessitated feeding children on unwholesome foods that resulted in diarrhoea. While diarrhoea was perceived as causing SAM others believed that it had supernatural causes requiring traditional healing and cleansing. Treatment seeking for illnesses and SAM was delayed and pluralistic with a combination of conventional and traditional medicine. Caregivers willingly used ready to use therapeutic food as treatment for diarrhoea and as alternative food for children. Inappropriate feeding and repeated episodes of diarrhoea however prolonged SAM treatment. Caregivers' quest for food for their household had a negative impact on child nutrition and wellbeing. Treatment seeking for SAM was delayed and mostly by traditional healing practices. There is need for livelihood and education support for caregivers, and to strengthen diarrhoea and SAM treatment efforts.

## **NUTRITION PERSPECTIVES AND ATTITUDES AMONG GHANAIAAN PREGNANT ADOLESCENTS AND ADOLESCENT MOTHERS**

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*Keywords: Adolescent girls, adolescent mothers, attitudes, perspectives, teenage pregnancy*

Although adolescent childbearing is prevalent in Ghana and efforts to reduce adolescent births exist, support for pregnant adolescents and adolescent mothers, particularly in addressing their nutritional needs, is lacking. This study explored the perspectives and attitudes of pregnant adolescents and adolescent mothers regarding nutrition during pregnancy and infant care in the Central Region of Ghana. As part of the Healthy Adolescent Nutrition in Ghana (HANIG) study, pregnant adolescents (n = 13) and adolescent mothers (n = 22) aged 12-19 years were purposively selected from nine communities in the Cape Coast Metropolitan Area to participate in focus group discussions (n = 6). MAXQDA Analytics Pro 2020 was used for qualitative data analysis, following the reflective thematic analysis framework proposed by Braun and Clarke. Five central themes emerged: health and well-being, infant nutrition, dietary habits, nutrition information sources, and social support. Participants reported that exclusive breastfeeding for six months was impractical, leading to the use of supplementary foods. Economic constraints often led them to rely on less nutritious street foods. Participants advocated for tailored vocational training and interventions for pregnant adolescents and adolescent mothers. The findings of our study indicate that adolescent mothers tend to diverge from the recommended practices for infant and young child feeding. In addition, various challenges, including economic and cultural constraints, significantly affect their dietary choices and practices. There is the need for targeted intervention programs to improve nutritional practices among pregnant adolescents and adolescent mothers, particularly in rural communities.

## **ASSESSING GLYCOSURIA PREVALENCE AND PREDICTORS IN PREGNANT WOMEN RECEIVING ANTENATAL CARE IN NORTHERN GHANA**

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*Keywords: Depression, Food Security, Gestational Weight Gain, Ghana, Glycosuria, Hyperglycemia, Pregnant Women*

Despite the availability of recommended diagnostic procedures, glycosuria testing remains a widely used screening strategy in most Low- and Middle-Income Countries (LMICs). Yet, literature is limited on the magnitude of glycosuria and its correlates, which could be useful for appropriate clinical and public health response strategies. Hence, this study sought to assess the prevalence and predictors of glycosuria in Northern Ghana. This was a facility-based analytical cross-sectional study among 416 randomly sampled pregnant women receiving antenatal care at major government health facilities in the northern region, Ghana. Maternal exposure variables, including antepartum depression, food security, physical activity, and dietary intake, were measured using Edinburgh postnatal depression scale, food insecurity experience scale, international physical activity questionnaire-short form and women dietary diversity questionnaire, respectively. Also, gestational weight gain was obtained using standardized tools. Glycosuria was assessed using a qualitative dipstick urine glucose test with outcomes ranging from trace, one plus, to three pluses. Odds ratios (OR) for glycosuria were tested using binary logistic regression. The prevalence of glycosuria was 11.1% (confidence interval [CI]: 8.2-14.5%). The prevalence of glycosuria varied among pregnant women experiencing antepartum depression (13.0%), inadequate dietary diversity (13.0%), food insecurity (43.5%), physical inactivity (34.8%), and inadequate weight gain (78.3%). Participants who were settlers had an increased risk of developing glycosuria (OR=2.03, 95% CI: 1.1-4.1), as did those who were food insecure (OR=2.2, 95% CI: 1.15-4.17). However, no significant associations were observed among the other exposure categories. Glycosuria affects approximately 11% of pregnant women in Northern Ghana, with significantly higher prevalence among those experiencing food insecurity and immigrants. The study highlights the need for targeted antenatal care interventions, particularly focusing on improving food security and addressing the needs of migrant populations. Strengthening lifestyle and nutritional policies could be critical in reducing the prevalence and impact of glycosuria in this setting.

# **EFFECTIVENESS OF PEER NUTRITION EDUCATION ON INCREASING AWARENESS AND UPTAKE OF COLORECTAL CANCER AND ITS SCREENING AMONG RESIDENTS OF MT. ELGON SUB COUNTY, BUNGOMA COUNTY, KENYA**

*by CHRISPINE OCHIENG NGWAWE / Maseno University*

*Keywords: Colorectal Cancer; Nutrition Related Non-Communicable Diseases; Peer Nutrition Education, awareness of CRC screening; uptake of CRC screening*

Colorectal Cancer (CRC) is a leading cause of mortality with a slight preponderance to populations in low and middle-income countries (LMICs). CRC accounted for 10.2% of all cancers and 8.2% of all cancer deaths worldwide in 2018. In Kenya, CRC was estimated at 6.5% of new cancer cases and 4.5% of all cancer cases in 2020. Awareness of CRC and uptake its screening remain suboptimal in LMICs. This study aimed at determining the effectiveness of Peer Nutrition Education in increasing awareness of CRC, awareness and uptake of CRC screening among residents of Mt Elgon Sub-County. This was a pre-post study using quantitative and qualitative approaches. Trained Peer Educators were used to impart knowledge. Quantitative data analyzed using SPSS version 25, while qualitative data using NVivo application. Chi-square test determined existence of associations. Cochran's Q tests determined statistical significance of the differences during the Peer Education. McNemar's test determined statistical significance of the differences observed between the baseline and end-line. At baseline only 19 (4.7%) were aware of CRC while 9 (2.2%) had undergone screening. At endline 291(72.4%) were aware while 34 (8.5%) had screened. Chi-square analysis at baseline reported that socioeconomic and sociodemographic factors had no significant association with CRC screening awareness and uptake. During the study, Cochran Q test confirmed statistically significant increase in the awareness and uptake of CRC at  $\chi^2(3) = 444.671$ ,  $p < 0.0001$  and  $(\chi^2(3) = 61.404$ ,  $p < 0.0001$ ) respectively. McNemar's test established statistically significant differences in awareness and uptake of CRC screening before and after the Peer Education intervention,  $p=0.001$ . Peer Education attained statistically significant increases in awareness and uptake of CRC screening. these findings inform global, national and county level efforts on enhanced awareness and uptake of CRC screening.

## **PREVALENCE AND PREDICTORS OF OVERWEIGHT/OBESITY, ELEVATED FASTING BLOOD GLUCOSE, AND ELEVATED BLOOD PRESSURE AMONG SCHOOL CHILDREN IN THE GREATER ACCRA REGION, GHANA**

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*Keywords: Blood pressure, fasting blood glucose, non-communicable diseases, overweight/obesity*

Globally, non-communicable diseases (NCDs) account for over 41 million deaths annually. Childhood-onset nutrition-related risk factors of NCDs can progress into adulthood and exacerbate the disease burden. The study's objective was to determine the prevalence and predictors of overweight/obesity, elevated fasting blood glucose (FBG), and elevated blood pressure among schoolchildren in two districts in the Greater Accra region. A cross-sectional study was carried out among 406 school children aged 9-15 years in the Tema West and Ningo-Prampram districts of the Greater Accra region. Weight and height measurements were taken and converted into WHO BMI-for-age Z-scores. A subsample of 316 children was informed to fast overnight for about 12 hours after which their FBG were determined using standardized glucometers. Blood glucose levels above 5.6 mmol/l were classified as elevated. Duplicate blood pressure (BP) of the children was measured every week for three weeks and those with systolic/diastolic  $\geq 90^{\text{th}}$  percentile were classified as having elevated BP. The majority (54%) of the study children were overweight/obese indicating a high prevalence of childhood obesity while 28% had elevated FBG levels. About 12% of the children had elevated BP. Sex (AOR=2.25, 95% CI, 1.46-3.46), age (AOR=1.27, 95% CI 1.10-1.46), district (AOR =0.42, 95% CI 0.27-0.64) and school type (AOR=2.12, 95% CI 1.26-3.55) significantly predicted being overweight/obese but not having high FBG or BP. The district type however significantly predicted having elevated FBG (AOR=2.59, 1.47-4.58) and BP (AOR=0.31, 0.15-0.63). The prevalence of nutrition-related risk factors of NCDs is high among study participants and tailored interventions to curb it are urgently needed.



# CONSUMPTION PATTERN AND ADEQUACY OF CALCIUM INTAKE IN SELECTED ADULT POPULATIONS IN THE GREATER ACCRA REGION OF GHANA

by Samuel Sackar / University of Ghana

*Keywords: Adult population, Calcium intake, Food Frequency Questionnaire, Recommended Daily Allowances*

Calcium is the body's most abundant mineral. It is essential for bone health as well as a variety of metabolic functions. Globally, there is a high prevalence of calcium deficiency among adults. Although research suggests that calcium levels are influenced by dietary intake, data on calcium intake in the Ghanaian adult population is limited. This research therefore, aimed to assess the adequacy of calcium intake in selected adult populations in the Greater Accra Region of Ghana. This was a retrospective study that utilized total enumeration of secondary data on 309 Ghanaian adults collected between 2022- 2023 from three cross-sectional studies conducted in Accra. Calcium intake was assessed using a quantitative food frequency questionnaire. The Excel based West African Foods nutrient composition analysis database was used to estimate calcium intake. Descriptive statistics (median and ranges) were used to analyse calcium intake. Statistical significance was set at  $p < 0.05$ . The total median calcium intake of participants was 521.40 (336.53 – 890.65) mg. Males had slightly higher, 553.60 (341.94 – 995.90) mg, median calcium intakes than females, 498.61 (325.89 – 834.13) mg. Majority (77.7%) of the participants had calcium intakes lower than the Recommended Daily Allowances (RDAs). The most frequently consumed dairy products were milk, yoghurt, ice cream, and wagashi. In the green leafy vegetables group, *kantomire* (31.0%) and *ayoyo* (28.1%) were consumed frequently. In the legumes and nuts group, black-eyed beans and groundnuts were frequently consumed by 25.2% and 39.2% of participants, respectively. The majority of the study population reported calcium intake below the recommended daily levels. There is a need to intensify nutrition education to encourage the consumption of calcium-rich foods. A facility-based qualitative study was used to gather data from twenty diabetic patients (fourteen females and six males). Face-to-face in-depth interviews were conducted to explore their self-management experiences in the Juaboso Government hospital. Atlas. ti version: 7.5.16 was used for the analysis to bring out the different themes of the study. Most participants (80%) were aged 50 years and above. Three main elements were identified in this study. These include the patients' experiences and perspectives of self- management, their knowledge regarding self-management techniques, and the barriers and enablers of self-

management. Economic access was perceived as a major barrier to accessing their meals and medications regularly. Family support was perceived as an enabler in ensuring they received their medications needed. Patients' experiences and perceptions of self-management highlights a common misperception in this study which has implications for the effective management of T2DM. In addressing these, there is the need to move towards patient-centered interventions by empowering individuals with Type 2 diabetes to navigate their treatment regiments more effectively, enhancing their quality of life and well-being.

## **DIABETES SELF-MANAGEMENT EXPERIENCES AMONG MIDDLE-AGED INDIVIDUALS IN THE JUABOSO GOVERNMENT HOSPITAL, GHANA**

*by PAMELA ANDOH AGYIMAH / SENAM KLOMEGAH / UNIVERSITY OF HEALTH AND ALLIED SCIENCE / UNIVERSITY OF HEALTH AND ALLIED SCIENCES*

*Keywords: Type 2 Diabetes Mellitus(T2DM), non-communicable diseases, self-management practices.*

Diabetes has significant implications for public health with the global population of persons with diabetes expected to reach five hundred and fifty-two million by 2030. In Juaboso, Type 2 diabetes mellitus(T2DM) accounts for ninety percent of all diabetes cases which mostly affects adults above forty years. To prevent and manage diabetes, a patient's active participation in his or her treatment is paramount. This study explored the perceptions and experiences of the self-management practices of middle-aged individuals living with T2DM at the Juaboso Government Hospital. A facility-based qualitative study was used to gather data from twenty diabetic patients (fourteen females and six males). Face-to-face in-depth interviews were conducted to explore their self-management experiences in the Juaboso Government hospital. Atlas. ti version: 7.5.16 was used for the analysis to bring out the different themes of the study. Most participants (80%) were aged 50 years and above. Three main elements were identified in this study. These include the patients' experiences and perspectives of self- management, their knowledge regarding self-management techniques, and the barriers and enablers of self-management. Economic access was perceived as a major barrier to accessing their meals and medications regularly. Family support was perceived as an enabler in ensuring they received their medications needed. Patients' experiences and perceptions of self-management highlights a common misperception in this study which has implications for the effective management of T2DM. In addressing these, there is the need to move towards patient-centered interventions by empowering individuals with Type 2 diabetes to navigate their treatment regiments more effectively, enhancing their quality of life

and well-being.

## **DRIVERS OF OVERWEIGHT AND OBESITY AMONG GHANAIAN WOMEN: A DECOMPOSITION ANALYSIS USING THE 2003-2022 GHANA DEMOGRAPHIC AND HEALTH SURVEYS**

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*Keywords: Decomposition analysis, Ghanaian women, Obesity, Overweight*

Over the past two decades, the prevalence of overweight and obesity among Ghanaian women has significantly increased, posing numerous health risks. This study identifies key factors associated with overweight and obesity among women of childbearing age, and examines how these drivers have contributed to changes in overweight and obesity prevalence over the years. Data from the Ghana Demographic and Health Surveys (GDHS) for 2003, 2008, 2014, and 2022 were analysed using a multivariate decomposition approach. The sample included women aged 15-49 years, with overweight defined as a Body Mass Index (BMI) of 25 to 29.9 kg/m<sup>2</sup> and obesity, BMI  $\geq 30$  kg/m<sup>2</sup>. A weighted multiple binary logistic regression model assessed the associations between overweight and obesity and selected covariates. The multivariate decomposition technique quantified the contributions of selected variables to changes in overweight and obesity prevalence. Sensitivity analysis using continuous BMI data validated the findings. The mean BMI among women aged 15-49 years increased significantly from 23.10 kg/m<sup>2</sup> in 2003 to 25.04 kg/m<sup>2</sup> in 2022. The proportion of overweight and obese women also increased during this period. Key drivers included age, wealth quintile, education, location of residence, region, and frequency of TV watching. Women in the richest quintile had approximately three times the risk of transitioning from a healthy weight to overweight, compared to those in the poorest quintile over the past two decades, and the risk of obesity was approximately eight times higher. The multivariate decomposition indicated that changes in the study population characteristics accounted for 0.43 (22%) of the increase in average BMI from 2003 to 2022. The rising prevalence of overweight and obesity among Ghanaian women is largely driven by socioeconomic factors, particularly wealth. This suggests a need for targeted public health interventions addressing these determinants.

## COMMUNAL-BOWL HAND-RISING AND COMMUNAL-BOWL EATING WITH HANDS, AS POTENTIAL RISKS FOR DIARRHOEA AND MALNUTRITION: A MULTI-COUNTRY MIXED METHODS EXPERT STUDY

### MULTIPLE MICRONUTRIENT SUPPLEMENTATION AND ITS ASSOCIATION WITH COPPER, IRON & ZINC LEVELS IN HUMAN MILK OF LACTATING MOTHERS AND INFANT NUTRITIONAL STATUS IN JOS, NIGERIA, A RANDOMISED CONTROL TRIAL.

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**Keywords:** Copper, Iron, Lactating mothers, Multiple Micronutrient Supplementation, Zinc

While single supplementation studies exist for pregnant and lactating mothers in Nigeria, data on the impact of multiple micronutrient supplementation (MMS) on human milk copper, iron, and zinc levels are scarce. This study aims to understand the effects of 10 weeks of MMS on these mineral levels in lactating mothers' milk. In a randomized controlled trial with 66 lactating mother-child pairs, the intervention group received 10 weeks of MMS (2.0 mg Cu, 30 mg Fe, 15 mg Zn), while the control group received a placebo. Human milk samples were collected at baseline, 6 weeks, and 10 weeks. Child anthropometry and maternal dietary intake were assessed, and Cu, Fe, and Zn levels were analyzed using ICP-OES. Maternal and infant demographics indicated successful randomization. No significant changes were observed in copper levels (baseline:  $0.58 \pm 0.29$  mg/L; 10 weeks:  $0.27 \pm 0.09$  mg/L) or iron levels (baseline:  $1.03 \pm 1.44$  mg/L; 10 weeks:  $0.35 \pm 0.18$  mg/L) in the intervention group. However, zinc levels significantly decreased from  $4.92 \pm 1.78$  mg/L at baseline to  $1.64 \pm 0.78$  mg/L at 10 weeks ( $p = 0.043$ ). In human milk, protein intake showed a weak positive correlation with copper (0.38), while disaccharide intake had a weak negative correlation (-0.32). For iron, calcium intake had a weak positive correlation (0.33). Calcium intake also had a weak negative correlation with zinc levels (-0.04). MMS had no impact on human milk Cu, Fe, and Zn after 10 weeks. No association was found between maternal intake of iron, zinc, and copper and their concentrations in human milk. However, maternal dietary calcium and phosphorus were associated with milk copper levels. Further long-term RCTs are needed.

## **PREDICTORS OF DIET QUALITY AMONG WOMEN OF REPRODUCTIVE AGE IN HOHOE.**

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*Keywords: Diet quality, Dietary Diversity Score, Food Security, Healthy Eating Index*

Diet quality, measured by dietary diversity and healthy eating indices, is crucial for supporting the body's maintenance, growth, and immunity. Poor diet quality is linked to increased risks of anemia, diabetes, and other non-communicable diseases, especially during pregnancy. Women of reproductive age are a vulnerable group, and research shows they often have low intakes of critical micronutrients (Iron, vitamin A). The study is conducted to assess the predictors of diet quality in a resource-poor community in the Volta region of Ghana. This study aims to determine the predictors of diet quality among Women of reproductive (15-49 years) age in Hohoe municipality. This was a cross-sectional study among 422 Women of reproductive age. A semi-structured questionnaire was administered to collect data on participant's background characteristics, food security status, and dietary intake (24-hour recall), providing insights into the connections between these factors. DDS was calculated and categorized as low ( $<5$ ) or high ( $\geq 5$ ) and HEI was calculated by converting food intake into grams and is scored as poor ( $<49$  points) or good ( $\geq 50$  points). The study population had a mean age of 27.9 years, with 41.9% aged 20-29. While 98.3% consumed cereals, only 1.4% had condiments. Some foods eaten that were neither high or low include Pulse 32%, Meat 37.2%, and green leafy vegetables 10.9%. Half had a good dietary diversity score, but 38.9% had a poor Healthy Eating Index, Christians were 70% less likely to have diversified food and 70% less likely to have a good healthy eating index. Married women were 2.5 times more likely to have a diversified diet than unmarried women. Food-insecure women were 40% less likely to have a good Healthy Eating Index. The consumption of cereals was high among participants and diet quality was influenced by religion, marital status, and food security status.

## **A COMPARATIVE STUDY OF MATERNAL AND PATERNAL KNOWLEDGE AND ATTITUDES TOWARDS BREASTFEEDING IN BAUCHI METROPOLIS, BAUCHI STATE, NIGERIA.**

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*Keywords: Breastfeeding attitudes, Exclusive breastfeeding, Infant welfare, Maternal and paternal nutrition knowledge*

Breast milk is the most beneficial source of nutrition for newborns and mothers. Improved maternal and paternal understanding, and involvement in breastfeeding can contribute to its prolonged sustainability. This study aimed to compare the maternal and paternal nutrition knowledge and attitudes towards breastfeeding in Bauchi metropolis. A descriptive cross-sectional study of 238 participants (130 mothers and 108 fathers) used a semi-structured questionnaire to gather socio-demographic data, nutrition knowledge, and attitudes. Data were analyzed using SPSS 25, employing descriptive statistics and chi-square tests for comparison, with significance set at  $p < 0.05$ . Most mothers (80.0%) and fathers (71.3%) agreed breast milk is more easily digested than animal milk ( $p = 0.12$ ). The majority (61.5% of mothers, 59.3% of fathers,  $p = 0.72$ ) recognized colostrum's nutritional value. Both groups (88.5% of mothers, 91.7% of fathers,  $p = 0.84$ ) acknowledged breastfeeding's protective effects against illness. Participants (60.8% of mothers, 63.0% of fathers,  $p = 0.72$ ) supported breastfeeding during work hours. A significant difference ( $p = 0.01$ ) was observed in attitudes towards mothers working while breastfeeding (69.2% of mothers and 72.8% of fathers disagreed). Notably, 56.9% of mothers and 48.1% of fathers ( $p = 0.15$ ) disagreed with WHO's recommendation for exclusive breastfeeding duration. This study found no significant differences in most aspects of breastfeeding knowledge and attitudes between mothers and fathers, except for opinions on working while breastfeeding. Both groups demonstrated good knowledge and positive attitudes. However, there's a need for improved education on WHO recommendations. Encouraging expectant parents to embrace exclusive breastfeeding during pregnancy could significantly enhance infant welfare.

## HEALTH INTERVENTIONS IN ADOLESCENTS: THE COMBINED EFFECTS OF IRON-FOLIC ACID SUPPLEMENTATION AND DEWORMING ON FOLATE AND ANAEMIA STATUS OF ADOLESCENT GIRLS IN ABUJA, NIGERIA

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*Keywords: Adolescents, anaemia, haemoglobin, iron-folic acid supplementation, serum ferritin*

Adolescence is a critical window for growth and development; unfortunately, adolescents are often overlooked as health and nutrition interventions targeted to this age group are often underfunded. This study assessed the combined effects of iron-folic acid supplementation and deworming on folate and anaemia status of adolescent girls in a Government Secondary School, Abuja, Nigeria. A quasi-experimental design was employed, and a total of 67 adolescents who met the inclusion criteria were recruited for the study. The adolescent girls were given weekly iron-folic acid containing 60 mg of elemental iron and 0.04 mg of folic acid for 12 weeks. A one-off deworming tablet (400 mg of Albendazole) was administered a week prior to the commencement of the weekly iron-folate intervention. Baseline data of haemoglobin, iron and folate level were collected. End-line assessment of anaemia (Hb), serum ferritin, and serum folate was conducted after the 12-week to determine the effect of the weekly iron-folic acid intervention on the adolescents. Statistical analysis of frequencies, mean, percentages, paired sample t-test and correlations, was carried out using IBM-SPSS, version 22. Differences were inferred to be significant at  $p < 0.05$ . The adolescents were within the age-range of 10-14 years (64.3%) and 15-19 years (35.7%). Worm infestation was low (7.5%), while prevalence of anaemia was 17.5% at baseline. After the 12 weeks intervention, all the subjects had normal haemoglobin level. At baseline, a total of 7.5% and 2.5% of the subjects had deficient serum ferritin and folate levels, respectively. However, at the end of the intervention 100% of the adolescents were free from worm infestation and had normal level of serum ferritin and folate. School-based weekly iron-folic acid supplementation and deworming improved folate and anaemia status and eradicated worm infestation among the adolescents.

## **ANAEMIA PREVALENCE AND RELATED FACTORS AMONG PREGNANT WOMEN IN GHANA: ANALYSIS OF FACILITY DATA FROM 2014 TO 2020 FROM TWO REGIONS**

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*Keywords: Anaemia, Eastern region, Ghana, Upper West region, Women of Reproductive Age*

Anaemia is a public health issue among women of reproductive age (WRA) in Ghana. Nationally, anaemia among WRA declined from 59% to 42% between 2008 and 2014. Sub-nationally, significant reductions were observed in the Upper West (UWR) (70% to 36%) and Eastern region (ER) (58% to 39%) simultaneously. This study examined anaemia prevalence and related factors among WRA in the two regions at the sub-national level. District Health Information System (DHIMS2) data from 2014 to 2020 for Ghana were analyzed for ER and UWR. Anaemia was measured as haemoglobin (Hb) <11.0g/dl. Percentages, means and frequencies were used to describe trends and patterns. Microsoft Excel and IBM SPSS V27 were used for data analysis. Of 799,622 antenatal care (ANC) registrants, 76.2% were from the ER and 23.8% from UWR. Anaemia prevalence at ANC registration was 31.9% (ER) and 40.4% (UWR). At  $\geq 36$  weeks of pregnancy, anaemia prevalence was 29.3% (ER) and 39.5% (UWR). The prevalence of mothers' 4th ANC attendance was 67.4% (ER) and 78.9% (UWR). The proportion of sulfadoxine-pyrimethamine (SP)/Fansidar (IPTp) dosing for malaria prevention was similar in both regions with IPTp1 being the highest dose- (65.2%) ER and (64.4%) UWR. The proportion of women given iron-folic acid supplementation 3 times was higher in ER (80.7%) than in UWR (63.1%). The proportion of ITN distributed was 64.8% (ER) and 53% (UWR). The proportion of mothers initiating breastfeeding was 72.3% (UWR) and 70.9% (ER). Anaemia prevalence is higher in the UWR than in the ER. There are disparities in related factors. The sociodemographic characteristics of the regions could explain this difference. Targeted interventions such as nutrition education for improved dietary intake and counselling should be encouraged among pregnant women in the UWR to reduce anaemia.



## **ANAEMIA IN PREGNANCY: MAGNITUDE AND ASSOCIATED FACTORS AMONG ADOLESCENTS IN THE NORTHERN REGION OF GHANA**

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*Keywords: Anaemia, Magnitude, Pregnant adolescents, nutritional status*

Pregnancy, particularly during adolescence, is a critical period for maternal and foetal nutrition. Yet, there is a dearth of data on anaemia in pregnancy among adolescents and its associated factors especially in the Northern Region of Ghana. Hence, this study sought to assess the magnitude of anaemia in pregnancy and its associated factors among adolescents in Yendi, Northern Region. The cross-sectional study involved 399 randomly-selected consenting pregnant adolescents aged 14 to 19 years. Semi-structured questionnaires were used to obtain data on socio-demographic characteristics, health and pregnancy-related issues. Dietary diversity and food security were also assessed using the women dietary diversity questionnaire (MDD-W) and the food insecurity experience scale respectively. Logistic regression was used to identify factors associated with anaemia in pregnancy among adolescent; statistical significance was considered at  $p < 0.05$ . The magnitude of anaemia in pregnancy among adolescents was 88.7% (CI: 85.2-91.7). Those who did not want to become pregnant were less likely to be anaemic [AOR: 0.09, CI (.03-0.28),  $p < .001$ ]. Those who used contraceptives [AOR: 4.07, CI (1.64-10.15),  $p = .003$ ] and those who suffered stigma and isolation [AOR: 3.55, CI (1.17-10.79),  $p = .025$ ] were four times more likely to be anaemic. Those who were food insecure were about three times more likely to be anaemic [AOR: 2.91, CI (1.18-6.67),  $p = .019$ ], and those with wealth status being in quartile 2 were about five times more likely to be anaemic [AOR: 4.76, CI (1.15-19.80),  $p = .032$ ]. Anaemia in pregnant adolescents is high, and associated with contraceptive use, suffering stigma and isolation, food security status, and wealth status. It is a public health concern and requires urgent attention. Health interventions and social behavior change programmes should take into account the associated factors when designing interventions to reduce anaemia in pregnancy.

## ASSESSMENT OF COVERAGE OF VITAMIN A SUPPLEMENTATION, DEWORMING AMONG CHILDREN AGED 6-59 MONTHS IN MERU, THARAKANITHI, NYERI, NYANDARUA, AND KIRINYAGA COUNTIES OF KENYA

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*Keywords: Coverage, Deworming, Malezi-Bora, Vitamin A*

Globally, Vitamin A Deficiency affects 30% of under-5 children and is associated with 2% [1] of deaths while Soil-Transmitted Helminth impairs their nutrition status[2]. WHO recommends biannual Vitamin A supplementation (VAS) and deworming, targeting >80% coverage. The Ministry of Health Kenya delivers the interventions through routine health facility, Malezi Bora (MB) events, community outreaches, and early childhood development centres. A post-event coverage survey was conducted in July 2023 to estimate the true coverage. A cross-sectional survey employed the WHO (2018) two-stage stratified cluster using both quantitative and qualitative methods. Clusters were selected by probability proportionate-to-size sampling and households randomly selected. The survey had one stratum reaching 887 caregivers and 999 children, 78 CHPs and 71 health workers. The VAS and deworming coverages were 83% and 75% respectively. Reasons for non-receipt were CHPs not visiting homes (VAS=39%;OR=1.336;p=0.041], and deworming (=37%;OR=1.027;p=0.050) and caregivers not informed (VAS=31%;OR=1.161;p=0.039], and deworming =27%;OR=0.938;p=0.029]). The VAS MB coverage was +5.8% higher than the administrative coverage of June 2023. Less than <48% of the respondents were aware of MB through CHPs= 45% and health workers=25%. Caregivers' knowledge on Vitamin A was 87%, but variations exist in awareness on benefits and dosing frequency. VAS and deworming coverages were satisfactory (>80% national target). The coverages were significantly higher during the MB events. The low caregiver knowledge is associated with missed opportunities and low coverage rates. Therefore, with better planning, mobilization and documentation, more children will be reached with the two interventions.

## **FOOD SECURITY, DIETARY INTAKE AND COGNITION IN SICKLE CELL DISEASE PATIENTS IN A HEALTH FACILITY IN GHANA**

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*Keywords: Cognition, Dietary Intake, Food Security, Sickle Cell Disease*

Patients with sickle cell disease (SCD) often experience cognitive issues, mostly due to biological factors. This study investigated the interplay between food security, dietary intake, and cognitive performance in sickle cell disease (SCD) patients compared to healthy controls in a healthcare facility in Ghana. The case-control study involved 64 stable SCD patients (case group) and 64 healthy individuals (control group), aged 13–24 years. Data were collected using structured interview questionnaires, and a 24-hour dietary recall. Cognitive function was assessed with the digit span test. The student t-test and Pearson chi-square of IBM SPSS software version-20 was used to analyze the data. Compared to the control group, the case group had lower levels ( $p < 0.001$ ) of haemoglobin ( $9.3 \pm 1.7 \text{ g/dL}$ ), hematocrit ( $9.35 \pm 1.79\%$ ), and mean cell volume ( $74.4 \pm 6.54 \text{ fL}$ ), suggesting a potential microcytic iron deficiency anaemia. The case group showed significantly higher platelet ( $330 \pm 134 \times 10^3/\text{uL}$ ) and white blood cell ( $8.95 \pm 3.40 \times 10^3/\text{uL}$ ) levels compared to the control group ( $p < 0.001$ ), possibly due to chronic hemolysis-induced inflammation in SCD participants. The average cognitive test score in the case group was  $15.73 \pm 3.6$  marks, higher than the control group's  $13.9 \pm 3.5$  marks ( $P < 0.002$ ). In the case group, 46.9% had high food security, and 23.4% had low food security, while in the control group, 35.9% had high food security and 37.5% had low food security ( $p = 0.096$ ). The case group had a greater intake of nutrients for most nutrients, except for potassium ( $1950.44 \pm 1133.59 \text{ mg}$ ) and manganese ( $3.85 \pm 1.87 \text{ mg}$ ), which were slightly lower compared to the control group, with no significant variance ( $p = 0.883$  and  $p = 0.414$  respectively). The paradoxical finding of improved cognitive performance in the case group compared to the control may be linked to higher dietary intake and increased food security among SCD patients. Addressing food security and dietary intake can improve cognitive function and overall well-being in sickle cell disease management.

## **MALNUTRITION AND ITS ASSOCIATED FACTORS AMONG GHANAIAN OLDER ADULTS RECEIVING INSTITUTIONAL CARE**

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*Keywords: Ghana, Institutional care, Malnutrition, Older adults*

The importance of providing quality care for older adults in institutional settings is increasingly being acknowledged and valued in Ghana. A significant concern that warrants attention is malnutrition as it remains pervasive with devastating consequences on health and well-being. This study assessed the malnutrition status and its associated factors among older adults receiving institutional care in Ghana. A Mini Nutritional Assessment (MNA) questionnaire was used to collect and score background, dietary, health and anthropometric information on 300 older adults receiving care from 16 selected institutions in the Greater Accra Region of Ghana. The scores from the 'MNA' were used to classify participants as well-nourished, at risk of malnutrition and malnourished. Data were analysed using R studio version 4.1.3. The associated factors were determined in a multinomial logistic regression. Participants were mostly female (76.7%), not married (67.3%), had basic education (43.3%) and were primarily caring for themselves (53.7%). A fifth of them were actively working with most engaged in trading. Nearly 29% of the older adults were either malnourished (24.4%) or at risk of malnutrition (4.3%). Older adults who sought care primarily from the institutions were twice more likely to be malnourished ( $p < 0.001$ ) and 3 times more likely to be part of the 'at risk' category ( $p < 0.001$ ). Those with at least one child were up to about 4 times less likely to be either malnourished ( $p < 0.001$ ) or part of the 'at risk' category ( $p < 0.001$ ). Malnutrition risk was high, with having at least one child and primarily under institutional care being associated factors. There is the need for nutrition education and other targeted interventions.

## **NUTRITION RELATED BURDEN OF NON-COMMUNICABLE DISEASE AND ITS ATTRIBUTABLE TO RISK FACTORS IN AFRICA FROM 2010 – 2021**

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*Keywords: Africa, Non-Communicable Disease, Nutrition, Risk Factors*

The rapid rise of the burden of non-communicable diseases (NCD) in African communities has resulted in a significant burden of mortality, morbidity, disabilities, and economic costs. A comprehensive evaluation of both nonfatal and fatal health trends nutritional related to non-communicable diseases by age, gender, and geographical location over time is essential to

guide policy decisions aimed at controlling these diseases. African cause-specific mortality rates were determined through a combination of vital registration, verbal autopsy data, and the Cause of Death Ensemble model (CODEm). Additionally, incidence data from medical insurance claims and hospital discharges were analyzed using DisMod-MR 1 a Bayesian meta-regression modeling tool, to estimate the age sex and location-specific incidence of urolithiasis from 2000 to 2012. YLLs due to urolithiasis were computed by multiplying the estimated number of deaths by the standard life expectancy at the age of YLDs. In 2021, Africa experienced 2.54 billion cases of NCDs. This represents a 33% increase in incidence cases and a 1% increase in the age-standardized incidence rate compared to 2010. All regions of the Africa Union saw an increase in NCD cases, ranging from 24% in Northern Africa to 40% in Western Africa. NCD-related deaths in Africa reached 4.01 million in 2021. This reflects a 24% increase in death counts, while the age-standardized death rate decreased by 7% compared to 2010. NCDs accounted for a significant proportion of health burdens in Africa, contributing to 32% of incidence cases, 36% of deaths, 34% of Disability-Adjusted Life Years, 71% of Years Lived with Disability, and 25% of all diseases. Cardiovascular diseases, neoplasms, digestive diseases, diabetes mellitus, and chronic kidney disease were the leading causes of NCD-related deaths in Africa. Age-standardized incidence rates for non-communicable diseases in Africa have seen a slight decrease, but the number of cases, deaths, and disability-adjusted life years has significantly increased.

## **ASSOCIATION BETWEEN DIETARY INTAKE, PHYSICAL ACTIVITY, PSYCHOSOCIAL STRESS AND OXIDATIVE STATUS IN INDIVIDUALS WITH TYPE 2 DIABETES ATTENDING AN OUTPATIENT CLINIC IN GHANA**

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*Keywords: Type 2 diabetes, antioxidants, oxidative stress, physical activity, psychosocial stress*

Unhealthy diet, physical inactivity and psychosocial stress are linked to increased oxidative stress which could exacerbate hyperglycaemia-induced oxidative stress in individuals with

type 2 diabetes (T2D). The aim of this study was assess associations between dietary intake, physical activity, psychosocial stress and oxidative status in outpatients with T2D. This cross-sectional study involved 102 adults with T2D from two outpatient clinics in Kumasi, Ghana. Dietary intake of antioxidant-rich foods, physical activity, psychosocial stress, anthropometric indices, fasting blood glucose (FBG) and glycated haemoglobin (HbA1c) were assessed. Additionally, thiobarbituric acid reactive substances (TBARS) and total antioxidant capacity (TAC) assays were performed as indicators of oxidative stress and antioxidant status respectively. Most (69.3%) of the participants were overweight/obese. Almost half (49.0%) reported moderate to high stress levels while 61.8% had low physical activity status. Majority (82.4%) reported consuming antioxidant-rich foods on a monthly basis. Additionally, 66.7% had poor glycemic control (HbA1c >7%). Participants' median TAC and TBARS were 0.92 mmol/l (IQR 0.84-1.02) and 317 ng/l (IQR 272.5-339.5) respectively. Normal weight participants had higher TAC than obese participants [0.97 mmol/l (IQR 0.87-1.09) vs 0.83 mmol/l (IQR 0.78-0.90)],  $p=0.002$ . Participants who reported tea consumption showed lower TBARS levels than those who did not [288.0 ng/l (IQR 232.0-321.5) vs 319.5 ng/l (IQR 288.0-344.5),  $p=0.016$ ]. Frequency of intake of antioxidant- rich foods, physical activity and psychosocial stress did not significantly influence participants' TAC and oxidative stress status ( $p>0.05$ ). Frequency of intake of antioxidant-rich foods, physical activity and psychosocial stress status did not influence oxidative stress and antioxidant status in this sample. Nevertheless, individuals with a normal weight status showed elevated antioxidant levels, whereas tea consumption was linked to reduced oxidative stress. Therefore, strategies promoting normal weight status and regular tea intake could potentially alleviate oxidative stress and enhance antioxidant levels among individuals with type 2 diabetes in Ghana.

## **PREVALENCE OF HYPERTENSION AND OBESITY AMONG PEOPLE LIVING WITH DIABETES IN CAPE COAST METROPOLIS, GHANA.**

*by Isaac Anane / University of Cape Coast*

*Keywords: Diabetes, Ghana, Hypertension, Obesity, Prevalence, Risk factors*

Globally, diabetes, hypertension, and obesity are major public health concerns with significant morbidity and mortality . These conditions frequently co-exist and interact synergistically to worsen health outcomes. This study aimed to determine the prevalence and factors associated with hypertension and obesity among people living with diabetes in Cape Coast, Ghana. A cross-sectional study was conducted among 290 people living with diabetes visiting two hospitals in Cape Coast. Data on socio-demographics, medical history, anthropometrics, and blood pressure were collected. Hypertension was defined as BP  $\geq 140/90$  mmHg or being on antihypertensive medication. Obesity was classified using

BMI categories. Chi-square test and multivariate logistic regression were used to determine factors associated with hypertension and obesity. Most of the study participants (68.6%) were overweight or obese with only about 29% having normal body mass index (BMI). Again, the majority of the study participants (76.6%) had some form of hypertension. Variables such as age ( $p=0.013$ ), level of education ( $p=0.042$ ), ethnicity ( $p=0.042$ ), and sex ( $p=0.031$ ) were associated with hypertension in people living with diabetes. Predictors of hypertension were age group  $\geq 60$  years (AOR = 12.2: 95%CI: 5.2 – 27.6:  $p=0.012$ ), alcohol intake (AOR = 3.634: 95%CI: 2.329 - 17.157:  $p=0.024$ ), family history of hypertension (AOR = 4.6: 95%CI: 0.161-35.38:  $p=0.002$ ). The prevalence of hypertension and obesity is high among people living with diabetes in Cape Coast. There is sufficient evidence suggesting that sociodemographic characteristics such as age, level of education, sex, ethnicity and alcohol intake is associated with hypertension in this study population.

## **DETERMINANTS OF METABOLIC SYNDROME AMONG ADULTS WITH TYPE 2 DIABETES IN 4 SELECTED HOSPITALS IN THE GREATER ACCRA REGION OF GHANA**

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*Keywords: High blood pressure, Metabolic syndrome, Type 2 diabetes, Waist to hip ratio*

Metabolic syndrome significantly increases the risk of type 2 diabetes, which in turn doubles the risk of cardiovascular disease. Calorie-dense diets and sedentary lifestyles are well-known risk factors globally, but their impact in Africa is less understood. The aim was to determine the prevalence of metabolic syndrome and its underlying causes in people with type 2 diabetes at 4 selected hospitals in the Greater Accra Region of Ghana. A hospital-based cross-sectional study was conducted among 80 diabetic patients attending four-selected diabetes mellitus hospitals in the Greater Accra Region of Ghana. Type 2 diabetes was most prevalent (69.3%) in people aged 50 to 79 years with a mean arterial pressure of ( $106.43 \pm 13.24$ )mmHg. Among diabetic patients in 4 selected hospitals in Ghana, 28.3% of females and 45% of males had normal BMI, 31.7% of females and 40% of males were overweight, and 40% of females and 15% of males were obese. Diabetic patients were found to have a 48.1% prevalence of metabolic syndrome. The prevalence of the metabolic syndrome (MetS) was higher in females than in males. The three most prevalent variables among metabolic syndrome were waist-to-hip ratio (98.7%), waist circumference (95%) and hypertension (70.3%). Significant gender differences were observed in waist circumference ( $p$ -value = 0.044) and high blood pressure ( $p$ -value = 0.024). Almost half of the diabetic population had metabolic syndrome which is of public concern.

## **EFFECT OF TAMARIND (*TAMARINDUS INDICA* L.) ON THE CARDIOMETABOLIC HEALTH OF PATIENTS LIVING WITH HIV AND ELEVATED TRIGLYCERIDE: A DOSE-RESPONSE DOUBLE-BLIND, RANDOMIZED EXPLORATORY TRIAL**

*by Tonny Kiyimba / Department of Food Science and Technology, Kyambogo University, Kyambogo, Uganda*

*Keywords: HIV, Keywords: Cardiometabolic health, Phytochemicals, Tamarindus indica L., Uganda, sub-Saharan Africa*

The upsurge in cardiometabolic dysfunction in sub-Saharan Africa calls for more sustainable remedies. Particularly, People Living with HIV (PLWH) have an increased risk of metabolic syndrome. Tamarind (*Tamarindus indica* L.), a fruit native to Africa, is rich in polyphenols and is traditionally used as a remedy for cardiometabolic risks. We assessed the potential of Tamarind fruit juice to improve lipid metabolism in PLWH. We conducted a 4-week, randomized (1:1) trial of 50 patients allocated to two doses of Tamarind fruit juice. The primary endpoint was triglycerides (TG), and eligible participants were aged 30 to 60y with TG $\geq$ 150 mg/dL. Patients consumed 600mL of Tamarind fruit juice daily, containing respectively 123mg, and 337mg of total polyphenols. Fasted blood samples were analyzed for lipid profile and glucose. Blood pressure, vascular function, anthropometry, and body composition were measured. Patients were required to maintain their habitual diet and lifestyle. Dietary intake and background polyphenol intake, and physical activity were measured throughout the study through a 24-hour dietary recall and the International Physical Activity Questionnaire. Trial registration (**NCT06058845**). There was a non-statistically significant difference in TG between doses of -17.7mg/dL (95% CI: -70.1, 34.7),  $P=0.499$ , which remained unchanged after adjusting for BMI, physical activity, and dietary intake. In the 337mg dose, the within-group effect was -39.8mg/dL (95% CI: -67.7, -11.9),  $P=0.006$ , corresponding to a 17.3% reduction of the baseline TG levels, while no statistically significant effect was noted for the 123mg dose. Concerning the secondary endpoints, the 123mg dose significantly reduced systolic blood pressure by -7.4mmHg (95% CI: -14.5, -0.26),  $P=0.043$ . Physical activity, dietary intake, and background polyphenol intake did not vary significantly within and between groups. A 4-week consumption of Tamarind fruit juice standardized at 337mg/d total polyphenols substantially improved TG metabolism. This exploratory trial provides a basis for future full-scale trials.



## **ASSESSING COOKING OIL USE AND TRANS FAT AWARENESS AMONG FRIED FOOD VENDORS IN GHANA: IMPLICATIONS FOR PUBLIC HEALTH POLICY**

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*Keywords: cooking oils, deep frying, food vendors, reuse oils, trans fats*

The consumption of high levels of trans-fatty acids (TFAs) causes 540,000 deaths annually. Despite global efforts to eliminate dietary TFAs, data to guide policies in low and middle-income countries is scarce. Repeated use of cooking oils can lead to harmful TFA levels in fried foods. This study explored cooking oil use and reuse practices among fried-food vendors in Ghana. We collected qualitative data in the Hohoe Municipality and quantitative data across all 16 regions of Ghana to assess oil use practices among fried-food vendors as part of a student practicum. Data collected included socio-demographic information, cooking oil use and reuse practices, and awareness of TFAs. The qualitative data were analyzed thematically using ATLAS.ti, while descriptive and inferential analyses on quantitative data in Stata. A total of 15 in-depth interviews conducted revealed a weak perception of risk associated with the repeated use of cooking oil, with cost-saving being the primary motivation for this practice. When informed about the harmful effects of TFAs, vendors expressed willingness to consider healthier alternatives, if affordable. In the survey, 1,334 food vendors (93.3% female) participated, with 61.1% having completed junior or senior high school. About 40% reused oil three or more times, and most (1,049) were unaware of TFAs. The key determinants for the repeated use of cooking oil included lower income (AOR = 0.55, 95% CI: 0.32–0.95), use of palm olein oil (AOR = 0.81, 95% CI: 0.59–1.12), and reliance on unpleasant odor as an indicator for oil change (AOR = 2.22, 95% CI: 1.16–4.26). The reuse of cooking oils, driven by cost-saving measures and lack of awareness about TFAs, poses public health risks. Targeted interventions, educational campaigns, and affordable, healthier oil alternatives are needed to reduce TFA consumption and mitigate health risks.

## AMELIORATIVE EFFECTS OF TERMITOMYCES ROBUSTUS ON COMPLICATIONS AND ALTERED MICRONUTRIENT STATUS IN STREPTOZOTOCIN-INDUCED DIABETIC WISTAR RATS

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**Keywords:** Diabetes complications, Diabetes mellitus, Micronutrient status, *Termitomyces robustus*

Diabetes mellitus, a global public health threat with severe, yet avoidable consequences is on the increase. Rising pharmacotherapy cost and complications have increased diabetes-related mortality, hence, the need to look inward for local solution. Edible indigenous mushrooms such as *Termitomyces robustus* (TR) have been implicated to have ameliorative effects on diabetic progression, but their modulatory roles remain insufficiently researched. The study was undertaken to evaluate ameliorative effect of TR on complications and altered micronutrient status in streptozotocin-induced diabetic rats. Four groups of Wistar rats were made diabetic using streptozotocin while one group served as control. Streptozotocin-induced hyperglycemia, diabetic complications, and nutrient depletion in the rats were treated with Metformin, 15% TR powder inclusion and TR aqueous extract. Serum nutrient composition were determined while liver, kidney and spleen were harvested for histopathology. Urea, Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), bilirubin and serum minerals were determined using standard methods. Streptozotocin-induced groups had 4.0 folds rise in fasting blood glucose (FBG) with 17-26% loss in pre-induction weight and elevated urea, ALT, AST, and bilirubin. Serum minerals and haematological indices were depleted in diabetic untreated groups. Treatment with Metformin, 15%TR powder, and extract decreased FBG by 78.6%, 66.0% and 34.0%, respectively, with weight gain observed only among 15%TR powder-fed group. Urea, ALT, AST, and bilirubin decreased significantly in 15%TR powder-fed group by 25.0%, 54.0%, 22.0%, and 65.0%, respectively. Heamatological parameters (PCV, RBC, WBC) increased insignificantly across groups. Increase in minerals (29.0%K, 4.2%Mg, 8.1%Ca, 15.4%Mn, 2.2%Fe, 14.0%Zn) were observed in 15%TR powder-fed rats compared with untreated diabetic group in which hyperplasia, liver inflammation, necrosis and glomerulonephritis were observed in rats' spleen, liver and kidney. These findings underscore *Termitomyces robustus*' promising role in managing diabetes-related complications and nutritional imbalances, suggesting its potential as a therapeutic intervention for diabetic individuals.

## MODELING THE CONTRIBUTION OF MULTIPLE MICRONUTRIENT FORTIFICATION OF SALT TO DAILY NUTRIENT INTAKE AMONG THE ETHIOPIAN POPULATION

by Semira Mitiku Saje / Dawd Gashu / Edward JM Joy / Katherine P Adams / Tibebe Moges / Masresha Tesemma<sup>4</sup> / E Louise Ander<sup>5</sup> / Addis Ababa University / Addis Ababa University / London School of Hygiene and Tropical Medicine / University of California, Davis / Ethiopian Public Health Institute / Ethiopian Public Health Institute / University of Nottingham, British Geological Survey

*Keywords: folate, micronutrients, nutrient modelling, salt fortification, zinc*

Salt is an affordable commodity with wide coverage regardless of economic and social status and, hence, could be suitable vehicle for multiple micronutrient fortification. We aimed to simulate the contribution folic acid and zinc fortification of iodized salt to nutrient intake among the Ethiopian population. The 2013 Ethiopian National Food Consumption Survey was used to estimate baseline individual-level micronutrient intake. Usual intake was estimated using the Simulating Intake of Micronutrients for Policy Learning and Engagement macro tool. Discretionary salt consumption was calculated from total salt intake estimated using urinary sodium excretion. Fortificant addition rates were set to obtain maximum nutrient intake while simultaneously constraining that population with intake above the tolerable upper intake level to <5%. Addis Ababa and Somali ( $N = 2271$ ) were selected as the regions with relatively the lowest and highest micronutrient deficiency prevalence in Ethiopia. Baseline median intake of Zn was below the estimated average requirement for all demographic groups. Inadequate Zn intake ranged from 73% to 99%, the highest prevalence being observed among women in lower class wealth quintiles from Somali region. Dietary folate inadequacy was as low as 2% among men in Addis Ababa but almost all (99%) women from Somali region had inadequate folate intake. Calculated discretionary salt intake was 7.5 g/d for adult men and women and 3.4 g/d for children. With the addition of 0.8 mg Zn and 30 µg of folic acid per gram of salt, multiple salt fortification is estimated to reduce Zn inadequacy by 38 percentage points in urban areas and 19 percentage points in rural areas. Modeled reductions in folate inadequacy were 18% in urban areas and 22% in rural areas. Multiple salt fortification could be an effective approach to address micronutrient adequacy in Ethiopia given its efficacious, technological, and economical feasibility.

## PROXIMATE ANALYSIS AND SENSORY EVALUATION OF CAKE MADE FROM BLEND OF SOYBEANS AND WHEAT FLOUR

by Elizabeth. .O. Aleru / Leadcity University

*Keywords: Proximate analysis, sensory evaluation, wheat flour and soybeans flour*

Snacking is the consumption of small amounts of food or beverage between meals, which can contribute to energy intake and lead to weight gain and increase the risk of diseases. The aim of this study was to determine the optimal blend ratio for both nutritional value and sensory properties. The soybeans was purchased and processed into flour and blended with wheat flour into varying ratios. cakes were baked using these blends and analyzed for nutritional and sensory properties. Nutrient analysis was done using the Association of Official Analytical Chemist (AOAC) methods and data were analysed using IBM SPSS V25. There was a significant difference between all the proximate nutrient content across all the samples. The moisture content ranged from (23.61±0.02) in sample C to (31.82±0.06%) in sample D. The protein content was highest in Sample B (14.40±0.08%) it ranged from (8.86±0.15%) in sample A. The fat content ranged from (15.16±0.03%) in sample A to (17.81±0.04%) in Sample C. The fibre content ranged from (0.013±0.01%) in sample A to (2.377±0.07%) in Sample B. Similarly, the ash content ranged from (1.73±0.06%) to (2.29±0.03%) in Sample B. The carbohydrate content ranged from (36.64±0.07%) in sample D (49.93±0.20%) in Sample A. The sensory evaluation of the formulated samples revealed that Sample A was the most preferred in respect to colour (4.25±0.72), aroma (3.95±0.69), sweetness (4.35±0.81), appearance (4.30±0.73), and overall acceptability (4.50±0.51); Sample C was the most preferred in respect to texture (4.20±0.77) while on the other hand, Sample B was the least preferred in respect to all parameters; colour (3.65±0.99), aroma (3.30±0.92), texture (3.80±0.77), sweetness (3.30±1.03), appearance (3.50±0.95), and overall acceptability (3.70±0.733). The blend of soybean and wheat flour can be used as a viable substitute in cake production offering a healthier alternative to plain cakes, thereby increasing the nutritional value of the cake, although the sensory properties may be slightly inferior.

### CULINARY EFFICACY AND ITS IMPACT ON THE MICRONUTRIENT CONTENT IN MEALS SERVED IN SCHOOL NUTRITION INTERVENTION PROGRAMMES IN SOUTH AFRICA

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*Keywords: Culinary efficacy, Nutrition Intervention, chronic malnutrition., micronutrients*

The critical common thread of culinary efficacy is that it dovetails food science with food preparation skills to produce more nutritious and fulfilling meals for consumers. Considering that 27% of South African children face the risk of chronic malnutrition, there is a need for culinary efficacy among the School Nutrition Intervention (SNI) food handlers. This study explored the culinary efficacy of food handlers in the SNIs and how they impact the micronutrient content of meals served to school children in South Africa. This survey administered two structured questionnaires to the 290 NSI food handlers, 180 nutrition teacher coordinators, and 110 school principals. The varimax rotation of a 30- question Likert scale questionnaire was used to identify crucial factors that influence the culinary efficacy required in the SNIs. Pearson Chi-Square was conducted to test the relationship between culinary efficacy and the micronutrient content in the NSI meal. The study found a low culinary efficacy among the SNI food handlers. Poor culinary competencies, such as overcooking food, using blunt knives, and prolonged food exposure to oxidation, were the most frequent potential risk factors influencing the micronutrient content in SNI meals. The varimax rotation of a Likert scale questionnaire identified technical skills (food preparation skills) and science skills (nutrition competencies) as crucial factors for culinary efficacy required in the SNI programme. All culinary competencies in the Pearson Chi-Square had p-values of 0.000, indicating a substantial relationship between culinary efficacy and the micronutrient content in the NSI meals. Poor culinary efficacy among food handlers compromises the nutritional quality of NSI meals in South Africa. Overcooking, using blunt knives, and prolonged exposure to oxidation reduces the stability and retention of micronutrients in SNI meals. Research has shown that sensitive micronutrients are not stable when fruits and vegetables are bruised, overcooked and oxidised.

## **ECONOMIC DETERMINANTS AND THEIR IMPACT ON DIVERSE DIET AND NUTRIENT-DENSE FOOD IN SCHOOL NUTRITION INTERVENTIONS. A CASE STUDY OF GAUTENG SCHOOLS**

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*Keywords: School nutrition intervention, economic, nutrition, nutrition-sensitive programs*

The ideal School Nutrition Intervention (SNI) should provide a diversified diet that constitutes nutrient-dense food. Though SNIs are widely implemented in South African schools, their nutritional quality has been doubted. Studies have shown that only 20 per cent of Nutrition-Sensitive programmes in South Africa are meeting the required nutritional outcomes. The delivery of optimal dietary outcomes in the SNIs is more dependent on the economic environment within communities and the national Gross Domestic product (GDP). This study sought to explore the economic determinants and their impact on the provision of diverse diets and nutrient-dense foods in the SNIs. A cross-sectional study was conducted using face-to-face interviews with 15 District Nutrition Coordinators (DNCs). The responses from interviews were divided into six economic themes and evaluated against FAO Nutrition-Sensitive Programme guidelines. The findings show a low supply of both dietary diversity and nutrient-dense food. High- starch foods dominate meals, while high nutrient-dense foods like fruits and vegetables are seldom served in SNIs. This has been attributed to the low involvement of local smallholder farmers, irregularities in the supply chain, low budget in the Conditional Grant from the National Treasury, little capacity development in school gardens, high food costs and the absence of partnership with the local business entities. The study clearly shows the impact of related economic activities on the nutritional outcome of SNIs. Further studies need to be conducted on the implementation of Corporate Social Investments (CSIs) as a solution to the economic challenges in the SNIs.

## **DEVELOPMENT AND VALIDATION OF INSTRUCTIONAL VISUAL AIDS ON ESSENTIAL NUTRITION ACTIONS FOR PRIMARY HEALTH CENTRES IN IBADAN NORTH LOCAL GOVERNMENT AREA, NIGERIA**

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*Keywords: Essential Nutrition Actions, Nutrition Education, Primary Healthcare Centre., Visual aids*

Essential Nutrition Actions (ENAs) provides a framework to implement a comprehensive package of preventive nutrition activities within the primary health setting. However, deployment in Nigeria is marred with many logistic challenges, consequently compliance to

recommended nutrition best practices remains low among caregivers. This study was designed to develop and validate instructional visual aids on essential nutrition actions for Primary Health Centres (PHCs) in Ibadan North Local Government Area (LGA), Ibadan, Nigeria. The cross-sectional study involved total sampling of 44 consenting health workers across 17 PHCs in Ibadan North LGA. Using the Analyze, Design, Develop, Implement, and Evaluate (ADDIE) model, visual aids were conceptualized based on WHO/FAO guidelines and Essential Nutrition Actions, critiqued, sketched and illustrated using design softwares. Resulting visuals were produced in print and video formats and validated using a six-component standard checklist (objectives, structure and presentation, relevance, organization, writing style and content). Reliability test of responses was measured using Cronbach's alpha. Validators were largely female (92.3%), had 10+ years working experience (97.7%), and 81.8% were nutrition education facilitators. Mean ratings for objectives, structure and presentation, relevance, organization, writing style and content were 3.54, 3.60, 3.63, 3.71, 3.68 and 3.63, respectively reflecting entire adequacy of the visual aids. The Cronbach's Alpha coefficients for the different sections of the checklist demonstrated good internal consistency with most sections achieving scores above the threshold of 0.7; structure and presentation 0.86, content 0.83, writing style 0.82 and relevance 0.72. Although, objectives and organization sections had a score of 0.68 and 0.55, respectively and requires refinement to strengthen the focus and internal coherence. The visual aids were well designed, clear and met the needs of the target audience with an accurate and updated information considered effective in delivering nutrition education on essential nutrition actions in primary healthcare centers.

## **USE OF BARCODES FOR IDENTIFICATION AND FOLLOW-UP OF MALNOURISHED CHILDREN INCLUDED IN PROSPECTIVE STUDIES: LESSONS FROM MALI.**

*by Alhousseyni Haidara / Zachary Tausanovitch / Grace Heymsfield / Issa Niamanto Coulibaly / Cesaïre T. Ouedraogo / Niele Hawa Diarra / Suvi T. Kangas / International Rescue Committee, Bamako Mali / International Rescue Committee, New York, USA / International Rescue Committee, New York, USA / International Rescue Committee, Bamako, Mali / International Rescue Committee, Bamako, Mali / International Rescue Committee, Brussels, Belgium*

*Keywords: Malnutrition; RCT, bar-code, patient monitoring, quality assurance*

During prospective and longitudinal electronic collection of patient data, in contexts where the number of patients is high and/or staffing is limited, there is a risk of introducing follow-up data from the wrong patient into another patient's file. In addition, manual entry of patient identifying information can be time-consuming, which may take a long time to find and correct. We tested the use of bar codes printed on stickers and placed on patient files and

appointment cards given to participants to minimize error and to save staff time in electronic data entry. Barcodes were created based on pre-defined unique IDs through Google Sheets. The unique IDs included a code for the health center followed by the registration order of the patient (eg. 01-001 for health center 1 and patient 1). Barcodes were then printed on sticker paper. Once a child was included in the study, they were given the next available ID with the corresponding barcode sticker that was attached to their patient file and to their appointment card. Upon follow-up visits, enumerators requested the participant to show their appointment card in order to scan the barcode and ensure the right participant file was opened. This system reduced visiting times and avoided the need for additional staff to confirm children's identities at each visit. In addition, this system has enabled us to avoid file errors and save precious time to retrace back and correct any mistakes that may have occurred and thus avoid incorrect and incomplete data. This experience demonstrates that barcodes in field research are a useful way of correctly identifying patients during a study, while minimizing the risk of errors in the process of tracking participants and optimizing staff time.

## **EXPERTISE OF NUTRITIONISTS/DIETICIANS PROVIDING NUTRITION THERAPY ON CANCER PATIENTS IN COUNTY REFERRAL HOSPITALS, KENYA**

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*Keywords: cancer, nutritionists, nutrition therapy*

In Kenya, Cancer is third leading cause of mortality with an estimated 27,000 deaths and 39,000 new cases each year. Cancer and its treatment causes' severe impairment to patient's health status, with more than half of patients dying of its' consequences rather than the cancer. To improve the health status of cancer patients, optimal nutrition is very crucial. Since it's a dynamic component that entails promoting healthy dietary practices and recommended quality and quantity of diets that deliver successful cancer outcomes. This can be effectively executed by knowledgeable and skilled nutritionists/dieticians nursing cancer patients. Thus, this cross-sectional study investigated level of expertise of experienced and licensed nutritionists/dieticians providing nutrition therapy and care on cancer patients. It was conducted from January to April, 2024 on purposively sampled nutritionists/dieticians of County Referral Hospitals. A total of 47 strata were developed representing County Referral Hospitals with a sample size of 150 calculated. Both Qualitative and Quantitative data was collected through skills tests, observation, focus group discussions, questionnaires and analyzed. The findings show that while nutritionists/dieticians in Kenya have moderate to high levels of knowledge and expertise in nutrition therapy, they



possess moderate to low levels of the same in cancer management. Levels of expertise in nutrition therapy were reported as Energy and substrate requirements ( $\beta=0.34$ ,  $p>0.01$ ,  $n=150$ ); nutrition interventions ( $\beta=0.30$ ,  $p>0.01$ ,  $n=150$ ); exercise ( $\beta=0.45$ ,  $p<0.01$ ,  $n=150$ ); pharmaconutrient and pharmacological agents ( $\beta=0.25$ ,  $p>0.01$ ,  $n=150$ ) were all below standards except for screening and assessment ( $\beta=0.72$ ,  $p<0.01$ ,  $n=150$ ) that significantly related with nutrition therapy. Relevant stakeholders should invest on improving cancer expertise in nutritionists/dieticians nursing cancer patients and create nutritional teams of experts in cancer management. Learning institutions should create short courses on “Nutrition Therapy of Cancer” which can be integrated in existing curriculums and offered to nutritionists/dieticians nursing cancer patients. No Conflict of interest.

## **ASSESSMENT ON THE OUTCOMES OF PROMOTION OF NUTRITION EDUCATION ON DIETARY DIVERSITY AMONG WOMEN’S OF REPRODUCTIVE AGE (15-49 YEARS) AND CHILDREN AGED 6-36 MONTH, TIGRAY REGIONAL STATE SELECTED RURAL KEBELES**

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*Keywords: BCC; Dietary diversity, Nutrition education, Nutrition-sensitive agriculture, Tigray.*

Poor nutrition disproportionately affects women and children in rural areas of low and middle income countries. This is linked with 45 % of child death. Mothers/caregivers inadequate knowledge of Infant and Young Child Feeding (IYCF) practices and poor cultural belifes increases the risk of nutrition disorders. Integrating nutrition education with food preference and nutrition-sensitive agriculture has the potential to improve diets, but rigorous evaluation of this approach are limited. Therefore, the present study investigated the outcomes of promotion of nutrition education in the presence and absence of nutrition- sensitive agriculture interventions on WRA and their children dietary intake in the rural farming community. Quasi-experimental study with two arms 1) NSA+BCC and 2) BCC alone was conducted from February-May 2018. The study was designed to include 200 mother-child pairs and samplings were directed by using simple random sampling technique to select the study participants. Women and children dietary intake have been measured using qualitative open 24-hrs dietary recall technique adopted from FAO and WHO. In the baseline assessment, proportion of minimum DD was extremely low (4.9% women and 4.1% children) in the BCC group. At the endline, 20.8% of women and 32.5% children from the NSA+BCC group has met the recommended minimum DD. NSA+BCC significantly improved the proportion of

women and children meeting minimum DD, when compared to BCC alone ( $P<0.05$ ). BCC alone had also shown positive trend in dietary diversity between baseline and endline values. Although both BCC and NSA+BCC improve dietary diversity, the increase in the proportion of children and women meeting the minimum DD was significantly higher when BCC and NSA were combined. Therefore, in rural farming communities integrating BCC that is informed by food preference along with NSA is recommended to improve diets of women and children.

## **COORDINATION OF MULTISECTORAL NUTRITION CONVERGENCE TO ADDRESS ADOLESCENT, MATERNAL, INFANT, AND YOUNG CHILD NUTRITION IN A PILOT PROJECT IN GOMBE STATE, NIGERIA**

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*Keywords: Adolescent Health, Gombe State, Maternal Nutrition, Multisectoral Coordination, Nutrition Convergence*

Nigeria faces severe malnutrition, with stunting at 51.2% and underweight at 30.4% in Gombe State (NDHS, 2018). Exclusive breastfeeding is 30.7%, with only 22.5% of children having minimum dietary diversity, 20% meeting meal frequency, and 8.4% receiving a minimum acceptable diet. The Federal Government's multisectoral convergence pilot project in Gombe involves Agriculture, Health, Education, Women Affairs, Planning sectors, and the National Social Safety Nets Program. A mixed-methods approach assessed the interventions using quantitative data from baseline and follow-up surveys of 920 households in Balanga, 900 in Nafada, and 905 in Yamaltu Deba, along with qualitative data from stakeholder meetings and routine monitoring. The project leveraged each ministry's strengths to implement nutrition-sensitive and specific interventions among vulnerable populations selected from the National Social Register, in three LGAs: Balanga, Nafada, and Yamaltu Deba. Activities included promoting homestead gardens, improving access to nutrition services, integrating nutrition education in schools, and empowering women and adolescent girls with income-generating activities. It reached 8,244 individuals, including 1,540 adolescents, 1,515 pregnant women, and 2,721 lactating mothers. The project improved dietary diversity and access to nutrition services, with 2,900 households establishing homestead gardens. The Federal Ministry of Health trained 8,244 beneficiaries on food preparation. The Federal Ministry of Education enhanced nutrition knowledge, provided deworming tablets, and administered Iron-Folic Acid to 44,091 school children. The Federal Ministry of Women Affairs empowered 3,600

women and girls through financial training and income-generating activities. Challenges included bureaucratic delays, inflation, and reaching remote areas. The project demonstrates that a coordinated multisectoral approach improves nutrition outcomes and highlights the need for streamlined procurement, increased funding, and strengthened referral systems to scale similar initiatives across Nigeria. Coordinated multisectoral approaches effectively address malnutrition, offering insights for scaling nationwide efforts to improve Nigeria's nutrition and health outcomes.

## **EFFECT OF MOTHER-TO-MOTHER SUPPORT GROUPS ON FEEDING AND NUTRITIONAL STATUS OF CHILDREN UNDER FIVE IN GHANA: A QUASI-EXPERIMENTAL DESIGN**

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*Keywords: Nutritional Status; Mothers; Self-Help Groups; Children under five years; Malnutrition; Ghana.*

In 2014, Ghana's government launched mother-to-mother support groups (MtMSGs) as catalyst to combating childhood undernutrition and foster long-term health improvements. This study aimed to evaluate the effectiveness of MtMSGs in enhancing the nutritional status of children under five years. Using a quasi-experimental design, we used multi-stage sampling to recruit 220 mother-child pairs from 12 intervention and 12 control communities in the Krachi West Municipality in Ghana following five years post-MtMSG implementation. A structured questionnaire was used to assess maternal infant and young child feeding (IYCF) practices and the prevalence of childhood underweight, stunting and wasting. Differences in the intervention and control groups were tested with Chi-square and binary logistic regression modelled to test the effectiveness of the MtMSG on IYCF and child growth. Crude (COR) and adjusted odds ratio (AOR) is reported at 95% confidence interval (CI). Mean age of mothers and infants were  $28.8 \pm 7.3$  years and  $19.1 \pm 14.5$  months, respectively. Mothers in MtMSG communities demonstrated significantly better IYCF knowledge (60.0% vs. 42.7%) and higher scores to meet indicators for minimum dietary diversity quality (86.5% vs 59.1%,  $p=0.026$ ), minimum meal frequency (37.7% vs 31.8 %,  $p=0.011$ ) and minimum acceptable diet (60.6% vs. 32.5%,  $p=0.070$ ). Stunting (22.3% vs 19.6%) and wasting (7.7% vs 7.3%) rates were similar between intervention and control groups, but more children in MtMSG communities were underweight (15.0% vs. 8.6%,  $p=0.041$ ). The intervention protected against underweight (COR: 0.54, 95% CI: 0.29-0.97) but this effect was not sustained in the adjusted model (AOR:0.63, 95% CI: 0.32-1.25). MtMSGs improved maternal knowledge and dietary practices, significantly IYCF practices. However, no significant association was found

between MtMSGs and child growth, which could indicate the influence of basic and underlying cases of malnutrition. A broad-spectrum approach to addressing the multi-faceted determinants of malnutrition needs strengthening.

## **PAEDIATRIC TYPE 1 DIABETES MELLITUS CAREGIVER NUTRITION EDUCATION TRAINING NEEDS AT HEALTH FACILITIES IN UGANDA**

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*Keywords: Type 1 diabetes, caregivers, nutrition education, nutritional management.*

A caregiver's active participation in their child's type 1 diabetes mellitus (T1DM) treatment plan and understanding of the role of proper nutrition are essential in achieving treatment goals. The study aimed to explore the current state of nutrition education among caregivers of children with T1DM in Uganda. A cross-sectional study design was used to determine the nutrition education needs among caregivers of children with T1DM. A total of 100 caregivers of children with T1DM attending the T1DM clinics at 8 health facilities in Uganda were interviewed. A document review of the diabetes education curriculum used at the health facilities was conducted to identify gaps. A nutrition education needs assessment survey was conducted among caregivers. Ethical clearance was granted by the St. Francis Hospital Nsambya Review and Ethics Committee (SFHN/REC/83) and a research permit was obtained from the Uganda National Council of Science and Technology (HS186ES). Informed consent was obtained from the caregivers. The majority of caregivers (79.8%) reported attending training sessions on T1DM. These trainings were primarily held at hospitals (81.7%). However, identified gaps included: content not tailored to Uganda-specific contexts, vital topics such as the glycemic index, the MyPlate model, fruit and vegetable intake, and interpreting food labels were notably absent. The needs assessment among caregivers revealed eight key topics proposed for a Ugandan T1DM nutrition education programme: blood glucose monitoring, the impact of food on blood glucose, carbohydrate counting, making healthy food choices when dining out, selecting healthy snacks, interpreting food labels, meal planning, and exercise. The study highlights the importance of developing nutrition education programmes that are contextualized and cater for the needs of caregivers of children with T1DM to enable them to support the nutritional management of their children.

## **EFFECT OF NUTRITION COUNSELING ON NUTRITION LITERACY AND DIETARY PRACTICES OF PREGNANT ADOLESCENTS IN WEST ARSI ZONE, CENTRAL ETHIOPIA, A CLUSTER RANDOMIZED CONTROLLED TRAIL, USING GEE**

*by Adane Tesfaye / Tefera Belachew / Desssaiegn Tamru / Dilla University, Ethiopia / Jimma University / Jimma University*

*Keywords: Alliance for development, Pregnant adolescent, nutrition behavior change communication*

Pregnant adolescent's nutritional knowledge and practices are important prerequisites for their proper dietary intake. Alliance for development [AFDs] are model women community health volunteers who got knowledge and experience by working with health professionals. Investigating effect of nutrition behavior change communication through AFD on nutrition knowledge and dietary practices of pregnant adolescents in West Arsi, Central Ethiopia. A two-arm parallel cluster randomized controlled community trial was carried out in randomly selected districts in West Arsi, Central Ethiopia. A total of 207 and 219 pregnant adolescents participated from the intervention and control clusters, respectively. Dietary practice was the primary outcome and nutrition knowledge was secondary outcome. Each pregnant adolescent in the intervention group attended four NBCC [Nutrition behavioral change communication] sessions. Adolescents in the control group attended the routine nutrition counseling given by the health care system. McNemar test and Generalized Estimating Equations were used to evaluate the effect of the intervention. Difference-in-differences (DID) was employed to estimate the net treatment effect. The average difference of appropriate dietary practice between the two groups was 25.9%. After controlling for the possible confounders, pregnant adolescents in the intervention group had 3.7 times [AOR =3.7, 95% CI: (2.6, 5.3)] higher odds of having appropriate dietary practices compared with the control group. Nutrition knowledge of pregnant adolescents who received the intervention were 5.5 times [AOR =5.5, 95% CI: (3.78-8.1)] higher than Nutrition knowledge score of adolescents in the comparison group. Nutrition behavior change communication [NBCC] through alliance for development based on the health belief model is an effective approach in increasing the proportion of pregnant adolescents who had appropriate dietary practices and good nutrition knowledge. Thus, these results point to the necessity of adopting the HBM in NBCC to enhance pregnant adolescents' nutritional knowledge and dietary practice.

## INDIRECT EFFECTS OF CO-CREATED NUTRITION-SENSITIVE INTERVENTIONS ON WOMEN'S AND CHILDREN'S DIETARY DIVERSITY IN TWO SUB COUNTIES OF TURKANA, KENYA: A SPATIAL ANALYSIS OF SPILLOVER EFFECTS

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*Keywords: Turkana County, children, co-creation, dietary diversity, spatial, spillover, women*

Study aimed to investigate spillover effects of nutrition-sensitive interventions co-created with communities in the arid Turkana County, Kenya, using a community-based participatory approach for development. Quasi-experimental study design was employed, with 17 communities randomly allocated to intervention (n=10) and comparison (n=7) groups. Within intervention communities, direct beneficiaries participated in co-creation workshops to develop and implement interventions to improve diets; indirect beneficiaries were not directly involved but lived in the targeted communities. Data were collected at baseline from intervention and comparison communities. At endline, the sample was stratified into comparison, direct, and indirect beneficiary groups. Outcomes were assessed using the dietary diversity scores for Women (WDDS, 10 food groups) and Children (CDDS, 7 food groups). Spatial analysis using mixed-effects models examined the relationship between distance from the training venues and the outcomes. Indirect beneficiaries had significantly higher dietary diversity scores compared to the comparison group, with a statistically significant increase of 0.79 food groups for women and 0.78 food groups for children (both  $p > 0.001$ ). Direct beneficiaries experienced even greater improvements, with additional increase of 0.35 food groups for women and 0.30 food groups for children compared to indirect beneficiaries. Spatial analysis revealed significant negative association between distance from the intervention venue and both WDDS ( $\beta = -0.18$ ,  $p = 0.006$ ) and CDDS ( $\beta = -0.20$ ,  $p = 0.002$ ), with a decline in dietary diversity observed up to approximately 10 kilometers, valid both for baseline and endline, indicating that distance matters but that the training location did not impact dietary diversity. These findings also demonstrate a presence of positive spillover effects from the co-created interventions in both WDDS (Wald  $\chi^2 = 225.84$ ,  $\beta = 0.79$ ,  $p < 0.0001$ ) and CDDS (Wald  $\chi^2 = 218.77$ ,  $\beta = 0.78$ ,  $p < 0.0001$ ). This study demonstrates the effectiveness of the community-based participatory approach for development and provides insights for targeting and scaling up such interventions in resource-limited settings.

## QUALITY OF ACUTE MALNUTRITION TREATMENT: COMPARATIVE PERFORMANCE EVALUATION OF FORMAL HEALTH CENTERS AND COMMUNITY HEALTH WORKER SITES IN MALI

by Issa Niamanto Coulibaly / Grace Heymsfield / Bareye Ouologuem<sup>3</sup> / Abel Khisa / Alhousseyni Haidara<sup>1</sup> / Suvi Kangas / IRC Mali / IRC New York / Ministry of Health; Mali / IRC Kenya / IRC Mali / International Rescue Committee, Brussels, Belgium

*Keywords: Acute malnutrition; simplified protocol; community-based management; CHWs site; ICCM+, quality*

Evidence suggests community health workers (CHWs) can adequately deliver acute malnutrition (AM) treatment alongside other public health interventions. We compared the quality of management of AM in children aged 6-59 months when provided by health Centers (HCs) and CHWs, in the health district of Nara. A structured guide was used to observe 49 steps across 5 treatment categories: (reception and triage, anthropometric measurements, clinical examination, medical and nutritional treatment and data completeness) during one day of treatment in all accessible sites. An average score was calculated for each treatment category and an overall score as the average of the 5 categories. We conducted non-inferiority test with a margin of 10% for the overall score and assessed differences by treatment category. We observed the treatment of 456 children across 31 formal HCs and 327 children across 30 CHW sites. The overall score indicated 72.9% of children in HCs were correctly treated, compared with 67.6% in CHW sites, with inconclusive non-inferiority ( $\Delta$ -4.9%, 90%CI: -10.3 to 0.4%). Reception and triage score was significantly higher in CHW site ( $\Delta$ 13.4%, 95%CI: 8.0 to 18.8%), while anthropometric assessment ( $\Delta$ -11.9%, 95%CI: -18.5 to -5.2%) and clinical examination scores ( $\Delta$ -14.4%, 95%CI: -20.5 to -8.4%) were significantly lower in CHW sites. No difference was observed in medical and nutritional treatment ( $\Delta$ -1.3%, 95%CI: -8.0 to 5.2%) nor in completeness of tools ( $\Delta$ -4.1%, 95%CI: -0.1% to 8.3%). Respect of different AM treatment steps varies between formal HCs versus at CHW sites. Compared to formal HCs non-inferiority of treatment quality at CHW sites could not be concluded. This was mostly driven by more frequently incorrect anthropometric and clinical assessment. In alignment with recent WHO guidance, we recommend thorough training and supervision of CHWs to ensure quality AM treatment.

## EMPOWERING YOUTH AND MEDIA TO DRIVE NUTRITION CHANGE: A COMMUNITY-BASED INTERVENTION IN GHANA

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*Keywords: Nutrition literacy, capacity building, community health, media engagement, youth empowerment*

The "Good Nutrition Starts with Me" youth initiative, a part of the Africa Catalyzing Action for Nutrition (AfriCAN) project, is being implemented across The Gambia, Cameroon, and Ghana. This initiative is designed to enhance knowledge and skills in nutrition, thereby promoting nutrition literacy and creating youth advocates for better nutrition within their communities. In April 2024, a 4-day training was conducted in the Volta Region of Ghana, targeting 51 youths and 25 media personnel (ages 15–48). The training covered basic nutrition, nutrition across the life cycle, diet-related non-communicable diseases, food systems, and water, sanitation, and hygiene (WASH). Facilitated by experts from academia, the Ghana Health Service, and the Ministry of Food and Agriculture, among others, the training included pre- and post-assessments to evaluate participants' understanding of the topics covered. Additionally, participants developed action plans to apply the knowledge gained innovatively within their communities. Following the training, nutrition knowledge increased by 30% among youth and by 26% among media participants. Media participants published over 19 articles and launched weekly radio shows. Youth participants established four communities of practice and initiated several activities, including home gardening in 10 households, nutrition education in 10 schools and 2 churches, the formation of a school nutrition club, and community engagement efforts targeting women and religious leaders. The training program effectively empowered youth and media leaders to promote nutrition and healthy living. Participants initiated diverse and creative activities that positively influenced their communities. These findings underscore the potential of engaging youth and media in fostering a culture of health and wellness within communities.



## THE 6-YEAR DOCTOR OF NUTRITION AND DIETETICS PROGRAMME: AN EXPERT COMMITTEE RECOMMENDATION FOR RESTRUCTURED TRAINING OF ENTRY-LEVEL PROFESSIONALS IN GHANA

by Percival D. Agordoh. / Paul Amuna / Reginald A. Annan / Collins A. Appiah / Ruby Arthur / Paul A. Aryee / Vincent A. Awuuh / Prince Baidoo / Felicia K. A. Danso / Freda Intiful / Anna Lartey / Christina Nsiah-Asamoah / , Kingsley K. A. Pereko / Olivia M. Timpo / Anthony Wemakor / Juliana Yeboah / Francis B. Zotor / Department of Nutrition and Dietetics, University of Health and Allied Sciences, Ho, Ghana, Professions Specific Committee (Nutrition and Dietetics) of the Allied Health Professions Council, Ghana, 3. Department of Dietetics, University of Ghana, Korle Bu, Ghana / Fred N. Binka School of Public Health University of Health and Allied Sciences, Hohoe, Ghana / Kwame Nkrumah University of Science and Technology, Kumasi, Ghana / Kwame Nkrumah University of Science and Technology, Kumasi, Ghana / Ghana Health Service / Nutritional Sciences Department, University for Development Studies, Tamale, Ghana / Allied Health Department, College of Nursing and Midwifery, Nalerigu, Ghana / Department of Dietetics, University of Ghana, Korle Bu, Ghana, Ghana Health Service, Ghana, Tema General Hospital, Ghana / Professions Specific Committee (Nutrition and Dietetics) of the Allied Health Professions Council, Ghana , Kwame Nkrumah University of Science and Technology, Kumasi, Ghana , Ghana Health Service, Ghana / Professions Specific Committee (Nutrition and Dietetics) of the Allied Health Professions Council, Ghana, Department of Dietetics, University of Ghana, Korle Bu, Ghana / University of Ghana, Legon & former President, International Union of Nutritional Sciences (IUNS) / University of Cape Coast, Ghana / University of Cape Coast / Ghana Health Service, Ghana / Nutritional Sciences Department, University for Development Studies, Tamale, Ghana / Korle Bu Teaching Hospital, Accra, Ghana / Fred N. Binka School of Public Health University of Health and Allied Sciences, Hohoe, Ghana

**Keywords:** Dietetics, Expert committee, Ghana, Nutrition, Professional Training

In response to changing training trends for allied health professions in Ghana, the professional body (Ghana Academy of Nutrition and Dietetics, GAND) reviewed the entry-level qualifications for nutrition and dietetics professionals, leading to a comprehensive evaluation of existing training programmes in Ghana. This paper presents the recommendation and rationale of the 17-member Expert Committee (EC) tasked to advise GAND on the matter of harmonizing/upgrading training for future entry-level nutritionists and dietitians in Ghana. In three online meetings, the GAND-appointed EC (comprising leading practitioners in practice, academia, training institutions and industry partners) conducted an expert review of the current training landscape in Ghana. They critically examined the demands for harmonized training and higher qualifications for entry-level nutrition and dietetics professionals. The discussions were guided by the West African Health Organization's harmonized training standards, the experiences and expertise of practitioners in the Ghana Health Service and academia, plus best practices in the field. By majority vote, the EC recommends the introduction of the entry-level “6-year Doctor of Nutrition and Dietetics (6-year-DND)” qualification for future NDPs. This harmonized qualification is to: (1) better align with emerging contemporary nutrition/dietetics trends and global best practices, (2) address growing demands for highly qualified entry NDPs with advanced competencies and skills, (3) improve professional progression and leadership opportunities, (4) serve as a foundational qualification for evolving career pathways (including specialist / fellowship training), and (5) enhance employability with corresponding increased earning potentials of NDPs plus individual choice of career paths along the prevention-curative-

practice-continuum. The 6-year-DND, to be implemented within 5 years, immediately impacts the curriculum development efforts of training institutions. Additionally, existing NDPs may require top-up training to upgrade to the 6-year-DND. The 6-year-DND will enhance the competence and performance of NDPs; ultimately improving patient care, service quality and professional relevance.

## **AN ASSESSMENT OF THE TRAINING NEEDS AND PERCEPTIONS ON SUPPLY CHAIN MANAGEMENT ROLES AMONG NUTRITION PROFESSIONALS FROM ZIMBABWE.**

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*Keywords: Supply chain management, Zimbabwe., nutrition commodities, procurement*

Supply chains are a sequence of stages and processes through which a product moves from production, distribution to consumption. The objective was to assess the level of competencies nutrition professionals, have in nutrition supply chain's technical and managerial domains. Again, to identify priority training needs for nutrition supply chain management,. An online tailored training needs analysis survey was administered to nutrition professionals for all ten provinces of Zimbabwe, notably, nutritionists, dieticians, hospital food service managers, nutrition assistants, food scientists and chief executives. Ethical approval was granted by the Medical Research Council of Zimbabwe (MRCZ/B/2647). The results' major findings were under four thematic areas: Competency levels in technical domain of the nutrition supply chain where the highest number of participants were proficient (46.9%), highly proficient 25.7%, and the rest were either averagely proficient, minimally proficient, or not proficient that is 21.7%, 4.4%, and 1.3%, respectively); competency level in managerial domain of the nutrition supply chain where the highest number of participants were proficient (47.7%), followed by highly proficient (31.8%), average proficient (17.4%), minimally proficient (2.2%), and not proficient (1%); priorities of training in technical domain of the nutrition supply chain management where the top five priorities for training were: managing procurement costs and budgets (10.9%, ensuring the quality of products (10.4%), forecasting and quantifying product needs 9.3%, managing tendering process (8.9%), and then Storage, warehousing, and inventory management (7.9%); priorities for training in managerial domain of the nutrition supply chain management where in the managerial domain, the top 5 priorities were, Problem-solving and decision-making (10%), Command of technology (9.5%), Transport management (9%), Performance management (8.8%), and Teamwork (8.4%). Results showed that there is a need for training, coaching, and mentoring so that professionals become highly proficient in the nutrition supply chain, guided by the identified training needs.

## **THE IMPACT OF GOVERNMENT TREASURY INVESTMENT TOWARDS STUNTING REDUCTION: THE CASE OF SEQOTA DECLARATION IN ETHIOPIA**

*by Daniel Tsegaye / Ministry of Health*

*Keywords: Lives saved, Malnutrition, Seqota Declaration, acute, and severe Malnutrition., stunting*

In July 2015, the Government of Ethiopia launched Seqota Declaration (SD) a 15 years commitment to end stunting among children under two years in Ethiopia by 2030. SD implements multi-phased and multi-sectoral high impact interventions among 10 implementing sectors. The government is the main financier of the SD from its treasury at federal and regional level. Based on the lesson in 40 woredas during the Innovation Phase, it is expanded in 240 woredas during the Expansion Phase. The purpose of this desk review is to share the impact of government investment on stunting reduction among children under the age of two. This assessment used desk review of multi-sectoral scorecards, SD investment plans, and federal and regional governments' treasury budget allocations and its impact on the stunting aversion. The government of Ethiopia has made sustained financial commitment to the SD program by allocating funds from its treasury, with steady increases in federal and regional investments from 2018 to 2023. The SD scorecard analysis shows a steady improvement in the program's performance across all regions ranging from 64.25 to 73.75. During this period, the amount of government treasury investment has increased from \$267,857 in 2018, \$2 million in 2019, \$13.5 to 16.5 million between 2020-2022 and \$21.7 million in 2023. This investment has prevented 20,888 children from stunting in 2018 to as high as 99,080 were prevented by 2022. In addition, deaths have been averted in a range of 282 to 3033 between 2019 and 2022. The results showed there is progressive increase in program performance scorecard, death prevented and stunting averted due to sustained government investment for the SD. It is highly recommended that the government of Ethiopia and other partners invest in the program to realize its goal of eliminating stunting by 2030.

## **IMPROVING COMMUNITY AWARENESS AND HEALTHCARE PROVIDER TRAINING TO ENHANCE VITAMIN A SUPPLEMENTATION AND DEWORMING COVERAGE**

*by Benjamin Kihika / Helen Keller International*

*Keywords: Child Health Nutrition, Micronutrients, Vitamin A Supplementation*

Micronutrient deficiencies are a major public health concern in many developing countries, including Kenya where 40% of children aged 12-59 months have Soil Transmitted Helminths (STH) infection, and 17.4% are deficient in vitamin A. According to the World Health Organization, vitamin A supplementation (VAS) can reduce child mortality by up to 24%

when >80% of children 6-59 months are supplemented twice annually. In this regard, VAS and deworming (VASD) are key interventions for promoting child health and nutrition in Kenya. However, coverage rates often remain suboptimal due to various factors, including inadequate healthcare worker (HCWs) training and lack of awareness among caregivers and Community Health promoters (CHPs). A cross-sectional survey was conducted in five counties of Central Kenya to assess the coverage of VAS and deworming among children aged 6-59 months. The survey evaluated caregiver knowledge, health-seeking behaviors, and the capacity of healthcare workers and CHPs to deliver these services. Data was collected through household interviews, health facility assessments, and interviews with HCWs and CHPs. The findings revealed that while the VAS coverage met the national target of 80%, the deworming coverage fell short, with significant variances from administrative data attributed to stockouts, overreporting, and poor documentation. Notably, only **38.3%** of caregivers knew the correct frequency of VASD, **49.7%** did not know the frequency, and **45.5%** did not know the benefits of VASD. However, **77%** of the respondents identified the Vitamin A Capsule. Barriers to VASD and deworming uptake include lack of awareness, low health literacy, and insufficient training for HCWs and CHPs. Therefore, the study underscores the need for comprehensive community education campaigns to raise awareness about the importance of VAS and deworming, creating demand in the facility and community, and how to administer the capsules, documentation, and reporting for HCWs and CHPs.

## **EFFECT OF A NUTRITION EDUCATION INTERVENTION ON FOOD SAFETY KNOWLEDGE, ATTITUDES AND PRACTICES OF MOTHERS OF UNDER 5 CHILDREN IN THE PERI-URBAN AREAS OF BOBO-DIOULASSO : BEFORE AND AFTER STUDY**

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*Keywords: Nutrition Education Intervention ; Knowledge Attitudes and Practices ; Food Safety ; Mothers of Children under 5 Years ; Burkina Faso*

This study assessed the effect of a nutrition education intervention. This intervention aimed to improve the knowledge, attitudes, and practices of mothers on food safety in the peri-urban areas of Bobo-Dioulasso in Burkina Faso. A total of 243 mothers of children under 5 years in the peri-urban of Bobo-Dioulasso were administered the FAO questionnaire for food safety knowledge, attitudes, and practices assessment during two cross-sectional surveys, before and after the intervention, in January and October 2017. The intervention included two

components consisting of a theoretical phase (counselling and discussion) and cooking demonstrations implemented for ten months. To account for the before-and-after design of the study, the McNemar's test was used to assess the effect of the intervention on food safety KAP of mothers of children under 5 years. The mean age of mothers was  $29 \pm 6.2$  years and 50.6% of them were between 20 and 29 years old. One for knowledge (cooking thoroughly with,  $p\text{-value} = 0.0001$ ) and another for attitudes (perceived benefits of reheating leftovers before eating them,  $p\text{-value} = 0.0001$ ), significantly increased after the intervention. In terms of food safety practices, all the indicators (cleaning of dirty surfaces, plates and utensils and storage of perishable foods) significantly increased (all  $p = 0.0001 < 0.05$ ). This study provided some evidence of an effective nutrition education intervention for improving maternal KAP on food safety for their child's feeding.

## **STRENGTHENING GOVERNANCE FOR NUTRITION: LESSONS FROM NSA CAPACITY STRENGTHENING IN ETHIOPIA PROJECT 2019-2024**

*by Tamene Asayehu / Save the Children*

*Keywords: Agriculture, Nutrition Sensitive Agriculture, Strategies, capacity and system strengthening, nutrition*

Chronic food and nutrition insecurity remains a significant challenge in Ethiopia. In address to the issue, the Ethiopian Ministry of Agriculture (MOA) developed the Nutrition Sensitive Agriculture (NSA) strategy to guide the sector's initiatives toward improved food and nutrition security. However, the MOA and regional Bureau of Agriculture (BOAs) lacked a robust organizational system to effectively implement the strategy. The NSA Capacity Strengthening Project (NSA CASE) aimed to address this by establishing a sustainable governance system for the food and nutrition security initiatives outlined in the NSA strategy. The project commenced with an organizational assessment and identified key technical and organizational capacity gaps in the sector. To address these gaps, the project utilized a Grant Under Grant Mechanism (GUGM), positioning the MOA and regional Bureaus of Agriculture (BOAs) as lead implementors. The project pursued four primary outcomes: Increased Financing and Prioritization for NSA, Strengthening M&E system, coordination for nutrition, and establishment of sustainable HR capacity from federal up to district level. The project established strong leadership both at the federal and regional levels. The project also strengthened data management systems by introducing sector-wide agreed-upon indicators, standardizing reporting formats between federal and regional stakeholders, and piloting an Agricultural Management Information System (AGMIS) in selected woredas, demonstrating the feasibility of digital data management. MOA restructured the Food and Nutrition Office, establishing a direct reporting line to the Minister of MOA. Food and Nutrition Directorates established in the respective regional BOA structures, and they are now functioning. The NSA CASE project significantly improved the MOA's capacity in terms of working modality,

financial resources, coordination, organizational structure, and the sustainability of achieved improvements. These advancements contribute to a solid foundation for implementing nutrition-sensitive policies and strategies that would guide the agricultural sector towards lasting positive impacts on food and nutrition security.

## **USING MASS MEDIA TO CHANGE NUTRITION AND EARLY CHILD DEVELOPMENT BEHAVIOURS OF CAREGIVERS IN TANZANIA**

*by Stephen Kumwenda / Pieter Remes / Vianney Atugonza / Dotto Kezakubi / Jennifer Hollowell / Joanna Murray / Development Media International Malawi / Development Media International Tanzania / Development Media International Tanzania / Development Media International Tanzania / Development Media International UK / Development Media International UK*

*Keywords: early child development, infant and young child feeding, mass media, social and behaviour change*

Tanzania has one of the highest rates of chronic malnutrition, with stunting at 32% among children under 5. Early stunting predicts poor cognitive and educational outcomes in later life. Development Media International (DMI) developed and evaluated a three-year radio and TV social and behaviour change (SBC) campaign to improve maternal and child nutrition, and encourage early childhood development (ECD) practices in five Lake Zone regions. The drama-style campaign spots were broadcasted from June 2017 to March 2020 on six radio stations, covering nutrition during pregnancy; exclusive breastfeeding; complementary feeding; and ECD. The spots were broadcast 10 times per day, following DMI's proven Saturation+ methodology. Formative research and three cross-sectional surveys were conducted before, during and at the end of the campaign. The former was used to shape spots content and the latter, to estimate impact. A total of 14,985 female caregivers and 6,730 male heads of household with children aged 0–23 months were surveyed. Campaign exposure was 60% and 70% for female and male participants, respectively. Dietary diversity during pregnancy increased by 12.7 percentage point (pp) over the study period. This increase was 6.8pp higher among mothers who reported being exposed to our campaign, a statistically significant difference (OR=1.33, CI=1.11-1.59, p=0.002). Self-reported exclusive breastfeeding increased over time by 13.7pp; but there was no significant difference among those exposed or unexposed to the campaign. The proportion of male and female carers who engaged with their children increased by 17.2pp and 16.8pp, respectively. Those exposed to the campaign were more likely to engage in ECD activities (10.6pp and +5.5pp among male and female carers, respectively). This campaign demonstrated largely consistent associations between exposure to DMI's media campaign and improvements in behaviours promoting maternal and newborn nutrition and ECD practices.

## **USING GARDENING WITH NUTRITION AND EARLY CHILD DEVELOPMENT BEHAVIOURS OF CAREGIVERS IN TANZANIA**

### **EMPOWERING FARMERS FOR IMPROVED HOUSEHOLD FOOD SECURITY AND NUTRITION: FINDINGS FROM THE GREAN PROJECT IN SOUTH SUDAN**

*by Abrham Assefa / Taban James DERE / Robert Waswaga / World Vision International South Sudan, Juba, South Sudan / World Vision International South Sudan, Juba, South Sudan / KenRo Team Consults Ltd., Kampala, Uganda*

*Keywords: PD Hearth, dietary diversity, food security, mother gardens, resilience*

The Greater Resilience through Enhanced Agriculture and Nutrition (GREAN) Project, implemented by World Vision South Sudan (2019-2024) in the counties of Rajaf and Tonj North, aimed to address severe food insecurity affecting 6.2 million individuals in targeted communities. Funded by the Australian Government's Department of Foreign Affairs & Trade, GREAN targeted 60,000 participants across 10,000 farmer households. The project integrated sustainable agricultural practices, women's economic empowerment, improved market linkages and water access, and a positive deviance approach for improved household food security and nutrition. The endline evaluation employed a pre-post mixed-method design alongside case study methodologies. At the endline evaluation, a total of 853 participants were sampled, comprising 790 respondents from household surveys and 63 from focus group discussions and key informant interviews. Endline survey results were compared with baseline data collected from 1,199 direct participants. The project significantly reduced moderate to severe food insecurity by 16.4% points from 71.6% at baseline, with the greatest gains observed among female participants and female-headed households. Women's access to nutritional information and knowledge of good nutrition rose by 9.5% and 5.3% from their respective baseline values of 65.1% and 65.7%. Impressively, 93.5% of women actively improved household nutrition by implementing strategies learned through interventions such as nutrition information dissemination, cooking demonstrations, and mother gardens, from 69.1% at baseline. These efforts resulted in a 16% increase in household dietary diversity from the baseline of 78.4%, with 89.7% of women and 79.1% of children 6-59 months meeting minimal dietary diversity. Adoption of locally available nutritious foods also increased to 79.9%, up from 65.7% at baseline. The GREAN project has strengthened community resilience through enhanced household food security and nutrition, particularly benefiting women and children. Challenges remain in addressing seasonal hunger and regional disparities, requiring sustained community efforts to address ongoing needs.

## **THE IMPACT OF PROFESSIONAL ASSOCIATIONS IN PROMOTING PROFESSIONALISM AND DEVELOPMENT OF CAPACITY AND SKILLS; A CASE STUDY OF THE GHANA ACADEMY OF NUTRITION AND DIETETICS (GAND) IN GHANA**

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*Keywords: Peptic Ulcer, Nutrition, Self-care, Awareness*

The nutrition and dietetics professional associations have existed for over a decade however, little is known of their impact on the professionalism and capacity, and skills development of its members as it's been the drive of most associations. The study aimed to assess the impact of professional associations on the professionalism, capacity, and skills of nutrition and dietetics professionals. The study employed a cross-sectional design in surveying 55 members of the Ghana Academy of Nutrition and Dietetics. Data on demographic characteristics, member professionalism, capacity development, skills to practice were collected using a digital semi-structured questionnaire design on Kobo Collect, following a convenience sampling technique. The data was descriptively analysed using frequencies and proportions. Close to 50% and 35% of respondents were Dietitians and Nutritionist respectively with a mean age of 32.4, SD 6.7 years and an average of 3, SD 1.8 years of membership. About 71% of responding indicated their involvement with GAND has had impact on their professionalism and 64% indicating an impact in their confidence to practice. The majority (70%) of the respondents indicate GAND have contributed to their capacity development and about 62% indicating an impact in their skills to practice. Nutrition professional association have impact on member's professionalism, confidence to practice, capacity development and skills.

## **EMOTION-DRIVEN EATING IN CHRONIC CONDITIONS IN GHANA: INTEGRATING EMOTION CARE INTO NUTRITIONAL COUNSELLING AND DISEASE MANAGEMENT**

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*Keywords: Chronic conditions, Dietary choices, Emotion-driven eating, Healthy food consumption, Nutrition intervention, Unhealthy food consumption*

The relationship between emotions and food consumption is well- documented, but there



is limited research on how emotion-driven eating behaviors influence dietary choices in chronic illness context. Understanding this relationship is crucial for developing effective dietary interventions for chronic illness management. Using the circumplex model of emotion classification, we investigated how different emotional states—high arousal positive valence, high arousal negative valence, low arousal positive valence, and low arousal negative valence—affect dietary choices among 801 individuals with chronic conditions (males = 52.8%, mean age = 46.61, SD = 16.21). Findings revealed high arousal positive valence emotions increased consumption of healthy foods and decreased consumption of unhealthy foods. In contrast, high arousal negative valence emotions increased consumption of unhealthy foods but not healthy food consumption. Low arousal positive valence emotions were positively associated with healthy food consumption, whereas low arousal negative valence emotions did not predict the consumption of either food type. The differential influence of arousal versus valence on eating behaviours suggests that the intensity of emotional states (arousal) is a stronger determinant of food choices than the valence (positive or negative). Integrating emotion-focused strategies into nutritional counselling is essential for enhancing chronic illness management.

## **THE USE OF PHOTO STORY NUTRITION INTERVENTION TO PROMOTE WATER CONSUMPTION AMONG SCHOOL AGED CHILDREN (7-10 YEARS) IN IBADAN, OYO STATE**

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*Keywords: focus group discussion, nutrition education, photostory, school-aged children, sugar-sweetened beverages, water intake*

Adequate water intake has significant health benefits, yet many, especially young children, favor sugar-sweetened beverages (SSBs) over water. This study examined the effect of a photostory intervention on promoting water consumption among school-aged children (7–10 years) in Ibadan, Nigeria. The mixed-method study involved 339 randomly selected pupils from two private primary schools, categorized into intervention (IG) and control groups (CG). Self-administered questionnaire assessed their knowledge on the benefits of adequate water intake and the consequences of over-consuming SSBs before and after the intervention. Additionally, 54 pupils randomly drawn from the sample participated in a focus group discussion (FGD) to assess their perceptions of water and SSB consumption. A photo-story was created to educate children on the importance of water and the risks of excessive SSB intake. Knowledge was measured on a 10-point scale, categorized as good ( $\geq 6$ ) or poor ( $\leq 5$ ). Data were analyzed using descriptive statistics and chi-square tests at  $p < 0.05$ . FGD recordings were transcribed and analyzed with NVivo software. The mean age of the pupils was

8.77±0.99 years, majority were girls (53.7%). Prior to the intervention, most children had fair knowledge of adequate water intake. Post-intervention, knowledge of water consumption benefits significantly increased ( $p=0.0015$ ) in the IG (30.7% to 42.8%) but decreased in the CG (40.9% to 29.8%). Water intake in the IG increased from 1 litre (38.6%) to >1.5 liters (40.7%) while daily consumption of SSBs reduced significantly (fruit flavored drinks: 18.3%-8.3%; Sodas: 18.3%-10.3%; Energy drinks: 13.1%-6.0%;  $p=0.009$ ) compared to CG (fruit flavored drinks: 16.9%-20.0; Sodas: 18.5%-22.7%; Energy drinks: 8.9%-11.8%). The FGD revealed more students chose water over SSBs post-intervention. The photo-story intervention improved overall knowledge and practices among school-aged children, suggesting adequate nutrition education can positively influence young children's dietary habits.

## **SALT USAGE AND CONSUMPTION IN A CLUSTER- RANDOMISED SCHOOL EDUCATION AND BEHAVIOR TRIAL IN RURAL AND URBAN MALAWI**

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*Keywords: Non-communicable Diseases, Randomized Control Trial, and Salt.*

Excessive salt consumption contributes to non-communicable diseases (NCDs) like hypertension. Despite the World Health Organization's (WHO's) recommendation of 5 grams of salt per day for adults, global intake remains high. In Malawi, where hypertension is prevalent, addressing dietary habits, especially among adolescents and adults, is crucial. Our study aimed to reduce salt intake among adolescents and their households in rural and urban Malawi. In this randomized control trial, dietary data was collected through 24-hour recalls and household questionnaires to assess salt usage. The study included 732 adolescents and 1238 adults, randomly assigned to intervention and control groups. Data were collected at baseline, 12 weeks, and 52 weeks post-intervention. The intervention involved educational sessions on salt reduction incorporated into the science curriculum for standard 6 students in primary schools in Lilongwe and Karonga districts. Household salt usage was tracked using provided containers. Baseline data indicated that most salt consumption came from home-cooked meals. Follow-up assessments showed a decrease in processed food consumption among adolescents in the intervention group. Participants primarily consumed salt from home-cooked meals, with a noted decrease in table salt addition among adolescents in the intervention group. Analysis showed significant behavior changes related to reduced salt intake in the intervention group compared to the control group ( $p=0.018$ ). Adults in the intervention group were less likely to consume processed foods ( $p=0.014$ ). Adolescents in both sites showed reduced odds adding table salt, with significant intervention effects. Reported household salt usage in the intervention group decreased from  $14.7 \pm 11.1$  g at baseline to  $12.7 \pm 8.9$  g at midline ( $p=0.0276$ ), weighed salt usage showed no significant

differences between groups. The study found minimal change in salt intake despite the intervention. The trial underscores the difficulty in changing salt consumption patterns and the need for innovative strategies to promote healthier dietary practices.

## **COMPUTER PROFICIENCY AND WEB-BASED NUTRITION INTERVENTION USE AMONG OLDER ADULTS WITH TYPE 2 DIABETES.**

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*Keywords: Computer proficiency, older adults, type 2 diabetes, web-based nutrition interventions*

Web-based information technologies can serve as an accessible and potent medium for engaging, educating, and empowering individuals living with chronic diseases. such as type 2 diabetes (T2D). Effective web-based diabetes self-management education can, therefore, contribute significantly to achieving metabolic control for prevention of complications and optimal health outcomes. Yet, participants' computer proficiency can act as a barrier or enabler in predicting the effectiveness of web-based dietary self-management education interventions. To assess baseline computer proficiencies of older adults with T2D prior to participating in a web-based glycemic index targeted nutrition education intervention program. Older adult T2D (N=67) completed a validated Computer Proficiency Questionnaire (CPQ). Average responses to items on the 5-point scale were summed to produce sub-scale and composite CPQ scores. Linear regression was used to determine relevant predictors of computer proficiency and t-tests were used to compare mean differences between CPQ scores by age and education. Participants were 64% men; mean (SD) age 69.5 (9.3) years, with a mean diabetes duration of 19.7 (14.4) years. Average subscale scores were basic computer skills (4.9±0.3), Internet use (4.3±1.0), and communication (4.3±0.7) and overall composite CPQ score was 25.4± 4.9 out of 30.0. Age and education were independently associated with the composite CPQ score (p<0.001). Computer proficiency was very high among this sample of older adults with T2D. Healthcare providers supporting this population might consider augmenting their services with web-based diabetes self-

management but should consider the individual level of computer and technology proficiency.

## **QUALITATIVE PROFILING OF POTENTIAL BIOACTIVE COMPOUNDS IN AFRICAN YAM BEAN SEED**

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*Keywords: African yam bean seed, Gas Chromatography/Mass Spectrometry (GC-MS), bioactive compounds, potentials*

African yam bean is one of Africa's under-utilized plant species with potentials to increase food supply. The plant produces small tuberous roots which contains more protein than other tubers such as sweet potatoes, potatoes, cassava roots among others. The nutrient composition of the seed has been studied extensively. However, there is dearth of information on the bioactive constituents of the seed, hence, the thrust of this study. The objective of this study was to qualitatively profile potential bioactive compounds in raw whole African yam bean seeds. African yam bean whole seeds were ground into a flour of 0.05 mm size. The flour was soaked in 60% (v/v) acetone at a solvent-to-solid ratio of 10:1 and continuously agitated for 30 min. at room temperature ( $27 \pm 2^{\circ}\text{C}$ ) for crude extract recovery. After extraction, a rotary vacuum extractor (Eyela, A-1000S, Japan) at  $40^{\circ}\text{C}$  was used to remove the solvent. The crude extract was separated and subjected to Gas Chromatography/Mass Spectrometry (GC-MS) for sample characterization. The results revealed bioactive compounds such as 2-Methyl-5,5-diphenyl-4- (methylthio) imidazole (enzyme inhibitor); 2-Methyl-7-phenylindole (bio-receptor), Hexa- hydropyridine, 1-methyl-4-[4,5-dihydroxyphenyl]- (reducing agent, inhibitor); 1H-Indole, 5- methyl-2-phenyl- (potential anticancer); Benzo[h]quinoline, 2,4-dimethyl- (bio-modulators); Amino salicylic acid (antimicrobial agent); 2,3-Dihydroxy-6-nitroquinoxaline (bio-receptor); 2-Myristynoyl-glycinamide (antitumor); Quinoline, 2-chloro-6-methoxy-4-methyl- (bioactivator/inhibitor); 6-Octadecenoic acid (enzyme inhibitor). Therefore, African yam bean seed qualitatively contains potential bioactive compounds that can be tested *in vitro* or *in vivo* to establish their levels of bioactivity.

## **SCREENING PRACTICES FOR HYPERGLYCEMIC CONDITIONS IN PREGNANCY AND PERIPARTUM BLOOD GLUCOSE LEVELS**

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*Keywords: Hyperglycemia, glycemic status., knowledge, newly delivered mothers, pregnancy*

Hyperglycemia in pregnancy (HIP) is the most prevalent metabolic disorder in pregnancy and carries significant implications on maternal and newborn health and potential long-term health consequences. Early screening enables timely interventions. This study assessed the proportion of pregnant women screened for HIP and the peripartum glucose levels of newly delivered mothers. This cross-sectional survey comprised 126 mother-newborn pairs recruited from birth to 2 weeks postpartum at post-delivery wards of the Hohoe and Nkwanta South municipalities in Ghana. Maternal and child health record book was reviewed for blood glucose screening during pregnancy. A scale was created to assess and determine knowledge of HIP. Maternal random blood sugar (RBS) was measured postpartum with levels of  $\geq 11.0$  mmol/L classified as HIP. Linear regression and correlation coefficient ( $r$ ) between RBS and childbirth outcomes were tested in STATA 17 at  $p \leq 0.05$ . The mean age was  $28.2 \pm 6.9$  years. Notably, 53.0% exhibited poor knowledge of HIP. Almost half (47.6%) were screened for HIP. The mean RBS was  $5.7 \pm 1.39$  mmol/L but none was found to be hyperglycemic. Gestational age at delivery was  $38.9 \pm 2.34$  weeks with 50.8% undergoing cesarean section. Birth weight ( $3.0 \pm 0.5$ kg), length ( $48.1 \pm 3.4$ cm), head circumference ( $33.5 \pm 2.1$ cm), and APGAR score ( $8.2 \pm 1.7$ ) were assessed together with preterm delivery (16.7%), low birth weight (10.3%) and stillbirth (2.3%). A unit decrease in maternal RBS corresponded to a decrease in the child's birth weight, length, and head circumference but the association was not statistically significant. There was a weak correlation between the RBS and mode of delivery ( $r=0.1902$ ;  $p=0.0343$ ). The limited knowledge of HIP could account for only half of the pregnant women being screened. No HIP was recorded, probably due to its determination using RBS which is less sensitive. Enforcing screening in gestation is essential for improving maternal and newborn health.

## **INVESTIGATING THE KNOWLEDGE, DIETARY PRACTICES AND RISK FACTORS FOR NCDS AMONG SUB-SAHARAN MIGRANTS IN MOROCCO**

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*Keywords: Nutrition- Migration- Chronic diseases*

Migration is often associated with changes in diet, level of physical activity and exposure to certain risk factors that may contribute to the development of non- communicable diseases (NCDs) such as cardiovascular disease, diabetes, cancer and chronic respiratory diseases. The aim of this study was to investigate the knowledge, dietary practices and risk factors for NCDs among sub-Saharan migrants in Morocco. We carried out an analytical cross sectional survey in the city of Casablanca in Morocco from January 2023 to January 2024. Altogether 290 migrants from the sub-Saharan Africa met the inclusion criteria and agreed to participate. We used a standardized questionnaire with the following headings: socio-demographic characteristics, dietary knowledge and practices, and lifestyle. A total of 290 were investigated, of which 48,97 were men and 51,03% women. The average age was  $24,83 \pm 7,23$  years. Only 26,2% of participants complied with WHO recommendations concerning the number of portions of vegetables to be consumed per day and 27,2% complied with recommendations concerning portions of fruit per day. 34,1% and 33,4% of respondents replied that they eat one portion of cereal or cereal products a day and more than one portion a day respectively. Most participants lacked nutritional knowledge. Among them, 87.37% were non-smokers, 22.76% were sedentary, and 78.6% consumed alcohol. This study revealed that, due to low rates of smoking, alcoholism, and sedentary behavior, the risk of non-communicable diseases is relatively low, but could increase due to a lack of nutritional knowledge and a diet low in fruits, vegetables, and cereals within this population.

## **ASSOCIATION OF ANTHROPOMETRIC STATUS AND BODY COMPOSITION WITH PUBERTAL DEVELOPMENT IN THE ILINS-DYAD GHANA BIRTH COHORT**

*by Helena Nti / University of Health and Allied Sciences*

*Keywords: Body composition, Ghana., adolescents, anthropometric status, pubertal development*

Early puberty has been linked to negative long-term consequences. Examining the association of anthropometric status and body composition with pubertal development in Ghanaian children can enhance our understanding of children's growth patterns and their potential future health risks. We aimed to determine the association of anthropometric and body composition indices with pubertal status among the birth cohort of the International Lipid-Based Nutrient Supplement (iLiNS)-DYAD trial in Ghana. This cohort was born to women recruited at  $\leq 20$  weeks gestation, who were randomized to different supplementation groups

in the trial. We assessed anthropometry at birth and ages 4-6 y (including body composition), 9-11 y, and 11-13 y. We used the Petersen Pubertal Development Scale (PDS) to assess puberty, and regression models to determine the associations of anthropometric and body composition z-scores versus age-adjusted PDS z-score (aPDSZ), including assessing sex interactions. Birth weight was positively associated with aPDSZ at 9-11 y ( $P = 0.019$ ). The z-scores for height-for age (HAZ), fat mass, waist circumference (WCZ), and hip circumference (HCZ) at age 4-6 y were positively associated with aPDSZ ( $P < 0.05$ ) at 9-11 y, with fat free mass z-score having a negative association ( $P = 0.048$ ). HAZ and HCZ at age 4-6 y remained significantly associated with aPDSZ at 11-13 y. HAZ, WCZ, HCZ, triceps skinfold and body mass index at 9-11 y and 11-13 y were positively associated with aPDSZ at both timepoints ( $P < 0.001$ ). Sex modified these associations ( $P$ -interaction  $< 0.10$ ), with most interactions being stronger in females than in males. Anthropometric and body composition status in early and late childhood reflecting larger size and greater adiposity are associated with pubertal development in early adolescence, with stronger effects observed in females.

## **NUTRITION KNOWLEDGE AND DIETARY HABITS AMONG UNIVERSITY STUDENT-ATHLETES: IMPLICATIONS FOR HEALTH PROMOTION AND PERFORMANCE.**

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*Keywords: University student-athletes, dietary habits, nutrition knowledge, performance*

Current research elaborates the critical role nutrition plays in promoting optimal sports performance. For athletes who are also students, nutrition plays a double role- supporting learning and enhancing athletic performance. In spite of this, the dietary habits of many student-athletes have been found to be poor. This study assessed the nutrition knowledge and dietary habits of student athletes in the University of Ghana, as well as the participants' preferred source of nutrition information. This cross-sectional study used self-administered questionnaire to collect socio-demographic information and information pertaining to nutrition information sources, as well as nutrition knowledge and dietary habits from ninety-one participants. The data was subsequently analyzed for associations between variables of interest and predictions of certain variables based on others, using a Spearman's correlation test, chi-square, linear and multiple regression analyses with the level of statistical significance set at  $p < 0.05$ . Participants had an average nutrition knowledge score of 76.7% with a much lower average score for dietary habits (51.5%). A significant percentage of

participants reported either never having intentionally sought nutrition information or sought it less than twice a week (72.6%). The internet was the most patronized source of nutrition information (39.6%) with 4.4% seeking information from nutritionists/dieticians. Besides a weak positive association between nutrition knowledge and dietary habits ( $r_s = 0.098$ ,  $p = 0.380$ ) and age and nutrition knowledge ( $r_s = 0.239$ ,  $p = 0.025$ ), no significant relationships were found between the other variables and either nutrition knowledge or dietary habits.



**EXAMINING THE PATHWAYS SUPPORTING THE IMPACT OF A MULTI-COUNTRY, MULTI-SECTOR GENDER TRANSFORMATIVE INTERVENTION ON NUTRITION: AN EVIDENCE SYNTHESIS**

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*Keywords: gender equity, intervention, pathways, synthesis*

Evidence-based multidisciplinary and multisectoral interventions are needed to address simultaneously the structural and social barriers impeding gender equality in health and nutritional outcomes, and access to care. The REACTS-IN project is an integrated (nutrition, agriculture, and sexual and reproductive health rights) intervention (2023-2030) in rural regions of Bangladesh, Kenya, and Tanzania. In this evidence synthesis, a review of the literature was conducted to assess evidence supporting the proposed REACTS-IN activities and pathways through which project outcomes are presumed to be achievable. The literature search included English-language publications (2004 to 2024) identified through PubMed database, using keywords to represent the foci of REACTS-IN's ultimate outcome indicators: < 5 y child stunting, adolescent anemia, and household gender equality. Thirty-four articles, many from South Asia and East Africa, met the eligibility criteria and were included in this review of intervention activities and associated findings. Evidence to support the proposed theory of change was uneven given the complexity of project activities and the multiple pathways of influence they entail. Activities that improved training for institutional and community-based health workers and promoted micronutrient-rich biofortified crops for improved rural diets, contributed to improved child linear growth. Intervention studies reported associations between reductions in stunting and improved training and support of frontline nutrition workers, and micronutrient supplementation. Results for pathways for adolescent anemia were mixed. Some school-based iron supplementation, biofortification, and nutrition education programs were associated with

improved iron status; however, compliance and effectiveness challenges were documented. Finally, a substantial evidence base links interventions focused on improving women's empowerment and gender equality with expanded decision-making equality in the use of income and agricultural activities. This evidence-based analysis of the theory of change guiding REACTS-IN identifies pathways well-supported by evidence and thus more likely to improve nutrition, health, and gender equity.

## **SEVERE ACUTE MALNUTRITION SURVEILLANCE SYSTEM EVALUATION IN NORTHWEST ETHIOPIA**

*by Ejigu Gebeye / University of Gondar*

*Keywords: Ethiopia, Malnutrition, Severe Acute Malnutrition, Surveillance, Surveillance System Evaluation*

Severe acute malnutrition (SAM) is a major public health problem in Ethiopia and it is among the 36 national priority reportable diseases. Despite the critical role of SAM surveillance in informing public health actions, there has been a lack of zonal-level evidence. Therefore, we evaluated core activities, supportive functions, and attributes of the surveillance system of SAM in the North Gondar zone. By systematically evaluating the surveillance system for SAM in this zone, we aim to identify strengths and weaknesses, provide evidence-based recommendations, and ultimately enhance the surveillance and response capacity at the zonal level. The surveillance system of severe acute malnutrition in North Gondar zone was simple, acceptable, and sensitive. However, the completeness of the surveillance report was below the World Health Organization targets (80%) indeed there was limited budget allocation, lack of appropriate data analysis, and poor feedback system. Hence these findings suggest proper budget allocation, regular data analysis, and timely feedback for SAM surveillance operations.

## **CONSEQUENCES OF IMPLEMENTING NUTRITION PROGRAMMES IN A CONTEXT OF INSECURITY, THE CASE OF NIGER**

*by Alex Marco O. NDJEBAYI / Helen Keller Intl*

*Keywords: National Micronutrient Day, VAS, vitamin A*

The political unrest in Niger since July 2023 has had an impact on the economic and social situation and, above all, a deterioration in the security situation in all areas of the country. We have carried out a study on the consequences of this situation on the implementation of nutrition programs in the field. This study was carried out by analyzing all the activity reports of some organizations (4) implementing health and nutrition programs in the field, including

Heln Keller Intl, Plan Intl, Mercy corps and Oxfam: Helen Keller Intl, Plan Intl, Mercy corps and Oxfam. The study was also based on individual interviews with some responsible of these organizations (8) involved in the field activities and of the regional Directors of the ministry in charge of NGO in Niger. Reports of the activities of the various partners from January to April 2024 clearly show a slowdown of more than 40% in field activities. This situation is most acute in the Tillaberry region where, for more than 4 months, more than 85% of NGO field visits have been banned and the area remains inaccessible without an army escort. One of the most example of this situation is the cancelling of two main activities from Helen Keller intl programs conducting to a redirection of more than one million USD in another country. The latest decree from the ministry of interior making mandatory the escort from army to carry out any activity in the field has increased for more than 20% the cost of main activities of the programs. Widespread insecurity in the intervention zones is a real obstacle to the implementation of health and nutrition programs. When these situations persist, they can lead to a total loss of all the achievements of nutrition programs

## **THE CLASSIFICATION OF COMMONLY CONSUMED GHANAIAAN FOODS AND BEVERAGES BY GHANAIAAN NUTRITION PROFESSIONALS**

*by Dr Zakia Abdul-Haq | Sheffield Hallam University*

*Keywords: Key words: Ghana, diet-related non-communicable diseases, multimethods, nutrient profiling, nutrition policy*

Nutrient profiling is defined as ‘the science of categorising food/beverages according to their nutritional composition’ and can help frame nutritional communications to guide consumers regarding the healthiness of food/beverages. As a science, validation is an essential step in the development of the Ghanaian NRF11.3 index (GNRF11.3 index), to ensure robust classification of foods/beverages and hence improve confidence in the model. The accuracy of methodologies used in NPMs is still debated. Therefore, it is important to test the convergent validity of the GNRF11.3 index developed for the classification of Ghanaian foods/beverages to test its performance. To assess how expert nutrition professionals in Ghana classify the healthiness/unhealthiness of commonly consumed Ghanaian foods and beverages and to determine the convergent validity of the GNRF11.3 index. A survey of Ghanaian Nutrition experts was conducted to assess the convergent validity of the GNRF11.3 index. This study adapted a comprehensive list of foods/beverages identified as commonly-consumed in Ghana from a database of 24-hour dietary recalls conducted by ‘Drivers of Food Choice (DFC)/TACLED projects in Ghana. This was used to test the extent to which GNRF11.3 index classification of food/beverages agreed with an external criterion. Participants, i.e., members of Ghana Academy of Nutrition and Dietetics (GAND), were

considered nutrition experts and a benchmark for convergent validity assessment. Findings showed a statistically significant positive correlation between the ranking of experts and the GNR11.3 index, the Spearman correlation coefficient,  $R_s = 0.549$ ,  $p < .001$ . This measured the strength and direction of the association between the two variables and means. These findings corroborate results from previous studies. The GNR11.3 index is a validated nutrient profiling model suitable for use in Ghana. It will assist policymakers in implementing interventions requiring labelling food for healthier choices. This will contribute to the overall reduction in diet-related non-communicable diseases in Ghana.

### **ENGAGING EXPERT PANELS: A CRUCIAL STEPS IN SHAPING NUTRITION AND FOOD SAFETY GUIDELINES FOR CHILD AND YOUTH CARE CENTRES IN KWAZULU-NATAL, SOUTH AFRICA**

*by Mumsy Chibe / Senior Lecturer*

*Keywords: Child and Youth Care Centres, Experts, and healthy eating., food, handling, preparation*

Research is based on the argument of food contamination and lack of data on health and hygiene in the Child and Youth Care Centres. In South Africa, there is a little information on the nutritional status of children in CYCCs. The Nutrition Education Programme provided a conceptual framework into which the study was embedded. Despite the availability of necessary regulations and processes governing food preparation, safety, and healthy eating, South Africa's CYCCs continue to have practice limitations. This study explores the use of expert panels to assess guidelines for child and youth well-being. Qualitative approach was used, included desktop reviews, exploratory research, and purposive sampling to select a panel of three experts in the fields of Child and Youth Care (n=1), Child and Youth Care Education and Training (n=1), and Food, Nutrition, and Community Research Education and Training (n=1). This study used the implementation and data analysis by providing experts with 58-page guidelines. The experts were requested to review the guidelines for two month and provide feedback on accuracy, completeness and relevance. Researchers examined the experts' written comments and responses. The responses were captured and analysed to identify recurring themes, ideas, patterns, and commonalities and then coded. The guidelines were revised based on expert feedback and common inputs. The reviewers recommended emphasising low-cost, widely available, cost-effective meals, using SA- acceptable language, and focusing on SA sources over global literature. After the corrections were made and reviewed by the primary investigator, the Nutrition, Food Preparation, Safety and Healthy Eating Guidelines were accepted as final and published as part of a PhD Thesis and provided to CYCCs. The study concluded that produced guidelines are essential as no guidelines of this nature are available to the CYCCs. Furthermore, expert reviewers acknowledged that the guidelines were applicable and necessary.

## **DATA QUALITY AND AVAILABILITY FOR EFFECTIVE PLANNING, PRIORITIZATION AND RESOURCE ALLOCATION FOR MATERNAL AND CHILD HEALTH SERVICE IN NAROK NORTH SUB-COUNTY, KENYA.**

*by Christine Nderitu / Melissa Baker / Mercy Mutua / Helen Keller International, Kenya, Locate IT, Kenya / Helen Keller International, Kenya. / Helen Keller International, Kenya*

*Keywords: Data Availability, Data Infrastructure., Data Quality, Health Services, Maternal and Child Health*

Maternal and child health (MCH) services in Narok North Sub-County, Kenya, face challenges related to data availability and quality, impeding effective planning and service delivery. This study assessed the availability and quality of data essential for improving MCH services in the region. We utilized mixed methods approaches, including reviewing health information systems, data abstraction, stakeholder discussions, and participatory mapping. Population data were modelled from digitized building footprints and population density raster data, while household data were updated using remote sensing and satellite imagery. We employed open-source GIS tools to update and validate spatial data such as road networks, rivers, land use, and elevation. Data sources encompassed international, national, and local government institutions, reports, health officials, community health assistants and promoters. Key data assessed included administrative boundaries, households, health facilities, population, road networks, rivers, early childhood development centers (ECDEs), community health units, and MCH indicators. There was significant variability and gaps in data. Administrative boundaries were mapped with input from health management teams. Household data indicated even distribution, except in Narok town, which is more densely populated. Notably, socio-demographic data was unavailable. Health facility mapping revealed disparities in location and service capacity; of 62 facilities, only 30 reported in the Kenya Health Information System (KHIS), with outdated data and limited private facility reporting. Geographical barriers to health service access were evident from spatial data. Elevation data showed minimal impact on travel time. ECDE centers were unevenly distributed, with data on under-five enrolment unavailable. MCH indicators showed variable coverage across facilities. Community health unit boundaries, mapped participatorily, exhibited resource and operational variances influenced by geographical and population factors. The study highlights critical data gaps and inconsistencies affecting MCH services in the Sub-County. Strengthening data infrastructure and enhancing inter-sectoral collaboration are essential for informed decision-making and improved health outcomes.

## **DEVELOPING AND OPTIMIZING A CONTEXT-SPECIFIC NUTRIENT PROFILE MODEL FOR CATEGORISING FOODS AND BEVERAGES IN GHANA**

*by Dr Zakia Abdul-Haq / Sheffield Hallam University*

*Keywords: Key words: Ghana, multimethods, nutrient profiling, nutrition policy, nutrition-related non-communicable diseases*

Nutrient profiling refers to the scientific process of categorising food and beverages according to their nutritional composition. The World Health Organization's recommendation to promote a healthy balanced diet coupled with Ghana's Ministry of Health's concern regarding the nutrition situation in Ghana necessitates the development of an objective method of

categorising foods/beverages to inform healthy dietary choices. However, the development of reliable and validated nutrient profiling models tailored to categorise the nutritional quality of Ghanaian foods/beverages is required to implement policies, such as taxing or controlling the advertising of unhealthy foods. This study aimed to develop a context-specific nutrient profiling model for categorising foods/beverages in Ghana; and to determine the optimal combination of nutrients required in the Ghanaian Nutrient Rich Food (NRF<sub>11.3</sub>) index for classifying foods /beverages. A secondary analysis of data from the ‘Drivers of Food Choice project (DFC)’ was used to develop the “Ghanaian Nutrient Rich Food Index (NRF<sub>11.3</sub>).” Multiple regression analysis was used to explore the optimal combination of nutrients using a stepwise approach. The internal consistency of the nutrients included was assessed. In addition, the optimal cut-off points for sensitivity and specificity were determined. Of the 14 models fitted, the nutrient profiling model with 11 positive and three negative nutrients was the optimal to use in the classification of Ghanaian foods and beverages (Adjusted  $R^2=0.999$ , BIC=338.52,  $p<0.001$ ). Subsequently, validation analysis from expert professionals found a statistically significant positive correlation ( $R_s = 0.549$   $p<0.001$ ) between the Ghanaian NRF<sub>11.3</sub> index profiling and the experts’ ranked scores for classifying foods. The Ghanaian NRF<sub>11.3</sub> index is a reliable and validated nutrient profiling model suitable for use in Ghana. It will assist policy makers in implementing interventions requiring the identification of “healthy” and “unhealthy” foods that could contribute towards the overall reduction in nutrition-related non-communicable diseases in Ghana.

## ENHANCING NUTRITION GOVERNANCE IN KENYA TANZANIA AND SOMALIA

*by Alice Yugi / Justine Aenishaenslin / World Vision / World Vision*

*Keywords: ARNS, Capacity building, Nutrition Targets, Policy*

The GROW ENRICH program (funded by [BMZ](#)) aims to strengthen nutrition governance and increase regional, national, and local accountability to nutrition policies and targets through the capacity building of civil society and state actors in Kenya, Tanzania, and Puntland, Somalia. Strengthening their capacity is key to achieving strong nutrition governance and improving nutrition outcomes. To achieve this, the project engages key actors in policy dialogues using [Citizen Voice and Action \(CVA\)](#) which is World Vision’s unique approach to social accountability and local advocacy. CVA is designed to improve the relationship between communities and government. It is being used to foster a deep understanding of nutrition's importance and a renewed commitment to the creation and/or implementation of nutrition policies at all levels. Thereby ensuring increased resource allocation and expenditure for essential nutrition actions, and enhancing accountability and reporting of the African Regional Nutrition Strategy 2015-2025 (ARNS). Results obtained were local- led social accountability mechanisms formed through CVA, participation and collaboration in the

review and development of ARNS 2026-2035, coordination and collaboration with the SUN movement at the N4G accountability workshop, advocating for funding allocation for nutrition, developed a roadmap between local stakeholders and INGOs to facilitate community-led, needs-based advocacy asks toward N4G, participation at the ECSA Health Ministers Conference where Ministers adopted nutrition recommendations Using CVA we see future opportunities for increased collaboration and commitment by stakeholders to Nutrition Governance. This approach to Governance strengthening can be replicated in other African countries. The roadmap and actions being taken in this project would suit a roundtable discussion with representatives from CSOs, government, and project staff.

## **NUTRITION LEADERSHIP DEVELOPMENT PROGRAMME IS ASSOCIATED WITH IMPROVEMENTS IN INDICATORS OF ORGANIZATIONAL EFFECTIVENESS**

*by Olutayo A. Adeyemi / Yetunde Akinmolayan / Sunday Oladiran / Thabo Putu / Folake Samuel / Johann Jerling / Department of Human Nutrition and Dietetics, Faculty of Public Health, University of Ibadan, Ibadan, Nigeria; Centre of Excellence for Nutrition, North-West University, Potchefstroom, South Africa / Centre of Excellence for Nutrition, North-West University, Potchefstroom, South Africa / Centre of Excellence for Nutrition, North-West University, Potchefstroom, South Africa / Centre of Excellence for Nutrition, North-West University, Potchefstroom, South Africa / Department of Human Nutrition and Dietetics, Faculty of Public Health, University of Ibadan, Ibadan, Nigeria / Centre of Excellence for Nutrition, North-West University, Potchefstroom, South Africa*

*Keywords: African Nutrition Leadership Programme, Communication, Enabling Environment, Leadership Development Programmes, Teamwork*

Many African countries are not on track to meet global nutrition targets due to insufficient implementation of nutrition-specific and nutrition-sensitive interventions, underpinned by inadequate enabling environments. The 2013 Lancet Nutrition Series highlights leadership programmes as a key intervention to enhance enabling environments for nutrition. However, evidence on how leadership programmes contribute to nutrition improvements is limited. This study addresses this gap by evaluating the short- to medium-term impact of a nutrition leadership programme on markers of organisational effectiveness. A retrospective analysis was conducted using anonymised evaluation data from the Leadership Development for Accelerated Progress in Nutrition in Nigeria Project (LEDA- NN). The LEDA-NN involved three workshops held four to six months apart, targeting the same 60 experienced mid-career participants from multiple sectors. These workshops aimed to develop various leadership capabilities and translate these into workplace practice. Participants provided anonymous evaluations at the end of each workshop, featuring both open-ended and closed-ended questions. The final evaluation after the third workshop included opinions on how the leadership training had improved work performance and could enhance nutrition outcomes. Additionally, participants' line managers completed independent, anonymous

evaluations of their staff. Data from all evaluations were coded and analysed for common themes. Evaluations from both participants and line managers indicated that several leadership capabilities improved due to LEDA-NN, including effective communication and feedback, self-reflection, delegation, advocacy, and networking. These enhancements led to better team dynamics, increased motivation, a more proactive and innovative work culture, improved professional relationships, greater resilience, work commitment, and a higher degree of personal responsibility for growth and development. The evaluation indicates that the LEDA-NN project, designed and implemented by the African Nutrition Leadership Programme, has the potential to improve nutrition outcomes by enhancing short- to medium-term markers of personal and organizational effectiveness.

## **SEQOTA DECLARATION: THE IMPACT OF HIGH IMPACT INTERVENTIONS ON CHILD STUNTING AND MORTALITY DURING THE EXPANSION PHASE**

*by Daniel Tsegaye / Ministry of Health*

*Keywords: Lives saved, Malnutrition, Seqota Declaration, acute, and severe Malnutrition., stunting*

Although Ethiopia has seen a steady and impressive reduction in child stunting over the last decade, rates remain high, and stark geographical disparities persist. To address these problems the Government of Ethiopia has made a unique commitment called the Seqota Declaration (SD), which is an innovative multi-phase and multi-sectoral approach to end stunting among children under two years by 2030 which is being implemented in 14 regions and 240 districts. The purpose of this analysis is to determine the impacts of SD expansion phase interventions on stunting cases averted, and additional lives saved, and to identify the most impactful SD interventions in 2022, in 11 regions and 215 districts of Ethiopia. The Lives Saved Tool (LiST) model was used to analyze and estimate stunting cases averted, and additional lives saved, and identify effective SD interventions for reducing child stunting and mortality. The analysis used secondary data from the national food and nutrition strategy baseline survey, Seqota Declaration monitoring scorecards, and HMIS data. The analysis revealed that a total of 3,033 additional under 5 lives were saved and 99,080 stunting cases were averted in 215 districts in 2022, resulting in 48 million USD in additional lifetime earnings. It also revealed that interventions like treatment of acute malnutrition, nutrition-sensitive agriculture, and piped water have significantly saved the lives of children under 5. Nutrition-sensitive agriculture, complementary feeding, use of filtered water, and food supplementation significantly averted stunting in children under five years, with children under two most prevented from death and stunting. The findings revealed that SD interventions have a significant impact on averting stunting cases and reducing child mortality. Based on the findings, we conclude that if the SD interventions are expanded and fully scaled, stunting may be reduced to the point where it is no longer a public health concern



in Ethiopia.

## **ABSTRACT NEUROLATHYRISM: AN INCURABLE DISABLING DISORDER OF THE POOR. A RESEARCH JOURNEY TO CREATE AWARENESS AND INFLUENCE THE POLICY DIRECTIONS.**

*by Netsanet Mengistu / University of Gondar*

*Keywords: Ethiopia, Food insecurity, Guaya, Neurolathyrism, Prevalence*

Grass pea ('Guaya'), if continuously and exclusively consumed, might result a condition known as *neurolathyrism*. Currently there are no comprehensive epidemiological and disability studies and there are only a few reliable statistics on the prevalence of *neurolathyrism*. This project was aimed to: measure incidence and prevalence of *neurolathyrism*; determine the predisposing factors for the disease in Ethiopia. and to evaluating the stage-to-stage progression of *neurolathyrism*. A stratified multistage cluster sampling design was applied to collect data. Age groups of both sexes who are 2 years or older were included. The overall prevalence of *neurolathyrism* in the study areas was 10.5% indicating one out of ten participants were affected by the condition. From these affected individuals 88.6 percent were males. Nearly seventy percent (69.34%) of cases were at stage one *neurolathyrism*, 25.72% were at stage two, 3.76% were at stage three and the remaining 1.16% encountered stage four of the disease. It was also observed that 21.1% (1 in 5) of cases had progressed from stage one to stage two, 7.51% also progressed from stage two to stage three of the disease, and the remaining 1.45 % of cases progressed from stage three to stage four. The current study revealed that there is a high prevalence of *neurolathyrism* in the study areas. Males are also the most affected sex groups when compared to females. As a new finding to our current study it has also been indicated that there is a stage-to-stage disease progression of *neurolathyrism* affected individuals. This finding is also a good indicator to the continuous consumption of grass pea despite its side effect showing the high food insecurity status of affected households.

## **FEASIBILITY OF INTEGRATING VITAMIN A SUPPLEMENTATION (VAS) WITH SCHOOL HEALTH PROGRAM IN MACHAKOS COUNTY, KENYA**

*by Mercy S. M. / Helen Keller International*

*Keywords: Community Health Promoters, Early Years of Education, Public Health Officers., School Health Program, Vitamin A supplementation*

Vitamin A deficiency remains a significant public health issue in Kenya. Mass Vitamin A Supplementation (VAS) campaigns achieve high coverage but are unsustainable. Currently, children aged 6-11 receive VAS at health facilities, while children aged 12-59 months are supplemented by Community Health Promoters (CHPs) at Early Years of Education Centres

(EYEs), which is resource intensive. This study examined whether the school health program in Machakos County could achieve a comparable coverage compared to the EYE delivery approach. From January 2024, Helen Keller International supported Machakos County in integrating VAS into the school health program. Public Health Officers and school health personnel were trained to administer VAS alongside routine deworming for children aged 12-59 months during school health days. These days aimed at promoting Health and wellness also included activities on hygiene practices and mental and physical health. Eligible children were registered and supplemented during these monthly sessions at schools. Administrative data from the Kenya Health Information System were analyzed to assess VAS coverage. VAS coverage data for children aged 12-59 months in Semester 2, 2023 (delivered by CHPs using the EYEs approach) was compared to VAS coverage in Semester 1, 2024 (integrated with school health programs). VAS coverage was 93% in Semester 2, 2023, and 87% in Semester 1, 2024. The reduction in 2024 may be attributed to more accurate targeting with school registers, avoiding supplementation of children over five years old, whereas the 2023 approach may have inflated coverage estimates due to less precise age- targeting. The integration of VAS with the school health program effectively maintained high coverage levels. However, the approach demonstrated that accurate targeting is crucial for reliable coverage estimates. Continued refinement of targeting strategies within integrated programs is essential to optimize VAS delivery and ensure that all eligible children are supplemented.

## **BARRIERS TO EFFECTIVE AND EFFICIENT VITAMIN A SUPPLEMENTATION (VAS) DURING THE NATIONAL MICRONUTRIENT DAY (NMD) IN NIAMEY, NIGER**

*by Alex Marco NDJEBAYI / Helen Keller Intl*

*Keywords: National Micronutrient Day, Vitamin A Supplementation, vitaminA*

Micronutrient Day in 2023, coverage of Vitamin A Supplementation among children aged 6-59 months, in Niamey fell below the national target of 80%, whereas nationally the figure is over 85%. In this study, we analyzed the results to identify the barriers to effective and efficient delivery of Vitamin A through campaign in Niamey. This study was conducted in the Niamey region of Niger, using a descriptive mixed-methods design. Sources of information were grey literature (~30 planning, financial and implementation-related documents), semi-structured interviews (50) with key stakeholders from the central, regional, district, health, and community levels, and focus group discussions (10) with community distributors. A quantitative survey was conducted among 1513 caregivers of children. The vitamin A supplementation campaign covered 85.6% of children. Analysis by stratum shows that there is a significant difference ( $p=0.000$ ) of 9 percentage points between Niamey, the capital (77%) and other regions (86%). The reasons for this significant difference are

difficulties to access the children in Niamey during the campaign at the usual times when distributors visit. The upper middle-class households (15.3%) and affluent households (8.1%), consisting mainly of civil servants, entrust the care of their children aged between 6 and 59 months to female caregivers recruited exclusively for this work. However, these women do not allow their children to receive inputs for mass campaigns without the parents' prior authorization. Furthermore, one child in four does not receive supplements because the parents are not informed of the campaign. Cases of refusal were very limited (1.6%) during this campaign. VAS coverage in Niamey is lower (77%) than in the rest of the country (86%) for several reasons, the most recurrent of them is the inaccessibility of children due to the absence of parents when the distributors visit.

## **BARRIERS AND FACILITATORS OF VITAMIN A SUPPLEMENTATION PROGRAMME IN NIGERIA WITH FOCUS ON EBONYI AND OYO STATES**

*by Chiamaka. Uche-Madu\*1, Oluwaseun. Ariyo1, Selina Quibrantar2, Obidimma. Ezezika2  
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*Keywords: Vitamin A supplementation, barriers, coverage, facilitators.*

Vitamin A Supplementation (VAS) is a low-cost, short-term strategy to combat vitamin A deficiency (VAD), having the ability to reduce all forms of child mortality by 12-24%. In Nigeria, VAD affects 30% of under-five children notwithstanding the stakeholders' efforts at controlling micronutrient deficiencies. This study was aimed to evaluate the barriers and facilitators of Vitamin A supplementation programme in selected states of Nigeria. A mixed-method design was adopted. Data on VAS and under-five mortality were accessed from National Primary Health Care Development Agency and UNICEF databases for trend analysis. In-depth interviews with stakeholders at different levels and focus group discussions among beneficiaries in Ebonyi and Oyo states were conducted to explore barriers and facilitators of VAS programme. Interviews were recorded, transcribed verbatim and analyzed using Nvivo version 14. VAS coverage fluctuates with 91%, 56%, and 67%, in 2010, 2016, and 2022, respectively, alongside steady decline in under five mortality from 135.5 -107.2/1000 live births during 2010-2022. Major facilitators include development partners' support in funding, training of health workers, facilitating collaboration, and supply of capsules. Prominent barriers included beneficiaries' financial situations, lack of transportation, misuse of vitamin A capsule, non-availability as routine service, poor logistics, competing priority, lack of well-trained health workers, community and beneficiaries' attitude etc. Suggested strategies to improve VAS programming include incentivizing performance, adopting community-led, tailored cultural and religious implementation initiatives, intensified media use for publicity, early education and resource mobilization, integration with existing health programmes, and availability of feedback

mechanisms. Vitamin A supplementation coverage is fluctuating amidst declining under-five mortality in Nigeria. Development partners support in funding, provision of vitamin A capsules, and capacity building of health workers facilitate successful programming amidst myriads of barriers including poor government support, misuse of vitamin A capsule, security concern, and non-supportive community and beneficiaries' attitudes.

## **ROLE OF INTERNATIONAL NGOS IN SUPPORTING LARGE-SCALE RICE FORTIFICATION: A CASE STUDY FROM INDIA**

*by Kumar Saurabh / Neeraj Jain / Regional Program Manager-Food Fortification (West Africa), PATH India Office / Country Director, PATH India Office*

*Keywords: Rice Fortification, Anemia Prevention , International NGOs, Technical Assistance , Public Health Initiatives in India.*

This case study highlights the critical role of international non-governmental organizations (NGOs) in supporting large-scale rice fortification efforts in India. By providing technical assistance to the Government of India, PATH, a global health NGO, has played a pivotal role in addressing the widespread issue of anemia through the distribution of fortified rice. The aim was to demonstrate the technical assistance provided to the Government of India in scaling up the rice fortification program, aimed at addressing the high prevalence of anemia across the country. To combat this issue, the Government of India has implemented the distribution of fortified rice (FR) through social safety net programs as a preventive and complementary measure. PATH, a global health non-governmental organization, serves as a technical partner to the national and 12 state governments in India (project timeline: 2021-2024). Our technical assistance supports the entire rice fortification supply chain by aiding premix manufacturers, fortified rice kernel (FRK) producers, and rice millers in scaling up their operations. We also work to strengthen India's micronutrient testing laboratories to ensure the quality of fortified rice, train government officials and frontline workers, establish QA and QC systems for the Government of India's fortified rice program, and conduct awareness campaigns for consumers of fortified rice. PATH's ongoing technical support to the national and 12 state governments in India has significantly contributed to the program's success, with fortified rice reaching over 300 million Indians. Additionally, more than 12,000 rice millers have installed FR blending units, and over 4,200 industrialists have been trained in rice fortification. Ambitious large-scale rice fortification programs in low- and middle-income countries

(LMICs) like India can be effectively implemented when impartial organizations provide technical support to national and state governments.

## **EFFECT OF EXCLUSIVE COW MILK CONSUMPTION ON HAEMOGLOBIN CONCENTRATION AND SHORT TERM WORKING MEMORY IN WEANLING MICE.**

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*Keywords: Cow milk, hippocampus, nutritional anaemia, working memory*

Cow milk is considered a nutrient dense food, and also the most inexpensive option of milk-food offered to children. Few population studies has shown association between cow milk consumption and anaemia, but paucy data is found on its effect in working memory. This study investigated the effect of exclusive cow milk consumption on weight, haemoglobin concentration, hepatic, and brain iron stores, working memory, and histology of the hippocampus in weanling mice. Twenty weanling mice, were divided into two groups of ten each. Group1 fed on normal mouse chow, while group 2 consumed cow milk. Deionized water was provided *ad-libitum*, haemoglobin concentration, and weights were assessed weekly. Working memory was evaluated before and after the cow milk feeding regimen (28 days), mice were thereafter sacrificed humanely, and tissues harvested. All laboratory, and statistical analysis were done using standard protocols. There was significant ( $p < 0.05$ ) decreases in the weight (g) ( $13.49 \pm 1.04$ ), haemoglobin concentration (g/dl) ( $8.95 \pm 1.76$ ), hepatic ( $0.07 \pm 0.01$ ), and brain ( $0.06 \pm 0.01$ ) iron stores (mg/g tissue) in mice fed cow milk, when compared with control ( $22.10 \pm 2.04$ ,  $13.20 \pm 0.75$ ,  $0.12 \pm 0.02$ , and  $0.08 \pm 0.01$  respectively). In the working memory assessment using the Y-maze, there was no significant ( $p > 0.05$ ) difference in the percentage entry into the novel arm, however, total arm entries significantly ( $p < 0.05$ ) decreased. The photomicrograph of the hippocampus showed a wide gap between the cornu ammonis (CA) 4, and the dentate gyrus (DG) regions of group on cow milk. Similarly, poor neuronal processes with more neuroglial cells were observed in the CA 3 region of cow milk fed group. This study has shown that a 28 days exclusive cow milk consumption induces nutritional anaemia, affects the hippocampal structure, and some aspects of working memory in weanling mice.

## **PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY PROFILES OF SALMONELLA ISOLATES FROM RAW BEEF AND MEAT CONTACT SURFACES, HOSSANA TOWN, CENTRAL ETHIOPIA REGION**

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*Keywords: Antimicrobial sensitivity, Foodborne illness, Hossana, Salmonella*

*Salmonella* is a leading cause of foodborne illness worldwide, with a rising concern for the developing and spreading of antimicrobial-resistant strains due to the imprudent utilization of antimicrobials. A cross-sectional study design was conducted to estimate the magnitude, associated risk factors, and antimicrobial susceptibility profile of *Salmonella* spp obtained from raw beef and meat contact surfaces in Hossana Town. Out of a total of 370 samples that were collected using a simple random sampling method, 31 (8.4%) tested positive for *Salmonella isolates* using biochemical tests. There was no statistically significant difference in the occurrence of *Salmonella* spp and sample sources ( $\chi^2=0.88$ ,  $P>0.05$ ). Multivariable logistic regression analysis revealed that job- relating training, medical checks-up, practice of hand washing, wearing protective clothing and tidiness of slicing material were among the potential risk factors that significantly correlated with the occurrence *Salmonella* spp in the study area ( $P<0.05$ ). All obtained isolates of *Salmonella* spp. were subjected to antimicrobial susceptibility testing with nine antibiotics using the Kirby-Bauer disk diffusion method. Ciprofloxacin and gentamycin were the most effective antibiotics; however, the highest resistance rate (93.5%) was observed against tetracycline followed by 83.9% and 67.7% to meropenem, and ampicillin, respectively. In all, 17 resistance patterns of *Salmonella* spp to six different classes of antimicrobials were observed. Of these, 90.3% of *Salmonella* spp accounted with multiple antibiotic resistances index $>0.2$  and 80.65% were resistant to three or more tested antimicrobial agents. This study ascertains a significant proportion of *Salmonella* spp with higher multi-drug resistance patterns to routinely prescribed antimicrobial agents. Therefore, strict hygienic management in the abattoir and meat retailer outlets as well as rational use of antimicrobials and detection of resistance genes should be applied to circumvent the further development of antimicrobial resistance in the study area.

## **MINERAL COMPOSITION, BIOACCESIBILITY AND BIOACTIVE CONSTITUENTS OF WHOLE WHEAT, ORANGE FLESHED SWEET POTATOES AND MUSHROOM (LENTINUS SQUARROSULUS) COOKIES**

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**Keywords:** *Bioactive, Biofortified sweet potatoes, Cookies, Lentinus squarrosulus, Minerals*

Cookies are cereal based foods commonly consumed by the populace and particularly among the children. Cookies are ready- to-eat, convenient food snacks that has been identified as a significant vehicle for food fortification. Orange fleshed sweet potatoes (OFSP) is a sweet, yellowish colored beta carotene biofortified crop developed to combat Vitamin A deficiency globally. Mushroom (*Lentinus squarrosulus*) is widely cultivated and commercialized in Nigeria. It is accepted for its taste, nutrition and bioactive constituents. The application of OFSP which is been classified as food security crop, and mushroom in cookies production could reduce dependence on wheat, improved nutrition by addressing mineral deficiency and overall health of consumers. Whole wheat grain (W), orange fleshed sweet potato (O) and mushroom (*L. squarrosulus*) (M) flours were produced and cookies were prepared from the composite flours blends at ratio W:O:M of 60:40 (A), 60:35:5 (B), 60:30:10 (C), 60:25:15 (D) ,60:20:20 (E) and 100 % whole wheat flour (W) was the control. The bioactive (Total carotenoids, phenolics and flavonoids), minerals (potassium, sodium, phosphorus, zinc, iron, magnesium and calcium) contents and bioaccessibility were analyzed using standard methods. Cookies produced with OFSP and mushroom (*L. squarrosulus*) substitution resulted in increased in mineral contents and bioaccessibility. Macroelement potassium was the highest at 256.76 mg/100g (Sample E) while phosphorous was the most bioaccessible (87.45 %) amongst the minerals studied. Increase in total flavonoids and phenol that acts as influential antioxidants, total carotenoids which are important in alleviating Vitamin A deficiency was observed in the cookies formulated from the composite blends. The inclusion of orange fleshed sweet potato and mushroom (*L. squarrosulus*) in cookie production improved the mineral contents, bioaccessibility and bioactive constituents. This study encourage the utilization and consumption of orange fleshed and mushroom (*L. squarrosulus*) substituted cookies for improved nutrition and health.

## **POSITIVE DEVIANCE HEARTH MODEL IN FRAGILE CONTEXTS: RESULTS FROM A 12-MONTH GREAN PROJECT PILOT STUDY IN SOUTH SUDAN**

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*Keywords: PDH, Positive Deviance Hearth, South Sudan, fragile context*

The Positive Deviance Hearth (PDH) model is a community-based program that rehabilitates malnourished children using local resources and knowledge. Its long-term effectiveness in fragile, food-insecure contexts is not well-documented. World Vision South Sudan piloted PDH in the Greater Resilience Enhanced Through Agriculture and Nutrition (GREAN) project (2019-2024), which aimed to enhance local resilience through improved food production, landscape restoration, social norms, and health services. Forty-six underweight children (24 girls and 22 boys) aged 6-36 months from Madingkar Boma, Tonj North County, were randomly enrolled in the PDH program. Sessions for 10-15 children lasted 12 days, with food from caregivers, community gardens, and project supplements. Children were admitted based on their underweight status and monitored for progress using weight gain on specified days. Results were assessed through weight changes, supplemented by observations, focus groups, and interviews. Descriptive quantitative Data was analyzed through the PDH Excel database. From Day 12, the number of children achieving normal nutrition status increased, while those in other categories of underweight decreased. At baseline, 46 children were enrolled and classified according to nutrition status: 0 Normal, 21 Mild, 13 Moderate, and 12 Severe. One child defaulted during the PDH sessions. By 6 months, 8 were Normal and 8 Mild, with no Moderate or Severe cases remaining. At 1 year, 12 children were Normal and 3 Mild. Of the 45 children, 17 (37.8%) improved their nutritional status within 3 months. The remaining 28 (62.2%) did not, indicating a need for ongoing support to enhance caregiver practices. Further research is warranted to fully understand how PDH can be effectively implemented in fragile, food-insecure contexts. This pilot shows promise, suggesting that integrating PDH with resilience projects can improve its feasibility and impact. A follow-up study in another GREAN project area is planned.

## **ASSESSING THE HEALTHINESS OF INDUSTRIAL- PROCESSED FOODS AVAILABLE IN MAJOR SUPER MARKETS FOR CHILDREN UNDER FIVE IN CAPE COAST USING THE WHO NUTRIENT PROFILING CRITERIA**

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*Keywords: WHONPM. , 'healthy', 'unhealthy'*

Industrial-processed foods may have high levels of salt, sugars, and fat, which are major



contributors to child obesity. The World Health Organisation's Nutrition Profiling Model (WHONPM) was primarily developed to identify unhealthy foods that should be restricted from being marketed to children. This study sought to determine whether industrially processed food products sold in major supermarkets are healthy or unhealthy for children under five years of age in the Cape Coast metropolis. This study employed a Cross-sectional study design identifying labeled industrially processed foods mainly fed to children under the age of 5 years in the major supermarkets in the Cape Coast Metropolis. The study estimated and sampled 3 major supermarkets in Cape Coast which the population frequent for food following a two-stage sampling procedure. Data collected included: name of food product, food category by WHONPM, composition of total fat, sugar, sodium, and saturated fats per 100g of each product identified. Descriptive analyses were undertaken to describe the number of products from each food group and the proportion of products categorized as 'unhealthy' and 'healthy' by the WHONPM. Out of 166 industrial processed foods identified, 55.4% were found to be unhealthy, 20.5% of them healthy, and 23.5% were inconclusive. The study revealed that Milk and dairy-based drinks(16. 6%) are the most common products in the supermarket for children under 5. A significant proportion of processed food products sold in major supermarkets for children under five years of age in Cape Coast are unhealthy for children. Public education on the risk of industrially processed foods for children under five should be encouraged.

## ASSOCIATIONS OF PRIOR WASTING MALNUTRITION WITH LATER INDICATORS OF GLUCOSE TOLERANCE ACROSS FOUR COUNTRIES IN AFRICA AND ASIA: THE SAMPA STUDY

by Dixi Paglinawan Modoc / Sana Ahmed / Molly Chisenga / Sharon Cox / Riddhi Dasgupta / Paulita Duazo / Daniel Faurholt-Jepsen / Lackson Kasonka / Paul Kelly / Ruth Keogh / Belinda Kweka / Rikke Krogh-Madsen / Nanette Lee / Evangelista Malindisa / Dorothea Nitsch / Patrick Ngoya / George PrayGod / James AM Shaw / Juan Antonio Solon / Mizinga Tembo / Geeta Trilok-Kumar / Suzanne Filteau / Nutrition Center of the Philippines, Manila, Philippines / Institute of Home Economics, University of Delhi, New Delhi, India / University Teaching Hospital, Lusaka, Zambia / London School of Hygiene and Tropical Medicine, London, UK / Translational and Clinical Research Institute, Newcastle University, UK / USC-Office of Population Studies Foundation, University of San Carlos, Cebu, Philippines / Department of Infectious Diseases, Rigshospitalet, Denmark / University Teaching Hospital, Lusaka, Zambia / University Teaching Hospital, Lusaka, Zambia / London School of Hygiene and Tropical Medicine, London, UK / National Institute for Medical Research, Mwanza, Tanzania / Department of Infectious Diseases, Rigshospitalet, Denmark / USC-Office of Population Studies Foundation, University of San Carlos, Cebu, Philippines / Department of Physiology, the Catholic University of Health and Allied Sciences, Tanzania / London School of Hygiene and Tropical Medicine, London, UK / Department of Radiology, Bugando Medical, Mwanza Tanzania / National Institute for Medical Research, Mwanza, Tanzania / Translational and Clinical Research Institute, Newcastle University, UK / Nutrition Center of the Philippines, Manila, Philippines / University Teaching Hospital, Lusaka, Zambia / Institute of Home Economics, University of Delhi, New Delhi, India / London School of Hygiene and Tropical Medicine, London, UK;

*Keywords: Africa, Asia, Malnutrition, diabetes*

Prenatal or infant wasting malnutrition followed by later overweight is associated with increased risk of chronic diseases including type 2 diabetes. It is unclear whether malnutrition later in life is also associated with diabetes risk. We followed up two child and four adult cohorts in Tanzania, Zambia, India, and the Philippines. Participants had documented low birth weight or wasting malnutrition in childhood or as adults following HIV or tuberculosis infection. Anthropometry, body composition, and diabetes risk, indicated by HbA1c and glucose at 120 minutes (glucose<sub>120</sub>) in an oral glucose tolerance test (OGTT), were assessed 3-38 years after prior malnutrition (PM) and in not previously malnourished controls (NPM). We investigated whether PM was associated with differences in diabetes prevalence. In adult cohorts, we investigated whether current nutritional status, assessed by body mass index (BMI), waist circumference (WC), and fat mass index (FMI), interacted with PM for associations with diabetes risk. There were few overall associations between PM and diabetes prevalence or plasma glucose during an OGTT. However, among participants currently obese, PM participants, compared to NPM, tended to have higher HbA1c (0.38%; 95% CI -0.10, 0.85%) and 2-hour glucose (0.57 mmol/L; 95% CI -0.40, 1.54 mmol/L). PM participants had higher HbA1c than NPM at both the highest and lowest terciles of FMI. PM, in early childhood and adulthood, amplifies the risk of diabetes in people who later become obese. The mechanisms require further study. Clinicians and public health managers should be

aware of the risk and intervene to prevent excess weight gain in people previously malnourished.

## THE ASSOCIATION BETWEEN PRIOR MALNUTRITION AND CURRENT EXOCRINE PANCREATIC FUNCTION IN SIX COHORTS FROM AFRICA AND ASIA

by Mizinga Jacqueline Tembo / Sana Ahmed / Riddhi Dasgupta / Evangelista Malindisa / Belinda Kweka / Patrick Ngoya / James AM Shaw / Sharon Cox / Nanette Lee / Dixi Paglinawan Modoc / Geeta Trilok- Kumar / Molly Chisenga / Lackson Kasonka / Paul Kelly / Suzanne Filteau / Tropical Gastroenterology and Nutrition group (TROPGAN), Lusaka, Zambia and University Teaching Hospitals (UTH), Lusaka, Zambia. / Institute of Home Economics, University of Delhi, New Delhi, India. / Translational and Clinical Research Institute, Newcastle University, Newcastle upon Tyne, United Kingdom and Newcastle Centre for Diabetes Care, Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, United Kingdom. / Department of Physiology, the Catholic University of Health and Allied Sciences, Mwanza, Tanzania, United Republic of. / Mwanza Research Centre, National Institute for Medical Research, Mwanza, Tanzania, United Republic of. / Department of Radiology, Bugando Medical Centre / Catholic University of Health and Allied Sciences, Mwanza, Tanzania, United Republic of. / Translational and Clinical Research Institute, Newcastle University, Newcastle upon Tyne, United Kingdom and Newcastle Centre for Diabetes Care, Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, United Kingdom. / Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, United Kingdom and School of Tropical Medicine and Global Health, Nagasaki University, 1-12-4 Sakamoto, Nagasaki, Japan / USC-Office of Population Studies Foundation, Inc., University of San Carlos, Cebu, Philippines. / Nutrition Center of the Philippines, Muntinlupa City, Manila, Philippines / Institute of Home Economics, University of Delhi, New Delhi, India and Trivedi School of Biosciences, Ashoka University, Sonapat, India / University Teaching Hospitals (UTH), Lusaka, Zambia. / University Teaching Hospitals (UTH), Lusaka, Zambia. / Tropical Gastroenterology and Nutrition group (TROPGAN), Lusaka, Zambia and Institute, Barts & The London School of Medicine, Queen Mary University of London, London, United Kingdom. / Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, United Kingdom.

**Keywords:** *Exocrine pancreas, faecal elastase, malnutrition*

Impairment of exocrine pancreatic digestive enzyme secretions, which are crucial for digestion, is termed exocrine pancreatic insufficiency (EPI). Diagnosis is often by faecal elastase-1 (FE-1), a highly resilient pancreatic enzyme suitable for non-invasive testing. Severe malnutrition during childhood poses significant consequences not only for immediate morbidity and mortality but also for the long-term health of survivors. While some complications of prior malnutrition have been documented, there is little information about associations of prior malnutrition and exocrine pancreatic function. Our aim was to determine the association between prior childhood and adulthood wasting malnutrition on FE-1. We followed-up six cohorts in India, the Philippines, Tanzania, and Zambia, with children and adults who were originally recruited 3-40 years ago (n=1,911). These were individuals with documented prior wasting malnutrition (PM) and those without (NPM). FE-1 was measured using the ScheBo FE-1 ELISA kit, with methods standardized across all cohorts. EPI was defined as FE-1 <200 µg/g stool. FE-1 levels were compared between PM and NPM, and associations with cohort, sex, age, and HIV infection were investigated. There was no

association of prior malnutrition with FE-1 levels. FE-1 was lower in African [median 238 (IQR 103-487)  $\mu\text{g/g}$ ] than Asian participants [median 566 (IQR 297-600)  $\mu\text{g/g}$ ;  $p<0.001$ ] and Africans [541/1255 (43%)] were more likely than Asians [105/656 (16%);  $p<0.001$ ] to have EPI; differences were not explained by HIV. Age was inversely correlated with FE-1 levels ( $\rho$ : -0.10;  $p<0.001$ ). Males had slightly higher FE-1 [median 349 (IQR 144-600)  $\mu\text{g/g}$ ] than females [median 322, IQR 127-596)  $\mu\text{g/g}$ ;  $p=0.07$ ]. There were no significant differences found in FE-1 levels between the PM and NPM. However, it seems that Africans have lower FE-1, which may predispose them to EPI. There is a need to understand the environmental and genetic factors that contribute to this difference.

## **ACCEPTABILITY OF A MICROBIOTA-DIRECTED COMPLEMENTARY FOOD FOR THE TREATMENT OF UNCOMPLICATED ACUTE MALNUTRITION IN CHILDREN 6-23 MO IN BURKINA FASO**

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*Keywords: Acceptability, Burkina Faso, children, microbiota-directed complementary food, uncomplicated malnutrition*

There is more interest for the development of therapeutic foods targeting gut microbiota due to its key role in malnutrition etiopathogenesis and recovery. This study aims to assess the acceptability of a microbiota-directed complementary food (MDCF) for the treatment of uncomplicated acute malnutrition in children in Burkina Faso. In a cross-over trial conducted in 2023, children 6-23 mo with uncomplicated MAM ( $n=42$ ) and SAM ( $n=20$ ) were enrolled. MDCF was tested against Plumpy'Sup (PPS) for MAM and Plumpy'Nut (PPN) for SAM. For direct observation, 50-g portion of each food was given to the children on alternate day. Subsequently, they received each food daily based on body weight (bw) for two-week home consumption. Food preferences of participants were assessed using a 5-point hedonic scale. The mean food and energy intakes were compared using pkcross test. Children with MAM consumed 26% (CI95%: 18.9; 33.1) and 32% (CI95%: 19.4; 44.6), respectively for PPS and MDCF, of the 50-g portion offered during the direct observation; for children with SAM, it was 33.2% (CI95%: 17.6; 48.7) for PPS vs. 24.8% (CI95%: 14.0; 35.6) for MDCF. Daily energy intake estimated from home consumption for PPS was significantly higher than that of MDCF ( $69 \pm 13.2$  kcal/kg bw vs.  $57.4 \pm 20.1$  kcal/kg bw) among children with MAM; no significant difference was found between MDCF and PPN ( $158.8 \pm 24.2$  kcal/kg bw vs.  $145 \pm 27$  kcal/kg bw) among children with SAM. Hedonic scale scores for the general appreciation of tested and standard foods were  $\geq 4$  for 95% or more of them. The

acceptability results were similar for MDCF and standard foods during direct observation but different among MAM children during home consumption. This allows the possible use of MDCF in an efficacy trial for children 6-23 mo.

## **MODELLING THE EFFECT OF WATER, SANITATION AND HYGIENE PRACTICES ON MALNUTRITION AND MALARIA IN NIGERIA**

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*Keywords: Malaria prevalence, Nigeria., malnutrition, regional disparities, water and sanitation*

The study was conducted to determine the relationship between Water, Sanitation, and Hygiene (WASH) practices, malaria exposure, and malnutrition (stunting, wasting, and underweight) among children under five across Nigeria's six geopolitical zones. Poor WASH services have severe public health implications, with millions of children dying annually due to unsafe WASH practices. Malaria remains a major health challenge in Nigeria, particularly among children under five, contributing significantly to morbidity and mortality. This retrospective study used data from the National WASH Repository, Demographic and Health Survey, and Malaria Indicator Survey, involving 30,713 participants aged 0-4 years. The study found significant regional disparities in socio-economic, demographic, and health-related characteristics. Malaria prevalence was highest in the North-West region (31.13%), followed by the South-South (19.2%) and South-East (17.725%) regions. Regression analyses showed that malaria prevalence is associated with stunting, age, gender, and region. The stunting variable alone explains only 0.22% (95% CI, -2.58, -1.79;  $p < 0.0001$ ) of the variation in malaria prevalence. However, a model that includes stunting, gender, and region explains 91.46% (95% CI, 0.58, 0.59;  $p < 0.0001$ ) of the variation in malaria prevalence. Additionally, the study examined the relationship between child growth, nutritional status (wasting and stunting), and malaria prevalence. It found that malaria prevalence is negatively associated with both wasting and stunting, indicating that malaria may contribute to poor child growth and nutritional status. The model, including malaria prevalence, age, gender, and region, explains 3.33% (95% CI, -0.03, -0.026;  $p < 0.0001$ ) of the variation in the wasting variable. The coefficient for the stunting variable (0.05250081) indicates a positive relationship between stunting and malaria prevalence. The study underscores the need for targeted interventions and policies tailored to the specific needs of each region, including efforts to improve educational access, economic opportunities, and access to basic services such as water, sanitation, and healthcare facilities.

## **MALNUTRITION AND ITS ASSOCIATED FACTORS AMONG PREGNANT AND LACTATING WOMEN UNDER ARMED CONFLICT AREAS IN ETHIOPIA**

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*Keywords: Ethiopia, Malnutrition, pregnant and lactating women*

Maternal malnutrition continues to be a major public health issue, particularly in low- and middle-income nations and war-torn areas such as Ethiopia. Malnourished pregnant and lactating mothers with insufficient nutrient storage have babies with poor mental and physical development, which increases the likelihood of adverse birth outcomes. Despite the fact that the majority of Ethiopian mothers are malnourished, there is scant proof in war-torn areas. The goal of this study was to determine the incidence of undernutrition and associated variables among pregnant and lactating women in Ethiopia's war-torn region. A community-based cross-sectional study was carried out from June 02 to July 25, 2023. A multistage random selection method was employed to identify 2532 pregnant and lactating mothers. MUAC was used to determine the outcome variable. The data was input and analysed using EPI INFO version 3.5.3 and SPSS version 24, respectively. A multivariable logistic regression analysis was used to identify the factors related with acute malnutrition. An adjusted odds ratio (AOR) with a 95% confidence interval was used to demonstrate the strength of the relationship, while a P-value of 0.05 was used to declare the association significant. The prevalence of acute malnutrition among pregnant and lactating women was 43.3% at the 95% confidence interval (40.9-45.8). Mother age (AOR = 0.73; 95% CI: 0.54, 0.99), family size 6-8 (AOR = 2.12; 95% CI: 1.13, 4.35), and family size higher than or equal to 9 (AOR = 3.02; 95% CI: 1.25, 5.01) were significantly associated with acute malnutrition. The current study found a high prevalence of acute malnutrition among pregnant and lactating women in the study area. In war-affected areas, acute malnutrition was associated with the mother's age and family size. As a result, mothers with large families will require special assistance to reduce the impact of malnutrition.

## **STUNTING AND WASTING IN CHILDREN 6–23 MONTHS OLD IN WEST AFRICA IS SIGNIFICANTLY ASSOCIATED WITH ILLNESS AND ACCESS TO HEALTH SERVICES**

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*Keywords: Stunting, illnesses, wasting, window of opportunity*

Undernutrition in children <24 months old remains a major challenge in West African countries; the prevalence of undernutrition in the region is one of the highest globally. Determinants of undernutrition in this age group in West Africa have not been fully explored, even though a lot of undernutrition is reversible in this period. This study therefore assessed factors associated with nutritional status of children <24 months old in West Africa. The study analysed demographic and health survey (DHS) data of 17,211 children 6–23 months old from 8 West African countries that conducted DHS VII (2017–2021): Benin, Gambia, Guinea, Liberia, Mali, Mauritania, Nigeria, Sierra Leone. Determinants of stunting and wasting were selected based on the malnutrition conceptual framework. Bivariate analyses were conducted and variables with  $p < 0.25$  in these analyses were included in multivariable analyses. Complex survey design in Stata 18.0 was used, with  $\alpha$  at 0.05. The prevalence of stunting was 26%, ranging from 21% in Gambia to 33% in Nigeria; while wasting was 9%, ranging from 6% in Gambia and Liberia to 14% in Mali. The odds of stunting were significantly ( $p < 0.02$ ) lower with increasing maternal education (adjusted odds ratio – AOR:0.97), being in the richer (AOR:0.75) or richest (AOR:0.52) quintile, receiving all basic vaccinations (AOR:0.89) and maternal antenatal care (ANC)  $\geq 4$  visits, (AOR:0.83). Having diarrhoea (AOR:1.18) or fever (AOR:1.18) increased the odds of stunting. The odds of wasting were significantly ( $p < 0.04$ ) higher among children with diarrhoea (AOR:1.26) and/or fever (AOR:1.72), but lower with skilled ANC (AOR:0.72) and household use of clean cooking fuels (reflecting indoor air quality; AOR:0.69). Among children 6–23 months old in West Africa, stunting remains at high/very high levels, while wasting is at medium/high levels. Interventions to address child illnesses and improve access to health services/environmental health are urgently needed.

## **IMPACT OF FOOD INSECURITY ON FAMILIES WITH UNDER 5 CHILDREN IN NIGERIA: A SYSTEMATIC REVIEW**

*by Ogunlade Titilope / University of Ibadan*

*Keywords: Child Health, Food Insecurity, Malnutrition, Under-5 children*

Food insecurity is a global public health concern affecting millions, particularly young Nigerian children, who are at high risk of malnutrition and developmental issues. The aim of this study is to explore the dynamics and coping strategies of Nigerian families with children under age five in order to understand the impact of food insecurity on these families. A comprehensive search of electronic databases such as PubMed, Scopus and Web of Science was carried out for relevant articles published between 2014 and 2024, the search strategy used keywords such as "food insecurity" AND "under-five children" AND "Nigeria". This study included papers with qualitative research that examined food insecurity in Nigerian households with children under five. The key challenges and tragedies of these families were

identified by applying thematic analysis methods to the analysis of the selected studies data. Ten studies that satisfied the inclusion criteria were included in this study. The study reveal that food insecurity significantly impacts the nutritional status, growth, and development of children under five years old in Nigeria, leading to malnutrition, stunting, wasting, and underweight. Factors such as poverty, unemployment, big families, low maternal education, and low agricultural production dramatically raises the morbidity and mortality rates in this age group. The review highlighted the psychological stress faced by caregivers, which exacerbates the difficulties of managing food insecurity within the household. Nigerian families with children under five are impacted by food insecurity, which has an impact on development and nutrition. The adverse effects on child nutrition and development highlight the need for targeted interventions aimed at improving food access and nutritional support for vulnerable families. Long-term effects can be reduced by addressing socioeconomic issues like unemployment and poverty, putting sustainable farming methods into place, and improving maternal education.

## **COST-EFFICIENCY OF ACUTE MALNUTRITION TREATMENT IN HUMANITARIAN SETTINGS: A META- ANALYSIS ACROSS 50+ PROGRAMS**

*by Derek Lee / Suvi Kangas / Grace Heymsfield / Abel Khisa / International Rescue Committee  
International Rescue Committee / International Rescue Committee / International Rescue Committee*

*Keywords: Acute Malnutrition, Cost, Cost-effectiveness, Scale, Simplified Approaches, Wasting*

Acute malnutrition remains a critical health challenge affecting millions of children under five in low- and middle-income countries, with less than one in five children in need receiving life-saving treatment. It is critical to understand the cost drivers of malnutrition treatment to scale treatment to as many children as effectively as possible. In this effort we aim to statistically analyze the growing body of cost-evidence to inform on best practices for decision-makers and government officials. We gathered program and cost data across several malnutrition treatment implementors including the IRC, Action against Hunger and Save the Children. Univariate and bivariate regression models were fitted to test multiple hypotheses related to cost-efficiency in different contexts and program designs. Key variables tested included program scale, budget, duration, the use of combined protocols, and treatment by community health workers. The study included 49 different programs with cost data across 14 countries in Africa and Asia. Average cost per child treated was around \$204 (2023 USD), with the average project costing around \$420,000 and average analysis length being 11 months. Scale, budget, duration and use of combined protocols correlated negatively with cost. The other variables tested include: Length of program, Integration of interventions,



Admission and Discharge criteria, Delivery setting and population density, Government delivery against NGO-delivery and Malnutrition prevalence and coverage rates. These results reflect the first effort to statistically derive programmatic lessons from the global body of evidence. These results help confirm that scale has significant impact on cost- efficiency and provides evidence that donors and governments should prioritize increased and durable funding for nutrition interventions. Additional research on how to achieve scale should additionally be prioritized.

## **EFFECT OF HIGH-PROTEIN READY-TO-USE THERAPEUTIC FOOD (RUTF) ON IGF-1 LEVELS AND GROWTH IN SEVERELY WASTED CHILDREN: A PROOF-OF- CONCEPT RANDOMIZED CONTROLLED TRIAL**

*by Isabel Potani / Jessie Jane Khaki Sithole / Chikondi Masamba Makanani / Chisomo Eneya / Chikondi Makwinja / Takondwa Mbulaje / Mehak Kaur Thind / Celine Bourdon / Glenda Courtney-Martin / André Briend / James A. Berkley / Wieger Voskuil / Sylvester Kathumba / Robert Bandsma / University of Toronto / Department of Epidemiology and Biostatistics, Kamuzu University of Health Sciences, Malawi / Department of Health Systems and Policy, Kamuzu University of Health Sciences, Malawi / Department of Pediatrics and Child Health, Kamuzu University of Health Sciences, Blantyre, Malawi / Department of Pediatrics and Child Health, Kamuzu University of Health Sciences, Blantyre, Malawi / Department of Pediatrics and Child Health, Kamuzu University of Health Sciences, Blantyre, Malawi / Translational Medicine Program, Research Institute, Hospital for Sick Children, Toronto, Canada / Translational Medicine Program, Research Institute, Hospital for Sick Children, Toronto, Canada / Translational Medicine Program, Research Institute, Hospital for Sick Children, Toronto, Canada / Centre for Child Health Research, University of Tampere School of Medicine, Tampere, Finland / Centre for Tropical Medicine and Global Health, University of Oxford, Oxford, United Kingdom. / Amsterdam UMC, location University of Amsterdam, Amsterdam Institute for Global Child Health, Emma Children's Hospital Meibergdreef 9, Amsterdam, the Netherlands / Department of HIV and Nutrition, Ministry of Health Malawi / Translational Medicine Program, Research Institute, Hospital for Sick Children, Toronto, Canada*

**Keywords:** *Protein, catch-up growth, children, ready-to-use therapeutic food, severe wasting*

Children recovering from severe wasting have suboptimal catch-up growth, which could be attributed to inadequate protein in standard Ready-to-use Therapeutic Food (SP-RUTF). We aimed to assess the potential of RUTF with higher protein quantity and quality in improving markers of linear growth among children with severe wasting. In a proof-of-concept randomized control trial, we compared a higher protein quantity and quality RUTF (HP-RUTF) to SP-RUTF in treating severe wasting (defined as weight-for- length z score (WLZ) <-3 standard deviations and/or a mid-upper-arm circumference (MUAC) <11.5cm). HP-RUTF had 15% protein-sourced energy and 76% dairy-sourced protein, whereas SP-RUTF had 10% protein-sourced energy and 54% dairy-sourced protein. At four sites, Children were randomized to receive 150-220kcal/kg/day of either treatment for eight weeks. Differences in growth markers at four and eight weeks of treatment were compared using Generalized Mixed Effects Models. The primary outcome was the mean insulin-like growth factor 1(IGF1) change at four weeks. We recruited 64 children in each arm (median age 12 [6,23] months). Children receiving HP-RUTF had higher IGF1 at four weeks than SP-RUTF; 16.1 [11.0,

21.2] ug/L versus 7.3 [2.3,12.4] ug/L,  $p<0.017$ . At eight weeks, groups did not differ in linear growth. However, at eight weeks, ponderal growth of children receiving HP-RUTF was higher (WLZ: 1.01 [0.82, 1.20] z-scores versus 0.71 [0.52, 0.91] z-scores,  $p<0.03$ ; WAZ: 0.68 [0.56, 0.81] z-scores versus 0.48 [0.36, 0.60] z-scores  $p<0.02$ ) and MUAC was also higher. Providing RUTF with enhanced protein quality and quantity improved markers of growth potential in children with severe wasting. These promising findings require further validation in larger trials, which should also assess cost implications.

## **IMPACT OF SICKLE CELL TRAIT, $\alpha$ -THALASSEMIA AND GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY ON OXIDATIVE STRESS AND BLOOD GLUCOSE AMONG TANZANIAN ADULTS WITH AND WITHOUT HIV**

*by Belinda Kweka / Myrela de Jesus / Oyesola Ojewunmi / Taane Clark / Evangelista Malindisa / Patrick Ngoya / Suzanne Filteau / George PrayGod / Susana Campino / Mwanza Research Centre, National Institute for Medical Research, Mwanza, Tanzania / Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, UK / Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, UK / Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, UK / Department of Physiology, the Catholic University of Health and Allied Sciences, Tanzania / Department of Radiology, Bugando Medical Centre / Catholic University of Health and Allied Sciences, Mwanza Tanzania / Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, UK / Mwanza Research Centre, National Institute for Medical Research, Mwanza, Tanzania / Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, UK*

*Keywords: Diabetes, HIV, Sickle cell trait, glucose-6-phosphate dehydrogenase deficiency,  $\alpha$ -thalassemia*

Sickle cell trait (SCT),  $\alpha$ -thalassemia and glucose-6-phosphate dehydrogenase deficiency (G6PDD) are common genetic conditions in Sub-Saharan Africa, known to generate high levels of oxidative stress. These conditions may be associated with high blood glucose levels, but it remains unclear whether the oxidative stress can contribute to diabetes in individuals with these conditions. HIV/AIDS also elevates oxidative stress, potentially increasing diabetes risk. This study investigates associations between SCT,  $\alpha$ -thalassemia, G6PDD, and diabetes among HIV-uninfected and infected adults, exploring the role of oxidative stress. This cross-sectional study included 381 participants from a cohort study investigating the role of severe acute malnutrition in children and adults (SAMPa). SCT and G6PDD were genotyped by sequencing while  $\alpha$ -thalassemia was genotyped by Gap-Polymerase chain reaction. Markers of oxidative stress (catalase and malondialdehyde) were assayed using Enzyme-Linked Immunosorbent Assays. Linear regression, adjusted for sex, body mass index, and age, assessed each genetic condition's association with the area under the curve (AUC) for blood glucose. Controlling for catalase and malondialdehyde in the main analysis evaluated oxidative stress's contribution to genetic conditions and blood glucose associations. All analysis were stratified by HIV status. The study included a total of 226 (59.6%) HIV-infected individuals on antiretroviral therapy (ART). Among HIV-infected

participants, homozygous  $\alpha$ -thalassemia (Coef 100 mmol.min (95% CI: 73, 128)  $P<0.001$ ), and hemizygous G6PDD (Coef 70 mmol.min (95% CI: 40, 100)  $P<0.001$ ) were all associated with higher AUCs for blood glucose. The associations did not change after controlling for malondialdehyde and catalase levels. No associations were observed among HIV-uninfected participants. Homozygous  $\alpha$ -thalassemia and hemizygous G6PDD HIV-infected individuals on ART have increased diabetes risk. However, oxidative stress did not play a role in the causal pathway. SCT, heterozygous  $\alpha$ -thalassemia and heterozygous G6PDD did not increase diabetes risk among either HIV-infected or HIV-uninfected participants.

## **LINEAR GROWTH DURING TREATMENT WITH A SIMPLIFIED, COMBINED PROTOCOL: SECONDARY ANALYSES OF SEVERELY WASTED CHILDREN 6-59 MONTHS IN THE COMPAS CLUSTER RANDOMIZED CONTROLLED TRIAL**

*by Grace Heymsfield / Zachary Tausanovitch / Kevin Stephenson / Jeanette Bailey / Suvi Kangas / IRC / IRC / Washington University St. Louis / IRC*

*Keywords: Acute malnutrition, linear growth, reduced and optimized dosage, severe wasting*

A simplified protocol treats children with MUAC<115mm or edema with 2 daily sachets of RUTF until reaching a MUAC >115mm and absence of edema for 2 consecutive measurements and then with 1 daily RUTF sachet until recovery declared with MUAC $\geq$ 125mm for 2 consecutive measurements. This protocol resulted in non-inferior recovery compared to standard treatment that used a higher weight-based RUTF dosing for children with MUAC<115mm and RUSF for MUAC 115-124mm in a cluster randomised controlled trial in Kenya and South Sudan. By reducing the RUTF dose for some children with SAM, the simplified protocol reduces nutrients essential for linear growth compared to the standard protocol. We conducted a secondary analysis of this trial to compare linear growth among children admitted with MUAC <115 mm. Linear and other anthropometric growth were calculated from admission to discharge and included HAZ change, linear growth in mm/w, weight and MUAC gain velocity in g/kg/d and mm/w. HAZ change adjusted for admission characteristics was negative during treatment but similar across arms ( $-0.21 \pm 0.18$  SE with standard and  $-0.24 \pm 0.18$  SE with simplified treatment). The unadjusted mean  $\pm$  SE linear growth velocity was  $1.8 \pm 0.7$  mm/ week in the standard arm compared to  $1.7 \pm 0.7$  mm/ week in the simplified arm; results were similar in adjusted analyses. MUAC and weight gain velocities were not different by treatment arm. This study adds to a growing body of evidence that suggests children with SAM can achieve similar anthropometric growth when treated with a reduced and simplified MUAC-based dose of RUTF during the SAM phase of treatment.

## **THE NIGERIAN DIET RISK SCORE (NiDRS)—EVALUATING MODIFIABLE HYPERTENSION RISK IN NIGERIAN ADULTS**

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*Keywords: Hypertension, Nigerian dietary Risk score, Nigerian dietary screening tool, mean arterial pressure*

Hypertension is a global health concern, particularly in Africa. It is expected to affect 1 in 3 adults living in Africa, with prevalence standing at 36% in Nigeria. Poor diet accounts for two-thirds of cases of hypertension and CVD globally and in Nigeria, and our recent meta-analysis confirms their contribution in West Africa. This study aimed to develop a culturally-appropriate diet risk score that can accurately identify individuals at risk of hypertension and support clinicians in providing personalised dietary advice to patients. We used a validated Nigerian Dietary Screening Tool (NiDST) to assess the dietary intake among 151 patients and used approaches similar to Framingham and INTERHEART studies to: (i) construct and validate a Nigerian Dietary Risk Score (NiDRS) for hypertension; and (ii) evaluate the NiDRS against a panel of clinical biomarkers of hypertension, using multiple logistic and linear regression models, ROC and decision curve analyses and mediation analysis to facilitate its use in clinical practice. Each incremental increase in the NiDRS was associated with a 2-fold increase in odds of overall hypertension (OR [95%CI]: 2.04 [1.16, 1.16],  $p=0.01$ ), with the highest score category associated with >18-food increased odds of hypertension, compared to lowest category (OR [95%CI]: 18.27 [1.33, 251.21],  $p=0.03$ ). The NiDRS demonstrated excellent discrimination with an AUC of 92%, high sensitivity (85%), specificity (94%), Brier score of 0.1 and a positive net benefit. In addition, biomarkers (total cholesterol triglycerides, LDL, CRP, and homocysteine) partially (41-76%) mediated the relationship between NiDRS and mean arterial pressure in a positive direction. The NiDRS is an accurate and valuable tool for clinicians to identify and stratify individuals at risk of hypertension and offer personalised dietary needs to address the rising prevention of hypertension in Nigeria.

## **SNACK CONSUMPTION AND ITS CONTRIBUTION TO ENERGY INTAKE AMONG PRESCHOOLERS**

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*Keywords: Energy Intake, Ghana, Preschool children, Snacking, Sugar Sweetened beverages*

Unhealthy snacking among children is a growing concern with potential implications for their health, particularly in the face of increasing prevalence of childhood obesity. This study sought to identify the different types of snacks and beverages consumed by children and assess their contribution to the total energy intake. This was a cross-sectional study that included children aged 3–5 years ( $n = 150$ ), their primary caregivers, and teachers living in Kwashieman, Accra. Dietary assessment was conducted using a 24-hour recall and a modified seven-day food frequency tool. Descriptive statistics and independent t-tests were used to analyze the data. Most of the children (81.3%) consumed at least one type of snack in the week prior to data collection, with cookies and biscuits being the most consumed snack type. The findings also revealed that the most common type of sugar-sweetened beverage among the participants belonged to the dairy products group. The average energy intake for all children was 2007.42 kcal. There was a significant difference in dietary energy intake across the age groups ( $p$ -value = 0.002), but not between males and females ( $p$ -value = 0.851). Snack consumers had a significantly higher dietary energy intake compared to those who did not consume snacks (2157.65 vs 1352.85 kcal,  $p$ -value < 0.001). Snacks and sugar-sweetened beverages contributed 16.0% and 7% of the children's total energy intake, respectively. Snacking was found to be a common practice among the preschoolers in the study, and snackers on average consumed more dietary energy compared to non-snackers. The excess energy consumption by snackers is consistent global concerns about unhealthy snacking behaviors among children. Efforts to address this concern need to be intensified as part of the interventions being considered in addressing the menace of childhood obesity.

## **EVALUATION OF THE NUTRITIONAL STATUS OF CHILDREN WITH CANCER AT THE NATIONAL HOSPITAL IN NIAMEY (NIGER)**

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*Keywords: Cancer, Niamey National Hospital., children, nutritional status, undernutrition*

La situation nutritionnelle des enfants atteints de cancer reste une grave préoccupation au Niger. Cette étude a été réalisée pour aider à améliorer l'état nutritionnel des enfants atteints de cancer à l'hôpital national de Niamey. Des mesures anthropométriques ont été prises sur 73 enfants atteints de cancer. Le test  $\chi^2$  a été utilisé pour déterminer la relation entre le type de cancer et l'état nutritionnel des enfants. Les résultats de cette étude ont révélé que 47,9 % étaient des filles et 52,1 % des garçons. Le groupe d'âge le plus représenté dans l'étude était celui des 0-5 ans, avec 84,9 %, suivi des 6-10 ans (11 %) et des 11-14 ans (4,1 %). La malnutrition a été constatée chez 89 % des enfants âgés de 0 à 5 ans, 8 % des enfants âgés de 6 à 10 ans et 3 % des enfants âgés de 11 à 15 ans. Les prédicteurs cliniques de la perte de poids observés chez ces enfants étaient la diarrhée (100 %), les vomissements (52,6

%), l'anorexie (90 %), la douleur (100 %), la mucite (50 %), la toxicité post-chimiothérapie (100 %) et l'anémie (100 %). Dans cette étude, les cancers les plus courants étaient les rétinoblastomes (21,9 %), la leucémie aiguë lymphoblastique (13,7 %), le lymphome de Burkitt (12,3 %) et la néphro (12,3 %). Cependant, l'association entre le type de cancer et l'état nutritionnel était statistiquement non significative, avec une valeur P de 0,5. De plus, il n'y avait pas de relation statistiquement significative entre le type de traitement et la malnutrition.

## **THE ISSUE OF NUTRITIONAL SUPPORT FOR HOSPITAL PATIENTS IN AFRICA**

*by Firdaoss Oluwa-Toyin YOUSSEFOU / Maïmouna Diop Ly / Nutrilife Africa, Abomey-Calavi Bénin / CYCAS -Health-nutrition, Dakar, Sénégal*

*Keywords: Africa, Nutritional support, hospital patients*

Nutritional status is key to improve health status people. It deserves greater attention among vulnerable people: children under five years of age, adolescent girls, pregnant and breastfeeding women, elderly (SDG Nutrition Target). Furthermore, some studies have shown that food and nutrition play a very important role in the treatment of disease of patients. The study aimed to highlight the situation of nutritional support for patients in hospitals in Africa. We studied the issue of nutritional support in hospitals through the strategic documents of regional organizations about the topic and publications found in search engine databases. Africa faces real challenges in terms of food and nutritional support for patients in hospitals. There is a guide to food and nutritional support for patients in emergency situations and a protocol for the management of severe acute malnutrition in children, people with HIV AIDS etc. The Global Leadership Initiative on Malnutrition (GLIM) group recommends that nutritional status screening and assessment be performed on all patients on admission to hospital (6). However, There is no strategic framework for providing food and nutritional support to patients. Hospital undernutrition is a globally recognised public health problem, particularly in Africa where health facilities are often under-equipped to meet the specific nutritional needs of hospitalised patients. Food menu centred on the patient's specific nutritional needs and in conjunction with the medical and kitchen staff could rapidly improve his health status, avoid long hospital stays, re-hospitalisation and, reduce the risk of premature mortality. Integrating patient-specific food and nutritional support into regional and national disease management strategies could revolutionise the sector in a context of universal health coverage. This will need clear nutrition screening, utilization of diet using local food, for cultural sensitivity and sustainability, including those fortified, training of health care workers on nutrition.

## NEUROLATHYRISM: AN INCURABLE DISABLING DISORDER OF THE POOR. A RESEARCH JOURNEY TO CREATE AWARENESS AND INFLUENCE THE POLICY DIRECTIONS.

by Netsanet Mengistu / University of Gondar

*Keywords: Ethiopia, Food insecurity, Guaya, Neurolathyrism, Prevalence*

Grass pea ('Guaya'), if continuously and exclusively consumed, might result a condition known as *neurolathyrism*. Currently there are no comprehensive epidemiological and disability studies and there are only a few reliable statistics on the prevalence of *neurolathyrism*. This project was aimed to: measure incidence and prevalence of *neurolathyrism*; determine the predisposing factors for the disease in Ethiopia. And to evaluating the stage-to-stage progression of *neurolathyrism*. A stratified multistage cluster sampling design was applied to collect data. Age groups of both sexes who are 2 years or older were included. The overall prevalence of *neurolathyrism* in the study areas was 10.5% indicating one out of ten participants were affected by the condition. From these affected individuals 88.6 percent were males. Nearly seventy percent (69.34%) of cases were at stage one *neurolathyrism*, 25.72% were at stage two, 3.76% were at stage three and the remaining 1.16% encountered stage four of the disease. It was also observed that 21.1% (1 in 5) of cases had progressed from stage one to stage two, 7.51% also progressed from stage two to stage three of the disease, and the remaining 1.45 % of cases progressed from stage three to stage four. The current study revealed that there is a high prevalence of *neurolathyrism* in the study areas. Males are also the most affected sex groups when compared to females. As a new finding to our current study, it has also been indicated that there is a stage-to-stage disease progression of *neurolathyrism* affected individuals. This finding is also a good indicator to the continuous consumption of grass pea despite its side effect showing the high food insecurity status of affected households.

## SUGAR SWEETENED BEVERAGE CONSUMPTION HABITS AND FACTORS DETERMINING THEIR INTAKE AMONG COLLEGE STUDENTS IN A STATE UNIVERSITY IN GHANA.

by Rebecca K. Steele-Dadzie / Nana Ama O. Dwamena / Samuel Sackar / Portia Nkumsah-Riverson /

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*Keywords: chronic disease, college students, eating habits, sugar sweetened beverages*

University is usually the place where most adolescents transit into adulthood and adopt unhealthy eating habits and patterns that may have adverse health effects later in life. Globally, high consumption of sugar sweetened beverages (SSBs) remains a public health problem among young adults and is associated with increased risk of obesity, type 2 diabetes and cardiovascular diseases. To determine the SSB consumption habits and the factors influencing their intake among University of Ghana students. An online survey using google forms was circulated to all students through their university emails. Consenting students provided socio-demographic information, types of SSBs consumed, frequency of intake and factors influencing their intake. Data was analyzed using SPSS version 25 at a 95% confidence interval. Descriptive and inferential statistics were used to analyze data. Significance was set at  $p < 0.05$ . A total of 580 students participated in the study; 57.1% female and 42.9% males. Mean age was  $21.2 \pm 2.2$  years (17 to 37 years). The majority, (62.1%) were resident on campus and 38.9% were in their final year. Availability of SSBs was the main reason students provided for their consumption (90.7%;  $p < 0.001$ ). Others consumed it as part of their meals (65.3%;  $p < 0.001$ ). More than half consumed SSBs at midday and in the evenings; 12% consumed it  $\geq$  once a day and 42.2%  $\geq$  twice a week. Carbonated drinks were most consumed (60%  $\geq$  once/week) while energy drinks were least consumed (10%  $\geq$  once /week). Students' income, gender or year of study did not correlate significantly with consumption of SSBs ( $p = 0.202$ ,  $p = 0.091$ ,  $p = 0.627$ ) respectively. Availability was the main reason for SSB intake among college students. Public health interventions to control SSB availability in the school environment is necessary to curb the rise of SSB intake in this population.

## **ANAEMIA PREVALENCE AND RELATED FACTORS AMONG PREGNANT WOMEN IN GHANA: ANALYSIS OF FACILITY DATA FROM 2014 TO 2020 FROM TWO REGIONS**

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*Keywords: Anaemia, Eastern region, Ghana, Upper West region, Women of Reproductive Age*

Anaemia is a public health issue among women of reproductive age (WRA) in Ghana. Nationally, anaemia among WRA declined from 59% to 42% between 2008 and 2014. Sub-nationally, significant reductions were observed in the Upper West (UWR) (70% to 36%) and Eastern region (ER) (58% to 39%) simultaneously. This study examined anaemia prevalence and related factors among WRA in the two regions at the sub-national level. District Health Information System (DHIMS2) data from 2014 to 2020 for Ghana



were analyzed for ER and UWR. Anaemia was measured as haemoglobin (Hb) <11.0g/dl. Percentages, means and frequencies were used to describe trends and patterns. Microsoft Excel and IBM SPSS V27 were used for data analysis. Of 799,622 antenatal care (ANC) registrants, 76.2% were from the ER and 23.8% from UWR. Anaemia prevalence at ANC registration was 31.9% (ER) and 40.4% (UWR). At  $\geq 36$  weeks of pregnancy, anaemia prevalence was 29.3% (ER) and 39.5% (UWR:). The prevalence of mothers' 4th ANC attendance was 67.4% (ER) and 78.9% (UWR). The proportion of sulfadoxine-pyrimethamine (SP)/Fansidar (IPTp) dosing for malaria prevention was similar in both regions with IPTp1 being the highest dose- (65.2%) ER and (64.4%) UWR. The proportion of women given iron-folic acid supplementation 3 times was higher in ER (80.7%) than in UWR (63.1%). The proportion of ITN distributed was 64.8% (ER) and 53% (UWR). The proportion of mothers initiating breastfeeding was 72.3% (UWR) and 70.9% (ER). Anaemia prevalence is higher in the UWR than in the ER. There are disparities in related factors. The sociodemographic characteristics of the regions could explain this difference. Targeted interventions such as nutrition education for improved dietary intake and counselling should be encouraged among pregnant women in the UWR to reduce anaemia

# ASSOCIATION OF ANTHROPOMETRIC STATUS AND BODY COMPOSITION WITH PUBERTAL DEVELOPMENT IN THE ILINS-DYAD GHANA BIRTH COHORT

*by Helena Nti / University of Health and Allied Sciences*

*Keywords: Body composition, Ghana., adolescents, anthropometric status, pubertal development*

Early puberty has been linked to negative long-term consequences. Examining the association of anthropometric status and body composition with pubertal development in Ghanaian children can enhance our understanding of children's growth patterns and their potential future health risks. We aimed to determine the association of anthropometric and body composition indices with pubertal status among the birth cohort of the International Lipid-Based Nutrient Supplement (iLiNS)-DYAD trial in Ghana. This cohort was born to women recruited at  $\leq 20$  weeks gestation, who were randomized to different supplementation groups in the trial. We assessed anthropometry at birth and ages 4-6 y (including body composition), 9-11 y, and 11-13 y. We used the Petersen Pubertal Development Scale (PDS) to assess puberty, and regression models to determine the associations of anthropometric and body composition z-scores versus age-adjusted PDS z-score (aPDSZ), including assessing sex interactions. Birth weight was positively associated with aPDSZ at 9-11 y ( $P = 0.019$ ). The z-scores for height-for age (HAZ), fat mass, waist circumference (WCZ), and hip circumference (HCZ) at age 4-6 y were positively associated with aPDSZ ( $P < 0.05$ ) at 9-11 y, with fat free mass z-score having a negative association ( $P = 0.048$ ). HAZ and HCZ at age 4-6 y remained significantly associated with aPDSZ at 11-13 y. HAZ, WCZ, HCZ, triceps skinfold and body mass index at 9-11 y and 11-13 y were positively associated with aPDSZ at both timepoints ( $P < 0.001$ ). Sex modified these associations ( $P$ -interaction  $< 0.10$ ), with most interactions being stronger in females than in males. Anthropometric and body composition status in early and late childhood reflecting larger size and greater adiposity are associated with pubertal development in early adolescence, with stronger effects observed in females.

## **EFFECT OF EXCLUSIVE COW MILK CONSUMPTION ON HAEMOGLOBIN CONCENTRATION AND SHORT TERM WORKING MEMORY IN WEANLING MICE.**

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*Keywords: Cow milk, hippocampus, nutritional anaemia, working memory*

Cow milk is considered a nutrient dense food, and also the most inexpensive option of milk-food offered to children. Few population studies has shown association between cow milk consumption and anaemia, but paucy data is found on its effect in working memory. This study investigated the effect of exclusive cow milk consumption on weight, haemoglobin concentration, hepatic, and brain iron stores, working memory, and histology of the hippocampus in weanling mice. Twenty weanling mice, were divided into two groups of ten each. Group1 fed on normal mouse chow, while group 2 consumed cow milk. Deionized water was provided *ad-libitum*, haemoglobin concentration, and weights were assessed weekly. Working memory was evaluated before and after the cow milk feeding regimen (28 days), mice were thereafter sacrificed humanely, and tissues harvested. All laboratory, and statistical analysis were done using standard protocols. There was significant ( $p < 0.05$ ) decreases in the weight (g) ( $13.49 \pm 1.04$ ), haemoglobin concentration (g/dl) ( $8.95 \pm 1.76$ ), hepatic ( $0.07 \pm 0.01$ ), and brain ( $0.06 \pm 0.01$ ) iron stores (mg/g tissue) in mice fed cow milk, when compared with control ( $22.10 \pm 2.04$ ,  $13.20 \pm 0.75$ ,  $0.12 \pm 0.02$ , and  $0.08 \pm 0.01$  respectively). In the working memory assessment using the Y-maze, there was no significant ( $p > 0.05$ ) difference in the percentage entry into the novel arm, however, total arm entries significantly ( $p < 0.05$ ) decreased. The photomicrograph of the hippocampus showed a wide gap between the cornu ammonis (CA) 4, and the dentate gyrus (DG) regions of group on cow milk. Similarly, poor neuronal processes with more neuroglial cells were observed in the CA 3 region of cow milk fed group. This study has shown that a 28 days exclusive cow milk consumption induces nutritional anaemia, affects the hippocampal structure, and some aspects of working memory in weanling mice.

## **EXAMINING INPATIENT SATISFACTION WITH HOSPITAL MEALS AND ASSOCIATED FACTORS AT HO TEACHING HOSPITAL, GHANA**

*by Selina Atayoko / Percival Delali Agordoh / Juliana Nyasordzi / Justice K. Amegashie / University of Health and Allied Sciences / University of Health and Allied Sciences, University of Ghana / University of Health and Allied Sciences / Ho Teaching Hospital*

*Keywords: Ghana, Hospital food, inpatients, plate waste, satisfaction*

This study investigated inpatient satisfaction with meals served by the Ho Teaching Hospital's food service system and the factors that influence it, as patient meal satisfaction is a key but often overlooked factor in patient recovery despite the established links between hospital malnutrition and adverse outcomes (including increased morbidity, mortality, and hospital-associated costs). This cross-sectional study at the Ho Teaching Hospital in Ghana included 210 clinically stable and conscious inpatients. The survey had three sections: general information, patient satisfaction with hospital meals, and food wastage using a 6-point scale. The patient satisfaction portion was adapted from an existing tool and covered four areas: food quality, meal service, physical environment, and staff/service. The data was analyzed descriptively using SPSS 20. This hospital-based cross-sectional study included 210 clinically stable and conscious inpatients from the male and female medical and surgical wards of the Ho Teaching Hospital in the Volta Region, Ghana. The questionnaire had three sections: General Information, Patient Satisfaction Level, and the Comstock 6-point scale. The patient satisfaction level was adapted from the ACHFPSQ survey tool and contained 14 items across four components: food quality, meal service quality, physical environment, and staff/service. A revised Comstock 6-point scale was used to measure food wastage, ranging from "not eaten" to "none left". The data was analyzed using SPSS 20 and reported descriptively. Overall, participants were satisfied with the temperature of the meals and the attentiveness of the staff. Enhancements to the quality and overall presentation of the meals could increase their appeal to patients, leading to greater consumption and reduced plate waste. Efforts should be made to inform patients about the ingredients and nutritional value of the meals served, enabling them to make informed choices aligned with their medical conditions and general health.

# **IMPACT OF FOOD INSECURITY ON FAMILIES WITH UNDER 5 CHILDREN IN NIGERIA: A SYSTEMATIC REVIEW**

*by Ogunlade Titilope / University of Ibadan*

*Keywords: Child Health, Food Insecurity, Malnutrition, Under-5 children*

Food insecurity is a global public health concern affecting millions, particularly young Nigerian children, who are at high risk of malnutrition and developmental issues. The aim of this study is to explore the dynamics and coping strategies of Nigerian families with children under age five in order to understand the impact of food insecurity on these families. A comprehensive search of electronic databases such as PubMed, Scopus and Web of Science was carried out for relevant articles published between 2014 and 2024, the search strategy used keywords such as "food insecurity" AND "under-five children" AND "Nigeria". This study included papers with qualitative research that examined food insecurity in Nigerian households with children under five. The key challenges and tragedies of these families were identified by applying thematic analysis methods to the analysis of the selected studies data. Ten studies that satisfied the inclusion criteria were included in this study. The study reveal that food insecurity significantly impacts the nutritional status, growth, and development of children under five years old in Nigeria, leading to malnutrition, stunting, wasting, and underweight. Factors such as poverty, unemployment, big families, low maternal education, and low agricultural production dramatically raises the morbidity and mortality rates in this age group. The review highlighted the psychological stress faced by caregivers, which exacerbates the difficulties of managing food insecurity within the household. Nigerian families with children under five are impacted by food insecurity, which has an impact on development and nutrition. The adverse effects on child nutrition and development highlight the need for targeted interventions aimed at improving food access and nutritional support for vulnerable families. Long-term effects can be reduced by addressing socioeconomic issues like unemployment and poverty, putting sustainable farming methods into place, and improving maternal education.

## **EFFECT OF PRE- AND POST-NATAL SMALL-QUANTITY LIPID-BASED NUTRIENT SUPPLEMENTS (SQ-LNS) ON AUTONOMIC NERVOUS SYSTEM REGULATION**

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*Keywords: autonomic nervous system, lipid-based nutrient supplement, multiple micronutrients, parasympathetic activity, sympathetic activity*

The autonomic nervous system (ANS) comprising parasympathetic and sympathetic branches enables the body to maintain homeostasis and adapt to environmental challenges. Nutritional impairments during the “first 1000 days” can lead to poor autonomic development and regulation in the child, translating into varying mental and physical health problems across the life course. We aimed to determine whether pre- and post-natal SQ-LNS providing additional macro- and micronutrients have longer-term effects on children’s ANS regulation beyond the reported positive effects on growth, micronutrient status, and survival. Participants were children born to women in the iLiNS-DYAD trial in Ghana (2009–2014) in which 1320 women  $\leq 20$  weeks gestation were randomized to receive daily, either iron and folic acid until delivery and placebo during 6 months postpartum (IFA), or multiple micronutrients providing

19 vitamins and minerals during both periods (MMN), or SQ-LNS during both periods (SQ-LNS); only the infants of SQ-LNS mothers received child SQ-LNS from 6-18 months. We measured parasympathetic and sympathetic activity of 965 children at 9-11 years via heart rate. We used analysis of covariance and Tukey-Kramer post-hoc pairwise comparisons to examine differences in parasympathetic and sympathetic activity between the SQ-LNS, MMN, and IFA groups. Children in the MMN ( $-2.54 \pm 4.45$ ,  $P=0.016$ ) and SQ-LNS groups ( $-2.31 \pm 4.94$ ,  $P=0.093$ ) had significantly or marginally significantly higher (absolute number) sympathetic reactivity (suggesting better sympathetic activity and ability to modulate arousal in response to environmental challenges) compared to those in the IFA group ( $-1.57 \pm 3.51$ ). Prenatal micronutrient supplementation appears to increase sympathetic reactivity.

## **SELF-MANAGEMENT PRACTICES AND COPING STRATEGIES AMONG PEOPLE LIVING WITH TYPE 2 DIABETES MELLITUS IN NEW JUABEN NORTH MUNICIPALITY**

*by Benedicta Yeboah / Senam Abena Klomegah / University Health and Allied Science / University Health and Allied Science*

*Keywords: Key words: Self-management, coping strategies., type 2 diabetes mellitus*

Type 2 diabetes mellitus has been a global health challenge in Ghana and the New Juaben Municipality is no exception. Education programs on diabetes are essential for reducing complications and enhance quality of life of people living with the condition. This study aimed to assess the self-management practices and coping strategies of individuals with diabetes in the New Juaben Municipality. This study employed a cross-sectional study by using a face-to-face interviewer-led semi-structured questionnaire to collect information on their self-management practices and coping strategies from 124 participants attending the diabetic clinic at the St Joseph Hospital in New Juaben Municipality, Eastern Region. STATA 17.0 was used for the analysis and statistical significance was determined at a confidence interval of 95% and p-value of 0.05. Among the 124 respondents, the majority 93(75%) were females. Majority 58(48.6%) were in the 66–80-year age group. Regarding marriage, 57.3% were married, and 79.1% were Akan. Traders made up the largest group (45.2%), and 36.3% earned between GH¢500-999. A majority (51%) practiced good self-care for diabetes. Nearly 90.3% checked their blood sugar weekly, and 98.3% kept records of their blood sugar and

blood pressure. Most (99.1%) believed in the importance of engaging in physical activity(exercise) for diabetes management, though 40.3% faced challenges in buying healthy food. Participants practiced some form of self-management and coping strategies to manage their conditions. Therefore, there is the need for tailored interventions to enhance their self-management practices.

## **FOOD WASTE KNOWLEDGE AND PRACTICES AMONG A SAMPLE OF GHANAIAAN UNDERGRADUATE HEALTH SCIENCE STUDENTS**

*by Abigail Apafo / Anna Amoako Mensah / Portia N. Riverson / University of Ghana, Legon / University of Ghana, Legon / University of Ghana, Legon*

*Keywords: Food waste, Knowledge and Practices., food waste management*

The environmental, economic, health and social equity problems resulting from food waste is well documented. Globally, an estimated 30% of edible food produced is wasted and young adults are among the most significant contributors. The reasons for food waste are diverse and complex but understanding them is critical to finding effective ways to reduce it. The aim of the study was to assess food waste knowledge and practices among undergraduate health science students at the University of Ghana. A quantitative cross-sectional survey was conducted among undergraduate biomedical and allied health students at the University of Ghana via online questionnaires. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 26. Mean age of the 113 respondents (males = 54.9%) was  $22.10 \pm 2.72$ . A majority were males (54.9%). Food waste at dinnertime was greater than at any other mealtime. In terms of food categories, starches and grains were the most wasted foods. Knowledge about food waste was poor among all participants, though good food waste management practices were reported by 45% of them. The results underscore the need for nutrition education to improve food waste knowledge and practices among undergraduate students. Multifaceted nature of the food waste menace that calls for context-specific research and interventions.



## **ANAEMIA AT 36 WEEKS: MAGNITUDE, ASSOCIATED FACTORS AND LOCAL HAEMATENICS IN THE VOLTA REGION OF GHANA**

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**Keywords:** *Anaemia, Dietary patterns, Haematenics, Haemoglobin, Pregnant women*

Anaemia is a public health concern, and affected by multi-faceted factors. Yet, studies on anaemia and related factors are inadequate in the Volta region. This study sought to estimate the magnitude of anaemia, its associated factors and document the usage of local haematenics in Volta region. Cross-sectional study among 416 pregnant women at 36 weeks gestation who were randomly sampled from six (6) health facilities in Volta region. Haemoglobin levels were measured at 36 weeks gestation, data on maternal characteristics, use of local haematenics, diet intake, antenatal services received were obtained using semi-structured questionnaires. Mean age of the study population was  $28 \pm 6.41$ ; prevalence of anaemia at 36 weeks was 58.7%, 95% CI(53.8-63.5)%. Pregnant women who were accompanied to ANC by their partners were 42% less likely to be anaemic [Adjusted Odds Ratio= 0.581, 95% CI (0.36-0.94);  $p=0.027$ ]. Those with lowest score for starchy roots and protein-rich foods were 2.58 times more likely to be anaemic [AOR= 2.578]; 95% CI (1.325-5.018);  $p=0.005$ ], those with no previous history of anaemia were 74% less likely to be anaemic [AOR= 0.263; 95% CI (0.162-0.426)]. About 61% , (95% CI (56.0-65.6)%) of pregnant women use local haematenics which include turkey berries alone (raw or cooked), tin tomatoes mixed with malt, boiled teak leaves with milk and sugar. Over a quarter (25.1) use such remedies on weekly basis, over a third prefer both local remedies and Iron and Folic Acid supplements. Factors such as history of anaemia and low scores for starchy roots and protein-rich foods consumption are risk factors whereas accompanying partners to health facility for ANC is a protective factor. Pregnant women should be encouraged to eat more from starchy roots and protein-rich foods diets, and behavior change activities should highlight the role of male

partners in reducing anaemia

## **BARRIERS AND FACILITATORS OF IRON FOLIC ACID SUPPLEMENTATION AMONG OUT-OF-SCHOOL ADOLESCENT GIRLS IN GHANA**

*by Georgina Frimpong Siraa / Mary Akanwi / Joyce Claudia Akolgo / Linda Gyimah, / Ernestina Azure /*

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*Keywords: Adolescents girls, Anaemia, Iron-Folic Acid Supplementation, Out-of-school*

Anaemia is a widespread nutritional deficiency, particularly among women of reproductive age. The Girls Iron and Folate Tablet Supplementation (GIFTS) programme is a proven intervention aiming to reduce anaemia by 27% in this population. This study assessed the prevalence of compliance and factors influencing the uptake of Iron-Folic Acid (IFA) tablets among out-of-school Ghanaian adolescent girls aged 10-19 years. This quantitative study employed a cross-sectional design, recruiting 1,902 out- of-school adolescent girls aged 10-19 years from five districts in Ghana. Face-to-face interviews was employed to assess participants' socio-demographic characteristics, knowledge and perceptions regarding anaemia and the (GIFTS) programme, and their compliance with (IFA) supplementation. Data analysis was done using Stata version 17.0 and included descriptive statistics for socio-demographic characteristics, chi-square tests to explore associations between independent variables and anaemia status, and logistic regression to identify factors predicting IFA uptake. All analyses were conducted at a significance level of  $p < 0.05$ . Overall compliance with (IFA) supplementation was 75.5%. Urban residence (AOR = 2.74, 95% CI: 1.99-3.77), living

with both parents (AOR = 0.55, 95% CI: 0.39-0.78), good understanding of anaemia (AOR = 2.07, 95% CI: 1.57-2.75), knowledge of the GIFTS programme (AOR = 4.14, 95% CI: 2.99-5.74), and positive perceptions of the programme (AOR = 4.19, 95% CI: 3.14-5.58) were significantly associated with IFA uptake. Age did not significantly influence uptake. Socio-demographic factors, family structure, and awareness/perception of anaemia and the GIFTS programme significantly influence IFA uptake. This highlights the need for targeted education programs, addressing urban-rural disparities, and exploring support structures for diverse families to improve and sustain utilization.

## **NUTRITIONAL STATUS OF ASTHMA PATIENTS ATTENDING UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA**

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*Keywords: Asthma, Body Mass Index, diet, nutritional status*

There is increasing evidence from observational studies that there are strong relationship between diet and respiratory disease. Diet is relatively recognized potential risk factor for asthma although the evidence to date is conflicting. This study thereby assess the nutritional status of asthma patients attending University College Hospital, Ibadan. The descriptive cross-sectional study involved 80 patients from the medical out patient department. The socio-demographic, socio- economic data, dietary habits, and anthropometric data (height and weight) of the respondents were collected and analysed with Statistical Package for Service Software (SPSS) version 23.0. The study showed that majority (82.5%) of the asthma patients were between the age of 18 and 35 years and 17.5% of them were between the age of 36 and 45 years. Most of the patients (83.8%) were female while 16.3% of the patients were male. The study further showed that half (50.0%) of the asthma patients ate three times in a day, 42.5% of patients ate twice a day and 7.5% of them remaining ate four times a day. More than half (71.3%) of the patients skipped meal and 28.8% of them don't skip meal. More than half

(52.5%) of the patients skipped breakfast, 16.3% skipped lunch, 2.5% of them skipped dinner while 28.8% of the patients don't skip meal. The study also revealed that less than half (41.3%) of the asthma patients had normal body mass index, 22.5% of the patient were underweight while 27.5% and 8.8% of the patients remaining were overweight and obese, respectively. The study further showed that there is significant ( $p<0.05$ ) relationship between nutritional status and skipping of meals. Summarily, most of the patients (58.7%) are malnourished (underweight, overweight and obesity). Many of them also have poor dietary habits

## **SECURING SUSTAINABLE GOOD NUTRITION IN THE FIRST 1000 DAYS: THE SYNERGY OF LOCALIZATION, SOCIAL BEHAVIOUR CHANGE COMMUNICATION AND MARKETS**

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*Keywords: First 1000 Days, markets, protein and micronutrients powder (PMNP), social behaviour change communication (SBCC), stunting, undernutrition*

The First 1,000 days of life is considered a crucial, nutrition-sensitive developmental stage during which gains in general and cognitive development can be made or irreversibly lost. Consequently, several partnerships are focused on preventing malnutrition during this period. In Ghana, such partnerships resulted in a reduction in stunting from 33% in 1999 to 18% in 2022. From 2009, the Ghana Nutrition Improvement Project (GNIP) was launched to contribute to such efforts. GNIP used an innovative approach to sustainably fight post-weaning undernutrition through: (a) the development of a protein and micronutrient powder (PMNP) based on the local food culture and the World Health Organization recommended intakes for micronutrients, protein and amino acids at 6-24 month; (b) an efficacy study to verify the impact of the product on undernutrition and stunting; (c) social behaviour-change communication (SBCC) for optimal infant and young child feeding (IYCF) practices; and (d) market-based distribution of the PMNP. The product was shown to supply 35-55% of essential amino acids and 50-150% of the RNI of micronutrients based on WHO total daily requirements and has been accepted by the World Food Programme for their Ghana food

basket. The efficacy study showed significantly higher length-for-age Z-scores (LAZ), reduced acute infection, and improved Hb among children fed the product from 6 to 18 months. The SBCC showed that caregivers record more knowledge of optimal IYCF practices than at baseline; children of caregivers who received IYCF information through SBCC were 15% less likely to have anaemia at follow-up; and caregivers recorded a higher purchase of PMNP (81.3% post- intervention vs. 60% at baseline). The findings highlight GNIP as a successful example of sustainable nutrition improvement through a combination of science-based, context-driven nutritious food product development, social behavior change communication (SBCC), and market-based distribution of the product.

## **FISH SMOKING AS A STRATEGY FOR ENHANCING FOOD SECURITY AND NUTRITION IN RURAL BENIN**

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*Keywords: Benin, Food security, Nutrition, Smoking; Fish processing*

Fish is an important source of protein for food and nutritional security. In order to improve the fish processing sector and promote the conservation of fishery products in Benin, an inventory review was carried out to summarize advances in fish smoking in Benin. Analysis of previous investigations showed that smoking is a fish processing technique that is applied in a variety of ways, depending on whether it is modern or traditional smoking. In general, catfish (*Clarias sp.*, *Heterotis niloticus*, etc.) and tilapia are the most commonly smoked fish in continental waters. In the marine environment, the most popular smoked fish are *Scomber scombrus* (mackerel), *Trachurus trachurus* (horse mackerel), *Thunnus spp.* (tuna), *Cyprinus spp.* (carp) and *Sardinella spp.* As a fish processing technique, traditional smoking uses equipments such as barrel, brick and clay smokehouses. Modern fish-smoking techniques involve mainly the use of improved chorkor ovens and NIFFR smokehouses, which produce top-quality smoked fish. In addition to being a fish processing technique, smoking is also a means of preserving fish. In fact, smoked fish can be stored in various types of packaging for periods ranging from few days to over six months, contributing to nutritional and food security especially in rural environment where children have limited access to protein sources and quality food. In view of its dual role of processing and conserving fish, fish smoking requires

special attention from policy-makers to ensure food, nutritional and health security of consumers in the Republic of Benin.

## **THE PREVALENCE OF NEURAL TUBE DEFECTS IN GHANA**

*by Obed Akwaa Harrison / Idole Ifie / William Peck Dorleku / Joycelyn Kwansemah Quansah / Albert Owusu Gattor / Emma Efua Adimado / Noella Semu / Benett Atta Dzandur / Firibu Kwesi Saalia / Matilda Steiner-Asiedu / Department of Nutrition and Food Science, University of Ghana, Legon, Accra / Department of Food Science and Nutrition, University of Leeds, England / Department of Biochemistry, Cellular and Molecular Biology, University of Ghana, Legon, Accra / Department of Nutrition and Food Science, University of Ghana, Legon, Accra / Faculty of Chemistry and Pharmacy, Medicinal Chemistry II, University of Regensburg, Germany / Institutional Care Division, Ghana Health Services, Accra, Ghana / Food and Agriculture Organization of The United Nations, Lilongwe, Malawi / Department of Nutrition and Food Science, University of Ghana, Legon, Accra / Department of Nutrition and Food Science, University of Ghana, Legon, Accra / Department of Nutrition and Food Science, University of Ghana, Legon, Accra*

*Keywords: Folate, folic acid, neural tube defects*

Neural tube defects (NTDs) are serious birth defects affecting the brain and spinal cord, with significant public health implications. Folate, a crucial B vitamin found in food, is essential in preventing these defects. Numerous studies have strongly linked insufficient folate levels to an increased risk of NTDs. This study assessed the prevalence of neural tube defects in Ghana. The assessment of NTDs in this study was based on clinical diagnoses recorded in health facilities across the country. NTD cases were identified through a review of medical records, with diagnoses confirmed by trained healthcare professionals using standardized criteria. The data source for this national study was the District Health Information Management System (DHIMS2) of the Ghana Health Service. This secondary data encompassed all 16 regions of Ghana over 5 years (2017-2021). Ethical approval for the study was obtained from the Noguchi Memorial Institute of Medical Research, and permission to use the DHIMS2 data was granted by the Institutional Care Division of the Ghana Health Service. Prevalence estimates were made by dividing aggregated case counts by the corresponding live births. The analysis of variance test was employed to evaluate variations

in NTD cases over five years in the sixteen regions. SPSS software version 27 and Microsoft Excel were used for the data analysis. From 2017 to 2021, the average prevalence of NTDs was 0.63 per 1000 live births. The prevalence estimates and case count of NTDs varied by region. The regions with a higher prevalence of NTDs than the national average was the Savannah, Upper East, Volta, Oti, Ahafo, Bono, and Bono East. The prevalence of NTD among newborns in Ghana has remained consistent from 2017 to 2021. The national average NTD prevalence was 0.63/1000 live births. This has health and economic implications for maternal and child health.

## **INVESTIGATING THE KNOWLEDGE, DIETARY PRACTICES AND RISK FACTORS FOR NCDS AMONG SUB-SAHARAN MIGRANTS IN MOROCCO**

*by N'DRI Deprince Nakensy / MOHTADI Karima / JAFRI Ali / DEROUICHE Abdelfettah / Mohammed VI University of Science and Health, Interdisciplinary Laboratory of Biotechnology and Health / Hassan II University, Casablanca, Ben M'sick Faculty of Science, Biology and Health Laboratory, Human Nutrition and Aromatic and Medicinal Plants Research Team / Mohammed VI University of Science and Health, Mohammed VI Higher Institute of Biosciences and Biotechnology, Interdisciplinary Laboratory of Biotechnology and Health / Hassan II University, Casablanca, Ben M'sick Faculty of Science, Biology and Health Laboratory, Human Nutrition and Aromatic and Medicinal Plants Research Team*

*Keyywords: Nutrition- Migration- Chonic diseases*

Migration is often associated with changes in diet, level of physical activity and exposure to certain risk factors that may contribute to the development of non- communicable diseases (NCDs) such as cardiovascular disease, diabetes, cancer and chronic respiratory diseases. The aim of this study was to investigate the knowledge, dietary practices and risk factors for NCDs among sub-Saharan migrants in Morocco. We carried out an analytical cross sectional survey in the city of Casablanca in Morocco from January 2023 to January 2024. Altogether 290 migrants from the sub-Saharan Africa met the inclusion criteria and agreed to participate. We used a standardized questionnaire with the following headings: socio-demographic characteristics, dietary knowledge and practices, and lifestyle. A total of 290 were investigated, of which 48,97 were men and 51,03% women. The average age was  $24,83 \pm 7,23$  years. Only 26,2% of participants complied with WHO recommendations concerning the

number of portions of vegetables to be consumed per day and 27,2% complied with recommendations concerning portions of fruit per day. 34,1% and 33,4% of respondents replied that they eat one portion of cereal or cereal products a day and more than one portion a day respectively. Most participants lacked nutritional knowledge. Among them, 87.37% were non-smokers, 22.76% were sedentary, and 78.6% consumed alcohol. This study revealed that, due to low rates of smoking, alcoholism, and sedentary behavior, the risk of non-communicable diseases is relatively low, but could increase due to a lack of nutritional knowledge and a diet low in fruits, vegetables, and cereals within this population.

## **MICRONUTRIENT ADEQUACY AND ITS PREDICTORS AMONG PREGNANT WOMEN IN GHANA**

*by Kamal S. Mumuni / Francis Agbokey / Issah Shani / Faustina Vimariba Tour / Saapiire Ferguson / Francis B. Zotor / Faith Agbozo / Seth Adu Afarwuah / Agartha Ohemeng / Francis N. Binka School of Public Health, University of Health and Allied Sciences / Francis N. Binka School of Public Health, University of Health and Allied Sciences / Nutrition and Food Science, University of Ghana / Francis N. Binka School of Public Health, University of Health and Allied Sciences / Francis N. Binka School of Public Health, University of Health and Allied Sciences / Francis N. Binka School of Public Health, University of Health and Allied Sciences / Francis N. Binka School of Public Health, University of Health and Allied Sciences / Nutrition and Food Science, University of Ghana / Nutrition and Food Science, University of Ghana*

*Keywords: Ghana, Micronutrient adequacy, dietary diversity, maternal health, nutritional status, pregnancy*

Micronutrient deficiencies are a significant public health concern, particularly among pregnant women in low and middle-income countries. Adequate intake of essential vitamins and minerals is crucial for the health of mother-newborn dyads. We investigated the levels and predictors of micronutrient adequacy among pregnant women attending antenatal clinics at Maamobi General and Asesewa Government Hospitals. A cross-sectional study was conducted in Ghana with 200 pregnant women (mean gestational age of 26 weeks) enrolled from two hospitals representing urban and rural settings Maamobi General and Asesewa Government Hospitals, respectively. Data on socio- economic and demographic



characteristics were collected using a Computer Assisted Processing Interview questionnaire. Dietary intakes were assessed using a single 24-hour recall, and the mean probability of adequacy (MPA) for 11 essential micronutrients was calculated based on the estimated average requirements (EARs). Multiple linear regression analysis was employed to determine the predictors of micronutrient adequacy and the regression coefficient ( $\beta$ ) reported. The mean dietary diversity score was  $5.3 \pm 1.6$ , with 65% of participants meeting the minimum dietary diversity score for women ( $MDD-W \geq 5$ ). Mean micronutrient intake was below the EAR for most micronutrients, except vitamins A and C. The mean probability of adequacy for the study population was 22.4%. Key predictors of MPA included wealth index and occupation. Interestingly, higher wealth index was negatively associated with MPA ( $\beta = -0.11$ ,  $p < 0.001$ ), while being an artisan ( $\beta = 0.20$ ,  $p = 0.013$ ), trader ( $\beta = 0.19$ ,  $p = 0.018$ ), civil servant ( $\beta = 0.31$ ,  $p = 0.001$ ), or unemployed ( $\beta = 0.24$ ,  $p = 0.006$ ) was positively associated with MPA compared to farming. Findings highlights significant micronutrient inadequacies among pregnant women in Ghana, with occupation and wealth index emerging as important predictors. The counterintuitive negative association between wealth index and MPA warrants further investigation. This underscores the need for targeted nutritional interventions and policies to improve micronutrient intake among pregnant women, particularly in resource-poor settings.

## **EFFECT OF HIGH-INTENSITY MOTOR LEARNING AND DIETARY SUPPLEMENTATION ON MUSCULAR FITNESS AND MOTOR SKILLS OF 5-7 YEARS OLD CHILDREN WITH MODERATE THINNESS IN JIMMA TOWN SOUTH-WEST, ETHIOPIA**

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*Keywords: Moderate thinness, high-intensity motor learning, motor skills, muscular fitness, school children*

## **EFFECT OF DIETARY SUPPLEMENTATION AND HIGH- INTENSITY MOTOR LEARNING ON NUTRITIONAL STATUS, BODY COMPOSITION, AND MUSCLE STRENGTH OF 5-7 YEARS OLD CHILDREN WITH MODERATE THINNESS IN JIMMA TOWN SOUTH-WEST, ETHIOPIA**

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*Keywords: Moderate thinness, dietary supplementation, high-intensity motor learning, muscle strength, preschoolers*

In Ethiopia, moderate thinness (MT) is a persistent issue among children. Yet, evidence on the effect of dietary supplementation and motor skill training in these children is limited. This study aimed to assess the effect of Ready to Use Supplementary Food (RUSF), whether or not combined with high-intensity motor learning (HiML) on weight, height, body composition, and muscle strength in 5 - 7 years old children with MT living in Jimma Town, Ethiopia. A cluster randomized controlled trial was carried out among 69 children (age 5-7) with MT assigned to receive RUSF (n=23), RUSF+HiML (n=25), or no intervention (control group, n=21). A multivariable Generalized Estimating Equations model was used and significance was set at  $\alpha < 0.05$ . At baseline, there were no significant differences in the outcome measurements between the RUSF, RUSF+HiML, and control groups. However, after 12 weeks of intervention, there were significant mean differences in differences (DID) between RUSF and the control arm with DID of 1.50 kg for weight ( $p < 0.001$ ), 20.63N (Newton) for elbow flexor ( $p < 0.001$ ), 11.00 N for quadriceps ( $p = 0.023$ ), 18.95N for gastrocnemius sup flexor of the leg ( $p < 0.001$ ), and 1.03 kg for fat-free mass ( $p = 0.022$ ). Similarly, the mean difference in differences was higher in the RUSF+HiML by 1.62 kg for the weight ( $p < 0.001$ ), 2.80 kg for grip strength ( $p < 0.001$ ), 15.93 for elbow flexor ( $p < 0.001$ ), 16.73 for quadriceps ( $p < 0.001$ ), 9.75 for gastrocnemius sup flexor of the leg ( $p = 0.005$ ), and 2.20 kg for fat-free mass ( $p < 0.001$ ) compared the control arm. Compared to the control group, the RUSF and RUSF+HiML interventions improved MT children's body composition, height, weight, and muscle strength. The findings suggest the potential that treating MT children with RUSF and combining it with HiML has for reducing the negative effect of malnutrition in Ethiopia.

# **EFFECTS OF DIETARY PRACTICES ON THE NUTRITIONAL STATUS OF CHILDREN 6-23 MONTHS IN THE WEST GONJA MUNICIPALITY, SAVANNAH REGION, GHANA**

*by Braimah Brian Mumuni / Ghana Health Service*

*Keywords: Diet, Infant and Young Child Feeding (IYCF), Nutritional Status, Undernutrition*

Undernutrition has a significant impact on child mortality in developing regions, particularly in sub-Saharan Africa. In Ghana, there is a worrying prevalence of malnutrition among children under five, with many experiencing stunting, wasting, or being underweight. This study focuses on the West Gonja Municipality, where nutritional challenges are worsened by suboptimal infant and young child feeding (IYCF) practices and limited caregiver knowledge. The main objective of this study was to explore the dietary practices of caregivers and their effects on the nutritional status of children aged 6-23 months in the West Gonja Municipality. A cross-sectional design and multi-stage cluster sampling were used to collect data from 403 caregivers. Bivariate and logistic regression analyses were then conducted to identify determinants of nutritional status among children. Children using insecticide-treated nets experienced a 60.6% decrease in underweight odds (AOR=0.394,  $p=0.009$ ), highlighting the importance of this intervention. Additionally, caregiver nutritional knowledge was found to play a critical role in reducing the risk of underweight (AOR=2.889,  $p=0.012$ ). The study also identified the adverse effects of introducing unmodified family foods (AOR=2.627,  $p=0.049$ ) and the influence of socio-economic status and healthcare accessibility on child nutrition. Those children in the underweight cohort were cared for by caregivers of poor nutritional knowledge while children in the normal nutritional status cohort were cared for by caregivers with appreciable level of nutritional knowledge. One out of every five children was introduced to complementary feeds early. Majority of caregivers modified the family foods to make them suitable for children. This is an indication that most caregivers met the Minimum Diet Diversity, a key benchmark for meeting Minimum Acceptable Diet standard.

## **PATHWAYS TO STRENGTHEN FOOD DEMONSTRATION IN SELECTED PRIMARY HEALTHCARE CENTRES IN AKINYELE LOCAL GOVERNMENT AREA, IBADAN**

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*Keywords: KEY WORDS: Food Demonstration, Lactating Mothers, Pregnant women, Primary Healthcare Centre, Qualitative Study*

Food demonstration offers practical knowledge and skills crucial to promote optimal dietary practices. Paucity of resources has impacted on the frequency and quality of food demonstration sessions in Nigeria's primary health facilities. Understanding the strategies to strengthen these sessions could promote healthy diet and reduce malnutrition. This study explores pathways to strengthen food demonstrations in primary health centres (PHC) in Akinyele Local Government Area, Ibadan, Nigeria. This qualitative study involved purposive sampling of four health facilities, 11 health workers, four community leaders and 60 pregnant/lactating women. Using single focus group discussions for pregnant/lactating women, and structured in-depth interviews and key informant interview for health workers and community leaders. Perspectives, barriers and opportunities to strengthen food demonstration in PHCs were explored using structured guide. Interviews were recorded, translated and transcribed verbatim from the local language to English to facilitate data management and analysis. Qualitative data were analyzed thematically following the steps outlined by Braun and Clarke, 2006; Creswell, 2013. Seventy-five participants were sampled in three structured IDIs, six single FGDs, and 12 structured KIIs. Identified barriers to effective food demonstration sessions in sampled PHCs include inadequate funding/financial limitations, insufficient infrastructure, high cost of food items, lack of collaboration and partnership with multiple sponsors, lack of awareness and involvement of local stakeholders. Existing opportunities includes availabilities of some partners and availability of manuals/recipe books in the state, inclusion of food demonstration funding in basic health care provision fund. Possible strategies to strengthen food demonstration

include involvement of community leaders/figures, complementing food demonstration with home gardening and animal rearing, creation of nutrition unit in PHCs, intensified awareness creation and increased commitment of governmental and non-governmental Organizations. Efforts to improve food demonstration sessions should include intensified awareness creation, advocacy and community involvement, creation of nutrition unit, and adequate resource allocation.

## **THE CONSUMPTION OF PEANUT BASED READY-TO-USED SCHOOL MEALS IMPROVES COGNITION AND ANTHROPOMETRIC INDICES AMONG BASIC SCHOOL CHILDREN IN THE MION DISTRICT OF THE NORTHERN REGION OF GHANA.**

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*Keywords: Key words: Ready-to-use school food, Mion district., basic school children, cognition*

Micronutrient deficiency has become a significant public health concern in recent years especially in developing countries. To address this, food supplementation and fortification is identified as the appropriate channels. School feeding is seen as an avenue through which this can be achieved. School meals improves both nutritional and academic gains among basic school children. In developing countries, it does not usually achieve its objectives because of poor implementation characterized by the provision of foods low in nutritional content. We employed a randomized control trial in 6 basic schools in Mion district and determined the effect of the consumption of a peanut based RUSF on the cognition and anthropometry of basic school children. Students were randomly assigned to receive either RUSF with or without milk (RUSF-PM or RUSF-PC) or a fortified cereal porridge (FP) with multiple micronutrients for a period of one academic year. Fluid cognition measured using four indicators, DCCS, FICA, LSWM and PCPS test scores. Weight, height and MUAC were measured. We found an improved cognition, weight and height gains among students who

received RUSF-PM compared to those who received either RUSF-CP or FP. Students who received RUSF with milk had improved DCCS, FICA, LSWM and PCPS. [RUSF-PM: OR = 0.8 (CI: 1.1 – 1.9),  $p = 0.02$ , RUSF-PC: OR=1.1 (CI: 1.3 – 1.7)  $p = 0.01$ ), FP: OR = 1.9 (1.3 – 1.6)  $p = 0.01$ ] and improved anthropometry measures compared to those who received either RUSF- CP or FP. The provision of peanut based ready-to-use-school meals in Ghanaian basic schools provides an avenue to address nutritional and academic challenges confronting basic school children in Ghana. Academic performance will be enhanced when the cognition of school children is improved. The adoption of the peanut-based school meals model in Ghanaian basic schools is recommended.

## **DETERMINATION OF INGREDIENT COMPOSITION, SODIUM AND MONOSODIUM GLUTAMATE CONTENT OF COMMONLY CONSUMED BOUILLON TABLETS IN THE SENEGAMBIA REGION OF WEST AFRICA**

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*Keywords: Bouillon tablets, MSG, micronutrient fortification, sodium content*

Bouillon tablets are widely consumed in West Africa, raising concerns about their high sodium content and monosodium glutamate (MSG) levels. This study aimed to analyze the composition of bouillon tablets in the Senegambia region, focusing on sodium and MSG content. Eleven popular bouillon tablet brands from Senegal and The Gambia were sampled. Ingredient label analysis was conducted by systematically recording all ingredients listed on product packaging. Quantitative analysis of sodium and MSG content was performed using flame photometry and titrimetry method, respectively. Results were compared with World Health Organization (WHO) guidelines and regional standards. Ingredient analysis revealed consistent use of iodized salt, MSG, flavor enhancers, starch, sugar, and caramel across all brands. Sodium content ranged from 1713 mg to 2160 mg per tablet, contributing 85.65% to 108.00% of WHO's recommended daily allowance in a single tablet. MSG levels varied widely, from 0.34% to 3.55% by weight, with some brands surpassing 1.5% limit established

in Nigeria. Limited additional micronutrient fortification was observed, with only two brands fortified with iron and one with vitamin A. The study revealed high sodium levels in bouillon tablets. Core ingredients consistently included iodized salt, MSG, flavor enhancers, starch, sugar, and caramel. The wide variation in MSG content suggests differing formulation strategies. The findings underscore the urgent need for regulatory measures to reduce sodium content, establish limits for MSG and expand micronutrient fortification, and enhance consumer education about the nutritional impacts of bouillon consumption in the region.

## **IMPACT OF SCHOOL FEEDING PROGRAMME ON ANTHROPOMETRY OF CHILDREN IN CHIKWAWA DISTRICT, MALAWI**

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*Keywords: Cyclone Freddy disaster, Education, Learning outcomes, Malawi, School Feeding Programme*

In order to improve school enrollment in Malawi, the government is implementing a School Feeding Programme in Chikwawa, one of the worst hit Tropical Cyclone Freddy towns where thousands of people died and others displaced following heavy rains and strong winds which damaged crops, animals and infrastructure in Malawi. Despite well implemented programme, there remains a need to comprehensively assess the impact of the School Feeding Programme on nutrition and learning outcome. The study aimed at assessing the effects of the programme on school children's nutrition status and learning outcome. It is hoped that this study will help to inform policy makers who make research based policies that benefit children in schools hence improve education and health outcomes in the district and the country at large. Mixed research methods using sequential explanatory approach where a between-subjects cross-sectional quasi-experimental design comparing six school feeding and control preschools were sampled through multi-staged stratified random sampling technique from Chikwawa District in Malawi. 208 preschool children were administered with cognitive assessments and anthropometric measurements using Zambia Child Assessment tools (ZamCAT). 12 Key informants were purposively selected for interview on perceived benefits of School Feeding Programme to explain and interpret quantitative data in depth. Data variables were analyzed to generate descriptive and inferential statistics showed that children fed on school meals have better nutrition status and learning outcome than their counter parts with p-value < 0.001. The

study findings show that SFP has an impact on nutrition status and learning outcomes.

## **IMPACT OF EDUCATION WITH SUPPORT ON THE ADHERENCE TO MEDITERRANEAN DIETARY PATTERN AMONG PATIENTS WITH TYPE 2 DIABETES: A RANDOMIZED CONTROLLED TRIAL**

*by Ivy P. Frimpong / Rebecca K. Steele-Dadzie / George Asare / Husein Mohammed / Thomas Ndanu /*

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*Keywords: Mediterranean diet, Type 2 diabetes, education, extra virgin olive oil, groundnut oil*

Diabetes, with a global prevalence of 9%, imposes a substantial burden on society including mortality. Evidence has shown that adoption of evidence-based lifestyle practices, including healthy eating, in particular the adoption of the Mediterranean diet (MedDiet), is one of the critical components of diabetes self-management. The aim was to determine the impact of education with support on the adherence to Mediterranean dietary pattern among patients with type 2 diabetes (T2D). T2D patients (n = 74), recruited by multi-stage sampling technique from selected hospitals in Accra, were randomly assigned to one of the two intervention groups: Mediterranean-type (Med-type) diet with extra virgin olive oil (EVOO) (n=25), or with groundnut oil (GO) (n= 25) or control (usual food intake; n = 24). Adherence to Med-type diet was assessed using the 14-point Mediterranean Diet Adherence Screener (MEDAS) at baseline and after three months of biweekly face-to-face education covering recommended intakes, culinary skills, and benefits of Med-type diet for the intervention groups. EVOO or GO was provided every two weeks. Adherence, based on mean score was classified as high (>10), medium (6-9) and low (0-5). ANOVA for repeated measures was used to analyse data.



Significance was  $p < 0.05$ . Patients' overall mean age was  $57.2 \pm 9.1$  years, with females constituting 90.5%. Adherence from baseline to endline significantly increased ( $p = 0.001$ ) for 12 out of the 14 MEDAS points, except for fruits and wine in the intervention groups; (mean scores; EVOO (6.16 - 8.96) and GO (5.72 - 8.88), but not in the controls (5.75 - 5.17). The use of EVOO/groundnut oil as the primary source of healthy fat improved in both intervention groups. Education with support significantly increased adherence to both GO and EVOO Med-type diets. Repeated patient education may improve healthy eating for better T2D management.

## **HEALTH LITERACY OF CAREGIVERS AND NUTRITIONAL STATUS OF CHILDREN (0-59 MONTHS) AT A CHILDREN'S HOSPITAL IN GHANA**

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*Keywords: Health Literacy, caregivers, children ( 0-59 months), nutritional status*

Adequate health literacy (HL) among caregivers is linked to better nutritional status in children under five, especially in low-resource settings. This study assessed the HL of caregivers with children aged 0-59 months and the corresponding nutritional status of these children. This cross-sectional study sampled 403 caregiver-dyads receiving health services at the Princess Marie Louise Children's Hospital in Accra. The data were collected using a structured questionnaire on KoboCollect and an adapted Food Nutrition Literacy (FNLIT) scale was used to assess the health literacy of caregivers. Additionally, MUAC was employed to determine the nutritional status of the children. The study data was refined and analyzed with STATA version 16.0. Out of 403 participants, 43.2% of caregiver-child dyads were aged 21-30 years. Majority of the children (83%) had adequate nutritional status. The study found that only 41.9% of mothers and caregivers possessed adequate HL. Factors such as educational level, age of the child in months, and parity of caregivers were statistically associated with adequate HL levels. Despite the study indicating that a significant proportion of caregivers possess inadequate health literacy, the majority of children exhibited normal nutritional status. This suggests that public health services, including child welfare clinics, are effectively mitigating malnutrition in children. However, there remains a pressing need to improve the health literacy levels of caregivers in Ghana.

## **THE ROLE OF BIOTECHNOLOGY IN IMPROVING THE NUTRITION VALUE IN FOOD PRODUCTION AND PROCESSING FOR SUSTAINABLE NUTRITION, SECURITY, AND HEALTH**

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*Keywords: Key words: Biotechnology, food production, food security, health , processing, sustainable nutrition*

In the recent years, people have been complaining, albeit, publicly, about non-availability of food, poor quality of available food stuffs, and inadequate food security in Nigeria in particular and Africa in general. To solve this, Biotechnology has succeeded in transforming our food system, thereby providing the populace with inventive and innovative answers to solve the lingering challenges such as poor nutritional quality of food, food insecurity and scarcity, and environmental sustainability, using latest and advanced technologies. This research therefore sought to bring to light, the role of biotechnology in improving the nutritional value in food production and processing for sustainable nutrition, food security, and health, using descriptive research design. This research has been able to elucidate among other things, that biotechnology can help in no small measures, in ensuring better nutrition is provided for the teeming population of the world, especially Africa and Nigeria in particular. With biotechnology, drought resistant crops, food preservation, and new food and feed for the future will be made available for the people. What we can use to provide all these are highly available in our environment. The researcher therefore recommends that we look deeper into the rich and available raw materials in our environment which we can consider as wastes to help us survive this scorching bite of hunger today. The government at all levels should also help to provide machineries that will make this expedition easier for upcoming researchers.

## **OPTIMIZING THE DRYING CONDITIONS TO MAXIMIZE VITAMINS A AND C AND PROTEINS RETENTION IN COWPEA LEAVES USING REFRACTANCE WINDOW DRYING TECHNOLOGY**

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*Keywords: Expert Design, Proteins and Moisture content, Vegetable leaves, Vitamin A, Vitamin C*

Leafy vegetables including cowpea leaves (*Vigna unguiculata* (L). Walp) are highly perishable, whose shelf life can be extended by several drying techniques including refractance window drying (RWD). RWD is a more reliable, efficient and cheaper drying method with better retention of the product's natural colour and aroma compared to conventional drying methods such as sun drying. This study optimized the refractance window drying process parameters for the production of dried cowpea leaves with maximum retention of selected micronutrients. The central composite design under Design Expert software, was used to investigate the effect of refractance window drying (RWD) technology, time and temperature variation, on the vitamins A and C, protein and moisture content of RWD dried cowpea leaves. Data obtained were evaluated using regression analysis. The study revealed that the parameters investigated were significant in producing high quality vegetable leaves with high contents of vitamin C and proteins and substantially low moisture content. The coefficient determination ( $R^2$ ) was good for the second-order quadratic model. The study found out that the combinations of the parameters; one hour and temperature of 72.6°C were the optimal conditions for producing high nutrient dense and safe dried cowpea leaves with vitamin A (12.41 µgRAE/100g), vitamin C (261.00 mg/100g), proteins (31.29 g/100g) and moisture content of (9.65%). The study further confirmed through additional analysis and validation that the model is adequate to optimize the process. No conflict of interest is declared by the authors.

## **EMPOWERING FARMERS FOR IMPROVED HOUSEHOLD FOOD SECURITY AND NUTRITION: FINDINGS FROM THE GREAN PROJECT IN SOUTH SUDAN**

*by Abrham Assefa / Taban James DERE / Robert Waswaga / World Vision International South Sudan, Juba, South Sudan / World Vision International South Sudan, Juba, South Sudan / KenRo Team Consults Ltd., Kampala, Uganda*

*Keywords: PD Hearth, dietary diversity, food security, mother gardens, resilience*

The Greater Resilience through Enhanced Agriculture and Nutrition (GREAN) Project, implemented by World Vision South Sudan (2019-2024) in the counties of Rajaf and Tonj

North, aimed to address severe food insecurity affecting 6.2 million individuals in targeted communities. Funded by the Australian Government's Department of Foreign Affairs & Trade, GREAN targeted 60,000 participants across 10,000 farmer households. The project integrated sustainable agricultural practices, women's economic empowerment, improved market linkages and water access, and a positive deviance approach for improved household food security and nutrition. The endline evaluation employed a pre-post mixed-method design alongside case study methodologies. At the endline evaluation, a total of 853 participants were sampled, comprising 790 respondents from household surveys and 63 from focus group discussions and key informant interviews. Endline survey results were compared with baseline data collected from 1,199 direct participants. The project significantly reduced moderate to severe food insecurity by 16.4% points from 71.6% at baseline, with the greatest gains observed among female participants and female-headed households. Women's access to nutritional information and knowledge of good nutrition rose by 9.5% and 5.3% from their respective baseline values of 65.1% and 65.7%. Impressively, 93.5% of women actively improved household nutrition by implementing strategies learned through interventions such as nutrition information dissemination, cooking demonstrations, and mother gardens, from 69.1% at baseline. These efforts resulted in a 16% increase in household dietary diversity from the baseline of 78.4%, with 89.7% of women and 79.1% of children 6-59 months meeting minimal dietary diversity. Adoption of locally available nutritious foods also increased to 79.9%, up from 65.7% at baseline. The GREAN project has strengthened community resilience through enhanced household food security and nutrition, particularly benefiting women and children. Challenges remain in addressing seasonal hunger and regional disparities, requiring sustained community efforts to address ongoing needs.

## **POSITIVE DEVIANCE HEARTH MODEL IN FRAGILE CONTEXTS: RESULTS FROM A 12-MONTH GREAN PROJECT PILOT STUDY IN SOUTH SUDAN**

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*Keywords: PDH, Positive Deviance Hearth, South Sudan, fragile context*

The Positive Deviance Hearth (PDH) model is a community-based program that rehabilitates malnourished children using local resources and knowledge. Its long-term effectiveness in

fragile, food-insecure contexts is not well-documented. World Vision South Sudan piloted PDH in the Greater Resilience Enhanced Through Agriculture and Nutrition (GREAN) project (2019-2024), which aimed to enhance local resilience through improved food production, landscape restoration, social norms, and health services. Forty-six underweight children (24 girls and 22 boys) aged 6-36 months from Madingkar Boma, Tonj North County, were randomly enrolled in the PDH program. Sessions for 10-15 children lasted 12 days, with food from caregivers, community gardens, and project supplements. Children were admitted based on their underweight status and monitored for progress using weight gain on specified days. Results were assessed through weight changes, supplemented by observations, focus groups, and interviews. Descriptive quantitative Data was analyzed through the PDH Excel database. From Day 12, the number of children achieving normal nutrition status increased, while those in other categories of underweight decreased. At baseline, 46 children were enrolled and classified according to nutrition status: 0 Normal, 21 Mild, 13 Moderate, and 12 Severe. One child defaulted during the PDH sessions. By 6 months, 8 were Normal and 8 Mild, with no Moderate or Severe cases remaining. At 1 year, 12 children were Normal and 3 Mild. Of the 45 children, 17 (37.8%) improved their nutritional status within 3 months. The remaining 28 (62.2%) did not, indicating a need for ongoing support to enhance caregiver practices. Further research is warranted to fully understand how PDH can be effectively implemented in fragile, food-insecure contexts. This pilot shows promise, suggesting that integrating PDH with resilience projects can improve its feasibility and impact. A follow-up study in another GREAN project area is planned.

## **THE ASSOCIATION BETWEEN CHILD FOOD INSECURITY AND THE GLOBAL DIETARY RECOMMENDATIONS SCORE AMONG GHANAIAAN ADOLESCENTS**

*by Nicholas F Russell / Elise C Reynolds / Christiana Nsiah-Asamoah / Harriet Okronipa / Christine P*

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*Keywords: Adolescents, Child food insecurity, Diet quality, Global dietary recommendations, Household income level*

Food insecurity can significantly impact adolescents by compromising their diet quality,

educational performance, socio-emotional development, behavior, and general health. Using adolescent reports, we examined the relationship between food insecurity and the Global Dietary Recommendations (GDR) score of adolescents. We randomly selected 187 junior high school (JHS) students and their parents from 8 purposefully selected JHS in Cape Coast, Ghana. Adolescent participants responded to questions about sociodemographic characteristics (age and sex) and food insecurity both at home and at school ( Child Food Insecurity Experience Scale (CFIES), score 0-20) . Diet quality was measured using the Diet Quality Questionnaire, and the GDR score (0-18) was calculated and categorized into low (0-5), medium (6-10) and high (11-18) adherence to GDR. Parental report of household assets was used to calculate their household income levels (categorized into low, middle, and high). Pearson correlation and multiple linear regression analysis were used to identify the relationship between CFIES (predictor) and GDR (outcome) while controlling for demographic variables (age, sex, and household income). The sample had 53% males, with an average age of 14 years ( $\pm 1.3$ ). Most participants (70%) came from households with middle socioeconomic status (SES). Adolescents had an average food insecurity experience score of 8.3 ( $\pm 6.1$ ) at home and 8.8 ( $\pm 6.1$ ) at school. 90% of the participants showed medium adherence to GDR. There was no significant correlation between CFIES scores (at home or at school) and GDR. The model with CFIES at home explained 1.4% of the variance in GDR, while the CFIES model at school explained 1.6%, but neither was statistically significant. The findings suggest that CFIES may not be a significant predictor of adolescents' Global Dietary Recommendations score. Future studies to explore alternative factors that are related to the diversity in GDR are needed.

## **KNOWLEDGE AND AWARENESS OF TYPE II DIABETES MELLITUS AMONG UNDERGRADUATE STUDENTS IN HEALTH-RELATED COURSES AT THE UNIVERSITY OF GHANA.**

*by Danso Edmund Acquah / Asante Elia / Theresa Andoh / Justina Owusu Serwaah / University of Ghana*

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*Keywords: Attitude., Awareness, Diabetes mellitus, Knowledge, Undergraduate students*

Diabetes mellitus (DM) is a major non-communicable disease (NCD) that is on the rise and poses a threat to the general public's health. Despite the alarming rates of DM in Ghana, most of the research conducted suggests that many individuals with diabetes often lack the knowledge necessary to manage their condition. It is imperative to know whether undergraduate students studying health-related courses know the condition to offer optimal expertise and care for individuals with DM. This study sought to assess the knowledge and awareness of students attending the University of Ghana. A cross-sectional study design was used to assess the knowledge and awareness of diabetes among 130 undergraduate students enrolled in health-related courses at the University of Ghana. A semi-structured questionnaire was employed to assess study participants' socio- demographic characteristics, knowledge, awareness, attitude, and self-reported anthropometry measurements. About 46% of the study respondents were female, and 53.8% were male. Most respondents had good knowledge and positive awareness of type II diabetes mellitus with the majority of them knowing answers to the questions relating to the definition of the disease (86.2%), risk factors (93.1%), signs and symptoms (93.8%), best ways to diagnose the disease (24.6%) and how to control and manage the disease (99.2%). The average composite score for overall diabetes knowledge was 92.3%. There was a significant association between the programme of study and knowledge of type II diabetes mellitus ( $p=0.003$ ). Findings from this study revealed that participants possess good knowledge and positive awareness towards DM. Nevertheless, a systematic education curriculum for diabetes education is paramount for all levels of the educational system in Ghana.

## **CHARACTERISTICS OF JUNIOR HIGH SCHOOL SCHOOL FOOD ENVIRONMENTS IN CAPE COAST, GHANA**

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*Keywords: Food environment, adolescent, food choice, food safety, school nutrition*

Food environments are known influencers of food purchasing behaviors. In Ghana, adolescents attending junior high schools (JHS) do not have access to the school feeding program and often purchase food from vendors during the day. The objective of this study is to describe JHS food environments and assess differences in food vendor characteristics by urban status, community income-generating activity, and on- and off- school campus vendors. Structured food environment observations were conducted across eight JHS in Cape Coast. Every food vendor within a 0.25-km radius of each school was surveyed. Schools were classified as urban/peri-urban and fishing/agriculture/trading communities. Vendors were classified by location on- or off- school campus. We used modified Poisson regression with robust standard errors to test differences in vendor types, foods sold, and food hygiene practices by urban status, income-generating activity, and on-/off- campus location. We identified 265 vendors, with 25.3% selling food on campus. Many vendors sold cooked/prepared foods (30.2%), and few sold fresh fruits (10.6%) and vegetables (2.6%). On-campus vendors had a lower likelihood of selling branded industrial snacks and branded industrial beverages and a higher likelihood of selling prepared dishes compared to off-campus vendors. Having water and soap, wearing gloves, and using clean cooking fuel were uncommon among all vendors. There were no significant differences in food safety practices between on- and off-campus vendors, but peri-urban vendors performed slightly better than urban as did agricultural and fishing communities compared to trading communities. School policies offer a promising avenue to shape food availability and food safety during school hours. More is needed to alter not just school environments, but also the neighboring environments where students purchase their foods. Research is needed to understand how school food environments can shape adolescent diet at school.

## **PREVALENCE OF GASTROINTESTINAL (GI) SYMPTOMS AMONG OUTPATIENTS VISITING THE UNIVERSITY OF GHANA HOSPITAL, LEGON, ACCRA**

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*Keywords: dietary pattern, gastroenterology, gastrointestinal symptoms*

Gastrointestinal symptoms are widespread and carry heavy economic and social consequences in Africa, impacting productivity and quality of life. Prioritising the role of dietitians in the care of patients who present with GI symptoms is beneficial for healthcare systems. This study is designed to examine the prevalence of gastrointestinal symptoms among outpatients. The aim was to determine the prevalence of gastrointestinal symptoms among outpatients visiting the University of Ghana hospital, Legon, Accra as a first step in planning a dietitian-first gastroenterology clinic at the University Hospital. A cross-sectional study was conducted among outpatients aged 18 years and above at the University of Ghana, Legon hospital. A structured questionnaire was used to collect demographics, the frequency of some gastrointestinal symptoms, medical history, and dietary intake. Data was analysed using Statistical Package for Social Sciences (SPSS) version 25.0. Chi-Square test was used to determine the relationship between dietary factors and gastrointestinal symptoms. Gastrointestinal symptoms were reported by 70.2% of participants, with heartburn and bloating being commonly experienced. Dietary intake revealed varied consumption patterns, with associations identified between consumption of porridges and cereals with bloat and diarrhoea ( $p<0.01$ ). Beverages ( $p=0.027$ ), Powdered milk ( $p<0.01$ ) and evaporated milk ( $p=0.03$ ) demonstrated a close association with diarrhoea. Juice and drinks also exhibited a close association with heartburn ( $p=0.042$ ). Bread consumption was closely related to constipation ( $p=0.024$ ) and bloat ( $p=0.035$ ). In addition, the BMI of patients was significantly associated with GI symptoms as underweight and bloat ( $p=0.037$ ), obesity and (bloat/gas- ( $p=0.039$ ) and obesity and heartburn ( $p=0.048$ ). The study found a high prevalence of gastrointestinal symptoms among patients. These insights contribute to a comprehensive understanding of the interplay between dietary patterns, weight status, and GI health in outpatient populations, and the need for prioritising dietetic care of such patients.

## **ACADEMIC STRESS LEVELS, FOOD CHOICES AND FOOD COPING STRATEGIES AMONG MEDICAL AND NON-MEDICAL UNDERGRADUATES IN A NIGERIAN UNIVERSITY**

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*Keywords: Academic stress and Food coping strategies, Food choices, Undergraduates*

Stress from academic obligations such as assignments, fieldwork, tests and examinations, play a significant role in university students' dietary habits particularly food choices, which is a multifaceted human behaviour influenced by many interrelated factors. This study assessed academic stress levels, food choices and food coping strategies among medical and non-medical undergraduates in the University of Ibadan. This study adopted a descriptive cross-sectional design to select 282 undergraduates from the medical and non-medical faculties in the University of Ibadan, using a three-stage sampling technique. Validated scales including perceived stress scale (PSS), food choice questionnaire (FCQ) and eating behavior questionnaire (EBQ) were adapted and compiled in a self-administered questionnaire to assess sources and levels of academic stress, food choices and food coping strategies. Data were encoded and summarized using frequencies, percentages, means and standard deviation. Majority (73.1%) of the undergraduates were within the age range of 21-25 years. 69% of the undergraduates exhibited a moderate level of stress with medical students reporting slightly lower stress levels (66.3%) compared to non-medical students (70.5%). The most common stressors among respondents were inability to concentrate during study hours (50%) and difficulty in remembering all that has been studied (57.5%). Sensory appeal (71.6%), price (65.7%), preparation convenience (54.5%) and packaging (50.4%) were strong influencers of food choices. Undergraduates exhibiting high level of stress had preference for soft drinks, snacks, and cereals and employ these choices as food coping strategies. Sensory appeal, price, convenience and packaging were major drivers of food choices. Soft drinks, snacks, and cereals are preferred choices of undergraduates exhibiting high level of stress and they employ these choices as food coping strategies. It is recommended that the institution provides a healthier food environment and regular nutrition education programs for the students.

## **NUTRITIONAL STATUS OF ADOLESCENTS LIVING IN LYMPHATIC FILARIASIS -ENDEMIC AREAS IN RURAL GHANA**

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*Keywords: Lymphatic filariasis, adolescent, anaemia, dietary diversity, malnutrition*

Curbing malnutrition in adolescents has long remained a public health concern in Ghana. Adolescents living in neglected tropical diseases endemic areas are more vulnerable to malnutrition. Nutrition-focused research on lymphatic filariasis (LF), a parasitic infection, centers on the disease patients with little or no focus on individuals living in LF-endemic regions. Therefore, this study sought to assess the nutritional status of adolescents living in LF-endemic areas in the Ahanta West District of Ghana. A cross-sectional study design was employed. A quantitative study method was used to assess the nutritional status of the participants. This study was conducted in 4 LF- endemic communities in the Ahanta West District in the Western Region of Ghana. A total of 107 adolescents participated in this study. Structured questionnaires were administered to gather information on their demographics, educational background, and socioeconomic data. Anthropometry measures and hemoglobin levels were taken to assess their anemic and nutritional status. A 3-day 24-hour recall was taken to assess their dietary intake and dietary diversity. The mean age of participants was  $14.8 \pm 1.73$ , and the majority were females (57.9%). The prevalence of stunting and anemia among participants was 28.04% and 78.5%, respectively. Nearly all the participants had adequate carbohydrate intake 106 (99.07%), and 22.43% had inadequate protein intake. Vitamin A and E recorded the highest level of inadequacy 105 (98.13%) while vitamin B-6 recorded the highest level of adequacy among the participants 94 (87.85%). The mean dietary diversity of was  $4.5 \pm 1.04$ . The association between anemia status and iron, folate and vitamin B12 intake was statistically significant at a p-value of 0.023, 0.016, 0.010, respectively. Prevalence of anemia and stunting was high among the adolescents. Vitamin A, E, K, zinc and folate deficiencies were identified, and the participants had a lower dietary diversity.

## DIETARY HABITS AND BODY MASS INDEX OF RURAL ELDERLY IN OGBOMOSO NORTH LOCAL GOVERNMENT AREA, OYO STATE

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**Keywords:** Complementary feeding, Household, Malnutrition, Water insecurity

As populations age, understanding the health and nutrition of elderly individuals, especially in resource-limited rural areas, becomes increasingly important. Anthropometric measures, such as Body Mass Index (BMI), and dietary habits provide insights into their nutritional status. Rural challenges, including limited food access and economic constraints, significantly impact the health and nutritional well-being of the elderly. This study therefore investigated the anthropometric characteristics and dietary habits of elderly individuals residing in rural areas. A descriptive cross-sectional study was conducted involving 250 participants aged 60 and above, selected through multi-stage random sampling. Data were collected using a semi-structured questionnaire that assessed socio-demographic parameters, height, weight, and dietary diversity. Data analysis was performed using SPSS 25, employing both descriptive and inferential statistics, including correlation analysis, to explore relationships between anthropometric measurements (BMI) and dietary intake. The socio-demographic analysis revealed that 60.4% of respondents were female, with a mean age of  $60.61 \pm 9.33$  years. Most were retired, with monthly incomes between 5,000 and 25,000 Naira. The mean BMI was  $22.64 \pm 3.27$  kg/m<sup>2</sup>. Dietary diversity analysis revealed that 52.9% of females had moderate diversity, while 25% of males had low diversity. Correlation analysis showed a strong positive correlation between BMI and education level ( $r = 0.705$ ), whereas BMI and monthly income showed a negligible positive correlation ( $r = 0.006$ ). Additionally, weak negative correlations were observed between dietary diversity score (DDS) and frequency of consumption ( $r = -0.082$ ) as well as DDS and age ( $r = -0.077$ ), indicating a slight decrease in dietary diversity with increasing age. The study shows the impact of socio-economic factors and dietary habits on the nutritional status of rural elderly. Lower income was associated with reduced dietary diversity. Addressing income disparities

and improving dietary diversity are essential for better health outcomes.

## **EMOTION-DRIVEN EATING IN CHRONIC CONDITIONS IN GHANA: INTEGRATING EMOTION CARE INTO NUTRITIONAL COUNSELLING AND DISEASE MANAGEMENT**

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*Keywords: Chronic conditions, Dietary choices, Emotion-driven eating, Healthy food consumption, Nutrition intervention, Unhealthy food consumption*

The relationship between emotions and food consumption is well- documented, but there is limited research on how emotion-driven eating behaviors influence dietary choices in chronic illness context. Understanding this relationship is crucial for developing effective dietary interventions for chronic illness management. Using the circumplex model of emotion classification, we investigated how different emotional states—high arousal positive valence, high arousal negative valence, low arousal positive valence, and low arousal negative valence—affect dietary choices among 801 individuals with chronic conditions (males = 52.8%, mean age = 46.61, SD = 16.21). Findings revealed high arousal positive valence emotions increased consumption of healthy foods and decreased consumption of unhealthy foods. In contrast, high arousal negative valence emotions increased consumption of unhealthy foods but not healthy food consumption. Low arousal positive valence emotions were positively associated with healthy food consumption, whereas low arousal negative valence emotions did not predict the consumption of either food type. The differential influence of arousal versus valence on eating behaviours suggests that the intensity of emotional states (arousal) is a stronger determinant of food choices than the valence (positive or negative). Integrating emotion-focused strategies into nutritional counselling is essential for enhancing chronic illness management.

## **USING GARDENING WITH NUTRITION EDUCATION AND MEAL PLANNING TO INFLUENCE KNOWLEDGE AND DIET QUALITY OF CHILDREN AND ADOLESCENTS IN ORPHANAGES IN IBADAN, NIGERIA**

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*Keywords: diet quality, gardening, nutrition education, orphans*

Reduced access to nutritious food results in poor dietary diversity and quality especially for children and adolescents living in orphanages and puts them at higher risk of malnutrition. Few studies have investigated a combined nutrition education and vegetable gardening for children and adolescents in orphanages to improve their dietary intake and quality. This study examined the influence of vegetable gardening with nutrition education and a structured meal plan on the diet quality and nutrition knowledge of orphans and caregivers in Ibadan. This study adopted a two-group comparison design (one control (CG) and one intervention group (IG)). Children and adolescents (N=76, aged 7 -18 years) and caregivers (N=14) in four orphanages in Ibadan, participated in either (1) hands-on vegetable gardening (VG) with nutrition education (NE), and meal planning (MP) or (2) only NE and MP, once a week for six weeks. Outcomes assessed by questionnaire included nutrition knowledge, diet quality (DQ) and meal planning knowledge pre- and post- intervention. Frequencies, means, t-test were used for data analysis ( $p < 0.05$ ). Nutrition knowledge scores (NKS) of the children and adolescents increased significantly in both IG (pre- $19.78 \pm 2.49$  to post- $29.63 \pm 0.59$ ) and CG (pre-  $8.79 \pm 3.12$  and post-  $29.32 \pm 1.19$ ); NKS between IG and CG, were not significantly different. Children/ adolescents in IG had improved DQ NCD protect scores from 2.1 to 3.6 points compared to the CG group which remained at 2.4 points. Dietary diversity score indicator for IG improved from 4 to 5.4 points compared to CG which reduced from 5.4 to 4 points. Caregivers' NKS and meal planning knowledge score in both IG and CG increased significantly. Vegetable gardening integrated with nutrition education and a structured meal plan, were useful to improve the nutrition knowledge and certain diet quality indicators of the participants.

## STUNTING AND WASTING IN CHILDREN 6–23 MONTHS OLD IN WEST AFRICA IS SIGNIFICANTLY ASSOCIATED WITH ILLNESS AND ACCESS TO HEALTH SERVICES

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*Keywords: Stunting, illnesses, wasting, window of opportunity*

Undernutrition in children <24 months old remains a major challenge in West African countries; the prevalence of undernutrition in the region is one of the highest globally. Determinants of undernutrition in this age group in West Africa have not been fully explored, even though a lot of undernutrition is reversible in this period. This study therefore assessed factors associated with nutritional status of children <24 months old in West Africa. The study analysed demographic and health survey (DHS) data of 17,211 children 6–23 months old from 8 West African countries that conducted DHS VII (2017–2021): Benin, Gambia, Guinea, Liberia, Mali, Mauritania, Nigeria, Sierra Leone. Determinants of stunting and wasting were selected based on the malnutrition conceptual framework. Bivariate analyses were conducted and variables with  $p < 0.25$  in these analyses were included in multivariable analyses. Complex survey design in Stata 18.0 was used, with  $\alpha$  at 0.05. The prevalence of stunting was 26%, ranging from 21% in Gambia to 33% in Nigeria; while wasting was 9%, ranging from 6% in Gambia and Liberia to 14% in Mali. The odds of stunting were significantly ( $p < 0.02$ ) lower with increasing maternal education (adjusted odds ratio – AOR:0.97), being in the richer (AOR:0.75) or richest (AOR:0.52) quintile, receiving all basic vaccinations (AOR:0.89) and maternal antenatal care (ANC)  $\geq 4$  visits, (AOR:0.83). Having diarrhoea (AOR:1.18) or fever (AOR:1.18) increased the odds of stunting. The odds of wasting were significantly ( $p < 0.04$ ) higher among children with diarrhoea (AOR:1.26) and/or fever (AOR:1.72), but lower with skilled ANC (AOR:0.72) and household use of clean cooking fuels (reflecting indoor air quality; AOR:0.69). Among children 6–23 months old in West Africa, stunting remains at high/very high levels, while wasting is at medium/high

levels. Interventions to address child illnesses and improve access to health services/environmental health are urgently needed.

## **ASSESSING COOKING OIL USE AND TRANS FAT AWARENESS AMONG FRIED FOOD VENDORS IN GHANA: IMPLICATIONS FOR PUBLIC HEALTH POLICY**

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*Keywords: cooking oils, deep frying, food vendors, reuse oils, trans fats*

The consumption of high levels of trans-fatty acids (TFAs) causes 540,000 deaths annually. Despite global efforts to eliminate dietary TFAs, data to guide policies in low and middle-income countries is scarce. Repeated use of cooking oils can lead to harmful TFA levels in fried foods. This study explored cooking oil use and reuse practices among fried-food vendors in Ghana. We collected qualitative data in the Hohoe Municipality and quantitative data across all 16 regions of Ghana to assess oil use practices among fried-food vendors as part of a student practicum. Data collected included socio-demographic information, cooking oil use and reuse practices, and awareness of TFAs. The qualitative data were analyzed thematically using ATLAS.ti, while descriptive and inferential analyses on quantitative data in Stata. A total of 15 in-depth interviews conducted revealed a weak perception of risk associated with the repeated use of cooking oil, with cost-saving being the primary motivation for this practice. When informed about the harmful effects of TFAs, vendors expressed willingness



to consider healthier alternatives, if affordable. In the survey, 1,334 food vendors (93.3% female) participated, with 61.1% having completed junior or senior high school. About 40% reused oil three or more times, and most (1,049) were unaware of TFAs. The key determinants for the repeated use of cooking oil included lower income (AOR= 0.55, 95% CI: 0.32–0.95), use of palm olein oil (AOR = 0.81, 95% CI: 0.59–1.12), and reliance on unpleasant odor as an indicator for oil change (AOR = 2.22, 95% CI: 1.16–4.26). The reuse of cooking oils, driven by cost-saving measures and lack of awareness about TFAs, poses public health risks. Targeted interventions, educational campaigns, and affordable, healthier oil alternatives are needed to reduce TFA consumption and mitigate health risks.

## **APPLICATIONS OF NANOTECHNOLOGY IN FORTIFICATIONS OF FOOD AND FEED**

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*Keywords: Nanotechnology; Food Fortification; Nano-Fertilizers; Nutrient Absorption; Anemia Treatment*

Global food and feed security faces significant challenges due to nutrient deficiencies. Nanotechnology offers innovative solutions, revolutionizing agriculture and the food industry. Nano-fertilizers like NPK (Nitrogen, Phosphorus, and Potassium) provide controlled nutrient release, improving crop yields and reducing environmental impact. In animal feeds, nano-calcium and nano-phosphorus enhance nutritional intake, leading to better growth rates, increased productivity, and overall livestock health. These nano-sized particles offer superior bioavailability and absorption compared to conventional sources. Nanotechnology is applied by developing nano-fertilizers that encapsulate nutrients into nano-sized particles for controlled release. In animal feed, nano-calcium and nano-phosphorus are synthesized to enhance bioavailability and absorption. Additionally, nano iron is incorporated into food products to address nutrient deficiencies, particularly anemia, through improved solubility and bioavailability. Nano-fertilizers improve crop yields and reduce environmental impact. In animal feeds, nano-calcium and nano-phosphorus improve growth rates and health by preventing deficiencies like rickets. Nano iron in food fortification effectively treats anemia with better absorption at lower doses. These applications enhance the nutritional value and efficiency of fertilizers and feeds, addressing global food security

and public health challenges. Nanotechnology in agriculture and food fortification provides significant benefits in addressing nutrient deficiencies and improving food security. Nano-fertilizers and nano-additives in animal feeds boost nutrient availability and absorption, leading to better crop yields and livestock productivity. Food fortification with nano iron offers efficient solutions for treating anemia. Targeting micronutrient deficiencies in Egypt by producing iron- and zinc-rich foods through nanotechnology presents a promising approach to enhance food security and public health.

## **ENHANCING NUTRITIONAL CARE FOR CHILDREN WITH CLEFT LIP AND PALATE IN ZIMBABWE: A NEEDS ASSESSMENT**

*by Faith Kamazizwa / Dr Svitlana Austin / Dr Paul Farai Matsvimbo / Global Cleft and craniofacial*

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*Keywords: Cleft lip and palate, Zimbabwe, nutrition*

Despite the significant burden of children with cleft lip/palate (CL/P) in Zimbabwe, there is no coordinated national service to address their complex needs. Before the opening of the Global Cleft and Craniofacial Organisation in 2020, the services were limited to surgical camps mostly conducted by international partners and there is a huge backlog. Lack of knowledge and stigma associated with CL/P further complicate access to care. This study aimed to identify gaps and strengths within existing systems to establish a structured nutrition program designed to support paediatric care, implement active screening, and effectively manage malnutrition among patients with CL/P. The study employed an exploratory qualitative design methodology, utilizing the socioecological theory to comprehensively assess the needs of children affected by CL/P, spanning from the affected caregivers to the healthcare system. Data collection methods encompassed observations, in-depth interviews, and focus group discussions. Participants included caregivers of children with CL/P, family members, community representatives, and healthcare professionals. Significant gaps in the service provision were identified at all levels analyzed. Zimbabwe has no structured national service for the management of CL/P patients. The provided service is still very fragmented. Patients with CL/P are not currently monitored by a national surveillance system or a single,

centralized database. Moreover, healthcare workers lack knowledge in cleft identification, management, and feeding counseling of the caregivers. As such, there is no effective information dissemination to caregivers resulting in poor care for children with CL/P from birth impeding appropriate breastfeeding practices and negatively affecting their nutrition. To enhance care for children with CL/P in Zimbabwe, it is imperative to facilitate and decentralize multidisciplinary care, and provide comprehensive capacity building for healthcare professionals. Additionally, there is a pressing need to enhance caregivers' knowledge, attitudes, and practices regarding the nutrition of children with clefts whilst improving access to supplementary feeding.

## **FOOD PURCHASING PRACTICES AND DIETARY INTAKES OF SCHOOL-AGE CHILDREN IN PUBLIC PRIMARY SCHOOLS IN GHANA**

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*Keywords: School-age children, dietary intake, food purchase, food security, school feeding.*

Surging food insecurity is increasing the vulnerability of school-age children (SAC) to malnutrition with implications on physical growth, cognitive development academic performance and overall long-term health. Food environment plays a vital role in purchasing practices and dietary intake within schools. We assessed food availability, meal sources and dietary intake of SAC and the predictors. A cross-sectional study was conducted among 213 SAC attending four public primary schools in the Hohoe Municipality where the Ghana school feeding program (GSFP) was implemented. Food insecurity experience scale and food frequency questionnaires captured participants' minimum dietary diversity scores and food security. Data analysis was performed using STATA 17, employing descriptive (proportions/means with standard deviations) and analytical analysis (Chi-square tests, binary

logistic regression) to identify the adjusted odds ratio (AOR) for purchasing food at school. The mean age of participants was  $9.8 \pm 1.7$  years, with 60.1% being female. About 55.9% of households were food secure. Most SAC met the minimum dietary diversity score, with 75.1% consuming foods from at least five food groups daily. Food sources included: vendors (37.9%), home (48.4%), school feeding program (53.5%), and school canteens (70.7%). Students who consumed snacks as part of their meals were 3.3 times more likely to purchase food at school (95% confidence interval [CI]: 1.48-7.02,  $p=0.003$ ), while those eating home-prepared foods were less likely (AOR=0.11, 95% CI: 0.05-0.26,  $p<0.001$ ). Children whose meals were provided through the GSFP were 4.8 times more likely to purchase food at school (95% CI: 2.07-10.96). Half of the SAC were food secure, and the majority purchased meals from the school canteen, but these were largely unhealthy snacks. As a population in the formative years, facilitating a health-promoting school food environment will foster healthier food choices and improve diet quality among SAC.

## **END USERS, REGULATORS/IMPLEMENTERS AND HEALTHCARE PROFESSIONALS' AWARENESS, IMPLEMENTATION AND USE OF THE 2007 WHO GUIDELINES ON THE SAFE PREPARATION, STORAGE AND HANDLING OF POWDERED INFANT FORMULA: QUALITATIVE FINDINGS FROM GHANA, ENGLAND AND WALES**

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*Keywords: Powdered infant formula, breastfeeding, contamination, end-users, non-professional caregivers, professional caregivers*

Powdered Infant Formula (PIF) is a vital child nutrition supplement. The 2007 WHO guidelines for safe PIF Preparation, Handling and Storage were developed following PIF-linked C. Sakazakii, S. Enterica and S. Agona infection outbreaks causing diarrhoea and

deaths. This study investigates the awareness, usage, and barriers to using of the Guidelines among implementers/regulators and end-users (healthcare and nursery workers, care providers) in Ghana, Wales and England. We conducted semi-structured interviews with participants. The recordings were transcribed and analysed thematically using *a priori* and emerging themes. 44 participants were interviewed (23 Ghana, 8 England, 13 Wales; of 23 mothers/non-professional caregivers, 12 nursery teachers/professional caregivers, 7 healthcare professionals, and 2 implementers/regulators). In all settings, knowledge on PIF preparation was acquired mainly from producers' manuals/label information. Training/education for all was reported to be mainly non-existent. Practices by end-users were largely unregulated and subject to diverse influences including personal choice and producers' information. Generic precautions for food safety were common but not related to reducing pathogens. Awareness of 2007 WHO PIF Guidelines was low in all three countries. The awareness was lowest in Ghana (5/23-) followed by England (2/8) but in Wales (5/13). Participants encountered the PIF Guidelines through various information sources, including electronic media, training workshops, and interactions with professional colleagues. Dissemination and implementation among end-users appeared to be uncoordinated in all settings. National policy favouring breastfeeding and the resulting 'taboo' around the use of PIF were identified as barriers to Guidelines dissemination and implementation across the three countries. The 2007 WHO PIF Guidelines are underutilised in our high- and low-income countries, posing a related infection risk. There is a need for training on safe PIF Guidelines' practices for all end-users, without compromising exclusive breastfeeding promotion.

## **EFFECT OF PALM OILS ON RAT LIPID PROFILES**

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*Keywords: Palm Kernel Oil, Palm Oil, Serum Lipid Profile, Wistar Rat*

Despite high consumption rates, the impact of palm oil on cardiovascular health remains controversial. Its effects on cardiovascular health are plagued with inconsistent results about its effect on lipid profiles. This study assesses the impact of various forms of palm oil; crude palm oil (CPO), refined palm oil (RPO), bleached palm oil (BPO), saturated palm oil (SPO),

unsaturated palm oil (UPO), and palm kernel oil (PKO) on serum lipid profiles of Wistar rats. Parallel animal experimental study design was employed involving 49 male Wistar rats divided into seven groups, each receiving different diets of which the respective oils were incorporated at 20mL to 100g of feed and a control diet for the control group. The rats were fed these diets for five weeks. Serum lipid profiles; High-Density Lipoprotein cholesterol (HDL-C), Low-Density Lipoprotein cholesterol (LDL-C), Total Cholesterol (TC), and triglycerides (TG) were measured. Results demonstrated significant effects of various palm oil diets on lipid profiles. The analysis indicated that TC ( $p=0.001$ ) and LDL-C ( $p=0.001$ ) were significantly reduced in CPO and BPO groups compared to RPO group. The control group exhibited significantly lower total cholesterol ( $p=0.048$ ) compared to SPO group. No significant differences in total cholesterol were observed between the control and PKO and UPO groups. The highest increase in LDL and TC was recorded in RPO group, while CPO showed a significant decrease in these parameters. HDL levels were significantly higher in PKO group when compared with control group ( $p=0.033$ ). BPO showed no significant change in serum lipid parameters. This study suggests that palm oil effects vary on lipid profiles. Refined palm oil consumption was associated with elevated TC and LDL-C concentrations, indicating a potentially higher cardiovascular risk. It is recommended to limit SPO consumption due to adverse effects on cholesterol levels, while PKO may benefit HDL levels when consumed in moderation.

## **EXAMINING THE PATHWAYS SUPPORTING THE IMPACT OF A MULTI-COUNTRY, MULTI-SECTOR GENDER TRANSFORMATIVE INTERVENTION ON NUTRITION: AN EVIDENCE SYNTHESIS**

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*Keywords: gender equity, intervention, pathways, synthesis*

Evidence-based multidisciplinary and multisectoral interventions are needed to address simultaneously the structural and social barriers impeding gender equality in health and nutritional outcomes, and access to care. The REACTS-IN project is an integrated (nutrition, agriculture, and sexual and reproductive health rights) intervention (2023-2030) in rural regions of Bangladesh, Kenya, and Tanzania. In this evidence synthesis, a review of the literature was conducted to assess evidence supporting the proposed REACTS-IN activities and pathways through which project outcomes are presumed to be achievable. The literature search included English-language publications (2004 to 2024) identified through PubMed database, using keywords to represent the foci of REACTS-IN's ultimate outcome indicators: < 5 y child stunting, adolescent anemia, and household gender equality. Thirty-four articles, many from South Asia and East Africa, met the eligibility criteria and were included in this review of intervention activities and associated findings. Evidence to support the proposed theory of change was uneven given the complexity of project activities and the multiple pathways of influence they entail. Activities that improved training for institutional and community-based health workers and promoted micronutrient-rich biofortified crops for improved rural diets, contributed to improved child linear growth. Intervention studies reported associations between reductions in stunting and improved training and support of frontline nutrition workers, and micronutrient supplementation. Results for pathways for adolescent anemia were mixed. Some school-based iron supplementation, biofortification, and nutrition education programs were associated with improved iron status; however, compliance and effectiveness challenges were documented.

Finally, a substantial evidence base links interventions focused on improving women's empowerment and gender equality with expanded decision-making equality in the use of income and agricultural activities. This evidence-based analysis of the theory of change guiding REACTS-IN identifies pathways well-supported by evidence and thus more likely to improve nutrition, health, and gender equity.

## **IMPLEMENTATION OF MICRONUTRIENT POWDER PROGRAMME IN NIGERIA IS ENABLED BY SUPPORTIVE KNOWLEDGE AND HINDERED BY SUPPLEMENT UNAVAILABILITY**

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*Keywords: Micronutrient powder, implementation research, nutrition education, supply chain*

Dietary intakes of micronutrients are inadequate in Nigeria and other African countries, even though consequences of micronutrient deficiencies in children can be very severe. The World Health Organization has recommended use of iron-containing micronutrient powders (MNP) in countries where child anaemia is  $\geq 20\%$ , and identified the need for implementation



research around MNP use. This study aimed to understand implementation of MNP programmes in Nigeria to support scale-up efforts. The study used a mixed-methods design. Two-stage, cluster randomized sampling was used to select 476 caregivers who had children 6–59 months old across North-East Adamawa and South-West Ondo States in Nigeria. Caregivers were surveyed using an interviewer- administered, electronic questionnaire and in-depth interviews were additionally conducted with 36 caregivers. Survey data were analysed in Stata 18.0. Interviews were coded and analysed in Dedoose 9.0.107 following transcription of audio-recordings. Although 75% and 63% of children in Adamawa and Ondo, respectively, had received iron- containing micronutrient supplements in the 12 months preceding the survey, 16% and 7% respectively, had been given MNP. Factors that significantly enabled MNP use ( $p < 0.05$ ) included advice from health workers, knowledge about benefits of MNP, desire for healthy/good looking children, and perception that social networks approved of MNP use. Another supportive factor, highlighted in interviews, was physical evidence of improved health in children given MNP, such as healthier-looking skin. The survey and interviews both highlighted that MNP use was hindered primarily by caregivers' inability to obtain MNP. Interviews further identified misconceptions about MNP, such as perception that it is only necessary for ill or malnourished children, and concerns about MNP's side effects (e.g., loose stools), as other barriers. The major MNP implementation challenge in Nigeria is inadequate supplies/stockouts. Increasing education and support to avoid misconceptions and manage side effects are also key to improving MNP uptake.

## **PERCEIVED INFLUENCE OF CLIMATE CHANGE ON FOOD SECURITY AMONG RESIDENTS OF ABAKALIKI EDUCATION ZONE OF EBONYI STATE, NIGERIA**

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*Keywords: access, availability, climate, food, utilisation*

Climate change is a long-term shifts in temperatures and weather patterns. This shift in the

weather pattern has affected all the biosphere including human beings. Climate change has affected the food security in the world today. Food security has four dimensions: food availability, access to food, stability of supply and access and safe and healthy food utilization. It is a key factor in good nutrition, along with health, sanitation and care practices. This study therefore examines the perceived influence of climate change on food security among residents of Abakaliki Education Zone of Ebonyi State, Nigeria. A survey research design was adopted for the study. The population of the study was 726,200 people residing in the four local government areas of Abakaliki Education zone, while the sample size was 400 respondents selected through a multi-stage sampling technique. Instrument for data collection was a structured questionnaire titled the perceived Influence of Climate Change on Food Security. Data collected from the research question items for the study were answered using mean and standard deviation. T-test and Analysis of variance (ANOVA) was used to test the hypotheses at 0.05 significant levels. The result of the study revealed that there is high knowledge of people in Abakaliki Education Zone of Ebonyi state, climate change affects crop yield of farmers thereby affecting food availability, access to food, stability of supply and access as well as safe and healthy food utilization among residents of Abakaliki Education Zone of Ebonyi state. From the data collected and analysed, there is need for more sensitisation of the masses especially rural farmers on various ways of mitigating the devastating effects of climate change for effective agricultural production and food security.

## **THE USE OF TURKEY BERRY (SOLANUM TORVUM) IN PREGNANCY: EVIDENCE FROM NORTHERN GHANA**

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*Keywords: Northern Ghana, Turkey berry, anaemia, pregnant women*

Turkey berry (*Solanum torvum*) is a locally grown plant that is noted for its diverse health benefits. Its pea-sized fruit is claimed to have anaemia resolution properties and is widely used by various people. There is however limited evidence regarding its consumption among pregnant women in Ghana. Also, considering the high prevalence of anaemia among pregnant women in Northern Ghana, we aimed to document the evidence of use among pregnant women, focusing on the prevalence of consumption. A mixed method approach was adopted. Quantitative methodology includes the use of a structured questionnaire to collect data from 294 randomly selected pregnant women attending antenatal clinic at selected health facilities in the Tamale Metropolis and the Damongo Municipal. The participants were also screened for anaemia using blood haemoglobin levels. Qualitative methodology includes an in-depth key informant interview of 12 selected pregnant women who consumed turkey berry. Of the 283 participants who indicated their awareness and/or knowledge of turkey berry, about two-third (64.7%) reported that they consumed it in one form or another during their pregnancy. The fruit was consumed raw or cooked, alone or mixed with other foods as a perceived remedy for anaemia in pregnancy. The prevalence of anaemia among the studied population is 69.4%. There was however no statistically significant association ( $p=0.698$ ) between turkey berry consumption and the prevalence of anaemia among the studied population. This study is the premier evidential documentation of the consumption prevalence of turkey berry among pregnant women in Ghana. Further studies are warranted to understand the possible anaemia resolution pathways of turkey berry.

## **IMPROVING NUTRITION SERVICES AND ENABLING ENVIRONMENT: THE CASE OF MBEYA REGION, TANZANIA.**

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*Keywords: Enabling Environment, financial resources, health systems, nutrition service delivery*

Adequate financial resources and proper financial management are key to ensuring adequate, equitable and quality nutrition service delivery but Tanzania regions face substantial challenges in providing adequate nutrition services. Various nutrition stakeholders have been

strengthening government health systems in delivering optimal nutrition services. The Mbeya Regional Secretariat and other development partners including COUNSENUTH and CRS conducted a review, focused on fund expenditure in the nutrition sector, nutrition compact indicators performance, and the enabling environment for community interventions from 2017/18 to 2021/22. The results obtained were increase in LGAs' fund expenditure in the nutrition sector from TZS 32,518,667 in FY 2017/18 to TZS 554,666,786 in FY 2021/22. For nutrition compact indicators performance, there was increased fund allocation and utilization for nutrition interventions, as well as commitment of the RS, LGA leaders, and major implementing partners such as CRS towards the signed nutrition compact agreement, the region has achieved significant improvement in some Nutrition Compact indicators as shown in the graph. With regards to enabling environment for community interventions, the region and its districts have also increased financial investment in nutrition services: in FY 2021/22, Mbeya region purchased job aid materials such as 335 weigh scales for frontline workers. Districts such as Chunya and Mbeya have invested in IDs, T-shirts, and transport for CHWs. CHW allowances have also gone up from TZS 72,960,000 (FY 2021/22) to TZS 115,481,000 (FY 2022/23). Remarkable progress results from utilizing existing platforms including Compact Review Meetings, Quarterly Multi-Sectoral Steering Committees for Nutrition, and pre-planning budget sessions to strengthen fund allocation and expenditure practices for nutrition. Despite these achievements, still there is a gap in funding to support enabling environment for nutrition interventions by 76%, Mbeya region continues to be the top target for nutrition funding to ensure sustained progress and other regions/countries can replicate Mbeya region's approach to improve enabling environment for community interventions.

## **DATA QUALITY AND AVAILABILITY FOR EFFECTIVE PLANNING, PRIORITIZATION AND RESOURCE ALLOCATION FOR MATERNAL AND CHILD HEALTH SERVICE IN NAROK NORTH SUB-COUNTY, KENYA.**

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*Keywords: Data Availability, Data Infrastructure., Data Quality, Health Services, Maternal and Child Health*

Maternal and child health (MCH) services in Narok North Sub-County, Kenya, face challenges related to data availability and quality, impeding effective planning and service delivery. This study assessed the availability and quality of data essential for improving MCH services in the region. We utilized mixed methods approaches, including reviewing health information systems, data abstraction, stakeholder discussions, and participatory mapping. Population data were modelled from digitized building footprints and population density raster data, while household data were updated using remote sensing and satellite imagery. We employed open-source GIS tools to update and validate spatial data such as road networks, rivers, land use, and elevation. Data sources encompassed international, national, and local government institutions, reports, health officials, community health assistants and promoters. Key data assessed included administrative boundaries, households, health facilities, population, road networks, rivers, early childhood development centers (ECDEs), community health units, and MCH indicators. There was significant variability and gaps in data. Administrative boundaries were mapped with input from health management teams. Household data indicated even distribution, except in Narok town, which is more densely populated. Notably, socio- demographic data was unavailable. Health facility mapping revealed disparities in location and service capacity; of 62 facilities, only 30 reported in the Kenya Health Information System (KHIS), with outdated data and limited private facility reporting. Geographical barriers to health service access were evident from spatial data. Elevation data showed minimal impact on travel time. ECDE centers were unevenly distributed, with data on under-five enrolment unavailable. MCH indicators showed variable coverage across facilities. Community health unit boundaries, mapped participatorily, exhibited resource and operational variances influenced by geographical and population factors. The study highlights critical data gaps and inconsistencies affecting MCH services in the Sub-County. Strengthening data infrastructure and enhancing inter-sectoral collaboration are essential for informed decision-making and improved health outcomes.

## **FEASIBILITY OF INTEGRATING VITAMIN A SUPPLEMENTATION (VAS) WITH SCHOOL HEALTH PROGRAM IN MACHAKOS COUNTY, KENYA**

*by Mercy S. M. / Helen Keller International*

*Keywords: Community Health Promoters, Early Years of Education, Public Health Officers., School Health Program, Vitamin A supplementation*

Vitamin A deficiency remains a significant public health issue in Kenya. Mass Vitamin A Supplementation (VAS) campaigns achieve high coverage but are unsustainable. Currently, children aged 6-11 receive VAS at health facilities, while children aged 12-59 months are supplemented by Community Health Promoters (CHPs) at Early Years of Education Centres (EYEs), which is resource intensive. This study examined whether the school health program in Machakos County could achieve a comparable coverage compared to the EYE delivery approach. From January 2024, Helen Keller International supported Machakos County in integrating VAS into the school health program. Public Health Officers and school health personnel were trained to administer VAS alongside routine deworming for children aged 12-59 months during school health days. These days aimed at promoting Health and wellness also included activities on hygiene practices and mental and physical health. Eligible children were registered and supplemented during these monthly sessions at schools. Administrative data from the Kenya Health Information System were analyzed to assess VAS coverage. VAS coverage data for children aged 12-59 months in Semester 2, 2023 (delivered by CHPs using the EYEs approach) was compared to VAS coverage in Semester 1, 2024 (integrated with school health programs). VAS coverage was 93% in Semester 2, 2023, and 87% in Semester 1, 2024. The reduction in 2024 may be attributed to more accurate targeting with school registers, avoiding supplementation of children over five years old, whereas the 2023 approach may have inflated coverage estimates due to less precise age- targeting. The integration of VAS with the school health program effectively maintained high coverage levels. However, the approach demonstrated that accurate targeting is crucial for reliable coverage estimates. Continued refinement of targeting strategies within integrated programs is essential to optimize VAS delivery and ensure that all eligible children are supplemented.

## PROXIMATE ANALYSIS AND SENSORY EVALUATION OF CAKE MADE FROM BLEND OF SOYBEANS AND WHEAT FLOUR

by Elizabeth. .O. Aleru / Leadcity university

*Keywords: Proximate analysis, sensory evaluation, wheat flour and soybeans flour*

Snacking is the consumption of small amounts of food or beverage between meals, which can contribute to energy intake and lead to weight gain and increase the risk of diseases. The aim of this study was to determine the optimal blend ratio for both nutritional value and sensory properties. The soybeans was purchased and processed into flour and blended with wheat flour into varying ratios. cakes were baked using these blends and analyzed for nutritional and sensory properties. Nutrient analysis was done using the Association of Official Analytical Chemist (AOAC) methods and data were analysed using IBM SPSS V25. There was a significant difference between all the proximate nutrient content across all the samples. The moisture content ranged from (23.61±0.02) in sample C to (31.82±0.06%) in sample D. The protein content was highest in Sample B (14.40±0.08%) it ranged from (8.86±0.15%) in sample A. The fat content ranged from (15.16±0.03%) in sample A to (17.81±0.04%) in Sample C. The fibre content ranged from (0.013±0.01%) in sample A to (2.377±0.07%) in Sample B. Similarly, the ash content ranged from (1.73±0.06%) to (2.29±0.03%) in Sample B. The carbohydrate content ranged from (36.64±0.07%) in sample D (49.93±0.20%) in Sample A. The sensory evaluation of the formulated samples revealed that Sample A was the most preferred in respect to colour (4.25±0.72), aroma (3.95±0.69), sweetness (4.35±0.81), appearance (4.30±0.73), and overall acceptability (4.50±0.51); Sample C was the most preferred in respect to texture (4.20±0.77) while on the other hand, Sample B was the least preferred in respect to all parameters; colour (3.65±0.99), aroma (3.30±0.92), texture (3.80±0.77), sweetness (3.30±1.03), appearance (3.50±0.95), and overall acceptability (3.70±0.733). The blend of soybean and wheat flour can be used as a viable substitute in cake production offering a healthier alternative to plain cakes, thereby increasing the nutritional value of the cake, although the sensory properties may be slightly inferior.

## **DETERMINANTS OF PRELACTEAL FEEDING AMONG UNDER 2 YEARS CHILDREN OF HEAD PORTERS IN TWO COMMERCIAL CITIES IN GHANA.**

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*Keywords: Head porters, breastfeeding feeding, caregivers, prelacteal feeding*

Prelacteal feeding (PF) is considered as a suboptimal breastfeeding practice which serves as a barrier to early initiation of breastfeeding (EIBF), exclusive breastfeeding practice and also increases the rates of child mortality and morbidity. Little is known about the determinants of PF among head porters (HPs) who migrate to commercial cities and live in slums and makeshift structures. Therefore, this study sought to investigate the determinants of PF among HPs in Ghana. A total of 456 HPs who were also caregivers were recruited from the two major cities of Ghana, Accra, and Kumasi using the multistage sampling method. PF was defined according to World Health Organization (WHO) recommendations as percentage of infants who received any liquid or powder substance other than breastmilk within the first three days after birth. Logistic regression analysis with a p-value less than 5% and an adjusted odds ratio (AOR) with a 95% confidence interval (CI) were used to determine the significant factors associated with PF practice. The mean age of the caregivers was  $25.3 \pm 5.7$  standard deviation (SD) in years. About 13% of infants received a PF mainly as water (63.9%) and infant formula (36.5%). Children from nuclear (OR= 0.383, 95% CI= 0.159-0.918) and extended families (OR= 0.318, 95% CI= 1.23-5.38) had a reduced risk of receiving PF. Also, mode of delivery (OR= 4.319, 95% CI= 1.35-4.75), and ethnic groups Kusasi (OR= 25.841, 95% CI= 3.81-6.21) and Mamprusi (OR=6.159, 95% CI= 1.41-4.89) significantly predicted PF. Prelacteal feeding was widespread among the HPs and the determinants were ethnic group, type of family and mode of delivery. Therefore, all these predictors should be considered when developing strategies to address breastfeeding among these caregivers to achieve optimal breastfeeding.



## **EFFECT OF MOTHER-TO-MOTHER SUPPORT GROUPS ON FEEDING AND NUTRITIONAL STATUS OF CHILDREN UNDER FIVE IN GHANA: A QUASI-EXPERIMENTAL DESIGN**

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*Keywords: Nutritional Status; Mothers; Self-Help Groups; Children under five years; Malnutrition; Ghana.*

In 2014, Ghana's government launched mother-to-mother support groups (MtMSGs) as catalyst to combating childhood undernutrition and foster long-term health improvements. This study aimed to evaluate the effectiveness of MtMSGs in enhancing the nutritional status of children under five years. Using a quasi-experimental design, we used multi-stage sampling to recruit 220 mother-child pairs from 12 intervention and 12 control communities in the Krachi West Municipality in Ghana following five years post-MtMSG implementation. A structured questionnaire was used to assess maternal infant and young child feeding (IYCF) practices and the prevalence of childhood underweight, stunting and wasting. Differences in the intervention and control groups were tested with Chi-square and binary logistic regression modelled to test the effectiveness of the MtMSG on IYCF and child growth. Crude (COR) and adjusted odds ratio (AOR) is reported at 95% confidence interval (CI). Mean age of mothers and infants were  $28.8 \pm 7.3$  years and  $19.1 \pm 14.5$  months, respectively. Mothers in MtMSG communities demonstrated significantly better IYCF knowledge (60.0% vs. 42.7%) and higher scores to meet indicators for minimum dietary diversity quality (86.5% vs 59.1%,  $p=0.026$ ), minimum meal frequency (37.7% vs 31.8 %,  $p=0.011$ ) and minimum acceptable diet (60.6% vs. 32.5%,  $p=0.070$ ). Stunting (22.3% vs 19.6%) and wasting (7.7% vs 7.3%) rates were similar between intervention and control groups, but more children in MtMSG communities were underweight (15.0% vs. 8.6%,  $p=0.041$ ). The intervention protected against underweight (COR: 0.54, 95% CI: 0.29-0.97) but this effect was not sustained in the adjusted model (AOR:0.63, 95% CI: 0.32-1.25). MtMSGs improved maternal knowledge and dietary practices, significantly IYCF practices. However, no significant association was found between MtMSGs and child growth, which could indicate the influence of basic and underlying cases of malnutrition. A broad-spectrum approach to addressing the multi-faceted determinants of malnutrition needs strengthening.

## IMPACT OF NUTRITIONAL TREATMENT OF SEVERELY UNDERWEIGHT CHILDREN: RESULTS FROM AN INDIVIDUALLY RANDOMISED CONTROLLED TRIAL IN MALI

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*Keywords: Mali, nutritional treatment, ready-to-use therapeutic food, severe underweight, simplified protocol*

Severely underweight children (weight-for-age z-score (WAZ)  $<-3$ ) are currently not receiving ready-to-use therapeutic food (RUTF) unless simultaneously wasted (mid-upper arm circumference (MUAC)  $<125\text{mm}$  or weight-for-height z-score (WHZ)  $<-2$ ). This despite evidence of their similarly high risk of mortality. We investigated whether children with  $\text{WAZ} <-3$  but  $\text{MUAC} \geq 125\text{mm}$  respond to nutritional treatment and whether simplified treatment is non-inferior to standard treatment. Children 6-59 months old were randomised to 1) no treatment 2) simplified treatment with 1 RUTF sachet/day until  $\text{WAZ} \geq -3$  for 2 visits or 3) standard treatment with  $\sim 170\text{kcal/kg/d}$  of RUTF if  $\text{WHZ} <-3$  or 1 RUTF/d if  $\text{WHZ} \geq -3$  but  $<-2$  or no treatment if  $\text{WHZ} \geq -2$  until  $\text{WHZ} \geq -2$  for 2 visits or a maximum of 12 weeks. Participants followed fortnightly visits until 12 weeks and monthly thereafter until 24 weeks. Main outcome was WAZ at 2- (primary endpoint) and 6-months (secondary endpoint) from enrolment and superiority of simplified treatment over no treatment tested and non-inferiority (by 0.2 z-scores) of simplified treatment over standard treatment tested. A total of 1378 children were enrolled from 09/2022 to 10/2023 in Nara, Mali. Mean age was 33 months and mean WAZ -3.4 at enrolment. Simplified treatment resulted in [97.5%CI] 0.17 [0.08, 0.25] and 0.16 [0.05, 0.27] increase in WAZ at 2-months and 6-months, respectively, compared to no treatment. Simplified treatment was non-inferior to standard treatment at 2-months [ $\Delta 0.07$ ; 95%CI: 0.02, 0.12] and at 6-months [ $\Delta 0.06$ ; 95%CI: -0.01, 0.13]. No effect

modification by sex, age, WHZ or HAZ category was observed. Simplified and standard treatment resulted in 52% and 42% recovery, respectively. More children in control and standard arms developed a MUAC<125mm during the 6-month follow-up than in simplified arm. Severely underweight children respond to nutritional treatment and simplified treatment is more effective than standard treatment. However, the relatively small impact of nutritional treatment questions its value among severely underweight children.

## **DISTANCE FROM TREATMENT IS ASSOCIATED WITH LATER TREATMENT SEEKING AND WORSE OUTCOMES AMONG ACUTELY MALNOURISHED CHILDREN**

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*Keywords: Acute malnutrition, CHW treatment, Distance, simplified treatment, wasting*

Distance from health facilities is an important predictor of treatment seeking and health outcomes. Recently, the World Health Organization recommended decentralizing malnutrition treatment to community health sites. We aimed to describe the relationship between distance from care with admission characteristics and treatment outcomes among children admitted to malnutrition treatment. Data was collected prospectively as part of an observational study on the effectiveness of a simplified malnutrition treatment program in the Nara district of Mali. Treatment was provided at 39 formal health care sites and 55 community health sites. Linear and logistics mixed models were fitted to estimate associations between distance from treatment with admission anthropometrics and programmatic outcomes including treatment sites and health areas as random effects and controlling for sex and age at admission as well as admission anthropometry for programmatic outcomes. A total of 49,115

children with mid-upper arm circumference (MUAC)<125mm or edema were admitted to treatment between December 2018 and December 2023. Most (52%) lived within the village where treatment was provided (0km) while 8%, 30% and 10% lived 1-5km, 6-15km and >15km distance from the treatment site, respectively. Up to 93% of children recovered. Distance from treatment was consistently associated with lower anthropometrics at admission with 0.58 mm, 1.28 mm and 1.63 mm lower MUAC among children who lived 1-5km, 6-15km and >15km distance from the treatment site, respectively ( $p<0.001$ ), compared to 0km. Living >15km from treatment site was associated with 17% decreased odds of recovery, 39% increased odds of defaulting, 26% decreased odds of referral to inpatient care and 22% increased odds of missing a visit when compared to 0km, and when adjusting for admission anthropometry. Later treatment seeking and worse treatment outcomes are observed among children living farther from treatment sites, emphasizing the need to further decentralize malnutrition treatment.

## **ENABLERS AND BARRIERS OF MICRONUTRIENT SUPPLEMENTS USE DURING PREGNANCY IN NIGERIA**

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*Keywords: Antenatal care, MMS, access, micronutrient supplements, nutrition education*

Micronutrient deficiencies are prevalent among pregnant women in Africa, including in Nigeria, limiting progress toward nutrition and development goals on the continent. Micronutrient supplementation effectively reduces the burden and consequences of these

deficiencies. Yet, coverage of such supplementation remains inadequate. This study aimed to identify factors that enable or hinder the use of micronutrient supplements during pregnancy and proffer suggestions for scaling up supplementation. A mixed-methods, cross-sectional study was conducted in Adamawa and Ondo States, Nigeria. A survey of 186 pregnant women was undertaken, and 84 participants were interviewed including women, husbands, grandmothers, and community gatekeepers (community leaders and traditional birth attendants). Data was collected using interviewer-administered electronic questionnaires and semi-structured interview guides. Survey data was analyzed using Stata 18.0; common themes were identified from interviews using Dedoose 9.0.107. The women had a mean age of 28 years, and >50% had at least secondary education. More than 75% of the women had received antenatal care (ANC) at least once, and 88% had received or bought micronutrient supplements during pregnancy. Iron and folic acid (IFA) were the most frequently used supplements (42%), and 30% had used multiple micronutrient supplements alone or with IFA. Two-thirds (67%) of supplement users paid for supplements. Attitudes to supplement use were more positive than negative, even among women with inadequate use. Factors enabling supplement use included knowledge about benefits, free supplements, family support, and acceptance and social mobilization by community gatekeepers. Barriers included difficulty in accessing supplements, late/no registration for ANC, lack of money to attend ANC or buy supplements, and perceived disapproval of supplement use among friends/relatives. Increasing coverage of micronutrient supplementation in pregnancy in Nigeria will require improving physical and financial access to supplements and delivery of information about supplements to both pregnant women and their social networks.

## **INTEGRATING THE NUTRITION-FRIENDLY SCHOOL INITIATIVE INTO THE GHANA SCHOOL FEEDING PROGRAMME: IMPACT ON DIETARY INTAKE, PHYSICAL ACTIVITY AND NUTRITIONAL STATUS OF PRIMARY SCHOOL CHILDREN**

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*Keywords: Healthy Eating, Nutritional Status, Physical Activity, School Children, School Health Intervention*

The Ghana School Feeding Program (GSFP) complemented by the Nutrition- Friendly School Initiative (NFSI) is expected to enhance school nutritional quality through education, healthy dietary habits, and physical activity. We assessed the synergistic effect of the GSFP alone (single intervention) or complemented by the NFSI (multiple interventions) on students' nutritional status, dietary intake, and physical activity. A cross-sectional survey was piloted among 391 primary students from four public schools implementing the GSFP alone (n=205) or in combination with the NFSI (n=185) in Hohoe, Ghana. Anthropometric and food frequency questionnaires captured participants' nutritional status and minimum dietary diversity. Physical activity was determined using the WHO physical activity questionnaire recording the type, intensity according to the metabolic equivalent task (MET), frequency, and duration per week. Adjusted odds ratios (OR) for the outcomes were tested through logistic regression. Participants' mean age was  $9.8 \pm 1.8$  years with more females (61.4%). Dietary adequacy was higher in single than multiple intervention schools (46.7% vs 18.3%,  $p < 0.001$ ). However, stunting (9.0%) was significantly prevalent in the single intervention schools (13.4% vs 4.5%) but with no differences for underweight (8.8%), thinness (10.8%), and overweight (1.8%). PA was significantly lower in single than multiple intervention schools (14.6% vs 53.8%). Running, dancing and football were the most common vigorous-intensity activities ( $\geq 6.0$  METs). Enrollment in schools implementing the multiple interventions dependently increased the odds for PA (OR=10.05, 95% CI: 4.76-21.21) and decreased stunting (OR=0.26, 95% CI: 0.07-0.96) but the odds for unhealthy dietary intake was higher (OR=2.20, 95% CI: 1.08-4.48). Receipt of multiple interventions was protective against physical inactivity and stunting but not diet quality suggesting its impact on immediate and long-term lifestyle outcomes when complemented with other existing school-based interventions. To optimize the effect, the influence of external factors beyond the school environment is crucial.

## MINERAL COMPOSITION, BIOACCESSIBILITY AND BIOACTIVE CONSTITUENTS OF WHOLE WHEAT, ORANGE FLESHED SWEET POTATOES AND MUSHROOM (*LENTINUS SQUARROSULUS*) COOKIES

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**Keywords:** Bioactive, Biofortified sweet potatoes, Cookies, *Lentinus squarrosulus*, Minerals

Cookies are cereal based foods commonly consumed by the populace and particularly among the children. Cookies are ready- to-eat, convenient food snacks that has been identified as a significant vehicle for food fortification. Orange fleshed sweet potatoes (OFSP) is a sweet, yellowish colored beta carotene biofortified crop developed to combat Vitamin A deficiency globally. Mushroom (*Lentinus squarrosulus*) is widely cultivated and commercialized in Nigeria. It is accepted for its taste, nutrition and bioactive constituents. The application of OFSP which is been classified as food security crop, and mushroom in cookies production could reduce dependence on wheat, improved nutrition by addressing mineral deficiency and overall health of consumers. Whole wheat grain (W), orange fleshed sweet potato (O) and mushroom (*L. squarrosulus*) (M) flours were produced and cookies were prepared from the composite flours blends at ratio W:O:M of 60:40 (A), 60:35:5 (B), 60:30:10 (C), 60:25:15 (D) ,60:20:20 (E) and 100 %

whole wheat flour (W) was the control. The bioactive (Total carotenoids, phenolics and flavonoids), minerals (potassium, sodium, phosphorus, zinc, iron, magnesium and calcium) contents and bioaccessibility were analyzed using standard methods. Cookies produced with OFSP and mushroom (*L. squarrosulus*) substitution resulted in increased in mineral contents and bioaccessibility. Macroelement potassium was the highest at 256.76

mg/100g (Sample E) while phosphorous was the most bioaccessible (87.45 %) amongst the minerals studied. Increase in total flavonoids and phenol that acts as influential antioxidants, total carotenoids which are important in alleviating Vitamin A deficiency was observed in the cookies formulated from the composite blends. The inclusion of orange fleshed sweet potato and mushroom (*L. squarrulossus*) in cookie production improved the mineral contents, bioaccessibility and bioactive constituents. This study encourage the utilization and consumption of orange fleshed and mushroom (*L. squarrulossus*) substituted cookies for improved nutrition and health.

## **SCREENING PRACTICES FOR HYPERGLYCEMIC CONDITIONS IN PREGNANCY AND PERIPARTUM BLOOD GLUCOSE LEVELS**

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*Keywords: Hyperglycemia, glycemic status., knowledge, newly delivered mothers, pregnancy*

Hyperglycemia in pregnancy (HIP) is the most prevalent metabolic disorder in pregnancy and carries significant implications on maternal and newborn health and potential long-term health consequences. Early screening enables timely interventions. This study assessed the proportion of pregnant women screened for HIP and the peripartum glucose levels of newly delivered mothers. This cross-sectional survey comprised 126 mother-newborn pairs recruited from birth to 2 weeks postpartum at post-delivery wards of the Hohoe and Nkwanta South municipalities in Ghana. Maternal and child health record book was reviewed for blood glucose screening during pregnancy. A scale was created to assess and determine knowledge of HIP. Maternal random blood sugar (RBS) was measured postpartum with levels of  $\geq 11.0$  mmol/L classified as HIP. Linear regression and correlation coefficient ( $r$ ) between RBS and childbirth outcomes were tested in STATA 17 at  $p \leq 0.05$ . The mean age was  $28.2 \pm 6.9$  years. Notably, 53.0% exhibited poor knowledge of HIP. Almost half (47.6%) were screened for



HIP. The mean RBS was  $5.7 \pm 1.39$  mmol/L but none was found to be hyperglycemic. Gestational age at delivery was  $38.9 \pm 2.34$  weeks with 50.8% undergoing cesarean section. Birth weight ( $3.0 \pm 0.5$ kg), length ( $48.1 \pm 3.4$ cm), head circumference ( $33.5 \pm 2.1$ cm), and APGAR score ( $8.2 \pm 1.7$ ) were assessed together with preterm delivery (16.7%), low birth weight (10.3%) and stillbirth (2.3%). A unit decrease in maternal RBS corresponded to a decrease in the child's birth weight, length, and head circumference but the association was not statistically significant. There was a weak correlation between the RBS and mode of delivery ( $r=0.1902$ ;  $p=0.0343$ ). The limited knowledge of HIP could account for only half of the pregnant women being screened. No HIP was recorded, probably due to its determination using RBS which is less sensitive. Enforcing screening in gestation is essential for improving maternal and newborn health.

## **DEVELOPMENT OF A STANDARDIZED RECIPE FOR PRODUCING YAJI SPICE**

*by Fati Bawa / KNUST*

*Keywords: Ghana, Yaji, consumer health, culinary applications, spice mix, standardization*

This study aims to develop a standardized recipe for the making of yaji spice mix which would be accepted and used globally. The study was conducted in some selected regions of Ghana. The survey was conducted to gather information on the production methods, recipes, types, and uses of Yaji, resulting in nine variations. A total of nine variations were produced using garlic-based and groundnut cake powder-based ingredients. The results of the survey were analyzed to identify trends, assess recipe consistency, and validate the standardized recipes for yaji (yajin tafarnuwa) spice. Also, the survey helped identify the uses of the various types of the yaji spice for making soups especially TZ (tuo zanfi) soups, stew, shito, and pot meals. This study highlights the distinction between yaji and suya spice, with suyya representing a specific type of yaji spice mix. Studies should replace bouillon cubes with some natural spice such as African nutmeg to help improve the health consciousness of consumers.

## **ASSESSING THE HEALTHINESS OF THE HOSPITAL FOOD ENVIRONMENT IN THE VOLTA REGION, HO AND HOHOE.**

*by Yabani Perfect Aseye, Dzidzornu Stephanie Salomey, Brako Eugenia, Doe- Adjrago Dorcas Nuerteykie, Dei-Dagadu Dorcas, Onso-Nyameyeh Lucy Amangofuah, Dr. Phyllis Addo | University of Health and Allied Sciences- School of Public Health*

*Keywords: Food consumption patterns, Food quality and safety, Food standards, Healthiness, Hospital Food Environment*

The Hospital food environment influences food consumption patterns for patients and their caregivers. Yet, for all the importance of the hospital-food environment, little is known about its healthiness for patients, staff, and caregivers. This study examines the availability of food standards, food quality, and safety in the two leading hospitals in the Volta region, the Volta Regional Hospital and the Ho Teaching Hospital, to give an overview of the food environment in the Volta region health care system. A mixed-methods approach comprising 112 food vendors and 7 key stakeholders was employed in measuring the healthiness of the hospital food environment. A census of all food vendors within a 200-meter radius of the selected hospitals was done for the quantitative data collection while stakeholders were purposively selected for in-depth interviews. Stata 17.0 and ATLAS.ti version 9 were used for analyses for both quantitative and qualitative respectively. GPS coordinates were used to map out food outlets used in the study. The Ho Teaching Hospital offers in-house catering with healthy options, while the Volta Regional Hospital is setting up a service. In Hohoe, 62.5% of food vendors follow safety practices, and 63.5% sell sugary foods at Volta Regional. Ho Teaching has 61.6% offering whole grains and fruits. Overall, the Ho Teaching Hospital has a healthier hospital food environment as compared to the Volta Regional Hospital. Hospitals in the Volta region require interventions to improve the establishment of food and nutrition standards, ensure food vendors compliance, and promote healthier food options in food outlets in the food environment.

# EVALUATION OF ONION BULB (*ALLIUM CEPA* L.) CONTAMINATION BY PESTICIDE RESIDUES BASED ON CULTURAL PRACTICES IN THE LAC KALASSANE AND NGUÉTHIORO AREAS OF NORTHERN SENEGAL

by Ngoné Fall Beye / Papa Mamadou Dit Doudou Sylla / Francisca Nadège Sètondji Vodounnou / Rokhaya

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**Keywords:** Cultural practices, Onion bulb, Pesticide residues, Senegal

The study aimed to evaluate the pesticide residues of onion bulbs produced at the Kalassane and Nguethioro sites according to the cultural practices. The plant material comes from experiment divided into split-plot design with three replicates using “violet of Galmi” variety. The cultivation methods were related to farmers' cultivation practices and to optimized methods based on the recommendations of the SAED technical data sheet. In addition, pesticide residue extraction was carried out in accordance with the modified QuEChERS method and onion extracts are read using Gas Chromatograph. Welch's test was used

as a statistical treatment to assess the results. The results revealed heavy contamination of onion bulbs at both sites by pesticides such as aldrin, bifenthrin and lindane, with values exceeding MRLs. In Kalassane, onion bulbs from the farmer's method had a higher residue ( $0.16 \pm 0.01\text{mg /kg}$  for aldrin;  $1.1 \pm 0.01\text{mg /kg}$  for bifenthrin;  $0.1 \pm 0.01\text{mg /kg}$  for lindane) than those from the optimized practice ( $0.10 \pm 0.01\text{mg /kg}$  for aldrin;  $0.88 \pm 0.01\text{mg /kg}$  for bifenthrin;  $0.09 \pm 0.01\text{mg /kg}$  for lindane). However, a comparison of the optimized methods for the two sites showed that onion bulbs from Nguéthioro had small pesticide residues ( $0.79 \pm 0.01\text{mg /kg}$  for aldrin;  $0.09 \pm 0.01\text{mg/kg}$  for lindane) than those from Kalassane. Moreover, influence of soil is also noted between the optimized method on two sites due to the characteristics of different soils. Chemical analyses carried out according to different cultural practices made it possible to detect and quantify certain pesticide residues at values above the MRLs. The consumption of onions at these levels of contamination because of the toxicity of pesticides exposes to many health risks. This work sketches out a frame of reference for the development of a decision-making tool that is essential for better pesticide management.

## **IMPACT OF OPTIMIZING THE SIMPLIFIED PROTOCOL TO TREAT ACUTE MALNUTRITION ON THE EFFECTIVENESS OF TREATMENT: RESULTS FROM A CLUSTER RANDOMIZED FACTORIAL TRIAL IN MALI**

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*Keywords: Acute malnutrition; simplified protocol; randomized controlled trial.*

A simplified protocol in the Nara Health District of Mali admits children based on a mid-upper arm circumference (MUAC) < 125mm or edema providing 2 daily ready-to-use therapeutic food (RUTF) sachets to MUAC < 115mm or edema (SAM) and 1 sachet to MUAC

115-124mm (MAM). Children are seen weekly and those admitted SAM start receiving 1 RUTF/d once MAM for 2 consecutive visits (SAM-MAM transition phase). This study assessed the impact of two protocol modifications on treatment effectiveness. This prospective cluster-randomized controlled study followed a 2x2 factorial design and divided 39 accessible health zones into 4 groups: A) fortnightly MAM visits and elimination of the SAM-MAM transition phase, B) elimination of the SAM-MAM transition phase, C) fortnightly MAM visits, and D) no change. Between April and November 2023, 7842 children were admitted to treatment, with approximately 2000 children per group. Among all children treated, MAM visit frequency had no impact on recovery (98.0% with weekly vs. 97.1% with fortnightly visits,  $\Delta$ 1.0%, 95%CI:-2% to 4% but increased length of stay (LOS) by 2.5 weeks (95%CI:2.0 to 3.1)) and RUTF consumption by 24 sachets (95%CI: 19.5 to 28.5). Eliminating the SAM-MAM transition phase had no impact on recovery among SAM (95.2% with versus 92.8% without transition,  $\Delta$ -2%, 95%CI:-6% to 1%), nor on LOS ( $\Delta$ 0.48 weeks, 95%CI:-0.43 to 1.4) but reduced RUTF consumption (104 with versus 94 sachets without transition, ( $\Delta$ -9.1 sachets, 95%CI:-17.7 to -0.5) and weight gain ( $\Delta$ -1.0 g/kg/d, 95% CI:-1.6 to -0.5). Fortnightly visits for MAM don't appear to negatively affect recovery but may increase LOS and RUTF consumption per child. The SAM-MAM transition phase can be eliminated without affecting recovery but may slightly decrease weight-gain velocity.

## **MALNUTRITION AND ITS ASSOCIATED FACTORS AMONG GHANAIAN OLDER ADULTS RECEIVING INSTITUTIONAL CARE**

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*Keywords: Ghana, Institutional care, Malnutrition, Older adults*

The importance of providing quality care for older adults in institutional settings is increasingly being acknowledged and valued in Ghana. A significant concern that warrants

attention is malnutrition as it remains pervasive with devastating consequences on health and well-being. This study assessed the malnutrition status and its associated factors among older adults receiving institutional care in Ghana. A Mini Nutritional Assessment (MNA) questionnaire was used to collect and score background, dietary, health and anthropometric information on 300 older adults receiving care from 16 selected institutions in the Greater Accra Region of Ghana. The scores from the 'MNA' were used to classify participants as well-nourished, at risk of malnutrition and malnourished. Data were analysed using R studio version 4.1.3. The associated factors were determined in a multinomial logistic regression. Participants were mostly female (76.7%), not married (67.3%), had basic education (43.3%) and were primarily caring for themselves (53.7%). A fifth of them were actively working with most engaged in trading. Nearly 29% of the older adults were either malnourished (24.4%) or at risk of malnutrition (4.3%). Older adults who sought care primarily from the institutions were twice more likely to be malnourished ( $p < 0.001$ ) and 3 times more likely to be part of the 'at risk' category ( $p < 0.001$ ). Those with at least one child were up to about 4 times less likely to be either malnourished ( $p < 0.001$ ) or part of the 'at risk' category ( $p < 0.001$ ). Malnutrition risk was high, with having at least one child and primarily under institutional care being associated factors. There is the need for nutrition education and other targeted interventions.

## **WHY SOME POTENTIALLY HARMFUL BEHAVIOURS PERSIST OVER TIME: A QUALITATIVE STUDY OF THE PRACTICE OF COMMUNAL BOWL HAND RINSING BEFORE MEALS, IN RURAL AND URBAN MALI.**

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*Keywords: handwashing; communicable diseases; common/communal bowl; shared bowl; motivations, hygiene, infection control, sanitation.*

Commensality in Sub-Saharan Africa, specifically eating together with hands from a common bowl, is a cherished practice, often preceded by Communal Bowl-Hand Rinsing (CB-HR). CB-HR involves multiple people washing their hands in a shared water bowl without using soap or changing the water, which could potentially spread pathogens and cause diarrhoea, a significant risk factor for malnutrition and child mortality. This study explores the public's views on CB-HR, its underlying beliefs, and the barriers to proper hand hygiene. We conducted 59 semi-structured interviews and 26 Focus Group Discussions (FGDs) in the local language of Bambara, in rural and urban Mali. Participants, selected through convenience sampling, included mothers, grandmothers, fathers, and elders, and were interviewed individually or in separate FGDs. Recordings transcribed into French, translated into English and analysed using thematic analysis. CB-HR was commonplace among our participants. They confirmed that CB-HR was rooted in tradition for social cohesion and family unity, often driven by the head of the family, habit, and convenience. The practice of CB-HR varied, including a few individuals washing their hands together in a bowl, and in rare cases, children having to drink the CB-HR water after the family had washed their hands. Most participants were aware of the infection-related risks associated with CB-HR, but felt the family and cultural ties were too strong for them to act differently as individuals. Participants added the need for heads of households to lead the change, by practising the recommended handwashing, to ensure sustainability. Despite decades of health education about handwashing during diarrhoea epidemics, and the recent Covid-19 pandemic, CB-HR remains prevalent due to its perceived importance in maintaining family cohesion and convenience. Given the link between diarrhoea caused by food-borne pathogens and malnutrition, there is an urgent need for socially acceptable interventions to limit this practice and reduce diarrhoea.

## **SOCIO-CULTURAL BELIEF INFLUENCE DIETARY PRACTICES OF MOTHERS AND CHILDREN IN THE CHAKHESANG TRIBE OF NORTHEAST INDIA.**

*by Vekutulu Chiero / H Lhungdim / International Institute for population Sciences, Mumbai /*

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*Keywords: Children, Food, Indigenous, Mother, Restriction, Tribe*

In the pre-Christian era, cultural taboos, prohibitions, and restrictions were cautiously adhered to due to the fear of supernatural consequences. However, even after adopting Christianity, these practices are not entirely eradicated although dwindled. The paper examines the extent to which socio-cultural beliefs on feeding practices persist in the face of changing societal dynamics. A quantitative study was carried out among 445 mothers/caregivers of children below 5 years. Whereas a qualitative study with 9 key informants and 18 in-depth interviews was conducted with mothers from 9 villages in Phek district, Nagaland. Descriptive statistics, bivariate analysis and qualitative analysis in inductive approach was used to present the study result. Study reveals that although 98.8% of children aged 6-23 months are breastfed, only a quarter are exclusively breastfed. Infants aged 6-7 months are introduced to porridge, made from varieties of rice grown organically, and rich in carbohydrates. 9.6% of mothers responded that food taboos exist during pregnancy and 92% of women have restriction on diets during pregnancy, mostly by elder's women. Certain foods like bananas, jackfruit, pineapple, honey, crab, fish, and eggs were restricted for pregnant women. First few months after childbirth, mothers are advised to eat solely non-veg food, rich in protein, for faster recovery and to boost breastmilk. Most mothers continued to adhere to these cultural beliefs, leading them to neglect nutrient-rich foods. However good practices such as keeping the infant warm, consuming locally grown food, and strong community support during childbirth kept the mother and child healthy. Educational interventions are necessary to enhance awareness about the negative impact of certain socio-cultural practices on maternal and child health. Whereas, positive and negative dietary practices of mother and children influence by cultural factors should be considered for further nutrition programs.



## OPTIMISATION OF INSTANT PORRIDGES FROM MAIZE AND ELEPHANTORRHIZA ELEPHANTINA FOR BETTER TOTAL PHENOLIC CONTENT, ANTIOXIDANT CAPACITY AND SENSORY ATTRIBUTES

by Talknice Z Jombo / Lovepeace. P. Meda / Ruth Nyoka / Shepherd Manhokwe / Armistice Chawafambira

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**Keywords:** Simple lattice design, extrusion, functional properties, proximate composition, sensory evaluation

*Elephantorrhiza elephantina* is an indigenous herb in Zimbabwe used as a traditional medicine to treat various ailments. However, it remains largely underutilised despite its acclaimed efficacy. The objective of the study was to optimise blending ratios of instant porridges formulated from maize and *E. elephantina* for better total phenolic content, antioxidant capacity and sensory attributes. Composite blends were generated using Simple Lattice design (Design expert software). The blends were evaluated for proximate composition, functional and thermal properties, total phenolic content, antioxidant activity and sensory analysis (9-point hedonic scale). There were no significant differences ( $p>0.05$ ) in protein, ash and water absorption capacity of porridges. Moisture content was higher in plain maize (10.33%) and maize porridge blended with *E. elephantina* powder (10.20%) compared to Instant blended porridges (6.50-6.93%). The plain maize (3.06%) and maize porridge blended with *E. elephantina* powder (3.03%) had higher fat content than instant porridge blends (0.82-1.13%). Instant blended porridges (82.01-82.63%) had higher carbohydrate content than plain maize porridge (77.13%) and maize porridge blended with *E. elephantina* powder (77.00%). Higher concentrations of *E. elephantina* powder increased oil absorption capacity (123.41-131.38 g/g), foaming capacity (88.50-99.30%) and foaming stability (95.63-99.47%). Furthermore, it increased total phenolic content of the blends (1.27.12-127.76 mg GAE/100 ml) and antioxidant activity (1.09-1.19 mg/ml). Thermal diffusivity increased with a higher concentration of *E. elephantina*. However, there were no

significant differences ( $p>0.05$ ) in thermal conductivity and specific heat capacity. Blended instant porridges had higher sensory score values compared to traditionally prepared plain and blended porridges. Formulation ISBE 5 g scored highest for mouthfeel, taste, texture and overall acceptability. The optimum point was in the range of maize (294.81 g), and *E. elephantina* powder (5.19 g) at a desirability of 0.987. Optimisation and extrusion cooking can help improve the development and acceptance of commercial nutraceutical instant porridges.

## **ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE OF MOTHERS/CAREGIVERS ON CHILD FEEDING PRACTICES AMONG THE CHAKHESANG NAGA TRIBE, NORTHEAST, INDIA**

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*Keywords: Attitudes, Infant and young child, Knowledge, Practices*

Adequate nutrition for children is crucial for sound physical and mental development. Nevertheless, evidence indicates that children in developing nations lack optimal feeding, undermining their capacity to grow and develop to their full potential. Hence, in this study, we assessed the knowledge, attitude, and practice of the mothers/caregivers on infant and young child feeding (IYCF) practice in Chakhesang Naga Tribe of Nagaland. A cross-sectional study was carried out among 445 mothers/caregivers in 9 villages from the Chakhesang tribe in the Phek district of Nagaland. Data was collected using a structured questionnaire administered separately to mothers/caregivers of children 0-5, 6-23, and 24-59 months. Descriptive statistics and bivariate analysis were used to present the study result. Study shows that 98.8% of the children were breastfed, however only a quarter of children 6-23 months are exclusively breastfed. Only one-third of women with children aged 0-5 months have good knowledge and practices towards IYCF, however, two-thirds have positive attitudes. Around 19% and 28% of women with children aged 6-23 months have good knowledge and practices, whereas 60% of women have positive attitudes. Half of women with children aged 24-59 months have good knowledge and practices towards diets of pre-school children and 55% of women have positive attitudes. Logistic regression shows that Mothers' education and higher wealth status have a significant effect on Knowledge of IYCF practices.

Finding suggest that this tribals women have limited knowledge regarding infant and young child feeding practices although they generally had a positive attitude. Nutrition programs should prioritize equipping mothers with recommended guidelines for feeding infants and young children.

## **DIETARY PRACTICES, NUTRITION -RELATED BEHAVIORS AND FOOD CHOICES AMONG URBAN ADOLESCENTS IN INFORMAL SETTINGS OF KAMPALA CITY.**

*by Agnes Acheng / Akii-bua Douglas / Ronald Kibonire / Save the children Uganda country office / Save*

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*Keywords: Adolescents (in and out of school), dietary practices, food choices, informal settings*

Kampala city food environment just like others significantly influences food choices and consumption patterns among adolescents shaped by socioeconomic status, cultural practices and access to health services. With urbanization, adolescents encounter both opportunities and challenges in their nutrition including availability of fast foods and limited knowledge on optimal food choices. Save the children conducted a formative study to identify nutrition practices for in and out of school adolescents in Kampala city. The objectives of the study were to describe the dietary practices, food choices and nutrition-related perceptions and behaviors among adolescents aged 15-19 years living in the informal settlement of Kampala district and to describe the barriers and facilitators of optimal dietary practices, food choices and nutrition-related behaviors among adolescents aged 15-19 years living in urban informal settlement. The study employed a community-based mixed method to collect data from adolescents, parents/guardians, health service providers, school and health administrators responsible for nutrition within selected secondary schools in Kampala. Qualitative data was collected on dietary practices and food choices as well as the nutrition-related behaviors and practices from adolescents. 350 interviews were conducted including 100 free food listings, 100 dietary recalls, 40 pile sorts, 40 peer dyad and 20 body images with adolescents and 50 interviews with parents/guardians, health workers and schoolteachers/administrators. The adolescents consumed mono-diet, had knowledge of good and healthy foods, had gender

differences in terms of food choices and habits. Key barriers to optimal dietary intake and habits among adolescents include cost, knowledge and beliefs. Facilitators of optimal nutrition were Knowledge and awareness, cost, seasonality and taste. The preferred sources of information were community leaders, adolescents' hotspots within the community. Dietary intake of adolescents within the informal setting is mono-diet and is suboptimal in quality, quantity and frequency with less diversification. Adolescent food choices are affected by food environment.

## **MODELING THE CONTRIBUTION OF MULTIPLE MICRONUTRIENT FORTIFICATION OF SALT TO DAILY NUTRIENT INTAKE AMONG THE ETHIOPIAN POPULATION**

*by Semira Mitiku Saje / Dawd Gashu / Edward JM Joy / Katherine P Adams / Tibebe Moges / Masresha Tesemma<sup>4</sup> / E Louise Ander<sup>5</sup> / Addis Ababa University / Addis Ababa University / London School of Hygiene and Tropical Medicine / University of California, Davis / Ethiopian Public Health Institute / Ethiopian Public Health Institute / University of Nottingham, British Geological Survey*

*Keywords: folate, micronutrients, nutrient modelling, salt fortification, zinc*

Salt is an affordable commodity with wide coverage regardless of economic and social status and, hence, could be suitable vehicle for multiple micronutrient fortification. We aimed to simulate the contribution folic acid and zinc fortification of iodized salt to nutrient intake among the Ethiopian population. The 2013 Ethiopian National Food Consumption Survey was used to estimate baseline individual-level micronutrient intake. Usual intake was estimated using the Simulating Intake of Micronutrients for Policy Learning and Engagement macro tool. Discretionary salt consumption was calculated from total salt intake estimated using urinary sodium excretion. Fortificant addition rates were set to obtain maximum nutrient intake while simultaneously constraining that population with intake above the tolerable upper intake level to <5%. Addis Ababa and Somali ( $N = 2271$ ) were selected as the regions with relatively the lowest and highest micronutrient deficiency prevalence in Ethiopia. Baseline median intake of Zn was below the estimated average requirement for all demographic groups. Inadequate Zn intake ranged from 73% to 99%, the highest prevalence being observed among women in lower class wealth quintiles from Somali region.

Dietary folate inadequacy was as low as 2% among men in Addis Ababa but almost all (99%) women from Somali region had inadequate folate intake. Calculated discretionary salt intake was 7.5 g/d for adult men and women and 3.4 g/d for children. With the addition of 0.8 mg Zn and 30 µg of folic acid per gram of salt, multiple salt fortification is estimated to reduce Zn inadequacy by 38 percentage points in urban areas and 19 percentage points in rural areas. Modeled reductions in folate inadequacy were 18% in urban areas and 22% in rural areas. Multiple salt fortification could be an effective approach to address micronutrient adequacy in Ethiopia given its efficacious, technological, and economical feasibility.

## **NUTRITIONAL STATUS OF BREAST CANCER PATIENTS UNDERGOING TREATMENT IN TWO HEALTH INSTITUTIONS IN ACCRA: A COHORT STUDY.**

*by Patience Anku / Agarthah Ohemeng / Florence Dedey / University of Ghana / University of Ghana /University of Ghana*

*Keywords: Breast cancer*

Breast cancer is a disease that occurs due to the formation of breast cells growing out of control to form tumours. The goal of the study was to assess the nutritional status and weight changes of breast cancer patients who were undergoing treatment in two health institutions in Accra, Ghana. The study employed a prospective cohort design, employing a quantitative method. All breast cancer patients who were eighteen years and above, who presented at the selected hospitals between May and July 2019 were eligible to join the study. The end line data was collected between August and November 2019. A validated questionnaire was used in both baseline and end line data collection. The quantitative data was analysed using SPSS. The number of breast cancer patients recruited in all were 54: (6 were from Sweden Ghana Medical Centre and 48 were recruited from the Korle Bu Teaching Hospital). Of these, end line data was obtained on twenty-five breast cancer patients. The mean age at baseline (Mean = 47.52 ± SD = 10.80). The mean BMI was (Mean = 28.10, ±SD = 5.54). At baseline, 70.4% had completed senior high school. For the 25 breast cancer patients who completed the study, mean weight at baseline (Mean = 72.51, SD = 11.91) and mean weight at end line (Mean = 73.64, SD = 10.74) differ significantly at the .05 level,  $t(24) = 2.32$ ,  $p = 0.029$ . The main reasons for lost to follow up was refusal to continue (6), defaulted from treatment (3), could not be reached through persistent phone calls (6), death (3), in progress of treatment (10) and

non-commencement of treatment as at the time of follow up (1). Breast cancer patients experience weight changes during treatment.

## **DIGITAL DEVICES OR TOOLS IN OBESITY MANAGEMENT AND THERAPY IN NIGERIA**

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*Keywords: Artificial Intelligence, Digital devices, Information Technology, Obesity epidemic, Technologies*

Obesity with its associated metabolic diseases is chronic disease among other diseases in the world. Its prevalence in Nigeria has risen to 33% in most recent years. Its treatment requires multifaceted approach and multi-modality care, including diets, pharmacotherapy, lifestyle and behavioral modifications, access to anti- obesity digital devices or tools, and healthcare providers and insurers. Accurate assessment and interpretation of obesity epidemic require mathematical tools and digital devices that are up to date and well tested for good results. Anthropometric measures the bodily components, fat mass (FM), fat- free mass (FFM), body mass index (BMI) and waist-to-hip ratio (WHR). Frequency of food consumption and 24hr dietary recall are collected, collated and analyzed using various apps on modest phones, ipads, computers, and other digital devices demonstrated mathematically and in the Cartesian space. This finding examined and gathered data about the modern technologies and digital or tools for obesity therapy from various touch-points and other communication channels and search tools (PubMed, Scopus, LILACS, Medline, Embase, Cochrane CENTRAL etc) in Nigeria. The finding detected possible gaps and corrections in other to improve treatment performance. People's data (genetics, education, social connection, environmental characteristics, intellectual activity and physical exercises and activities) fast circulates by media via latest technological advancement, using virtual patient data connected for social support. Artificial Intelligence AI-powered tools and robotics assist in accurate, rapid, labour/cost-saving service restoring health, knowledge, overall quality of life, increased life expectancy and excellence attainment. Information Technology (IT)

devices, internet, online voice analysis and advancement facilitates interactions with collaborators, patients, and educational programs. The performances of the digital devices and tools resulted in diverse virtual offerings and interactions, aiding in recharging, ensuring a harmonious state of being, reduction of time, and money spent for the treatment in Nigeria.

## **FACTORS INFLUENCING THE CONSUMPTION OF ULTRA-PROCESSED FOODS AMONG SCHOOL-GOING ADOLESCENTS IN NORTHERN GHANA**

*by Azindow Iddrisu / Gynadu Abubakar / University of Ghana / University for Development Studies*

*Keywords: Ultra-processed foods, participatory photography and group interview., school food environment, school-going adolescents*

Globally, the consumption of Ultra-Processed Foods (UPFs) is increasing among school children with the school food environment being a hotspot for access and consumption. This issue is becoming a public health concern especially in emerging economies, where the UPF sector is growing rapidly. However, what influences increasing consumption of UPFs, especially within and around the school food environment, is not fully understood. This paper discusses some of the factors influencing the consumption of UPFs among adolescents within the school food environment in Ghana. It argues that access and decision making on the consumption of UPFs by adolescents within the school environment are influenced by socio-economic factors. This paper employs a political economy approach to discuss the socio-economic conditions that shape the expansion of UPFs in the school food environment. It focuses on urban and rural schools in the Northern Region of Ghana and deploys novel methods, including participatory photography (Photovoice) and group interviews with adolescents. The preliminary findings suggest that the school food environment is highly diverse and factors such as disposable money of students, advertisements, taste of UPF products, availability, pricing, relationships with food vendors, parental and peer pressure and participation in social events are important in influencing the decision making and access to UPFs such as carbonated drinks and confectioneries among adolescents in schools. However, there are differences in the levels of UPF consumption between urban and peri-urban on the one hand, and rural schools on the other. For instance, compared to their counterparts in rural schools, participants from peri-urban and urban schools have comparatively greater access to

and consume more UPFs which is highly influenced by the differences in the disposable money of students. Socio-economic inequalities are therefore important factors in UPFs consumption disparities among adolescents.

## **CONTRIBUTION OF HOME AND SCHOOL FOODS TO DIET PATTERNS AND QUALITY AMONG SCHOOL AGE CHILDREN ATTENDING PRIVATE AND PUBLIC SCHOOLS IN ACCRA.**

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*Keywords: Dietary pattern, diet quality, home foods, school foods, school-age children*

At least 50% of Ghanaian school-age children's (SAC) dietary intakes are sourced from home. Understanding the contributions of home-sourced foods (HSF) and school-sourced foods (SSF) to SAC's diet patterns (DP) and quality (DQ) can inform interventions to promote healthy eating among SAC. We assessed the contribution of HSF and SSF to the DP and DQ of SAC attending private (SAC\_PVT) and public schools (SAC\_PUB) in a suburb of Accra. A Cross-sectional survey of 217 upper primary SAC\_PVT and SAC\_PUB was conducted. Data were collected on sociodemographic characteristics and a single 24-hour dietary recall was used to obtain information on all foods consumed and their sources (HSF or SSF) on the previous day. The chi-square statistic was used to assess the contributions of HSF and SSF to the SAC's DP (frequency and type of eating occasion) and DQ (contributions to different food groups [FG] consumed and meeting Ghana food-based dietary guidelines' [GFBDG] daily recommended servings [DRS] for selected FG. The SAC's mean age was  $11.0 \pm 1.0$  years. Breakfast and supper were more likely to be home-sourced ( $\geq 75\%$ ;  $P < 0.001$ ). HSF contributed more than SSF to the SAC's total intakes of vegetables, eggs, dairy products, fruit, and staples ( $P < 0.05$ ). SSF contributed more to SACs intake of organ meats, legumes, and sugary foods. The SAC's total intakes met  $\geq 85\%$  of GFBDG DRS for staples and legumes but less than 50% for all other FG. The contribution of HSF and SSF to FG consumed and the extent of meeting the DRS differed by school type. The SAC's food intake mainly comprised of HSF and fell short of the DRS for all FG. Group differences in the contribution of HSF and SSF to the children's intake suggest different intervention needs to promote



healthy diets among SAC.

## **CULINARY EFFICACY AND ITS IMPACT ON THE MICRONUTRIENT CONTENT IN MEALS SERVED IN SCHOOL NUTRITION INTERVENTION PROGRAMMES IN SOUTH AFRICA**

*by Tendaiishe Berejena, Florence Malongane / University of South Africa (UNISA)*

*Keywords: Culinary efficacy, Nutrition Intervention, chronic malnutrition., micronutrients*

The critical common thread of culinary efficacy is that it dovetails food science with food preparation skills to produce more nutritious and fulfilling meals for consumers. Considering that 27% of South African children face the risk of chronic malnutrition, there is a need for culinary efficacy among the School Nutrition Intervention (SNI) food handlers. This study explored the culinary efficacy of food handlers in the SNIs and how they impact the micronutrient content of meals served to school children in South Africa. This survey administered two structured questionnaires to the 290 NSI food handlers, 180 nutrition teacher coordinators, and 110 school principals. The varimax rotation of a 30- question Likert scale questionnaire was used to identify crucial factors that influence the culinary efficacy required in the SNIs. Pearson Chi-Square was conducted to test the relationship between culinary efficacy and the micronutrient content in the NSI meal. The study found a low culinary efficacy among the SNI food handlers. Poor culinary competencies, such as overcooking food, using blunt knives, and prolonged food exposure to oxidation, were the most frequent potential risk factors influencing the micronutrient content in SNI meals. The varimax rotation of a Likert scale questionnaire identified technical skills (food preparation skills) and science skills (nutrition competencies) as crucial factors for culinary efficacy required in the SNI programme. All culinary competencies in the Pearson Chi-Square had p-values of 0.000, indicating a substantial relationship between culinary efficacy and the micronutrient content in the NSI meals. Poor culinary efficacy among food handlers compromises the nutritional quality of NSI meals in South Africa. Overcooking, using blunt knives, and prolonged exposure to oxidation reduces the stability and retention of micronutrients in SNI meals. Research has shown that sensitive micronutrients are not stable when fruits and vegetables are bruised, overcooked and oxidised.

## TEN GOOD PRACTICES TO MINIMISE CHILDHOOD OBESITY IN LOW- AND MIDDLE-INCOME COUNTRIES: A SYSTEMATIC SYNTHESIS OF THE LITERATURE

*by Albert Kyei-Kankam Poakwah / University of Chester*

*Keywords: childhood obesity, community programmes, parental involvement., prevention, public health policies*

In the context of ongoing issues of malnutrition, in low- and middle-income countries (LMICs), the prevalence of childhood obesity is rising at an alarming rate, making it a serious public health concern. Several studies reporting on global trends in childhood obesity identified rates of obesity among children are significantly rising in LMICs contributing to a double burden of malnutrition. The aim was to undertake a systematic synthesis of literature pertaining to childhood obesity and identify ten good practices that can be used as a basis to inform approaches to the prevention agenda for LMICs. A qualitative narrative review and meta-synthesis was undertaken with peer reviewed scientific published papers. The findings emerge from 13 published papers found from a range of themes regarding the implementation and effectiveness of 10 childhood obesity preventive practices that can be adopted by Low-Middle-Income countries. The 10 steps identified fell into a three-pronged approach. Approach one; relevance of general well-being of the parents, family and carers such as: promoting of healthy diets, increasing of physical activity, encouraging healthy amongst the immediate family to enable impact; Approach two; the health of new-borns including the importance exclusive breastfeeding and timely approach to complimentary feeding; Approach three; public health approaches that involve the built environment and urban planning, regulation of food marketing, public health policies, health care initiatives and school-based interventions. After identifying these practices, a cross- cutting step-by-step rollout plan was created which emphasise the significance of evidence- based, population-level solutions that involve communities, families, schools, healthcare systems, and legislators including based on public health practices that can be delivered in LMICs. These strategies emphasise a comprehensive and multisectoral approach to combating childhood obesity, acknowledging that no single intervention can deal with the intricate causes of this major global health issue.

## COMPARATIVE STUDY OF COMMERCIAL AND LOCALLY FORMULATED READY TO USE THERAPEUTIC FOODS FOR MALNUTRITION IN RAT MODEL

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*Keywords: growth performance, local production, ready-to-use therapeutic foods, severe acute malnutrition*

Malnutrition remains a significant challenge in Nigeria and developing countries. About 18% of under-5 children suffer from acute malnutrition, despite various strategies – many lack sustainability and long-term impact. Supplementary foods are recommended, but issues of availability and accessibility persist due to high costs and lack of local production. This study aimed to formulate a locally made ready-to-use therapeutic food (RUTF) to treat severe acute malnutrition, matching efficacy levels of commercially available RUTFs. Twenty-five albino rats were randomly assigned to five groups. After a week of acclimatization, they were regrouped into treatment groups – positive control (PC) fed normal rat chow, commercial RUTF (CRUTF), soybean-formulated RUTF (SRUTF), milk-formulated RUTF (MRUTF), and negative control (NC) fed hypoproteic diet – *ogi*/white pap. To induce malnutrition, four groups (excluding PC) were fed pap the first 14 days. Subsequently, rats were fed according to their groups for 28 days. Growth performance indices were recorded throughout the experiment. At baseline, the PC group's weight was significantly higher than NC and RUTF groups, indicating better health conditions. At endline, there was no significant weight difference between PC and CRUTF, PC and SRUTF, and CRUTF and SRUTF groups, suggesting catch up growth and effective recovery from malnutrition. MRUTF group showed a significant weight difference less than PC and CRUTF group ( $p < 0.005$ ). Comparing weight gain changes between RUTF groups, MRUTF showed a slight difference from CRUTF group ( $p = 0.02$ ), indicating it was less effective but still facilitated some recovery. A 40% mortality rate was recorded for NC group, indicating hypoproteic diet was inadequate. CRUTF and SRUTF were most effective in promoting growth recovery from malnutrition in rats. MRUTF, while beneficial, did not perform as well as both. Locally formulated RUTFs containing soybean and milk are viable alternatives to commercial RUTFs with promising outcomes, especially in resource-constrained settings.

## MODELLING THE EFFECT OF WATER, SANITATION AND HYGIENE PRACTICES ON MALNUTRITION AND DIARRHOEA INFECTION IN NIGERIA

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*Keywords: Nigeria, WASH practices, children under five, diarrhoea, malnutrition*

Nigeria faces significant public health challenges due to suboptimal water, sanitation, and hygiene (WASH) practices, contributing to high rates of diarrhoeal diseases and malnutrition among children. This study aims to monitor trends and estimate the direct effect of WASH practices on diarrhoea and malnutrition indicators in Nigeria. A retrospective study using data from the 2018 Demographic and Health Survey, covering 33,924 households across Nigeria's six geopolitical zones, was conducted. Logistic regression modeled associations between WASH indicators and malnutrition and diarrhoea infection among children under five. The prevalence of diarrhoeal episodes varied considerably across regions in Nigeria, with the highest rates observed in Northern Nigeria 85.14% compared to Southern Nigeria 14.86%. Notably, the North-East and North-Western regions exhibited the highest prevalence of 24.3% and 13.8%, respectively, while the South-East and South-South zones had lower prevalences of 6.54% and 5.83%, respectively. The distribution of diarrhoea diseases was closely associated with water, sanitation, and hygiene (WASH) practices. Communities and households with poorer WASH practices had a significantly higher prevalence of diarrhoea than those with better WASH practices ( $p=0.013$ ). Specifically, children residing in households relying on unprotected water sources and lacking access to improved sanitation facilities were more likely to experience higher episodes of diarrhoea ( $p<0.001$ ). Regression analyses modeling the effect of diarrhea on malnutrition indicators revealed that diarrhea explained the variation in stunting (95% CI, -0.33; -0.25  $p<0.001$ ), wasting (95% CI, -0.17; -0.11  $p<0.001$ ), and underweight (95% CI, -0.31; - 0.25  $p<0.001$ ) among Nigerian children among Nigerian children under five. Diarrhoeal diseases significantly impact child malnutrition in Nigeria, with regional disparities linked to access to safe water and sanitation. Integrating WASH interventions with nutrition-specific interventions, targeted awareness campaigns, and multi-stakeholder collaboration is crucial to address the interconnected challenges of malnutrition and diarrhoeal diseases among

children in Nigeria.

## **USING MASS MEDIA TO CHANGE NUTRITION AND EARLY CHILD DEVELOPMENT BEHAVIOURS OF CAREGIVERS IN TANZANIA**

*by Stephen Kumwenda / Pieter Remes / Vianney Atugonza / Dotto Kezakubi / Jennifer Hollowell / Joanna Murray / Development Media International Malawi / Development Media International Tanzania / Development Media International Tanzania / Development Media International Tanzania / Development Media International UK / Development Media International UK*

*Keywords: early child development, infant and young child feeding, mass media, social and behaviour change*

Tanzania has one of the highest rates of chronic malnutrition, with stunting at 32% among children under 5. Early stunting predicts poor cognitive and educational outcomes in later life. Development Media International (DMI) developed and evaluated a three-year radio and TV social and behaviour change (SBC) campaign to improve maternal and child nutrition, and encourage early childhood development (ECD) practices in five Lake Zone regions. The drama-style campaign spots were broadcasted from June 2017 to March 2020 on six radio stations, covering nutrition during pregnancy; exclusive breastfeeding; complementary feeding; and ECD. The spots were broadcast 10 times per day, following DMI's proven Saturation+ methodology. Formative research and three cross-sectional surveys were conducted before, during and at the end of the campaign. The former was used to shape spots content and the latter, to estimate impact. A total of 14,985 female caregivers and 6,730 male heads of household with children aged 0–23 months were surveyed. Campaign exposure was 60% and 70% for female and male participants, respectively. Dietary diversity during pregnancy increased by 12.7 percentage point (pp) over the study period. This increase was 6.8pp higher among mothers who reported being exposed to our campaign, a statistically significant difference (OR=1.33, CI=1.11-1.59, p=0.002). Self-reported exclusive breastfeeding increased over time by 13.7pp; but there was no significant difference among those exposed or unexposed to the campaign. The proportion of male and female carers who engaged with their children increased by 17.2pp and 16.8pp, respectively. Those exposed to the campaign were more likely to engage in ECD activities (10.6pp and +5.5pp among male and female carers, respectively). This campaign demonstrated largely consistent associations

between exposure to DMI's media campaign and improvements in behaviours promoting maternal and newborn nutrition and ECD practices.

## **THE EFFECT OF CRUDE AND REFINED PALM OIL CONSUMPTION ON LIPID PROFILE IN HEALTHY ADULTS - A META ANALYSIS**

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*Keywords: Adults, Palmoil, Randomized control trials, lipid profile*

Crude and refined palm oils are widely consumed dietary oils. There is a big controversy on the health benefits of crude palm oil due to its high saturated fat composition and the expected effect of this on serum cholesterol and triglycerides. Moreover, the results and conclusions from previously-conducted Randomized Controlled Trials show a huge disparity, making it difficult to make evidence-based conclusions about the effect of crude palm oil consumption on human lipid profiles. This study was therefore conducted as a meta-analysis to summarize available evidence on the effects of consuming crude and refined palm oils on human lipid profile. A comprehensive search of literature was conducted, focusing on published Randomized Controlled Trials (RCTs) with parallel and cross-over study designs gotten from various databases (Google scholar, PubMed) between the year 1985– 2023. The eligibility and suitability of studies included in the meta-analysis was predetermined, and meta-analysis was conducted separately by two independent researchers. Heterogeneity scores for refined palm oil for all lipid profiles was between 47.16 and 58.33, while that of crude palm oil was less than 0.00. There were no statistically significant differences between the effect size pooled estimates for HDL-C, LDL-C, TC and TG in both refined and crude palm oils. This concluded that crude palm oil and refined palm oils have similar effects on lipid profile. While palm oil may not substantially affect lipid profile, other health considerations, such as oxidative stability and nutrient content, should also be taken into account. It is still important to consume it in moderation as part of a balanced diet.

## **HEALTH INTERVENTIONS IN ADOLESCENTS: THE COMBINED EFFECTS OF IRON-FOLIC ACID SUPPLEMENTATION AND DEWORMING ON FOLATE AND ANAEMIA STATUS OF ADOLESCENT GIRLS IN ABUJA, NIGERIA**

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*Keywords: Adolescents, anaemia, haemoglobin, iron-folic acid supplementation, serum ferritin*

Adolescence is a critical window for growth and development; unfortunately, adolescents are often overlooked as health and nutrition interventions targeted to this age group are often underfunded. This study assessed the combined effects of iron-folic acid supplementation and deworming on folate and anaemia status of adolescent girls in a Government Secondary School, Abuja, Nigeria. A quasi-experimental design was employed, and a total of 67 adolescents who met the inclusion criteria were recruited for the study. The adolescent girls were given weekly iron-folic acid containing 60 mg of elemental iron and 0.04 mg of folic acid for 12 weeks. A one-off deworming tablet (400 mg of Albendazole) was administered a week prior to the commencement of the weekly iron-folate intervention. Baseline data of haemoglobin, iron and folate level were collected. End-line assessment of anaemia (Hb), serum ferritin, and serum folate was conducted after the 12-week to determine the effect of the weekly iron-folic acid intervention on the adolescents. Statistical analysis of frequencies, mean, percentages, paired sample t-test and correlations, was carried out using IBM-SPSS, version 22. Differences were inferred to be significant at  $p < 0.05$ . The adolescents were within the age-range of 10-14 years (64.3%) and 15-19 years (35.7%). Worm infestation was low (7.5%), while prevalence of anaemia was 17.5% at baseline. After the 12 weeks intervention, all the subjects had normal haemoglobin level. At baseline, a total of 7.5% and 2.5% of the subjects had deficient serum ferritin and folate levels, respectively. However, at the end of the intervention 100% of the adolescents were free from worm infestation and had normal level of serum ferritin and folate. School-based weekly iron-folic acid supplementation and deworming improved folate and anaemia status and eradicated worm infestation among the adolescents.

## **DIETARY INTAKE OF CALORIE AND MICRONUTRIENTS (IRON AND ZINC) IN WOMEN OF REPRODUCTIVE AGE IN SELECTED ESTUARINE SITES IN GHANA: THE CONTRIBUTION OF OYSTER'S CONSUMPTION TO TOTAL MINERAL INTAKE AND ANAEMIA STATUS.**

*by Francis Z. Taabia / Agartha N. Ohemeng / Brietta M. Oaks / Seth Adu-Afarwuah /  
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*Keywords: and oysters, calorie intake, dietary intakes, mineral inadequacy, women*

Micronutrient deficiencies pose serious public health concerns for women, particularly due to their reproductive health outcomes. Data on the dietary intake of nutrients and prevalence of inadequacies among specific subgroups, such as women “shellfishers”, are very scarce. Therefore, the study sought to determine the dietary intake of nutrients and the contribution of oyster consumption to the overall mineral intake and anaemia status among women shellfishers at selected estuarine sites. In June and July 2021, dietary intake data from women of reproductive age at three estuarine sites were collected through two non-consecutive 24-hour dietary recalls. Nutrient intakes were estimated using the Ghana foods nutrient database and the 2019 West African Food Composition Table. ANOVA and Pearson's Chi Square were used to compare the mean and percentage differences among the sites, while logistic regression assessed the association between dietary intake and anaemia. Participants had an average caloric intake of  $1465 \pm 662$  kcal/d. Oyster consumption contributed 17.2% (1.6 mg/d) of Fe and 18.3% (1.1 mg/d) of Zn intakes. Mean intakes of Fe, Zn, Ca, Mg, and P varied significantly by occupation, diet diversity, food security, and oyster consumption ( $p < 0.05$ ). Probabilities of inadequacy were 81.5% for calories, 53% for P, 74.8% for Mg, 76.2% for Zn, 94% for Fe, 98.8% for K, and 99% for Ca. The mean adequacy ratio based on six nutrients was 62%. No significant association was found between total dietary Fe (aOR=1.0; CI: 0.946, 1.048;  $p=0.866$ ), Fe from oysters (aOR=1.0; CI: 0.981, 1.065;  $p=0.300$ ), and anaemia status. Women shellfishers had inadequate nutrient intake, including calories, zinc, iron, and calcium. These findings highlight the need for nutritional interventions focusing on dietary diversity, food security, and factors affecting micronutrient absorption to improve maternal nutrition and reproductive health outcomes.



## **MAPPING OBESOGENIC ENVIRONMENT IN TAKORADI**

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*Keywords: Built Environment, Food Environment, Mapping, Obesogenic*

Obesity prevalence has increased significantly in Africa over the last 30 years. This rise is attributed to the imbalance between unhealthy food consumption and limited physical activity opportunities within built and social environments. The term "obesogenic environment" describes settings that increase obesity risk due to environmental characteristics. This study aimed to measure the contribution of obesogenic environments to obesity health outcomes by identifying and mapping such environments in Takoradi, Ghana. An obesogenic environment fails to promote healthy weight maintenance, discouraging organized physical activities and healthy food choices. Consequently, these environments influence individuals' or populations' tendencies toward obesity. It is crucial for environments to support active participation in physical activities and promote nutritious food choices, enhancing health, well-being, and productivity. This cross-sectional study examined dietary patterns among Takoradi residents, focusing on the patronage of food outlets that promote obesity. 4 communities were randomly selected to represent low-income community, middle-income community and High income community. Data on the food and built environment were collected using a semi-structured questionnaire, and Google Maps was utilized to map these environments. A key finding from this study was that low-income communities are more likely to promote obesity among children and adults compared to high-income communities. The findings underscore the need for deliberate efforts to create environments that facilitate physical activity by investing in infrastructure and recreational sites, particularly in low- and middle-income communities.

## **PREVALENCE AND AWARENESS OF TYPE 2 DIABETES MELLITUS AMONG ADULTS ATTENDING MARGRET MAQUART CATHOLIC HOSPITAL-KPANDO, GHANA.**

*by Millicent Eyrarn Tsogbe / Ms Senam Klomegah / University of health and allied sciences /  
University of health and allied sciences*

*Keywords: Adults ., Awareness, Prevalence, Type 2 diabetes*

Diabetes is a significant public health issue affecting millions globally. Long-term neglect or inappropriate treatment will cause extensive blood vessel damage and issues with the eyes, kidneys, heart, brain, and nerves. Type 2 diabetes mellitus (T2DM) prevalence keeps rising rapidly and expected to reach pandemic levels by 2030. study aimed to determine the prevalence and awareness of T2DM among adults in Kpando Municipality. descriptive cross-sectional study design was employed to recruit 238 adults who attended Margret Marquart Catholic Hospital, Kpando, using simple random sampling method. Data collected was analyzed using Stata 17.0. Chi-square and logistics regression was run to find association between variables.  $p\text{-value} < 0.05$  was considered statistically significant. Results were presented in simple tables and graphs. Results showed that the proportion of study participants who were diabetic was 25.2%. Level of awareness of the study participants was average (51.7%). Majority of the study respondents agreed that overweight, lack of exercise and sedentary lifestyle are the risk factors of diabetes and more than half of the respondents thought that family history, oily food, fast food, and soft drinks are the risk factors of diabetes. DM-positive individuals were greater than or equal to 45 years of age, when age is increased, the prevalence of DM also increases. Immediate need to promote awareness about diabetes among the general population with the help of community-based campaigns, collaborations with local media outlets, partnerships with healthcare providers. Early diagnosis and proper management, which are keys to preventing or delaying complications and improving the quality of life for patients with diabetes as the study results suggested that level of awareness of diabetes risk factors among the study respondents was average.

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## **INTEGRATING NUTRITION IN FARMER FIELD SCHOOLS (FFS)**

*by Noella Semu Kamwendo / Food and Agriculture Organization of the United Nations*

*Keywords: Farmer Field Schools, Food Systems, Minimum Dietary Diversity, Nutrition*

The challenges of unsustainable food systems are compounded by the growing demand for nutritious diversified foods that are brought about by population growth, increasing incomes, and urbanization. Currently, programs in Malawi integrate nutrition-sensitive agriculture in food system. The purpose of the study was to analyze the impact of nutrition sensitive agriculture in Farmer Field Schools (FFS). Mixed and cross-sectional approaches were used to collect qualitative and quantitative data through household surveys, key informant interviews, and gender-disaggregated, Focus Group Discussions (FGDs) for FFS members and non-FFS members. Matched Case Control was used, whereby data was collected, analyzed, and interpreted for those in the FFS (case) to those not participating in the FFS (control). Quantitative data was entered and analyzed in SPSS where frequencies and means of variables were generated. All qualitative data was entered in MS excel and analyzed using directed content analysis. The study revealed increased nutritional skills among FFS participants such as ability to develop a diversified meal plan. There is a positive relationship between participating in FFS and formulating a meal plan ( $\chi^2 = 14.059$ ,  $p \text{ value} < 0.001$ ). The relationship is such that non-FFS-participants are 60 % less likely to formulate meal plans (OR=0.061, 0.454-0.827). On dietary diversity, households belonging to FFS were more likely to meet their minimum dietary diversity requirement. This means that integrating nutrition in FFS enhance processing and preservation skills after having a backyard garden, livestock, and fruit trees, in addition to capacity building on nutrition related topics, high adoption of nutritional, water, sanitation and health practices. NSA projects must be designed in a way to contribute to nutritional outcomes. Integrating nutrition in FFS significantly contribute to attainment of minimum dietary diversity therefore Scale -up nutritional benefits derived from FFS is strongly recommended.

## **DIETS, FRUITS AND VEGETABLES INTAKE AND NUTRITIONAL STATUS IN TANZANIA: SCOPING REVIEW**

*by Dorcas A Amunga / Frederick KE Grant / Sonja Y Hess / Joyce Kinabo / Deanna K Olney / International Potato Center, Kenya / International Potato Center, Uganda / University of California Davis, USA / Sokoine University of Agriculture, Tanzania / International Food Policy Research Institute, USA*

*Keywords: Fruit and vegetable intake, diet, dietary diversity, nutrition*

Globally, the consumption of fruits and vegetables (F&V) is far below the recommended levels, contributing to various health challenges including micronutrient deficiencies and non-communicable diseases and mortality. In Tanzania, where the triple burden of malnutrition persists, there is a need to identify gaps in evidence, better understand F&V consumption patterns and interventions for improved intake. We conducted a scoping review to summarize the evidence on dietary intake, F&V intake, and nutritional status in Tanzania. This included three separate literature searches in PubMed covering the years 2012-2023 for the dietary intake and nutritional status and 2002-2023 for F&V intake. A total of 62, 37, and 14 articles met pre-defined eligibility criteria for the review of overall diet, dietary intake of F&V and nutritional status, respectively. Identified studies suggest that overall dietary practices among all population groups were primarily based on carbohydrate-rich foods, complementary feeding practices were sub-optimal among young children and a low proportion of women of reproductive age (WRA) and pregnant and lactating women achieved minimum dietary diversity for women (MDD-W). Across all population groups, F&V intake was below the recommended 400g per day. Analysis of nutritional status in Tanzania in population representative surveys showed high stunting prevalence in children below 5 years of age, and a high prevalence of overweight and obesity among WRA, particularly in urban areas. Additional research is needed to better understand the complex interactions between diet and nutrition and health outcomes, and to identify efficient and cost-effective strategies to improve overall dietary quality, including increasing F&V intake.

## **ECONOMIC DETERMINANTS AND THEIR IMPACT ON DIVERSE DIET AND NUTRIENT-DENSE FOOD IN SCHOOL NUTRITION INTERVENTIONS. A CASE STUDY OF GAUTENG SCHOOLS**

*by Florence Malongane / Tendaiishe Berejena / Department of Life and Consumer Sciences, University of*

*South Africa (UNISA) Science Campus, Private Bag X6, Florida, Roodepoort 1710, South Africa / Department of Life and Consumer Sciences, University of South Africa (UNISA) Science Campus, Private Bag X6, Florida, Roodepoort 1710, South Africa*

*Keywords: School nutrition intervention, economic, nutrition, nutrition-sensitive programs*

The ideal School Nutrition Intervention (SNI) should provide a diversified diet that constitutes nutrient-dense food. Though SNIs are widely implemented in South African schools, their nutritional quality has been doubted. Studies have shown that only 20 per cent of Nutrition-Sensitive programmes in South Africa are meeting the required nutritional outcomes. The delivery of optimal dietary outcomes in the SNIs is more dependent on the economic environment within communities and the national Gross Domestic product (GDP). This study sought to explore the economic determinants and their impact on the provision of diverse diets and nutrient-dense foods in the SNIs. A cross-sectional study was conducted using face-to-face interviews with 15 District Nutrition Coordinators (DNCs). The responses from interviews were divided into six economic themes and evaluated against FAO Nutrition-Sensitive Programme guidelines. The findings show a low supply of both dietary diversity and nutrient-dense food. High- starch foods dominate meals, while high nutrient-dense foods like fruits and vegetables are seldom served in SNIs. This has been attributed to the low involvement of local smallholder farmers, irregularities in the supply chain, low budget in the Conditional Grant from the National Treasury, little capacity development in school gardens, high food costs and the absence of partnership with the local business entities. The study clearly shows the impact of related economic activities on the nutritional outcome of SNIs. Further studies need to be conducted on the implementation of Corporate Social Investments (CSIs) as a solution to the economic challenges in the SNIs.

## UNDERSTANDING DRIVERS OF EXCESSIVE SALT AND ALCOHOL CONSUMPTION: A QUALITATIVE SOCIO- ECOLOGICAL STUDY IN GHANA

*by Joseph P Mensah / Robert Akparibo / Richmond Aryeetey / Chloe Thomas / Alan Brennan / School of Medicine and Population Health, University of Sheffield, UK / School of Medicine and Population Health, University of Sheffield, UK / School of Public Health, University of Ghana, Legon, Ghana / School of Medicine and Population Health, University of Sheffield, UK / School of Medicine and Population Health, University of Sheffield, UK*

*Keywords: alcohol, qualitative, salt, socio-ecological model, unhealthy consumption*

Excessive salt and alcohol consumption are significant modifiable risk factors for various diseases, including cardiovascular conditions and some cancers. Understanding the factors driving excess consumption is crucial for effective interventions. This study applies the socio-ecological model (SEM) to explore stakeholder perspectives on the drivers and influences behind unhealthy alcohol and salt consumption in Ghana. Semi-structured interviews were conducted with 21 purposively sampled respondents from five stakeholder groups: health policymakers, national regulatory agencies, civil society organisations, health researchers, and health care workers. Interviews were transcribed verbatim and analysed using qualitative content analysis, with inductive category development to identify themes, which were then mapped onto the corresponding levels of influence in the socio-ecological model. Stakeholders highlighted factors at the individual, interpersonal, community, societal, and policy levels that influence consumption levels. At the individual level, drivers include the prioritising of taste and disregard for health risks associated with salt and alcohol use. Community drivers include easy access to unhealthy foods and cultural norms that encourage alcohol use at events, and salt in traditional dishes. Societal and policy-level influences were marked by inadequate regulation of alcohol and food industries, thereby exacerbating individual and interpersonal drivers. These higher-level factors significantly impact lower-level influences, promoting excessive consumption among individuals. The study reveals multiple influences across all SEM levels, highlighting the complex interplay that predicts unhealthy alcohol and salt consumption. There is need to address multi-level factors simultaneously; unhealthy consumption is not just a matter of personal responsibility but also heavy influence by societal and political factors.

## THE USE OF PHOTO STORY NUTRITION INTERVENTION TO PROMOTE WATER CONSUMPTION AMONG SCHOOL AGED CHILDREN (7-10 YEARS) IN IBADAN, OYO STATE

*by Elizabeth Oluwafolakemi ALERU / Igbagboyemi A. DENIRAN / Ujirotoghene Favour OBOKPARO / Oluwatosin Dorcas OLUFAJO / Department of Human Nutrition and Dietetics, Lead City University Ibadan / Ladoke Akintola University of Technology, Ogbomoso, Nigeria / Department of Human Nutrition and Dietetics, Lead City University Ibadan / Department of Human Nutrition and Dietetics, Lead City University Ibadan*

*Keywords: focus group discussion, nutrition education, photostory, school-aged children, sugar-sweetened beverages, water intake*

Adequate water intake has significant health benefits, yet many, especially young children, favor sugar-sweetened beverages (SSBs) over water. This study examined the effect of a photostory intervention on promoting water consumption among school-aged children (7–10 years) in Ibadan, Nigeria. The mixed-method study involved 339 randomly selected pupils from two private primary schools, categorized into intervention (IG) and control groups (CG). Self-administered questionnaire assessed their knowledge on the benefits of adequate water intake and the consequences of over-consuming SSBs before and after the intervention. Additionally, 54 pupils randomly drawn from the sample participated in a focus group discussion (FGD) to assess their perceptions of water and SSB consumption. A photo-story was created to educate children on the importance of water and the risks of excessive SSB intake. Knowledge was measured on a 10-point scale, categorized as good ( $\geq 6$ ) or poor ( $\leq 5$ ). Data were analyzed using descriptive statistics and chi-square tests at  $p < 0.05$ . FGD recordings were transcribed and analyzed with NVivo software. The mean age of the pupils was  $8.77 \pm 0.99$  years, majority were girls (53.7%). Prior to the intervention, most children had fair knowledge of adequate water intake. Post-intervention, knowledge of water consumption benefits significantly increased ( $p = 0.0015$ ) in the IG (30.7% to 42.8%) but decreased in the CG (40.9% to 29.8%). Water intake in the IG increased from 1 litre (38.6%) to  $>1.5$  liters (40.7%) while daily consumption of SSBs reduced significantly (fruit flavored drinks: 18.3%-8.3%; Sodas: 18.3%-10.3%; Energy drinks: 13.1%-6.0%;  $p = 0.009$ ) compared to CG (fruit flavored drinks: 16.9%-20.0%; Sodas: 18.5%-22.7%; Energy drinks: 8.9%-11.8%). The FGD revealed more students chose water over SSBs post-intervention. The photo-story intervention improved overall knowledge and practices among school-aged children, suggesting adequate nutrition education can positively influence young children's dietary



habits.

## **BELIEFS, MYTHS AND CURRENT PERCEIVED PRACTICES RELATING TO BREASTFEEDING AND COMPLEMENTARY FEEDING: A QUALITATIVE STUDY OF MOTHERS, GRANDMOTHERS, FATHERS AND ELDERS IN RURAL AND URBAN MALI**

*by Rachel L Adams / Selina Sfeir / Evans Atiah Asamane / Cheick Sidibe / Mariam Yazdani / Mitali Bajaj / Chloe Poole / Ousmane Toure / Katinka Weber / Paula Griffiths, / Nicola Gale / Semira Manaseki-Holland / Health Services Management Centre, University of Birmingham, UK / Institute of Applied Health Research, University of Birmingham, UK / Institute of Applied Health Research, University of Birmingham, UK / University of Sciences, Techniques and Technologies of Bamako, Bamako, Mali / University of Cambridge, Department of Political Science and International Studies / Epsom and St Helier University Hospitals NHS Trust, Wrythe Ln, Sutton, Carshalton SM5 1AA, UK / Counties Medical Integrated Health Clinic, 6/18 O'Shannessey Street, Papakura, Auckland 2110, New Zealand / Institute of Applied Health Research, University of Birmingham, UK / University of Sciences, Techniques and Technologies of Bamako, Bamako, Mali / Institute of Applied Health Research, University of Birmingham, UK / Loughborough University, School of Sport, Exercise and Health Sciences, Loughborough, UK / Health Services Management Centre, University of Birmingham, UK / Institute of Applied Health Research, University of Birmingham, UK*

*Keywords: Breastfeeding, Complementary feeding, Infant nutrition, Mali, culture, infant feeding*

Sub-Saharan Africa, including Mali, continues to experience high under-five mortality rates. Exclusive breastfeeding and good nutrition are recognised as critical for improving mortality and childhood health and development outcomes. This research explores local practices, identifying barriers and facilitators (determinants) to optimal breastfeeding and complementary feeding in Mali, and the influence of traditional beliefs on these determinants. We conducted a qualitative study, conducting semi-structured focus groups (FGs) in 4 urban communities and 3 rural villages. Separate FGs were conducted in each community with mothers, grandmothers, fathers and elders (4 groups per community). Convenience sampling recruited participants with children/grandchildren aged 6-24 months. Data were collected

using a semi-structured topic guide, recorded, transcribed, and analysed thematically. Data analysis was guided by the UNICEF Conceptual Framework on Maternal and Child Nutrition. Administration of colostrum was considered important, however exclusive breastfeeding varied. The administration of water, juices, and medications including herbal remedies to children under 6 months were common practices. Participants varied in when they introduced complementary foods and stopped breastfeeding. Underlying determinants influencing participants' decisions were the need to return to work, cost, availability and convenience of complementary foods, as well as traditional beliefs around forbidden foods e.g. eggs causing malaria. There were mixed messages emerging about sugary/sweet foods. Participants talked about practices they had discontinued following healthcare advice, mixing dates in hot water for infants less than 6 months old. Health education had influenced breastfeeding and complementary feeding practices. However, challenges still remained. The study highlights the need for awareness of local beliefs in health campaigns, support for breastmilk alternatives in the short term for those returning to work early and in the longer term improved maternity leave policies to improve maternal and child feeding outcomes and improved health and mortality outcomes for infants in Mali.

## **INFLUENCE OF FEEDING PRACTICES ON NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN IN SCHOOLS IN LUANDA SUB-COUNTY, KENYA**

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*Keywords: Kenya, Pre-schools, children, feeding, practices*

According to Kenya's nutrition profile (2022), nearly 1.2 million children are suffering from chronic malnutrition and 631,196 children are underweight. Kenyan rural county governments have made little effort to develop school feeding programs for children in pre-schools in other areas other than the arid and semi-arid areas. The specific objectives of the study are, to establish the demographic and socio-economic characteristics of the caregivers, assess the feeding practices of pre-school children, assess the nutritional status of pre-school children and determine the relationship between feeding practices and nutritional status of pre-school children. This study employed the cross-sectional study design. Stratified random sampling was used to select a sample population of 40 households. The sample

included children aged 6 years and below attending preschools whose guardians consented in their involvement in the research. The data collection tools used included questionnaires, food frequency questionnaire, 24-hour dietary recall, and anthropometric measures. Nutrition data was entered into Nutri survey software for analysis. Descriptive and inferential statistics was used to analyze the relationship between feeding practices and nutritional status. The study showed that the prevalence of malnutrition among preschool children was 25%. All the children did not meet the recommended dietary allowance (RDA) for vitamin A, folate, and calcium. 37.5%, 82.5%, and 27.5% did not meet their RDA for proteins, carbohydrates and fiber respectively. Compromised nutritional status was strongly associated with type of school, mother's education level, presence of school-feeding programs and family size. It is important that the feeding practices at home and school be carefully considered to ensure adequacy in the promotion of the nutritional status of preschool children. The findings from this study can inform policymakers in the Ministry of Education and Ministry of Health in designing more effective, efficient, and affordable school feeding programs for schools.

## **CHALLENGES OF ACCESSING QUALITY NUTRITION AMONG ADOLESCENT SECONDARY SCHOOL STUDENTS IN SOUTHEAST NIGERIA**

*by Mrs Stella Odoh / Ebonyi State College of Education, Ikwo Nigeria*

*Keywords: challenges, education, nutrition, quality, students*

Quality nutrition in food intake is very important for proper growth and development of the adolescent student. Healthy and quality food is associated with the nutrition value of such food, and is very necessary for the physical and mental development of the body. More often than not, especially in the developing countries of the world, the adolescent secondary school students face a lot of developmental issues which in one way or other could be linked to the poor nutrition value of their food intake. This paper is aimed at identifying the challenges facing the adolescent students in accessing quality nutrition in their food intake, and to proffer some solutions. A survey research design was adopted for this study with a sample population of 2570 students randomly selected from different secondary schools in the study area. Instrument for data collection was a structured questionnaire titled the Quality Nutrition Challenges Questionnaire (QNCQ). Two research questions and two hypotheses were formulated to guide the study. The instrument was validated by experts and the reliability was tested using Cronbach Alpha which yielded a coefficient of 0.95. Data collected from the

research were analysed using mean and standard deviation. The hypotheses were tested at 0.05 significant levels using t-test statistical instrument. Several challenges were identified, including lack of proper nutrition knowledge, family responsibility burden on the parents and guardians, among others. It is therefore recommended that appropriate nutrition education be introduced in secondary schools in the area, among others.

## **SNACK CONSUMPTION AND ITS CONTRIBUTION TO ENERGY INTAKE AMONG PRESCHOOLERS**

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*Keywords: Energy Intake, Ghana, Preschool children, Snacking, Sugar Sweetened beverages*

Unhealthy snacking among children is a growing concern with potential implications for their health, particularly in the face of increasing prevalence of childhood obesity. This study sought to identify the different types of snacks and beverages consumed by children and assess their contribution to the total energy intake. This was a cross-sectional study that included children aged 3–5 years ( $n = 150$ ), their primary caregivers, and teachers living in Kwashieman, Accra. Dietary assessment was conducted using a 24-hour recall and a modified seven-day food frequency tool. Descriptive statistics and independent t-tests were used to analyze the data. Most of the children (81.3%) consumed at least one type of snack in the week prior to data collection, with cookies and biscuits being the most consumed snack type. The findings also revealed that the most common type of sugar-sweetened beverage among the participants belonged to the dairy products group. The average energy intake for all children was 2007.42 kcal. There was a significant difference in dietary energy intake across the age groups ( $p\text{-value} = 0.002$ ), but not between males and females ( $p\text{-value} = 0.851$ ). Snack consumers had a significantly higher dietary energy intake compared to those who did not consume snacks (2157.65 vs 1352.85 kcal,  $p\text{-value} < 0.001$ ). Snacks and sugar-sweetened beverages contributed 16.0% and 7% of the children's total energy intake, respectively. Snacking was found to be a common practice among the preschoolers in the study, and snackers on average consumed more dietary energy compared to non-snackers. The excess

energy consumption by snackers is consistent global concerns about unhealthy snacking behaviors among children. Efforts to address this concern need to be intensified as part of the interventions being considered in addressing the menace of childhood obesity.

## **ASSESSING THE HEALTHINESS OF INDUSTRIAL- PROCESSED FOODS AVAILABLE IN MAJOR SUPER MARKETS FOR CHILDREN UNDER FIVE IN CAPE COAST USING THE WHO NUTRIENT PROFILING CRITERIA**

*by Dr. Ruth Nana Adwowa Aidoo / Prof. Kingsley Pereko / University of Cape Coast School of Medical Sciences , University of Cape Coast Hospital / University of Cape Coast School of Medical Sciences*

**Keywords:** *WHONPM. , 'healthy', 'unhealthy'*

Industrial-processed foods may have high levels of salt, sugars, and fat, which are major contributors to child obesity. The World Health Organisation's Nutrition Profiling Model (WHONPM) was primarily developed to identify unhealthy foods that should be restricted from being marketed to children. This study sought to determine whether industrially processed food products sold in major supermarkets are healthy or unhealthy for children under five years of age in the Cape Coast metropolis. This study employed a Cross-sectional study design identifying labeled industrially processed foods mainly fed to children under the age of 5 years in the major supermarkets in the Cape Coast Metropolis. The study estimated and sampled 3 major supermarkets in Cape Coast which the population frequent for food following a two-stage sampling procedure. Data collected included: name of food product, food category by WHONPM, composition of total fat, sugar, sodium, and saturated fats per 100g of each product identified. Descriptive analyses were undertaken to describe the number of products from each food group and the proportion of products categorized as 'unhealthy' and 'healthy' by the WHONPM. Out of 166 industrial processed foods identified, 55.4% were found to be unhealthy, 20.5% of them healthy, and 23.5% were inconclusive. The study revealed that Milk and dairy-based drinks(16. 6%) are the most common products in the supermarket for children under 5. A significant proportion of processed food products sold in major supermarkets for children under five years of age in Cape Coast are unhealthy for children. Public education on the risk of industrially processed foods for children under five should be encouraged.

## **PREVALENCE OF PREDIABETES/DIABETES AND ITS ASSOCIATED RISK FACTORS AMONG ADULTS IN SELECTED COMMUNITIES IN ACCRA**

*by Kwaku Brobbey Akyea-Boakye / Frederick Vuvor / Justina Serwaah Owusu / University of Ghana, Nutrition and Food Science Department / University of Ghana, Nutrition and Food Science Department / University of Ghana, Nutrition and Food Science Department*

*Keywords: Diabetes mellitus, behavioural, dietary, prediabetes, prevalence*

Diabetes mellitus is a global health issue, with cases projected to surge from 180,000,000 in 1980 to over 693,000,000 by 2045. Prediabetes precedes a full-blown type 2 diabetes which must be diagnosed early and take appropriate measures. This was a cross-sectional study conducted among adults  $\geq 18$  years of age ( $n = 360$ ). Fasting blood glucose levels were determined using glucometer. Sociodemographic variables, behavioral patterns, dietary intakes, anthropometric measures and clinical indicators were collected. Logistic regression was employed to estimate associations between all variables and prediabetes status. The prevalence of prediabetes and diabetes was 26.7% and 29.4% respectively. Results showed significant correlations between prediabetes and sociodemographic factors such as female sex (OR: 2.03, 95% CI: 1.02-4.59) age group 40-59 years (OR: 2.97, 95% CI: 1.10-8.32) and being single (OR: 2.60, 95% CI: 1.05-6.43). Behavioural factors including salt consumption (AOR: 6.25, 95% CI: 1.69-23.02), smoking (AOR: 10.14, 95% CI: 1.21-111.03), caffeine consumption (AOR: 2.51, 95% CI: 1.53-11.88), low physical activity (AOR: 3.53, 95% CI: 1.83-7.89) and high stress levels (AOR: 8.29, 95% CI: 3.30-20.80) were significantly associated with prediabetes. Dietary factors including increased consumption of starchy foods (AOR: 3.63, 95% CI: 1.74-7.58), animal-sourced foods (AOR: 2.54, 95% CI: 1.36-4.86), fats and oils (AOR: 5.87, 95% CI: 2.76-12.51), legumes (AOR: 2.45, 95% CI: 1.23-6.11), and confectionaries (AOR: 2.25, 95% CI: 1.19-5.23) were significantly associated with prediabetes. Participants with BMI over 25 (AOR: 4.55, 95% CI: 2.12-18.11), high mean arterial pressure (AOR: 4.21, 95% CI: 1.50-11.81) and stage 1 hypertension (AOR: 6.74, 95% CI: 1.50-30.29) showed significant association with prediabetes. This shows an unacceptably high prevalence of the condition with significant factors identified. Targeted public health interventions to mitigate the risk and prevalence of prediabetes are needed.

## **BLACK JACK LEAVES AND EXTRACTS OF CACTUS PEAR AS A NATURAL THERAPY OF OVARIAN CANCER PATIENTS IN KAKAMEGA COUNTY**

*by Lucy Mutuli / Agatha Christine Onyango / Department of Nutritional Sciences-School of Public Health*

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*Keywords: black jack, cactus pear, ovarian cancer.*

Cancer is a pool of over 100 different disorders in a single disease and is the world's second leading cause of death. Universally, chemotherapy and radiotherapy are the conventional cancer therapies currently used. These therapies are expensive to most patients in rural Kenya communities who depend on well-wishers for medical support thus opt for natural products (black jack leaves and aqueous extracts of cactus pear) as alternative for conventional cancer treatment. This study tested efficacy of black jack leaves and aqueous extracts of cactus pear in treatment of ovarian cancer patients. Through a randomized controlled study with two arms; treatment (98) and control (98) group conducted from January to November 2023 amongst purposively sampled patients stratified in stage 1, 2, 3 levels of ovarian cancer. Interestingly, combination of black jack leaves and cactus pear extract blocked cell growth in cancer cells and suppressed the tumor cells activity at ( $\beta=0.62$ ,  $p<0.001$ ,  $n=98$ ); with association of ( $-.724^{**}$ ) and accounted for 0.68% improvement from stage 3 to 2. Improvement from stage 2 to 1 at ( $\beta=0.65$ ,  $p<0.001$ ,  $n=98$ ) with association of ( $-.697^{**}$ ) and accounted for 0.62%. No significant relationship was reported in separate ingestion of black jack leaves and cactus pear extract ( $p=0.881$ ). Further research is needed to reveal the biological properties of the bioactive compounds found in this combination of black jack leaves and cactus pear extract that may develop innovative alternative prevention and/or treatment for cancer cells in ovarian cancer as well as other cancers. No conflict of interests exists.

## **PREVALENCE OF HYPERTENSION AND OBESITY AMONG PEOPLE LIVING WITH DIABETES IN CAPE COAST METROPOLIS, GHANA.**

*by Isaac Anane / University of Cape Coast*

*Keywords: Diabetes, Ghana, Hypertension, Obesity, Prevalence, Risk factors*

Globally, diabetes, hypertension, and obesity are major public health concerns with significant morbidity and mortality. These conditions frequently co-exist and interact synergistically to worsen health outcomes. This study aimed to determine the prevalence and factors associated with hypertension and obesity among people living with diabetes in Cape Coast, Ghana. A cross-sectional study was conducted among 290 people living with diabetes visiting two hospitals in Cape Coast. Data on socio-demographics, medical history, anthropometrics, and blood pressure were collected. Hypertension was defined as BP $\geq$ 140/90 mmHg or being on antihypertensive medication. Obesity was classified using BMI categories. Chi-square test and multivariate logistic regression were used to determine factors associated with hypertension and obesity. Most of the study participants (68.6%) were overweight or obese with only about 29% having normal body mass index (BMI). Again, the majority of the study participants (76.6%) had some form of hypertension. Variables such as age ( $p=0.013$ ), level of education ( $p=0.042$ ), ethnicity ( $p=0.042$ ), and sex ( $p=0.031$ ) were associated with hypertension in people living with diabetes. Predictors of hypertension were age group  $\geq 60$  years (AOR = 12.2: 95%CI: 5.2 – 27.6:  $p=0.012$ ), alcohol intake (AOR = 3.634: 95%CI: 2.329 - 17.157:  $p=0.024$ ), family history of hypertension (AOR = 4.6: 95%CI: .4.6(0.161-35.38:  $p=0.002$ ). The prevalence of hypertension and obesity is high among people living with diabetes in Cape Coast. There is sufficient evidence suggesting that sociodemographic characteristics such as age, level of education, sex, ethnicity and alcohol intake is associated with hypertension in this study population.

## **FOOD ENVIRONMENT AND DIETARY BEHAVIOUR OF ADOLESCENTS IN SELECTED PUBLIC SECONDARY SCHOOLS IN IBADAN SOUTH WEST LOCAL GOVERNMENT AREA**

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*Keywords: Food environment, adolescents, dietary behavior, nutritional knowledge*

School food environment is a huge predictor of the food consumption pattern amongst adolescents. The adolescence stage is crucial in imbibing healthy eating habits hence, this study aimed to assess the food environment and dietary behavior of adolescents in selected public schools in Ibadan Southwest local government area. This cross-sectional study in Ibadan included 355 adolescents aged 10-19. Multi-stage sampling was used to select schools and participants. Instruments used were questionnaire, weighing scale, and stadiometer. Data analysis was done using SPSS 25.0. Ethical approval and consent were obtained, ensuring confidentiality. Socio-demographic profile: 14-17 age group (58.9%), females (68.5%), Christians (62.8%), urban dwellers (70.1%). Knowledge on nutrition was assessed with 83.94% scoring excellent. Meal habits of respondents revealed 65.4% eat 3-4 meals/day, frequent breakfast (75.5%), and lunch was mostly skipped (33.5%). Common snacking (95.8%). Normal BMI status is prevalent, some underweight and obesity noted. The chi-square test shows that there was no significant association between nutritional status and dietary behavior ( $\chi^2 = 0.805$ ,  $df = 3$ ,  $p = 0.848$ ). The correlation between nutritional knowledge and dietary behavior was extremely weak ( $-0.005$ ) and not significant ( $p = 0.922$ ). The correlation coefficient between nutritional status and nutritional knowledge was  $0.024$  and not significant ( $p = 0.647$ ). The correlation coefficient between nutritional status and dietary behavior was extremely weak ( $-0.020$ ) and not significant ( $p = 0.703$ ). This study concludes that the school food environment fosters both underweight and overweight conditions among students, with a notable disconnect between their nutritional knowledge and actual dietary practices.

## **FOOD SECURITY AND NUTRITIONAL STATUS OF IN- SCHOOL ADOLESCENTS IN IFO LOCAL GOVERNMENT AREA OGUN STATE, NIGERIA.**

*by Oluwadamilola .B. Adekolujo / Esther .I. Alao / Yusuff .G.O. Adebuseyi / Lead City University Toll Gate Area Ibadan Oyo State Nigeria / Lead City University Toll Gate Area Ibadan Oyo State Nigeria / Lead City University Toll Gate Area Ibadan Oyo State Nigeria*

*Keywords: Adolescents, Food Security, Malnutrition, Nutrient intake.*

Achieving Sustainable Development Goal 2 (Zero Hunger) is arguably one of the most important and difficult challenges faced by mankind. In light of the high burden of malnutrition and its consequences, the Sustainable Development Goals (SDGs) highlight food security as a human right and a major determinant of the overall health outcome. Low food security among adolescents has been linked to malnutrition due to rapid growth and development and changes in dietary habits that influenced their nutrient intake. This study therefore assessed food security and nutritional status among in-school adolescents in Ifo Local Government Area, Ogun State, Nigeria. A descriptive cross-sectional study was conducted among 400 in-school adolescents in Ifo Local Government Area, Ogun State in southwestern Nigeria, selected via multi-stage sampling. A semi-structured, self-administered questionnaire was used for data collection which included the 10-item US Household Food Security Scale Module (HFSSM) to assess food security. Body weight and height were assessed using standard procedures. Data were analyzed using SPSS v. 25. Total Dietary Assessment (TDA) was used to assess nutrient adequacy, World Health Organization (WHO) Anthro plus software was used to determine the anthropometric indices. Descriptive statistics was used to summarize data and inferential statistics was used to ascertain relationships between variables. The prevalence of food insecurity was 67.5%. Gender, age, parents occupation, living arrangement, family type, feeding money, food intake were associated ( $p < 0.05$ ) with food insecurity. A majority of the in-school adolescents had inadequate of essential nutrients such as vitamins. The prevalence of food insecurity among in-school adolescents in Ifo Local Government Area was high. A multi-sectoral approach including the government, ministry of education, non- governmental organization, health care providers and media is necessary in tackling the challenges of food insecurity and its numerous consequences among adolescents.

## **SOCIO-DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS, DIETARY INTAKE, AND NUTRITIONAL STATUS OF HOUSEHOLDS WITH CHILDREN AGED 1-3 YEARS IN HOUSEHOLDS IN SEME SUB-COUNTY, KENYA**

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*Keywords: Keywords: Nutritional status, dietary diversity, stunting, underweight, wasting*

Despite efforts by the Kenyan Government to address household food insecurity, Seme Sub-County reports a higher rate of households lacking food or money to purchase food (41.9%) compared to the national average (36.2%). Additionally, Seme has an under-five mortality rate of 72 deaths per 1000 live births, surpassing the national rate of 52 per 1000. Despite this high mortality rate, over 50% of mothers in Seme introduce complementary feeding early, increasing the risk of undernutrition, including stunting, wasting, and being underweight. This study aimed to assess the demographic, socio-economic, dietary intake, and nutritional status of children aged 1-3 years in Seme Sub-County. Data were collected from 193 families using a questionnaire on household demographic and socio-economic characteristics, and children's nutritional status was assessed using anthropometric measures. Multiple linear regression was employed to determine the relationship between dietary intake and nutritional status. Findings revealed that 38.9% of children were stunted, indicating chronic malnutrition and long-term food deprivation; 16.1% were underweight, and 8.8% were wasted. These rates exceed national averages of 26% for stunting, 11% for underweight, and 4% for wasting. Early introduction of complementary feeding and poor consumption of Vitamin A-rich vegetables and tubers (15.6%) were significant contributors to these high rates, along with a lack of food or money to purchase food. A statistically significant relationship was found between stunting and low dietary diversity ( $p=0.02$ ). Children aged 1-3 years consuming a poorly diversified diet were 12 times more likely to be stunted, holding moderate and high dietary diversity constant ( $\beta(95\%CI)=12(11.92,12.08)$ ). Low dietary diversity is a critical factor in the high stunting rates observed in Seme.

## **LATENT HIGHER EDUCATION INSTITUTIONS' OPPORTUNITIES IN THE PREVENTION AND CONTROL OF NON-COMMUNICABLE DISEASES IN LOW AND MIDDLE INCOME COUNTRIES**

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*Keywords: health promotion, higher education institutions, non-communicable diseases, prevention, sustainable development.*

Higher education institutions have the potential to promote health to students, employees and surround communities. Unfortunately, despite this fact, some students, even the referred to workers engage in health-risky-behaviours, which predispose them to many diseases most of

which are preventable. Adopting and implementing a holistic higher- education nutrition promotion education policy and public health interventions can control a significant number of health-related problems especially non-communicable diseases among students, employees and surround communities in low and middle income countries, especially the most affected sub-Saharan Africa. This will greatly enhance universities' potentials and contributions to harness a sustainable health development within the institutions and beyond their boundaries. The sustainable health development will be seen even among old adults. The proportion of senior people in many societies including low and middle income countries has been rising, which is increasing the demand for healthcare services and other social services (Alqahtani, 2022). Compared to other different age groups, elderly individuals have the highest prevalence of chronic diseases and the largest, most significant expenses associated with long-term care (Visser et al., 2019). With a longer lifespan comes increasing chronic disease risk for the individual and burden for the health care system. Health economic studies show that despite increasing longevity, the number of years lived in poor health have increased in the last 30 years (Global Disease Burden, 2019). Therefore, this review advocates for “health promoting universities” concept among all institutions of higher learning, even in lower levels by streamlining health promotion content and activities throughout all teaching, learning, research and extra-curricular activities.

## **ASSESSING THE NUTRITIONAL QUALITY, MICROBIAL SAFETY AND SENSORY ACCEPTABILITY OF READY-TO- USE COMPLEMENTARY FOODS**

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*Keywords: Malnutrition., Microbial safety, Nutritional quality, Ready-to-use food, Sensory analysis Complementary feeding*

The World Health Organization estimates that 149 million children under 5 are stunted, 45 million are wasted, and 38.9 million are overweight or obese. About 45% of deaths among children under 5 are linked to undernutrition, which can be mitigated through complementary feeding. This study determined the nutritional composition, microbial safety, and sensory evaluation of developed ready-to-use complementary foods. A facility-based analytical cross-sectional design was used. Mothers aged 18–49 years with children 6-24 months were selected

using convenience sampling. Data was collected from 110 mothers at Volta Regional Hospital via a pretested questionnaire and analyzed using STATA version 16. Proximate analysis determined the nutrient composition of complementary foods (fonio, maize, soybeans, and beans soup). Microbial quality was assessed through total colony counts, and sensory evaluation was conducted with a 9-point Hedonic scale. Moisture content ranged from 9.49% to 11.11%, crude protein from 18.94% to 34.95%, crude fiber from 1.73% to 4.71%, crude fat from 4.47% to 13.64%, ash from 6.06% to 7.78%, and carbohydrate from 28.41% to 57.12%. Significant differences were found in fiber ( $p<0.01$ ), fat ( $p<0.0001$ ), protein ( $p<0.0001$ ), and carbohydrate ( $p<0.0001$ ) content among formulations. Zinc content was below the Codex Alimentarius standard, while iron content exceeded it. No growth of *Salmonella*, *Staphylococcus aureus*, mold, or yeast was found, except for *Staphylococcus aureus* in the soybean-based formulation. Fonio soup received the highest ratings for taste (7.89), color (7.74), texture (7.94), aroma (7.60), mouthfeel (7.71), and overall acceptability (7.81), significantly higher than other formulations. Bean soup was least accepted for taste (4.62) and aroma (4.88). Nutritious complementary foods with high macro and micronutrient content and good consumer acceptance can be developed using blends of cereals like fonio and legumes such as soybeans.

## **THE USE OF PHOTO STORY NUTRITION INTERVENTION TO PROMOTE WATER CONSUMPTION AMONG SCHOOL- AGED CHILDREN (7-10 YEARS) IN IBADAN, OYO STATE: QUALITATIVE STUDY**

*by Ujirotoghene Obokparo Favour / Lead City University*

*Keywords: focus group discussion, nutrition education, photostory, school-aged children, sugar-sweetened beverages, water intake*

Adequate water intake has significant health benefits to individuals, however, most individuals do not meet up with their daily requirement particularly young children, who often favor Sugar-Sweetened Beverages (SSBs) over water. Over-consumption of SSBs has been associated with the rising prevalence of diet-related non-communicable diseases in Nigeria. This study examined the effect of photostory intervention to promote consumption of water among school-aged children (7 –10 years) in Ibadan, Nigeria. The study was a mixed study design using quasi-experimental and qualitative design. 54 pupils were purposively recruited from two private primary schools. Focus group discussion (FGD) was carried to assess their

level of knowledge about adequate water consumption, water consumption patterns and perceptions of SSBs before and after the intervention using a focus group guide. A photostory was designed in form a story to educate young children on the importance of consuming water and consequences of over-consumption of SSBs. The FGD was recorded using an audio recorder. The discussion was transcribed and analyzed using NVivo software. The majority of the students were girls (53.7%). Prior intervention, majority of the children had a fair knowledge of adequate water intake. The photo story nutrition intervention improved their level of knowledge as they better understood the benefits of adequate consumption of water, particularly in comparison to SSBs; and also preferred consumption of water to SSBs at the end of the intervention. Photostory intervention improved the overall knowledge and practices among school-aged children which implies adequate nutrition education could influence young children's dietary habits.

## **PREVALENCE AND RISK FACTORS FOR OVERWEIGHT AND OBESITY AMONG AFRICAN MEN AND WOMEN: A SYSTEMATIC REVIEW AND META-ANALYSIS.**

*by Robert Akparibo / Hibbah Osei-Kwasi / Paschal Awingura Apanga / Albert Kwansa / Evans Atiah Asamane / Sawudatu Zakariah-Akoto / Joseph Mensah / Eunice Nago / Afua Tetteh / Issac Boadu / Emmanuel Anaba / Laura Gray / Richmond Aryeetey / School of Medicine and Population Studies, University of Sheffield, UK . / School of Sports Exercise and Health Sciences, Loughborough University, UK. / The Jenner Institute, Nuffield Department of Medicine, University of Oxford, UK / School of Medicine and Population Studies, University of Sheffield, UK / Institute for Applied Health Research, University of Birmingham, UK / Noguchi Memorial Institute for Medical Research, University of Ghana, Legon. / School of Medicine and Population Studies, University of Sheffield, UK / Université d'Abomey- Calavi, Benin / School of Public Health, University of Ghana, Legon / School of Public Health, University of Ghana, Legon / School of Public Health, University of Ghana, / School of Medicine and Population Studies, University of Sheffield, UK / School of Public Health, University of Ghana, Legon*

*Keywords: Africa., Keywords: overweight, men, obesity, prevalence, risk factors, women*

This systematic review and meta-analysis assessed the prevalence and risk factors associated with overweight and obesity among African men and women. A systematic search was

conducted in MEDLINE, EMBASE, CINAHL, Web of Science, Scopus, Google Scholar, African Index Medicus, and African Journals Online, to identify studies that reported the prevalence and risk factors of overweight and obesity in men and women in Africa. Two independent reviewers carried out study selection, data extraction, and quality assessment. Pooled prevalence of overweight and obesity was estimated using random effects meta-analysis. The  $I^2$  statistic was used to assess heterogeneity between studies. Thematic analysis was used to summarise the risk factors of overweight and obesity. The search retrieved a total of 1,897 studies, of which 68 studies met the eligibility criteria—all cross-sectional studies. Of these, 23 and 28 studies were included in the meta-analysis for overweight and obesity, respectively. The overall prevalence of overweight was 26.58% (95% CI: 21.80–31.35). Pooled prevalence of overweight was 29.89% (95% CI: 23.67–36.11) in women, and 23.09% (95% CI: 16.29%–29.90%) in men. The overall prevalence of obesity was 18.91% (95% CI: 16.22–21.61). Pooled prevalence of obesity was 26.43% (21.03–31.83) in women, and 10.46% (95% CI: 18.34–12.59) in men. The factors identified as significantly associated with overweight and obesity were grouped into 3 themes: *socio-economic and demographic* (gender, age, education, ethnicity, marital status, employment, monthly income, residential status, family history of overweight/obesity, and other NCD); *lifestyle, dietary and behavioural* (alcohol & food consumption, smoking, physical inactivity/lack of exercise, and contraceptive use), and *reproductive* (contraceptive use, parity/multiple births). The findings demonstrate high overweight and obesity prevalence among African men and women, posing a threat to vulnerable healthcare systems in African countries. The high prevalence highlights the need for effective policies and interventions to address overweight and obesity in Africa.

## **EFFECT OF TAMARIND (TAMARINDUS INDICA L.) ON THE CARDIOMETABOLIC HEALTH OF PATIENTS LIVING WITH HIV AND ELEVATED TRIGLYCERIDE: A DOSE-RESPONSE DOUBLE-BLIND, RANDOMIZED EXPLORATORY TRIAL**

*by Tonny Kiyimba / Department of Food Science and Technology, Kyambogo University, Kyambogo, Uganda*

*Keywords: HIV, Keywords: Cardiometabolic health, Phytochemicals, Tamarindus indica L., Uganda, sub-Saharan Africa*

The upsurge in cardiometabolic dysfunction in sub-Saharan Africa calls for more sustainable remedies. Particularly, People Living with HIV (PLWH) have an increased risk of metabolic syndrome. Tamarind (*Tamarindus indica* L.), a fruit native to Africa, is rich in polyphenols and is traditionally used as a remedy for cardiometabolic risks. We assessed the potential of Tamarind fruit juice to improve lipid metabolism in PLWH. We conducted a 4-week, randomized (1:1) trial of 50 patients allocated to two doses of Tamarind fruit juice. The primary endpoint was triglycerides (TG), and eligible participants were aged 30 to 60y with  $TG \geq 150$  mg/dL. Patients consumed 600mL of Tamarind fruit juice daily, containing respectively 123mg, and 337mg of total polyphenols. Fasted blood samples were analyzed for lipid profile and glucose. Blood pressure, vascular function, anthropometry, and body composition were measured. Patients were required to maintain their habitual diet and lifestyle. Dietary intake and background polyphenol intake, and physical activity were measured throughout the study through a 24-hour dietary recall and the International Physical Activity Questionnaire. Trial registration (**NCT06058845**). There was a non-statistically significant difference in TG between doses of -17.7mg/dL (95% CI: -70.1, 34.7),  $P=0.499$ , which remained unchanged after adjusting for BMI, physical activity, and dietary intake. In the 337mg dose, the within-group effect was -39.8mg/dL (95% CI: -67.7, -11.9),  $P=0.006$ , corresponding to a 17.3% reduction of the baseline TG levels, while no statistically significant effect was noted for the 123mg dose. Concerning the secondary endpoints, the 123mg dose significantly reduced systolic blood pressure by -7.4mmHg (95% CI: -14.5, -0.26),  $P=0.043$ . Physical activity, dietary intake, and background polyphenol intake did not vary significantly within and between groups. A 4-week consumption of Tamarind fruit juice standardized at 337mg/d total polyphenols substantially improved TG metabolism. This exploratory trial provides a basis for future full-scale trials.

## **CONSUMER PERCEPTIONS, ATTITUDES AND WILLINGNESS TO PAY FOR EDIBLE INSECTS AND THEIR PRODUCTS.**

*by Nomagugu Ndlovu / Midlands State University*

*Keywords: Consumers, attitudes, edible insects, perceptions, willingness*

The global urgent need for sustainable food systems has increased interest in edible insects due to their known lower carbon footprint as an alternative to the conventional protein sources



such as meat and all other animal products. The study was conducted to provide in- depth information on consumers' perceptions, attitudes and willingness to purchase edible insects and their products in Gweru, Zimbabwe. A descriptive approach with both qualitative and quantitative approach was used. Study participants were grouped into various strata and randomly sampled. Each study participant completed a questionnaire which sought to ascertain knowledge, attitude, perception and willingness to buy edible insects and their products. Data was analysed using IBM SPSS, five-point Likert rating scale and Contingent Valuation Method (CVM). The common reactions of insect-based products were shock, excitement and inquisitiveness. Only 23% of the participants were willing to replace meat with edible insects. More than half (56%) of the respondents preferred edible insects as a whole and were not willing to pay for insect-based products. Forty-four percent (44%) of the respondents had positive attitudes towards products made from edible insects and indicated willingness to pay for them. The insect-based biscuit was the most preferred product (46%), followed by the cereal blend (28%) and lastly the cereal bar (26%). Consumers were willing to pay USD\$1.58, USD\$1.40 and USD\$0.84 for these products respectively. Although fewer participants expressed willingness to replace insects with meat, at least the high number of those consuming the edible insects in their original state shows potential that with increased awareness of benefits of edible insects, more consumers will appreciate edible insects-based products. In addition to the health benefits, taste and aesthetics are critical parameters influencing consumers' willingness to purchase edible insects and their products.

## **INFLUENCE OF CLIMATE CHANGE ON FOOD SECURITY AMONG RESIDENTS OF ABAKALIKI METROPOLIS OF EBONYI STATE, NIGERIA**

*by Ngozi Nwonu Onuenyim / Benedette Obioma Onah / Ebonyi State College of Education, Ikwo Nigeria / Ebonyi State College of Education, Ikwo Nigeria*

*Keywords: agricultural production, climate change, food security*

Climate change is a long-term shifts in temperatures and weather patterns. This shift in the weather pattern has affected all the biosphere including human beings. Climate change has affected the food security in the world today. Food security has four dimensions: food availability, access to food, stability of supply and access and safe and healthy food utilization. It is a key factor in good nutrition, along with health, sanitation and care practices. This study therefore examines the perceived influence of climate change on food security among

residents of Abakliki Education Zone of Ebonyi State, Nigeria. A survey research design was adopted for the study. The population of the study was 726,200 while the sample size was 400 respondents selected through a multi-stage sampling technique. Instrument for data collection was a structured questionnaire titled the perceived Influence of Climate Change on Food Security. Data collected from the research question items for the study were answered using mean and standard deviation. T-test and Analysis of variance (ANOVA) was used to test the hypotheses at 0.05 significant levels. The result of the study revealed that there is high knowledge of people in Abakliki Education Zone of Ebonyi state, climate change affects crop yield of farmers thereby affecting food availability, access to food, stability of supply and access as well as safe and healthy food utilization among residents of Abakliki Education Zone of Ebonyi state. From the data collected and analysed, there is need for more sensitisation of the masses especially rural farmers on various ways of mitigating the devastating effects of climate change for effective agricultural production and food security.

## **INTEGRATING NUTRITION IN FARMER FIELD SCHOOLS (FFS)**

*by Noella Semu / Food and Agriculture Organization of the United Nations*

*Keywords: Farmer field schools, Food Systems, Minimum Dietary Diversity, Nutrition*

The challenges of unsustainable food systems are compounded by the growing demand for nutritious diversified foods that are bought by population growth, increased incomes and urbanization. Currently programs in Malawi integrate nutrition sensitive agriculture in Farmer Field Schools (FFS) to ensure that the current food system is producing maximum diversified yields benefits to contribute to nutrition outcomes. The research reviewed various elements of nutrition component (s) embedded within FFS on effectiveness and proposition to improve integration. Participatory research approaches were used to gauge and explain on the overall functionality, effectiveness, efficacy, short and long-term nutritional benefits of the FFS. Mixed and cross-sectional approaches were used to collect qualitative and quantitative data through household surveys, key informant interviews and gender disaggregated focus group discussion (FDGs) for FFS members compared to non FFS members. Households were more likely to meet their dietary diversity requirements because of diversified production. Some FFS incorporated value addition of crops like juice making from fruits (baobab), making tomato puree and honey processing. This implies that integrating nutrition in FFS enhances skills due nutrition education on nutrition related topics, high adoption on nutrition and WASH activities,

having backyard gardens, livestock and fruit trees with processing and preservation. Therefore, NSA projects must be designed in a way to contribute to nutrition outcomes through integrating nutrition topics with other topics rather than doing them separately. secondly among others develop key performance indicators (KPIs) to define envisioned success NSA in FFS. Integrating nutrition in FFS significantly contribute to attainment of minimum dietary diversity but not nutrition outcome, however programmes properly designed, can contribute to nutrition outcomes.

## **DISTRICT-LEVEL MAIZE ZN CONCENTRATIONS ARE ASSOCIATED WITH SPATIAL VARIATION IN ZN APPARENT INTAKES IN MALAWI**

*by Lucia Segovia de la Revilla / Lester Botoman / Gareth Osman / Edward Joy / Murray Lark / London School of Hygiene and Tropical Medicine / Chitedze Agricultural Research Station, Department of Agricultural Research / Lilongwe University of Agriculture and Natural Resources / London School of Hygiene and Tropical Medicine / University of Nottingham*

*Keywords: Zinc apparent intake; spatial variation; micronutrients; Malawi*

Zinc is an essential micronutrient and its deficiency is widespread in Malawi. Dietary zinc intakes and population status are likely to vary at sub-national scales. In Malawi, where localised food systems are predominant, these subnational differences are partially explained by the spatially-dependent variation in maize zinc concentration which is largely driven by the zinc availability in agricultural soils and influenced by soil pH and other agro-environmental factors. Despite this, food composition data used to estimate dietary zinc (and other micronutrient) intakes are typically reported as single data points, national aggregations or imputed values from other countries. This limits the ability to estimate intakes accurately and identify populations at risk of inadequacy. Estimates of zinc apparent intake and prevalence of inadequacy in Malawi were calculated using nationally representative data on household food consumption from the 2019 Malawi Integrated Household Survey. This dataset was matched to zinc composition data at national level and at district level. The former used food composition tables from Malawi, Western Africa and others. The later substituted zinc concentration in maize and maize products to district level estimates. These estimates were calculated using block kriging and the geo-referenced maize zinc concentration collected by the GeoNutrition project in Malawi. Differences in zinc apparent

intake estimates and risk of inadequacy using district-level maize zinc concentration showed spatial differences when compared to national-level (single-value) zinc concentration. For instance, the risk of zinc apparent inadequacy increased 4% (from 71-67%) in Mzuzu district and decreased 7% (from 46-53%) in Chiradzulu district, when comparing national-level with district-level data. The use of spatially resolute micronutrient concentrations for estimating micronutrient intakes and inadequacies provided higher data resolution highlighting subnational differences. These nuances are key when designing and implementing equitable and cost- effective nutrition interventions.

## **CHALLENGES OF ACCESSING QUALITY NUTRITION AMONG ADOLESCENT SECONDARY SCHOOL STUDENTS IN SOUTHEAST NIGERIA**

*by Mrs Stella Odoh / Ebonyi State College of Education, Ikwo Nigeria*

*Keywords: adolescent students, challenges, nutrition education, quality nutrition*

Quality nutrition in food intake is very important for proper growth and development of the adolescent student. Healthy and quality food is associated with the nutrition value of such food, and is very necessary for the physical and mental development of the body. More often than not, especially in the developing countries of the world, the adolescent secondary school students face a lot of developmental issues which in one way or other could be linked to the poor nutrition value of their food intake. This paper is aimed at identifying the challenges facing the adolescent students in accessing quality nutrition in their food intake, and to proffer some solutions. A survey research design was adopted for this study with a sample population of 2570 students randomly selected from different secondary schools in the study area. Instrument for data collection was a structured questionnaire titled the Quality Nutrition Challenges Questionnaire (QNCQ). Two research questions and two hypotheses were formulated to guide the study. The instrument was validated by experts and the reliability was tested using Cronbach Alpha which yielded a coefficient of 0.95. Data collected from the research were analysed using mean and standard deviation. The hypotheses were tested at 0.05 significant levels using t-test statistical instrument. Several challenges were identified, including lack of proper nutrition knowledge, family responsibility burden on the parents and guardians, among others. It is therefore recommended that appropriate nutrition education be introduced among the students among others.

## **EFFECT OF THE CONSUMPTION OF COMMERCIAL BREASTFEEDING PRODUCTS (DR. ANNIE'S LACTATION PRODUCTS) ON BREAST MILK OUTPUT ON LACTATING MOTHERS OF PRETERM INFANT: A SINGLE BLINDED RANDOMIZED CONTROL TRIAL.**

*by Edward Appiagyei / Kwame Nkrumah University of Science & Technology*

*Keywords: breastfeeding, breastmilk, galactagogue, preterm infants*

Breastmilk is the baby first meal and first vaccination as it contains macronutrients, micronutrients, antibodies, good bacteria and immunoglobulins. Breastfeeding is a complicated biochemical process including biological, hormonal, and psychological elements. Lactagogues (galactagogues) are substances which could be used to assist initiation of maternal milk synthesis. Foods like fenugreek, moringa, fennel and oats have been used as galactagogues for years in Ghana, but little is known about their ability to increase breastmilk. The objective of the study was to compare if there was a significant difference in breast milk volume and infant weight in participating mothers of preterm infants who consumed a commercial galactagogues product and those who took a placebo. The study site was the 37 Military Hospital (NICU), where mothers with preterm and have low breastmilk supply were enrolled. The mothers of the intervention group consumed the product and the mothers in the placebo group had placebo given for 7 days. 32 participants were recruited, but 26 participants completed the study. There was an increase in the breast milk volume and infant weight from after 7 days, with the mean difference of 450 ( $\pm 70.71$ ) ml and 0.12kg for the granola group. The breast milk volume between the cookies group was significantly different ( $p = 0.04$ ) but not so in the granola group ( $p = 0.08$ ). The comparison between the treatment group and placebo group with their infant weight between the granola group was  $p = 0.67$  and for cookies group was 0.15, which was not significantly different. There is a significant difference in the breast milk volume of the cookie group only but no significant difference in infant weight gain in all groups hence the cookies product can be recommended to mothers with breast milk output problems for assurance.

## **CHILD FOOD POVERTY, COMPLEMENTARY FEEDING AND NUTRITIONAL STATUS OF CHILDREN AGED 6-24 MONTHS IN IBADAN NORTH LOCAL GOVERNMENT AREA, OYO STATE**

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*Keywords: child food poverty, children., complementary feeding, nutritional status*

Child food poverty harms all children, while diverse diets are associated with improved survival and linear growth and a lower risk of child undernutrition (stunting and wasting), micronutrient deficiencies and overweight and obesity in early childhood. The prevalence of undernutrition has risen despite an increase in the exclusive breastfeeding rate, over 50% of Nigerian infants are given complementary foods too early with lower frequency and from lesser food groups than what is required for their ages. Therefore, the study assessed the complementary feeding practices, severity of child food poverty, and nutritional status of children aged 6-24 months in Ibadan north local government area, study was a descriptive cross- sectional design, 273 mother-child pairs were selected across five primary health centres in Ibadan North lga. An interviewer- administered questionnaire using the kobo collect app was used to collect data on socio-demographic characteristics, infant feeding practices of the mothers, diet diversity, and anthropometric measurement of the children. Data was analyzed using descriptive statistics and bivariate significance using chi-square to examine the association between independent and dependent categorical variables with a significance level of  $p < 0.05$ . The prevalence of mothers who practised appropriate complementary feeding practices was low (26%), 49.5% of the children were living in child food poverty. Malnutrition was seen in the study area in the form of stunting, wasting, underweight, and overweight with stunting being the most predominant form (58.2%). The introduction of complementary food was shown to have a significant association with stunting, minimum meal frequency with underweight, minimum acceptable diet with wasting, underweight, overweight, minimum dietary diversity with all the forms of malnutrition, and overall complementary feeding practices with underweight. Appropriate overall complementary feeding practices was low, almost half of the children were living in child food poverty and this was significantly associated with the children nutritional status.

## **DRAMA SERIES INTERVENTION IN TWO LOCAL GOVERNMENT AREAS OF IBADAN: IMPLICATION ON INFANT GROWTH STATUS IN THE FIRST 180 DAYS OF LIFE**

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*Keywords: Drama intervention, Infant growth pattern, Postpartum., infant head circumference*

The first 180 days of life after birth is a critical period and window of opportunity for early child growth, neurodevelopment, weight gain, and intellectual development of the child. Research evidence has established that drama provides embodied engagement in metacognition and experiential learning. Few studies have used drama intervention to monitor early child growth pattern. This study assessed the implication of drama intervention on infant growth pattern in two Local Government Areas (LGAs) of Ibadan, Nigeria. The longitudinal study employed a quasi-experimental design. Five communities each within two LGAs were randomly selected. Two hundred participants (pregnant women in their second trimester) were recruited and randomised into experimental (100) and control (100) groups. Participants' information was obtained on socio-demographic characteristics and anthropometry. At prenatal stage, the experimental group viewed a four-episode drama twice within two weeks on importance of exclusive breastfeeding practices, and a practical session on hygiene practices. Participants were followed up at one week, one, three, and six months postpartum. Descriptive statistics, ANOVA and Chi square test were used to analyse the data. WHO-Anthro was used to determine infant growth. Level of significance was set at  $p < 0.05$ . Participants' ages were  $27.29 \pm 6.03$  (experimental), and  $28.27 \pm 6.68$  (control), respectively. At one-week postpartum, there was increase in mean weight and head circumference as well as length of infants in intervention group compared to control group ( $p < 0.05$ ). There was significant relationship in infants' weight gain at one month ( $X^2 = 1.94$ ,  $P = 0.04$ ) and head circumference at six months postpartum ( $X^2 = 2.43$ ,  $p = 0.01$ ) in the intervention group

compared to the control group at ( $p < 0.05$ ). Drama on Exclusive breastfeeding practices was effective in increasing infant weight, length and head circumference, hence, its use should be promoted.

*Sponsored by “Nestle Research Foundation” for the study of nutritional problems in the world.*

## **IMPACT OF FOOD SYSTEM CHANGES ON DIETARY PATTERNS AND PUBLIC HEALTH IN AFRICA: A NARRATIVE REVIEW OF CURRENT EVIDENCE**

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*Keywords: Africa, Dietary patterns, Food system changes, Nutrition transition, Public health*

The African food system has undergone significant transformations due to globalization, urbanization, economic development, and policy changes. However, agricultural productivity has been constrained by climate variability, limited technology, and inadequate infrastructure. This study aims to present the current state of evidence on how shifts in Africa's food system affect dietary intake and health outcomes. A comprehensive literature search was conducted using databases such as PubMed, Web of Science, Scopus, and Google Scholar. Keywords included “food system changes,” “dietary patterns,” “public health,” “nutrition transition,” and “Africa”. Nine (9) studies published in English from 2010 to 2023 were selected based on their relevance. Data extraction was performed independently by two reviewers to ensure accuracy and a narrative synthesis approach was used to integrate findings from the selected studies. The review identified that urbanization and economic development have shifted African diets from traditional, nutrient-rich foods to processed foods high in



sugars and unhealthy fats. Trade liberalization has increased access to energy-dense, nutritionally poor foods, raising obesity and non-communicable disease rates. Supermarket expansion and adoption of modern food processing techniques have driven preferences for convenience foods and animal products, causing dietary imbalances and a double burden of malnutrition. Climate change and political instability exacerbate food insecurity, particularly among women and children, further increasing vulnerability to infectious diseases and straining healthcare systems. Current changes in Africa's food system have significantly impacted dietary patterns and public health, resulting in increased healthcare expenditure and a greater demand for medical services to address both ends of the malnutrition spectrum and diet-related non-communicable diseases. Addressing these challenges therefore requires investments in sustainable agricultural practices, nutrition-sensitive policies that promote equitable food production and distribution, and comprehensive food security strategies.

## **ASSOCIATION BETWEEN DIETARY PATTERN QUARTILES AND THE LIKELIHOOD OF METABOLIC SYNDROME AMONG WOMEN OF REPRODUCTIVE AGE IN THE HOHOE MUNICIPALITY, GHANA**

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*Keywords: diabetes, dietary pattern, hypertension, metabolic syndrome, obesity, women*

The association between diet and MetS among women of reproductive age (WRA) in Ghana is underexplored. Thus, this study aimed to determine whether dietary pattern quartiles were

associated with MetS and MetS risk factors among WRA. In this cross-sectional study, we used a semi-structured questionnaire to obtain information on socio-demographic characteristics of 322 WRA in the Hohoe municipality, Volta region. Dietary assessment was done using 24-hour recall. Anthropometric measurements, systolic/diastolic blood pressure (SBP/DBP), fasting blood sugar (FBS), and total cholesterol (TC) were measured early in the morning following standard procedures. Principal component analysis was used to derive three factors reflecting traditional, mixed, and alternative dietary patterns. We defined MetS as  $FBS \geq 6.1$  mmol/L plus the presence of any two of the following: body mass index (BMI)  $\geq 30 \text{ kg/m}^2$ ,  $SBP/DBP \geq 140/90$  mmHg, waist circumference (WC)  $> 0.85$  m, and  $TC > 5.2$  mmol/L as per WHO criteria. We used logistic regression to test whether increasing dietary pattern quartiles were associated with MetS and MetS risk factors. Mean age was 30 years, and one-quarter were food insecure. The traditional diet included vegetables, fruits, legumes, fish, and seafood; meats, dairy/milk, and milk products, and nuts for the mixed diet; and oils and fats, alcohol, beverages, and sweets for the alternative dietary pattern. The prevalence of MetS was 39.1%. Compared to the lowest quartile of the mixed dietary pattern, WRA in the third quartile were 4x more likely to have hypertension (AOR = 4.26; 95%CI: 1.04, 17.49) while the odds of high WC were 58% lower (AOR: 0.42; 95% CI: 0.19, 0.92) among WRA in the second quartile of mixed dietary pattern. There was no association between the three dietary patterns and MetS. Mixed dietary pattern appeared to be negatively associated with high WC and positively associated with hypertension but not with MetS among the WRA.

## **EFFECT OF HIGH-PROTEIN READY-TO-USE THERAPEUTIC FOOD (RUTF) ON IGF-1 LEVELS AND GROWTH IN SEVERELY WASTED CHILDREN: A PROOF-OF- CONCEPT RANDOMIZED CONTROLLED TRIAL**

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*Keywords: Protein, catch-up growth, children, ready-to-use therapeutic food, severe wasting*

Children recovering from severe wasting have suboptimal catch-up growth, which could be attributed to inadequate protein in standard Ready-to-use Therapeutic Food (SP-RUTF). We aimed to assess the potential of RUTF with higher protein quantity and quality in improving markers of linear growth among children with severe wasting. In a proof-of-concept randomized control trial, we compared a higher protein quantity and quality RUTF (HP-RUTF) to SP-RUTF in treating severe wasting (defined as weight-for-length z score (WLZ) <-3 standard deviations and/or a mid-upper-arm circumference (MUAC) <11.5cm). HP-RUTF had 15% protein-sourced energy and 76% dairy-sourced protein, whereas SP-RUTF had 10% protein-sourced energy and 54% dairy-sourced protein. At four sites, Children were randomized to receive 150-220kcal/kg/day of either treatment for eight weeks. Differences in growth markers at four and eight weeks of treatment were compared using Generalized Mixed Effects Models. The primary outcome was the mean insulin-like growth factor 1(IGF1) change at four weeks. We recruited 64 children in each arm (median age 12 [6,23] months). Children receiving HP-RUTF had higher IGF1 at four weeks than SP-RUTF; 16.1 [11.0, 21.2] ug/L versus 7.3 [2.3,12.4] ug/L,  $p<0.017$ . At eight weeks, groups did not differ in linear growth. However, at eight weeks, ponderal growth of children receiving HP-RUTF was higher (WLZ: 1.01 [0.82, 1.20] z-scores versus 0.71 [0.52, 0.91] z-scores,  $p<0.03$ ; WAZ: 0.68 [0.56, 0.81] z-scores versus 0.48 [0.36, 0.60] z-scores  $p<0.02$ ) and MUAC was also higher. Providing RUTF with enhanced protein quality and quantity improved markers of growth potential in children with severe wasting. These promising findings require further validation

in larger trials, which should also assess cost implications.

## **DIETARY PATTERNS AND THE RISK OF EATING DISORDERS AMONG HEALTH SCIENCE STUDENTS IN A TERTIARY INSTITUTION IN GHANA**

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*Keywords: Dietary pattern, Ghana, University students, eating disorder*

Health is a comprehensive term encompassing physical, mental and social well-being. Often, people lose sight of this holistic approach, emphasizing only on the physical aspect. Adjustments to new environments, changes in the food environment, coupled with stressful studying schedules are common features associated with university students. Hence, the need to assess dietary pattern and risk of eating disorders among this population to ensure adequate measures are put in place to deal with such problems should they exist. The study aimed to determine the association between dietary pattern of health science students and their risk of eating disorders. It was a descriptive cross-sectional study among 265 health science students randomly selected at the University of Ghana. Food frequency questionnaires were administered to assess participants' frequency of intakes. Principal component analysis was used to determine dietary patterns from frequency of intakes. The validated Eating Attitudes Test - 26 (EAT- 26) questionnaire was used to assess their risk. Statistical Package for Social Sciences (SPSS) version 26 was used for data analysis. Most (54.9%) participants were females. Participants age ranged between 18 - 27. Most (85.4%) participants were not at risk of eating disorders. Two major dietary patterns were identified, nutrient dense pattern and convenience dietary patterns. Nutrient-dense dietary pattern accounted for the largest variance in the food consumption data. It consisted of legumes and nuts, vegetables, oils, and oily foods. There was no significant association between the convenience and nutrient - dense dietary patterns and the risk of eating disorders ( $p=0.568$  &  $p=0.433$  respectively) There was low risk of eating disorders among the health science students and there was no association between the dietary patterns and the risk of eating disorders. Nevertheless, continuous nutrition education is still needed among this population to prevent eating disorders and its

associated health implications.

## **THE UN DECADE OF NUTRITION IN AFRICA: HOW HAVE NUCLEAR TECHNIQUES HELPED?**

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*Keywords: Capacity building, Nuclear techniques, UN Decade of Nutrition*

The Decade of Nutrition is soon coming to an end, the double burden of malnutrition, co-existence of stunting, wasting, micronutrient deficiencies on the one hand with rising of overweight and obesity, remains a global problem with disproportionate burden on low-and-middle income countries; Africa still carries a one of the largest proportions of this burden. This presentation will showcase how the IAEA has supported its African Member States in the period 2015-2025 to apply safe and non-invasive stable isotope and related nuclear techniques to generate evidence necessary for policy formulation and programme design to combat the double burden of malnutrition. African countries have generated useful data using stable isotope techniques under several themes including three themes: 1) Early life nutrition (achieving exclusive breastfeeding targets); 2) diet quality (nutrient bioavailability from diets) and 3) prevention and management of diet-related non- communicable diseases. The IAEA has also supported the raising of a new generation of African nutrition professionals via a regionally standardised MSc Nutrition and Nuclear techniques curriculum. Ability to accurately measure nutrition indicators such as nutrient absorption, infant and young child feeding practices, body fat, energy metabolism and diet quality accumulation becomes urgently imperative for evaluation of gains and shortfalls in achieving the decade's ambitions in Africa. Suitably qualified nutrition professionals remaining in the continent to drive the nutrition agenda is a critical factor in meeting the aspirations of the Africa Union's agenda 2063.

## **SUGAR-SWEETENED BEVERAGES CONSUMPTION AND ITS ASSOCIATED FACTORS AMONG SCHOOL ADOLESCENTS IN THE HOHOE MUNICIPALITY, GHANA**

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*Keywords: Adolescents, Obesity and type 2 diabetes, Sugar-sweetened beverages (SSBs)*

In many low- and middle-income countries (LMICs), infectious diseases continue to pose major health challenges. However, over the past few decades, non- communicable diseases (NCDs) related to diet and lifestyle have risen dramatically, with Sugar-sweetened beverages (SSBs) contributing to 10 to 15% of the burden among young people, playing a significant role in the obesity epidemic. This study aimed to assess SSB consumption and its associated factors among school adolescents in the Hohoe Municipality. A cross-sectional study was conducted involving 362 in-school adolescents, who were selected through multi-stage sampling and completed a semi-structured, self- administered questionnaire. Data analysis was performed using STATA 17.0, with relevant descriptive and inferential statistics calculated, considering a significance level of  $p < 0.05$ . Participation was entirely voluntary, and strict confidentiality was maintained. Among the 362 respondents, the mean age was 14 years. The prevalence of SSB consumption was high at 85%, with 55% consuming them excessively. Respondents whose parents had no formal education were 90% less likely to consume SSBs (aOR=0.10, 95% CI: 0.003-0.666,  $p=0.010$ ). Also, participants who believed that high SSB intake has negative health effects were 2 times more likely to consume SSBs (aOR=2.14, 95% CI: 1.168-3.910,  $p=0.014$ ). Factors influencing SSB purchases included thirst (18.3%), price (20.0%), and availability (31.5%). The prevalent intake of sugar-sweetened beverages (SSBs) among school- aged adolescents poses serious health risks. Efforts to decrease SSB consumption should be tailored to various contexts, targeting children and their families or surroundings, particularly in socially disadvantaged areas.

## **NUTRITION KNOWLEDGE AND DIETARY HABITS AMONG UNIVERSITY STUDENT-ATHLETES: IMPLICATIONS FOR HEALTH PROMOTION AND PERFORMANCE.**

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*Keywords: University student-athletes, dietary habits, nutrition knowledge, performance*

Current research elaborates the critical role nutrition plays in promoting optimal sports performance. For athletes who are also students, nutrition plays a double role- supporting learning and enhancing athletic performance. In spite of this, the dietary habits of many student-athletes have been found to be poor. This study assessed the nutrition knowledge and dietary habits of student athletes in the University of Ghana, as well as the participants' preferred source of nutrition information. This cross-sectional study used self-administered questionnaire to collect socio-demographic information and information pertaining to nutrition information sources, as well as nutrition knowledge and dietary habits from ninety-one participants. The data was subsequently analyzed for associations between variables of interest and predictions of certain variables based on others, using a Spearman's correlation test, chi-square, linear and multiple regression analyses with the level of statistical significance set at  $p < 0.05$ . Participants had an average nutrition knowledge score of 76.7% with a much lower average score for dietary habits (51.5%). A significant percentage of participants reported either never having intentionally sought nutrition information or sought it less than twice a week (72.6%). The internet was the most patronized source of nutrition information (39.6%) with 4.4% seeking information from nutritionists/dietitians. Besides a weak positive association between nutrition knowledge and dietary habits ( $r_s = 0.098$ ,  $p = 0.380$ ) and age and nutrition knowledge ( $r_s = 0.239$ ,  $p = 0.025$ ), no significant relationships were found between the other variables and either nutrition knowledge or dietary habits. This study highlighted the need for the involvement of nutrition professionals in initiatives aimed at improving the dietary habits and subsequently, performance of student-athletes, using programs which do not focus on merely improving knowledge, but which translate knowledge

into practice.

## **DIETARY APPROACHES EMPLOYED GHANAIAN SCHOOL CHILDREN TO MANAGE BODY WEIGHT: A QUALITATIVE STUDY**

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Portia Dadson / University of Cape coast / University of Cape coast / University of Cape coast  
/ University of Cape coast*

*Keywords: Childhood, Obesity, Overweight, healthy, unhealthy*

Childhood obesity is a growing concern in low- and middle-income countries. This trend is driven by factors such as urbanization, changes in dietary habits, and decreased physical activity. This qualitative study explored experiences of Ghanaian school-aged children regarding dietary practices to manage body weight. Three focus group discussions each comprising 8-9 participants were conducted among school-aged children in three basic school in Cape Coast, Ghana. Qualitative data analysis was conducted employing Braun and Clarke's reflective thematic analysis method in MAXQDA Analytics Pro 2020. Four themes emerged: (i) health and dietary knowledge (ii) dietary practices and preferences; (iii) influence on dietary choices; (iv) health and safety concerns. The study participants demonstrated a good understanding of healthy diets. Their food choices were driven by parents, guardians, teachers, peers, and the availability and costs of foods in their home and school environments. They also raised concerns of the lack hygienic practices of food vendors as a factor that influences their food choices. They called for parents and teachers to help address their school environment to make healthy foods easily accessible and encourage regular physical activity. School children can adopt healthy practices to manage their body weight, but their school food environment and support from parents and teachers are important determinants. Ensuring the accessibility and affordability of healthy foods, addressing hygienic practices of food vendors, and fostering a collaborative effort between parents, teachers, and school administrations are essential steps.



## KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS SUGAR SWEETENED BEVERAGES AMONGST ADOLESCENTS IN CAPE COAST SECONDARY SCHOOLS

*by Jessica Ayensu / Freda Nana Agyeiwaa Okrah / Elinam Dzorgbe / Sandra Mensah / University of Cape Coast / University of Cape coast / University of Cape coast / University of Cape coast*

*Keywords: Attitude and Practises (KAP), Sugar sweetened beverages (SSB); Knowledge*

The escalating consumption of sugar-sweetened beverages (SSBs) has emerged as a pivotal contributor to the rise in diet-related health issues, particularly affecting adults and adolescents in developed nations. Despite the acknowledged impact of attitudes and nutritional knowledge on food choices, a substantial data gap persists in understanding an association with the consumption behaviour of Ghanaian adolescents, particularly in the context of SSBs. The study involved 393 randomly selected students from three different schools. The research hypothesized associations between sociodemographic factors, and nutritional knowledge, attitudes, and SSB consumption. The Knowledge, Attitude and Practices (KAP) questionnaire score was calculated by summing the correct responses of the participants. Each domain was categorized into 'poor' 'moderate' or 'good'. Poor knowledge was indicated by a score of  $\leq 3$ , moderate knowledge by a score of 4-6, while good knowledge was indicated by a score of  $\geq 6$ . Similarly, poor attitude was indicated by a score of  $\leq 6$ , while good attitude was indicated by a score of 11, and poor practice was indicated by a score of  $\leq 1$ , while good practice was indicated by a score of 2. The study revealed that 55.7% had moderate knowledge, 47.1% had a negative attitude with 57.5% high consumption levels of SSBs. There was a weak positive correlation between knowledge and SSB consumption (0.076, p-value 0.134) and a weak negative correlation between knowledge and BMI for age (-0.087, p-value 0.087). Adolescents displayed moderate knowledge about SSBs, but this did not impact their consumption patterns, with a majority showing high consumption rates and notable gender differences in BMI and attitudes. No significant associations were found between demographic factors and SSB consumption levels. Despite a moderate level of nutritional knowledge among students, the prevalence of high SSB consumption was evident. To mitigate this, innovative nutritional education is imperative to reshape attitudes among high school students.

## WEIGHT PERCEPTION AND ITS INFLUENCING FACTORS AMONG WOMEN LIVING IN ACCRA METROPOLIS

by Enoch. S.S. Asiedu / Agartha. N. Ohemeng / Gloria. E. Otoo / University of Ghana / University of Ghana / University of Ghana

*Keywords: Ghana, Weight perception, diabetes, hypertension, obesity, women*

The subjective account of how individuals view and interpret their weight or weight perception directly influences their health-related behaviors. Accurate weight perception is essential for informed diet, physical activity, and weight management decisions. This study investigated weight perception and its influencing factors among women living in the Accra metropolis. A cross-sectional design was employed to survey 378 participants. The study population was female adults aged 18 to 65 years and residing in the Accra Metropolis. Weight perception was assessed using the Feel-weight-status minus Actual-weight-status Index (FAI), thus self-reported weight status (underweight, normal weight, overweight, and obese) compared to their measured body mass index (BMI) based on the World Health Organization (WHO) cut-offs. A semi-structured questionnaire was used to collect sociodemographic information. A logistic regression model was used to determine the association between weight perception, and its influencing factors. The majority of the respondents, 256 representing 67.7% exhibited inaccurate weight perception (FAI scores were positive), where they were heavier than they thought. Conversely, only 2.4% were lighter than they thought (FAI scores were negative). The prevalence of overweight and obesity was 38.1% and 29.9% respectively. Almost half (49.5%) of the respondents recorded a high waist-to-hip ratio (WHR). The average age of the respondents was  $42.1 \pm 13.2$  years. Increasing age was significantly associated with inaccurate weight perception (AOR= 1.025, 95% CI: 1.006-1.044). These findings show the need for targeted public health interventions that promote accurate weight perception among older female adults. This will potentially enhance weight management behaviors and reduce the risk of metabolic disorders among women in the study population.

## **COST-EFFICIENCY OF ACUTE MALNUTRITION TREATMENT IN HUMANITARIAN SETTINGS: A META- ANALYSIS ACROSS 50+ PROGRAMS**

*by Derek Lee / Suvi Kangas / Grace Heymsfield / Abel Khisa / International Rescue Committee / International Rescue Committee / International Rescue Committee / International Rescue Committee*

*Keywords: Acute Malnutrition, Cost, Cost-effectiveness, Scale, Simplified Approaches, Wasting*

Acute malnutrition remains a critical health challenge affecting millions of children under five in low- and middle-income countries, with less than one in five children in need receiving life-saving treatment. It is critical to understand the cost drivers of malnutrition treatment to scale treatment to as many children as effectively as possible. In this effort we aim to statistically analyze the growing body of cost-evidence to inform on best practices for decision-makers and government officials. We gathered program and cost data across several malnutrition treatment implementors including the IRC, Action against Hunger and Save the Children. Univariate and bivariate regression models were fitted to test multiple hypotheses related to cost-efficiency in different contexts and program designs. Key variables tested included program scale, budget, duration, the use of combined protocols, and treatment by community health workers. The study included 49 different programs with cost data across 14 countries in Africa and Asia. Average cost per child treated was around \$204 (2023 USD), with the average project costing around \$420,000 and average analysis length being 11 months. Scale, budget, duration and use of combined protocols correlated negatively with cost. The other variables tested include length of program, integration of interventions, admission and discharge criteria, delivery setting and population density, government delivery against NGO-delivery and malnutrition prevalence and coverage rates. These results reflect the first effort to statistically derive programmatic lessons from the global body of evidence. These results help confirm that scale has significant impact on cost- efficiency and provides evidence that donors and governments should prioritize increased and durable funding for nutrition interventions. Additional research on how to achieve scale should additionally be prioritized.

## DIETARY QUALITY AND ASSOCIATED FACTORS AMONG WOMEN OF REPRODUCTIVE AGE AND YOUNG CHILDREN IN CÔTE D'IVOIRE AND SENEGAL

*by Melissa Baker / Helen Keller International*

*Keywords: Africa, child, dietary diversity, nutrition, women*

Micronutrient malnutrition remains a pressing issue among women of reproductive age (WRA) and young children in sub-Saharan Africa. This study examined dietary diversity and its determinants among WRA and children aged 6-23 months in Côte d'Ivoire and Senegal. In this cross-sectional study, data were collected from children and WRA in Côte d'Ivoire (N=118, N=242, respectively) and Senegal (N=2,647, N=7,232, respectively) using the Diet Quality Questionnaire. Minimum Dietary Diversity (MDD) was evaluated (separately) for children and WRA based on the consumption of specified food groups. MDD was defined as consuming  $\geq 5$  of 8 food groups for children, including breast milk, grains, pulses, dairy, etc. For WRA, MDD was defined as consuming items from  $\geq 5$  of 10 food groups, including grains, dairy, meat, etc., during the previous day/night. Additionally, All-5 consumption, non-communicable disease (NCD) risk, and global dietary recommendations (GDR) indicators were assessed for WRA. Bivariate and multivariable analyses were conducted to explore socio-demographic factors influencing MDD. MDD among children was 54.2% in Côte d'Ivoire and 30.8% in Senegal. MDD was significantly higher among children in urban (vs. rural) areas and in the wealthiest (vs. poorest) households in Senegal ( $p < 0.001$ ). In Côte d'Ivoire, MDD prevalence was higher among children in the poorest (vs. medium) households ( $p = 0.033$ ). MDD among WRA was 81.4% in Côte d'Ivoire and 50.6% in Senegal. Fewer than half of women attained All-5 consumption (17.4% in Senegal, 46.3% in Côte d'Ivoire). The percentage of women attaining MDD was significantly higher in urban (vs. rural) areas in Senegal ( $p < 0.001$ ). MDD among WRA and All-5 consumption was higher among women in the wealthiest (vs. poorest) households in Senegal ( $p < 0.001$ ). NCD-Risk scores among WRA were low, and GDR scores were  $> 10$  in both countries. The study reveals significant disparities in dietary diversity among WRA and young children in Côte d'Ivoire and Senegal.

## THE INFLUENCE OF SOCIAL DETERMINANTS ON DIETARY PRACTICES OF FEMALE ADOLESCENTS: IMPLICATIONS FOR ANEMIA

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*Keywords: Anemia, Dietary Practices, Social determinants, Teenage Females*

Anemia remains a global public health concern, particularly affecting children, teenagers, and premenopausal women. Iron deficiency anemia continues to be the leading cause of anemia in both low- and middle-income countries. Adolescent females are especially vulnerable, as poor dietary choices often lead to undernutrition, adversely affecting their reproductive health. This study aims to evaluate the social determinants that influence the dietary practices of adolescent girls and their relationship with anemia, as previous studies have not adequately addressed these social factors as potential contributors to anemia among this demographic. This cross-sectional study involved 270 adolescent girls aged 10 to 15 years from three randomly selected junior high schools in the Atwima Nwabiagya North District in the Ashanti Region. Data were collected using a pretested structured questionnaire, which gathered information on the participants' background characteristics, dietary intake over the week preceding the study, and the social determinants influencing their dietary practices. Descriptive statistics were used to summarize the data, and bivariate and logistic regression analyses were conducted to examine the associations between dietary practices and social determinants. Out of the 270 participants, 70 (25.93%) engaged in healthy dietary practices (regularly consumed fruits, vegetables, and proteins). The social determinants that were significantly associated with their poor dietary practices were family influence, reading of food labels, exposure to the media, and the convenience of preparing healthy foods at home. The dietary practices of teenage girls in the district are generally poor (74.07%). Findings from this study may inform anemia reduction interventions among school-going adolescents and suggest the need to tailor them uniquely for teenage girls especially, to improve their health and nutritional status.

## **DETERMINANTS OF MALNUTRITION AMONG HOSPITALIZED ADULTS WITH PNEUMONIA USING THE MINI NUTRITIONAL SCREENING, TOOL (MNA).**

*by Theresa Andoh / University of Ghana*

*Keywords: Elderly, Ghana, Malnutrition, Mini Nutritional Assessment Full, Pneumonia, Predictors, and Determinants.*

Increased life expectancy and declining fertility among the population are driving an unprecedented and ongoing change in the age structure globally. In Sub-Saharan Africa, the prevalence of undernutrition among older people is high. Infections contribute to malnutrition, while malnutrition also contributes to infections, hence establishing a cyclical pattern. The presence of undernutrition has been linked to adverse medical outcomes in adults diagnosed with pneumonia, including prolonged hospitalizations, admission to the Intensive Care Unit, and an increased risk of mortality. Therefore, this study seeks to determine the factors associated with malnutrition among hospitalized adults with pneumonia. A cross-sectional survey was conducted among 74 hospitalized adults aged 60 years and above infected with pneumonia. Data were collected on socio-demographics characteristics, information on their health status and anthropometric measurements. The Mini Nutritional Assessment Tool (MNA) and Body Mass Index were used to determine the prevalence of malnutrition, while bivariate and multivariate regression analyses were performed to determine the predictors of malnutrition. Using the MNA scores, 50.0% of the participants were at risk of malnutrition, and 40.7% were malnourished. Participants who were mobile had higher [AOR 31.1 (1.053–917.743), 0.047] odds of being malnourished than those who were immobile, while respondents who had moderate food intake had higher [AOR 23.2 (1.244 -433.569), 0.035] odds of being malnourished as compared with those who had severely reduced food intake. Findings from this study highlights a significant prevalence of malnutrition among hospitalized adults with pneumonia, with 50% at risk and 40.7% already malnourished. Mobility and moderate food intake were identified as key predictors of malnutrition. These findings underscore the need for targeted nutritional interventions to improve health outcomes in this vulnerable population.

## FACTORS CONTRIBUTING TO GENDER DIFFERENCES IN ELEVATED BLOOD PRESSURE AMONG ADULTS IN ONDO STATE, NIGERIA

by *OLUWASII OLABISI OLAITAN* / *University of Medical Sciences, Ondo, Nigeria and Durban University of Technology, South Africa*

*Keywords: Adults, Elevated Blood Pressure, Gender, Nigeria*

The rate of hypertension keeps rising despite several efforts. However, insufficient information on factors related to gender variation limits its effective management in different populations. Addressing this gap requires population-specific strategies to reduce elevated blood pressure (EBP). A cross-sectional study was conducted using a four-stage sampling technique to select 769 adults in Ondo State, Nigeria. Respondents' sociodemographic characteristics, lifestyle practices and physical activity were assessed by interviewer-administered questionnaire. Physical inactivity was defined as <600 metabolic equivalent minutes per week. Nutritional status was determined by dietary patterns and anthropometric indices (body mass index and waist-height ratio) to define obesity ( $\geq 30.0 \text{ kg/m}^2$ ) and abdominal adiposity ( $\geq 0.5$ ), respectively. Blood pressure (systolic and diastolic) was measured using standard procedure. Elevated BP was set at  $\geq 140/90 \text{ mmHg}$ . Data were analysed using descriptive statistics and multivariate analysis at  $p < 0.05$ . Respondents (54.9% men, 45.1% women) had mean ages of  $32.3 \pm 11.6$  years and  $33.9 \pm 11.7$  years, respectively. Men earned higher monthly incomes while women used supplements (1.9%; 3.2%) and were physically inactive (25.6%; 30.5%) more. Prudent 1 (33.4%; 32.9%), prudent 2 (36.7%; 29.1%) and protein-rich (33.4%; 33.1%) dietary patterns were more predominant among men while traditional (32.2%; 34.6%) and fat-rich (32.7%; 34.0%) patterns likewise obesity (4.3%; 14.1%) and abdominal adiposity (41.7%; 54.8%) were more among women. Only systolic BP was higher in men ( $117.8 \pm 14.8 \text{ mmHg}$ ) than women ( $115.0 \pm 16.9 \text{ mmHg}$ ), diastolic BP was similar in both genders ( $73.5 \pm 10.1$ ;  $73.4 \pm 10.9$ ), respectively. Elevated BP was more prevalent among men (9.2%) than women (8.6%). Aside from age, family history, food insecurity and abdominal adiposity which contributed to EBP in both genders, using supplements, low physical activity, obesity and a fat-rich diet significantly contributed to EBP in women ( $p < 0.05$ ). Gender differences in dietary patterns, physical inactivity, misuse of supplements and abdominal adiposity contributed to gender variation in elevated blood pressure among Nigerian adults.

## FOOD INSECURITY FACTORS ASSOCIATED WITH ELEVATED BLOOD PRESSURE AMONG ADULTS IN ONDO STATE, NIGERIA

by Oluwasiji Olabisi Olaitan / University of Medical Sciences, Ondo, Nigeria and Durban University of Technology, South Africa

*Keywords: Adults, Elevated Blood Pressure, Food Insecurity, Nigeria*

Food insecurity undermines 2030 nutrition goals and its implication resonates with irreparable health and economic consequences in Nigeria. However, food insecurity components could give clues to areas requiring intervention. A cross-sectional study assessed the relationship between food insecurity components and elevated blood pressure (EBP) among 769 adults (422 males, 347 females) aged 20-60 years, selected by a four-stage sampling technique in Ondo State, Nigeria. Food insecurity was evaluated by eight component-food insecurity experience scale survey modules (WORRIED, HEALTHY, FEWFOODS, SKIPPED, ATELESS, RANOUT, HUNGRY and WHOLEDAY) and categorised into; mild (1-3), moderate (4-6) and severe (7-8) food insecurity. The standard procedure measured blood pressure (systolic and diastolic) and EBP was set at  $\geq 140/90$  mmHg. Data were analysed using SPSS 25.0 for logistic regression at  $\alpha 0.05$ . Respondents' age was  $33.1 \pm 11.6$  years. Monthly income was  $\$49.2 \pm 39.42$ . Married and unemployed were 51.7% and 29.8%, respectively. Respondents who worried about not having enough food to eat, being unable to eat healthy foods, eating few foods, skipping meals, eating fewer foods, running out of foods and sometimes being hungry a whole day for lack of resources were 28.9%, 29.6%, 20.2%, 30.7%, 22.6%, 12.1%, 10.1% and 5.1%, respectively. Mild, moderate and severe food insecurity was 18.6%, 13.5% and 7.4%, respectively. Systolic and diastolic BP were  $116.5 \pm 15.9$  mmHg and  $73.5 \pm 10.5$  mmHg, respectively. Elevated BP was 9.0% and significantly associated with worry about not having enough food to eat (OR=0.26, CI=0.13, 0.54,  $p < 0.001$ ), skipping meals (OR=0.35, CI=0.13, 0.99,  $p = 0.049$ ), mild food insecurity (OR=0.22, CI=0.10, 0.48,  $p < 0.001$ ), not with moderate (OR=0.89, CI=0.40, 1.95,  $p = 0.763$ ) and severe (OR=0.45, CI=0.18, 1.12,  $p = 0.087$ ) food insecurity. Worrying about food and skipping meals confirms the association between food insecurity and elevated BP, suggesting mental stress and uncertainty regarding food access in Nigeria.



## THE NIGERIAN DIET RISK SCORE (NiDRS)—EVALUATING MODIFIABLE HYPERTENSION RISK IN NIGERIAN ADULTS

by Nimisoere P. Batubo / Carolyn I. Auma / J Bernadette Moore / Michael A. Zulyniak / Department of Human Physiology, Rivers State University, Port Harcourt, Nigeria / School of Food Science and Nutrition, University of Leeds, Leeds, United Kingdom / School of Food Science and Nutrition, University of Leeds, Leeds, United Kingdom / Food, Nutrition and Health, University of British Columbia, Vancouver, BC, Canada.

*Keywords: Hypertension, Nigerian dietary Risk score, Nigerian dietary screening tool, mean arterial pressure*

Hypertension is a global health concern, particularly in Africa. It is expected to affect 1 in 3 adults living in Africa, with prevalence standing at 36% in Nigeria. Poor diet accounts for two-thirds of cases of hypertension and CVD globally and in Nigeria, and our recent meta-analysis confirms their contribution in West Africa. This study aimed to develop a culturally-appropriate diet risk score that can accurately identify individuals at risk of hypertension and support clinicians in providing personalised dietary advice to patients. We used a validated Nigerian Dietary Screening Tool (NiDST) to assess the dietary intake among 151 patients and used approaches similar to Framingham and INTERHEART studies to: (i) construct and validate a Nigerian Dietary Risk Score (NiDRS) for hypertension; and (ii) evaluate the NiDRS against a panel of clinical biomarkers of hypertension, using multiple logistic and linear regression models, ROC and decision curve analyses and mediation analysis to facilitate its use in clinical practice. Each incremental increase in the NiDRS was associated with a 2-fold increase in odds of overall hypertension (OR [95%CI]: 2.04 [1.16, 1.16],  $p=0.01$ ), with the highest score category associated with >18-food increased odds of hypertension, compared to lowest category (OR [95%CI]: 18.27 [1.33, 251.21],  $p=0.03$ ). The NiDRS demonstrated excellent discrimination with an AUC of 92%, high sensitivity (85%), specificity (94%), Brier score of 0.1 and a positive net benefit. In addition, biomarkers (total cholesterol triglycerides, LDL, CRP, and homocysteine) partially (41-76%) mediated the relationship between NiDRS and mean arterial pressure in a positive direction. The NiDRS is an accurate and valuable tool for clinicians to identify and stratify individuals at risk of hypertension and offer personalised dietary needs to address the rising prevention of hypertension in Nigeria.

## IMPROVING COMMUNITY AWARENESS AND HEALTHCARE PROVIDER TRAINING TO ENHANCE VITAMIN A SUPPLEMENTATION AND DEWORMING COVERAGE

*by Benjamin Kihika / Helen Keller International*

*Keywords: Child Health Nutrition, Micronutrients, Vitamin A Supplementation*

Micronutrient deficiencies are a major public health concern in many developing countries, including Kenya where 40% of children aged 12-59 months have Soil Transmitted Helminths (STH) infection, and 17.4% are deficient in vitamin A. According to the World Health Organization, vitamin A supplementation (VAS) can reduce child mortality by up to 24% when >80% of children 6-59 months are supplemented twice annually. In this regard, VAS and deworming (VASD) are key interventions for promoting child health and nutrition in Kenya. However, coverage rates often remain suboptimal due to various factors, including inadequate healthcare worker (HCWs) training and lack of awareness among caregivers and Community Health promoters (CHPs). A cross-sectional survey was conducted in five counties of Central Kenya to assess the coverage of VAS and deworming among children aged 6-59 months. The survey evaluated caregiver knowledge, health-seeking behaviors, and the capacity of healthcare workers and CHPs to deliver these services. Data was collected through household interviews, health facility assessments, and interviews with HCWs and CHPs. The findings revealed that while the VAS coverage met the national target of 80%, the deworming coverage fell short, with significant variances from administrative data attributed to stockouts, overreporting, and poor documentation. Notably, only **38.3%** of caregivers knew the correct frequency of VASD, **49.7%** did not know the frequency, and **45.5%** did not know the benefits of VASD. However, **77%** of the respondents identified the Vitamin A Capsule. Barriers to VASD and deworming uptake include lack of awareness, low health literacy, and insufficient training for HCWs and CHPs. Therefore, the study underscores the need for comprehensive community education campaigns to raise awareness about the importance of VAS and deworming, creating demand in the facility and community, and how to administer the capsules, documentation, and reporting for HCWs and CHPs.

## NUTRITIONAL PROFILING OF BREASTFEEDING BISCUIT (BB)

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*Keywords: Breastmilk, minerals, nutrition, phytochemicals and biscuit.*

Breastmilk is thought to be a perfect meal for the baby; however, the quality and quantity are greatly affected by the mother's nutritional state. Functional foods that use galactagogues, such as fenugreek, fennel, flax seeds, and oats, are increasingly becoming popular. This is because their high flavonoid and mineral content improves the mother's nutrition and breastmilk quality. Galactagogues extend the duration of peak breastmilk synthesis through modulation of the insulin-like growth factor-1 (IGF-1) axis, thus increasing milk ejection by activating oxytocin secretion. The aim of this study is to determine the nutritional and phytochemical composition of Hearty's breastfeeding biscuits. A commercially available biscuit manufactured with the above-mentioned claim. The BB samples were analyzed to determine proximate content, specific mineral profile, and phytochemical composition and the mean values of parameters were recorded. The moisture content of the BB was  $(4.59 \pm 0.47\%)$ , carbohydrate  $(50.89 \pm 0.00\%)$ , fiber  $(16.22 \pm 0.99\%)$ , fat  $(14.87 \pm 1.78\%)$ , protein  $(11.60 \pm 0.31\%)$ , and ash  $(1.83 \pm 0.58\%)$ . The biscuit also contained a significant amount of minerals, mainly calcium  $(548 \pm 23.25 \text{ mg/100 g})$ , magnesium  $(230 \pm 5.70 \text{ mg/100 g})$ , iron  $(10.59 \pm 0.87 \text{ mg/100 g})$ , and zinc  $(0.87 \pm 0.31 \text{ mg/100 g})$ . Phytochemical screening of breastfeeding biscuits showed the presence of saponins (22.63%), tannins (11.49 mg/100 g), and a total antioxidant of 75.69%. Coumarins and alkaloids were also detected but not quantified. The BB is rich in proteins, fat, Ca, Mg, Fe, and Zn. This can help meet the mother's RDA for these nutrients. The BB can also improve breastmilk quality since the mother will be well nourished after consumption. The BB is a reliable source of phytochemicals like tannins, saponins, alkaloids, and coumarins, making it an excellent source of antioxidants that can improve postpartum recovery. Further clinical research is needed to confirm these claims in vivo.

## ADHERENCE TO GLOBAL DIETARY RECOMMENDATIONS AND NUTRITIONAL STATUS OF SCHOOL-AGED CHILDREN IN TWO DISTRICTS IN THE GREATER ACCRA REGION

*by Sarah Twum / Agarthah Ohemeng / Justina Owusu / University of Ghana / University of Ghana / University of Ghana*  
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*Keywords: BMI-for-age, GDR score, Physical activity, School-aged children*

School-aged children facing malnutrition are susceptible to long-term health complications including non-communicable diseases (NCDs). One pathway is through lifestyles that predispose the children to an increased risk of these diseases. This study assessed adherence to global dietary recommendations (GDR) associated with NCDs and the nutritional status of school-aged children in two districts in the Greater Accra Region. This cross-sectional study included 219 children (ages 9-15 years) from Tema West and Ningo-Prampram. Socio-demographic characteristics, diet quality, physical activity, and anthropometric measurements were assessed using standardized procedures. BMI-for-age z-scores determined nutritional status. Among the participants, 118 were females (53.9%), while 101 were males (46.1%). The mean age was  $11.6 \pm 1.8$  years. Participants exhibited low physical activity levels (PAQ-C score:  $2.2 \pm 0.7$ ). The GDR score was  $9.3 \pm 2.2$ , ranging from 0-18, indicating that the children were largely not meeting WHO dietary recommendations that seek to protect them against NCDs. Notably, 14.2% of the children were overweight, and 6.8% were obese. The study revealed a combination of high prevalence of overweight/obesity (21%), low physical activity level, and suboptimal adherence to WHO dietary recommendations for protection against NCDs among school-aged children. To enhance children's dietary patterns and overall health, it is imperative to implement school-based nutrition education programs that prioritize healthy choices, portion control, and increased opportunities for physical activity.

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## **WEIGHT PERCEPTION AND RISK OF NON- COMMUNICABLE DISEASES AMONG FEMALE ADULTS LIVING IN ACCRA METROPOLIS**

*by Enoch. S.S. Asiedu / Agartha. N. Ohemeng / Gloria. E. Otoo / University of Ghana /  
University of Ghana / University of Ghana*

*Keywords: Ghana, Weight perception, diabetes, hypertension, obesity, women*

The increase in the prevalence of non-communicable diseases (NCDs) among women living in the Accra metropolis has raised concern. Existing studies centered on objective metrics such as body mass index (BMI) and waist-to-hip ratio, and their association with the prevalence of NCDs, without exploring the role of perceived weight of the respondents. This study investigated the relationship between weight perception and NCDs (obesity, diabetes, and hypertension) among women living in Accra Metropolis. A cross-sectional design was employed to recruit 378 female adults aged 18-65 years in the Accra Metropolis. Weight perception was assessed using the Feel-weight-status minus Actual-weight-status Index. Obesity was diagnosed using BMI based on the World Health Organization cut-offs. Hypertension and diabetes were diagnosed through multiple blood pressure readings and random blood sugar tests. Regression models were used to find the associations between weight perception and the NCDs while controlling for potential confounders. The majority of the respondents (70.1%) exhibited inaccurate weight perception. The proportion at risk of obesity, hypertension, and diabetes were 38.1%, 29.1%, and 6.6%, respectively. Age was a predictor of both risks of diabetes (AOR = 1.040, 95% CI: 1.013 - 1.068,  $p < 0.001$ ) and hypertension (AOR = 1.041, 95% CI: 1.017 - 1.066,  $p < 0.001$ ). Conversely, high income was a protective factor against the risk of diabetes (AOR = 0.445, 95% CI: 0.253 - 0.784,  $p = 0.002$ ) and hypertension (AOR = 0.526, 95% CI: 0.310- 0.892,  $p = 0.012$ ). Accurate weight perception reduced the risk of obesity (AOR = 0.071, 95% CI: 0.039, 0.129,  $p < 0.001$ ). There is a need for public health education aimed at promoting accurate weight perception among women, alongside addressing objective measures to mitigate NCD risks in the study area. Additionally, high income is key to the prevention of diabetes and hypertension among the study population.

## **DEEP FRIED FOODS FROM UNLICENSED STREET VENDORS IN CAMEROON: A PUBLIC HEALTH RISK WITH REGARD TO CULINARY PROCESSES?**

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*Keywords: Fried foods, public health risks, street vendors, toxic compounds*

Cameroonians' eating habits are increasingly oriented towards fried foods. Although frying leads to an improvement in the organoleptic qualities, failure to comply with the regulation can lead to the deterioration oils with the appearance of toxic compounds in fried foods. These compounds (acrylamide, 3-monochloropropane-1,2-diol, glycidol,...) have been classified as a “possible human carcinogen” by the International Agency for Research on Cancer. An investigation was conducted to verify if deep-frying processes used by street vendors regularly adhere to sanitary protocols and rules. Questionnaire on the food preparation process was administered to 80 street vendors. The main quality criteria of the food frying assessed were: type of frying oil, ingredients used before frying process, ratio of food to deep-frying oil, number of frying episodes. More than 70 % of street vendors use refined palm oil for frying, the most suitable for fried foods because of its high content of monounsaturated fatty acids. Salt and Maggi added before frying in uncontrollable quantities may lead to the formation of 3- monochloropropane-1,2-diol. 83 % of unlicensed street vendors realize frying in a ratio 3.1-5/10. All the street vendors use the same oil for more than eight fries which is contrary to the standard and foods fried in these conditions would contain large amounts of toxic compounds. Results indicate that deep-frying processes used by street vendors regularly do not adhere to sanitary protocols and rules. Frying foods obtained under these conditions could be considered public health risks. We need to pay special attention to this alarming situation.

## **NUTRIPATH: PROGRAM TO COMBAT NUTRITION-RELATED PATHOLOGIES IN THE SAINT-LOUIS REGION, SENEGAL**

*by Abibatou Faguy Tall / Mbathio Dieng / Adama Ly / Hadji Tabara Ndiaye / Abdoulaye Djigo / Aisse Konte / ONG AGORA Sante Publique / ONG AGORA Sante Publique / ONG AGORA Sante Publique / ONG AGORA Sante Publique / ONG AGORA Sante Publique / ONG AGORA Sante Publique*

*Keywords: MUAC, malnutrition, nutritional assessment, stunting, underweight*

In the northern region of Saint-Louis, Senegal, a triple burden of malnutrition persists, encompassing undernutrition, micronutrient deficiencies, obesity, and diet-related non-communicable diseases. To address these challenges, the NGO AGORA has launched NUTRIPATH, an innovative initiative aimed at combating nutritional disorders in the region. This program combines training for mothers and grandmothers, malnutrition screening, awareness campaigns, introduction of fortified foods, and enhancement of community-based care for malnourished children aged 6 to 59 months. NUTRIPATH organizes community-level training sessions for mothers, fathers, and child caregivers on the use of mid-upper arm circumference (MUAC) for malnutrition screening. The anthropometric indicators measured were height, weight, and MUAC. After screening and nutritional assessment, children with moderate acute malnutrition (MUAC), underweight based on (BMI)-for-age z-score (BAZ), and stunted growth based on height-for-age z-score (HAZ) are treated at the Centre for Nutritional Recovery and Learning (CARNE). Some children are also referred to health facilities for specialized care. The intervention includes the use of locally-produced fortified flour. From October 2023 to April 2024, 693 parents and caregivers were trained to use MUAC tapes and received them for early detection of acute malnutrition at home. A total of 827 children were screened, revealing that 207 children (25%) suffer from moderate acute malnutrition, 52 children (6%) are underweight, 65 children (8%) are stunted, and 492 children (59%) have a good nutritional status. Among the 324 malnourished children, 231 received treatment, with 124 recovering. Twenty children abandoned the treatment, while the rest are still undergoing treatment. NUTRIPATH, through training and early management of malnutrition cases, has significantly improved the nutritional status of children using locally-produced fortified flour. This program demonstrates the positive impact of community training and local initiatives on child health and nutrition in the Saint-Louis region.

## **CAREGIVERS' WILLINGNESS TO PAY FOR READY-TO-USE FOOD AMONG SCHOOL-AGED CHILDREN IN THE KETU SOUTH MUNICIPALITY, GHANA.**

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*Keywords: RUSF, age, cowpea-based, education, willingness to pay*

Notwithstanding caregivers' desire to provide nutritious meals for children of school-going age, traditional ready-to-use supplementary foods (RUSF) remain underutilized because of lack of knowledge and perceived affordability. In this study we developed a novel cow pea-based RUSF aimed at school-age children and sought to assess caregivers' perception of its market value and their willingness to pay for the product. Four hundred and twenty-six (426) children/caregiver pairs were randomly selected from 10 schools in the education district of the Ketu South Municipality. Samples of porridge were prepared from the cowpea-based RUSF recipe and subjected to sensory testing by both the caregivers and children. Caregivers also provided their responses on willingness to pay (WTP) for it through a semi-structured questionnaire. Caregivers' age and level of education were adjusted for in determining factors influencing willingness to pay for the RUSF. A p-value of 0.05 was deemed statistically significant at a 95% confidence level. Willingness to pay for the product was low (226, 53%), of whom (175, 47%) were willing to pay GHC 5.00 per 100g sachet (i.e. equivalent to 0.33 USD \$ per 100g). There was a significant association between caregivers' age, educational level, and their WTP. Older caregivers (51+ years) were 70% less willing to pay for the RUSF (AOR: 0.30, 95% CI: [0.10-0.85] P = 0.024), while those with tertiary education were 6.75 times more willing to pay (AOR: 6.75, 95% CI: [1.89-24.11] P = 0.003). These findings suggest inter-generational differences in WTP and underscore the need to consider demographic characteristics in targeted interventions. Social marketing and product promotions tailored to older caregivers and those with lower educational levels may increase acceptance and adoption of novel RUSF products.



## **INNOVATIONS ADDRESSING GENDER, YOUTH AND SOCIAL INCLUSION TO IMPROVE NUTRITION-SEEKING BEHAVIOR IN MATERNAL, INFANT, YOUNG CHILD AND ADOLESCENT NUTRITION IN UGANDA. A CASE OF KAMWOKYA, KAWEMPE DIVISION, KAMPALA DISTRICT**

*by Kamara Daniel / Bwindi Community Hospital*

*Keywords: Adolescent and Youth, Gender, Maternal child health, Nutrition Seeking behavior*

Maternal and Child Health nutrition indicators for Uganda are characterized by high mortality rates, under-nutrition, and anemia in women and children, especially among the most vulnerable community members. In addition to early childbearing among the youth and its deleterious impacts, gender and social exclusion exacerbates pre-existing health issues for gender and youth. The lack of knowledge on the importance of nutrition and inclusion of the youth and gender negatively influence nutrition-seeking behavior. The aim was to improve nutrition seeking behavior through knowledge enhancement by addressing issues regarding gender, youth and social inclusion. Through the Nutrition Rehabilitation Centre, an outreach was conducted in Kamwokya from 14<sup>th</sup> to 18<sup>th</sup> Feb, 2022 that involved 45 young mothers (15- 24 years) of children 0 to 59 months. Nutrition assessment and knowledge towards the practice of exclusive breastfeeding was done where VHTs and Peer mothers were involved in study groups, and which were able to identify the gender and youth exclusion and lacked minimum knowledge on nutrition seeking behavior.

## **THE USE AND ACCEPTABILITY OF HIGH PROTEIN READY- TO-USE THERAPEUTIC FOOD AMONG SEVERELY WASTED CHILDREN IN MALAWI**

*by Chikondi Masamba Makanani / Edmary Ipyana Ngosi / Takondwa Mbulaje / Agnes Malamula / Chisomo Eneya / Robert Bandsma / Voskuijl Wieger / Sylvester Kathumba / Jessie Khaki-Sithole / Glenda Courtney Martin / James A Berkley / André Briend / Dave Namusanya / Isabel Potani / Department of Health Systems and Policy, Kamuzu University of Health Sciences, Blantyre, Malawi / Research Department, Zomba Theological University, Malawi / Department of Pediatrics and Child Health, Kamuzu University of Health Sciences, Blantyre, Malawi / Department of Pediatrics and Child Health, Kamuzu University of Health Sciences, Blantyre, Malawi / Department of Pediatrics and Child Health, Kamuzu University of Health*

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*Keywords: Acceptability, Malawi, Ready to use therapeutic foods, Severe Acute Malnutrition, high protein.*

Catch-up growth of severely wasted children (weight-for-length z-score  $<-3SD$  and/or a mid-upper-arm circumference  $<11.5cm$ ) can be improved by increasing the protein quantity and quality in Ready-to-use-therapeutic foods (RUTF). Limited evidence exists on the use and acceptability of higher protein RUTFs. This study aimed to evaluate the use and acceptability of high-protein RUTF (HP-RUTF), containing 15% energy from protein (79% dairy-sourced), compared to standard-protein RUTF (SP-RUTF), with 10% energy from protein (54% dairy-sourced). We conducted in-depth interviews (IDIs) with a subset of caregivers of 6–23-month-old severely wasted children previously randomized to treatment with either HP-RUTF or SP-RUTF as part of a proof-of-concept randomized control trial. Data was collected in Chichewa, translated, transcribed to English, and analyzed using thematic analysis. Thirty caregivers (14 HP-RUTF and 16 SP-RUTF) participated in the IDIs. While it was established that both RUTFs were well accepted in terms of taste, smell and appearance in the children, some caregivers mentioned that their children had an aversion to the HP-RUTF, experiencing occasional vomiting when consumed directly rather than mixed in porridge. However, participants from both groups expressed similar expectations regarding the therapy's potential benefits, describing them as medicines that promote child health. Meanwhile, notable changes in eating habits and breastfeeding patterns were observed among participants with the introduction of HP-RUTFs. There was a significant improvement in the appetite of most children, while conversely, there was a reduction in breastfeeding frequency among breastfeeding participants. Both HP-RUTF and SP-RUTF appear to be well

accepted by severely wasted children, but further focused research on high-protein RUTF is needed to confirm the acceptability of HP- RUTF. Providing prescription guidance and implementing potential strategies for breastfeeding support and counseling during treatment and upon discharge are essential.

## **PRIORITIZING BEHAVIOURS TO ADDRESS THE TRIPLE BURDEN OF MALNUTRITION IN ADOLESCENTS: EVIDENCE FROM CAMEROON.**

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*Keywords: Adolescents, Cameroon, Impact-likelihood Matrix, Malnutrition, Social and Behaviour change*

The triple burden of malnutrition is a major public health problem affecting adolescents in Cameroon. Social and Behaviour Change ( SBC) programmes that focus on one or few behaviours to improve healthy eating and physical activity levels are cost effective and easily adopted. However, selecting which behaviours to promote out of a myriad of options is a challenge in a setting with limited resources. This study aims to use a community participatory approach to prioritize behaviours to address the triple burden of malnutrition in adolescents in Cameroon. A narrative literature review and an expert online survey was used to generate a list of 26 behaviours phrased using the Audience Target Action Context Time (ATACT) Framework. Using the Impact-Likelihood methodology, impact and likelihood of adoption scores for each of these behaviours were derived from surveys, with input from 24 experts and 842 school- going adolescents. These scores were mapped onto a simple 4 quadrant graph to generate the matrix. Five dietary behaviours (Avoid snacking, Eating 5 portions of fruits and vegetables, Limiting the intake of fast foods, Eating calcium rich foods, Taking breakfast every morning) and Two health-related behaviours (Taking iron supplements when

menstruating for girls, Taking dewormers twice per year) were identified as first priority behaviours. These behaviours were perceived to have the highest impact by experts and are easily adopted. Physical activity behaviours came as second priority behaviours with the most practiced behaviour being; doing household chores followed by walking to school. The least practiced physical activity behaviour being doing physical activity in clubs. By synthesizing existing literature, validating identified behaviors through expert consultation and investigating the barriers to behaviour adoption with adolescents, this research provides a robust foundation in selecting behaviours that can inform the development of efficient and effective social and behaviour change programs.

## **UNDERSTANDING BREASTFEEDING AWARENESS, PRACTICES AND CHALLENGES: A MIXED-METHODS INVESTIGATION IN THE WEST REGION OF CAMEROON**

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*Keywords: Breastfeeding practices and knowledge, Healthcare providers\\' knowledge and promotion, Obstacles to breastfeeding, West region of Cameroon.*

Breastfeeding stands as a pivotal public health concern affecting both maternal and child well-being. This study delves into breastfeeding practices and knowledge among mothers and healthcare providers in Cameroon's West region. In a mixed-methods approach, 470 mothers with children under 12 months and 137 healthcare providers engaged in maternal and child health services participated in a quantitative survey. Additionally, 10 focus group discussions and 64 individual interviews were conducted with healthcare providers, mothers, and fathers. The inquiry explored factors such as awareness, beliefs, and practices concerning breastfeeding. Findings reveal a high level of awareness among mothers, with 87% acknowledging the benefits of exclusive breastfeeding for six months, and 94% endorsing continued breastfeeding beyond that period. Nonetheless, around 20% introduced

non-breastmilk foods initially, and only 49.8% initiated breastfeeding within the first hour post-birth. While 72% of mothers received breastfeeding guidance from healthcare providers, the latter demonstrated gaps in knowledge, with only 72% aware of crucial aspects of skin-to-skin contact evaluation and 83% knowledgeable about recommended breastfeeding frequency for infants under six months. Furthermore, 10% of healthcare providers were unfamiliar with the code of marketing of breastmilk substitutes, and a similar proportion advocated for its advertising. Obstacles to breastfeeding stemmed from healthcare providers' knowledge, limited breastfeeding promotion, and childbirth management. Mothers' health, breastfeeding difficulties, knowledge, and jobs also played a role. The study recommends developing and disseminating breastfeeding awareness tools, enhancing healthcare providers' breastfeeding counseling skills, and enforcing regulations pertaining to breastmilk substitute marketing. These measures aim to bolster breastfeeding support and education, thus optimizing maternal and child health outcomes.

## **EXPLORING ADOLESCENT EATING HABITS AND NUTRITIONAL AWARENESS IN AN URBAN SETTING: A QUALITATIVE STUDY**

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*Keywords: Adolescence, Cameroon, Eating habits, Food choices, Nutritional awareness.*

Adolescence is a critical period for establishing lifelong eating habits, and poor dietary choices during this stage can lead to significant health issues. This study examines the eating habits of secondary school students in Yaoundé, Cameroon, focusing on the determinants of their food choices and their awareness of the health consequences of poor diet. A qualitative approach was used, involving four Focus Group Discussions (FGDs) with ten students each, aged 13 to 18, from four schools in Yaoundé. The discussions included equal numbers of boys and girls, using a semi-structured interview guide to explore themes related to food roles,

dietary habits, determinants of food choices, and health impacts. The findings indicated that students usually eat breakfast at school, with common choices like "bread + spaghetti," "bread + minced meat," and doughnuts. Most students ate three meals a day and frequently snacked. Fruit and vegetable intake was low, averaging 2-3 times per week. Most students consumed carbonated and sweetened beverages weekly, with some also drinking alcohol occasionally. Key determinants of food choices included taste, family habits, and cost. Regional culinary traditions influenced main dish selections, though some students tried foods from other regions. Students acknowledged the impact of diet on weight gain but attributed it mainly to genetics. They were generally aware of the negative health impacts of poor diet, linking sugar consumption to diabetes and salt intake to health issues. They defined a good diet as one rich in fruits, vegetables, and balanced nutrients, with minimal salt, fat, and sugar. Post-discussion reflections revealed a shift from perceiving their diet as good to recognizing it as inadequate. This study highlights a gap between students' dietary knowledge and habits, driven by taste, family, and economic factors. These findings can guide targeted interventions for improved dietary behaviors.

## **DIET QUALITY ASSESSMENT OF ADULTS LIVING IN IBADAN METROPOLIS USING THE DIET QUALITY QUESTIONNAIRE (DQQ) AND GLOBAL DIET QUALITY SCORE (GDQS) APPLICATION**

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*Keywords: DQQ, Diet quality, GDQS application, Ibadan metropolis, adults*

Frequent assessments of population-level diet quality are crucial for understanding dietary patterns and supporting policy making for food systems transformation. Traditional diet quality assessment tools are burdensome. Several tools have been developed to ease such assessments. This study measured and compared diet quality of adults in Ibadan metropolis using the Diet Quality Questionnaire (DQQ) and Global Diet Quality Score (GDQS) application. The study included 1208 adults (642 females, 566 males) aged 18–64 years. All respondents completed the DQQ and 26% (n=315) additionally completed the GDQS.

Minimum Dietary Diversity for Women (MDD-W), consumption of all five food groups typically recommended for daily consumption in food-based dietary guidelines (All-5), and Global Dietary Recommendation (GDR) score were analyzed from the DQQ. GDQS was calculated; moderate risk and high risk of poor diet quality outcomes were defined as  $GDQS \geq 15$  and  $< 23$ , and  $GDQS < 15$ , respectively. The field performance of the DQQ and GDQS application tools was compared qualitatively. About 37% of women did not achieve MDD-W, and 72% of all respondents did not achieve All-5. Mean GDR score was 9.3 out of a maximum 18. Mean GDQS score was 16.1 out of a maximum 49, with 61% and 35% of respondents classified as at moderate and high risk of poor diet quality outcomes, respectively. The GDQS application and DQQ required an average time of 12 minutes (range 6–22 minutes) and 4 minutes (range 3–5 minutes), respectively, to administer. Significant differences and trade-offs exist in the measurement approach used by each tool. The DQQ and GDQS both effectively assessed population-level diet quality and found that diet quality of adults in Ibadan is poor. The GDQS identified more cases of poor diet quality. The choice of tool should depend on research objectives, resources, and details required from the assessment.

## **AMELIORATIVE EFFECTS OF TERMITOMYCES ROBUSTUS ON COMPLICATIONS AND ALTERED MICRONUTRIENT STATUS IN STREPTOZOTOCIN-INDUCED DIABETIC WISTAR RATS**

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*Keywords: Diabetes complications, Diabetes mellitus, Micronutrient status, Termitomyces robustus*

Diabetes mellitus, a global public health threat with severe, yet avoidable consequences is on the increase. Rising pharmacotherapy cost and complications have increased diabetes-related mortality, hence, the need to look inward for local solution. Edible indigenous mushrooms such as *Termitomyces robustus* (TR) have been implicated to have ameliorative effects on

diabetic progression, but their modulatory roles remain insufficiently researched. The study was undertaken to evaluate ameliorative effect of TR on complications and altered micronutrient status in streptozotocin-induced diabetic rats. Four groups of Wistar rats were made diabetic using streptozotocin while one group served as control. Streptozotocin-induced hyperglycemia, diabetic complications, and nutrient depletion in the rats were treated with Metformin, 15% TR powder inclusion and TR aqueous extract. Serum nutrient composition were determined while liver, kidney and spleen were harvested for histopathology. Urea, Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), bilirubin and serum minerals were determined using standard methods. Streptozotocin-induced groups had 4.0 folds rise in fasting blood glucose (FBG) with 17-26% loss in pre-induction weight and elevated urea, ALT, AST, and bilirubin. Serum minerals and haematological indices were depleted in diabetic untreated groups. Treatment with Metformin, 15%TR powder, and extract decreased FBG by 78.6%, 66.0% and 34.0%, respectively, with weight gain observed only among 15%TR powder-fed group. Urea, ALT, AST, and bilirubin decreased significantly in 15%TR powder-fed group by 25.0%, 54.0%, 22.0%, and 65.0%, respectively. Haematological parameters (PCV, RBC, WBC) increased insignificantly across groups. Increase in minerals (29.0%K, 4.2%Mg, 8.1%Ca, 15.4%Mn, 2.2%Fe, 14.0%Zn) were observed in 15%TR powder-fed rats compared with untreated diabetic group in which hyperplasia, liver inflammation, necrosis and glomerulonephritis were observed in rats' spleen, liver and kidney. These findings underscore *Termitomyces robustus*' promising role in managing diabetes-related complications and nutritional imbalances, suggesting its potential as a therapeutic intervention for diabetic individuals.

## **NUTRIENT COMPOSITION AND POTENTIAL HEALTH BENEFITS OF EDIBLE TERMITOMYCES ROBUSTUS MUSHROOM TRADITIONALLY CONSUMED IN SOUTHWEST, NIGERIA**

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**Keywords:** Antinutrients, Edible mushroom, Nutrient composition, *Termitomyces robustus*



Malnutrition remains a pervasive global health issue, affecting millions globally. Studies have shown that macrofungi are valuable reservoir of essential nutrients against protein malnutrition and crucial for maintaining physiological functions. However, the role of nutrient-dense indigenous edible mushrooms in promoting dietary diversity as part of strategies to combat malnutrition seems to have received limited attention. Also, little is known about the chemical composition of edible *Termitomyces robustus* mushroom which grows wild in Southwest, Nigeria, hence, the study was carried out to evaluate its chemical composition and nutritional potentials. Fresh *Termitomyces robustus* sample was obtained from farms in Ekiti State, Nigeria, and identified at the herbarium of Botany Department, University of Ibadan. The sample was thoroughly washed to remove dirt and earthly materials and divided into two portions. The first portion was used for moisture and vitamin contents determination while the second was oven-dried at 60<sup>0</sup> C overnight and used for determination of proximate composition, amino acid profile, mineral and anti-nutrient composition using standard methods of AOAC. A 100g of *Termitomyces robustus* 35.0g crude protein, 3.0g crude fat, 1.2g ash, 13.5g dietary fibre, 27.5g carbohydrate, 716.3mg potassium, 86.2mg calcium, 93.1mg magnesium, 518.26mg phosphorus, 3.7mg iron, 2.1g zinc, 0.95mg manganese, 56.95µg vitamin A, 45.40µg folic acid, 10.03mg vitamin C, and 4.58mg vitamin E. The mushroom contains the nine indispensable amino acids in appreciable amount, making it a protein of high biological value. The antinutrient content of the mushroom are negligible (phytate 0.13mg, oxalate 0.11mg, tannin 0.01mg, saponin 0.23mg, trypsin inhibitor 1.89 TIU/100g sample), hence cannot constitute hindrance to nutrient bioavailability in human body. *Termitomyces robustus* is rich in nutrients and contains protein of high biological value, hence, its use can be explored in dietary interventions aimed at addressing protein and micronutrient malnutrition.

## **SOCIO-DEMOGRAPHIC DETERMINANTS OF FOOD INSECURITY AMONG HOUSEHOLDS IN THE TAMALE METROPOLIS: A COMMUNITY-BASED CROSS-SECTIONAL SURVEY**

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*Keywords: Food insecurity, Sociodemographic characteristics, prevalence*

This study investigated the sociodemographic factors associated with household food insecurity and its prevalence in the Tamale Metropolis, Northern Region, Ghana. A cross-sectional analytical design was employed, involving 374 participants. The data were collected using a structured questionnaire to gather demographic information and the Household Food Insecurity Access Scale to determine food security status. Participants were recruited through systematic and random sampling techniques. Due to non-normality in the data, Kruskal-Wallis tests were conducted to identify sociodemographic factors associated with household food insecurity, with statistical significance accepted at  $p < 0.05$  and a 95% confidence interval. Descriptive statistics profiled the participants' sociodemographic and household food insecurity prevalence, and post-hoc analyses identified specific groups contributing to significant relationships. Among the surveyed households, 18.4% ( $n = 69$ ) were mildly food insecure, 8.8% ( $n = 33$ ) were moderately food insecure, 42.5% ( $n = 159$ ) were severely food insecure, and 30.2% ( $n = 113$ ) were food secure. Significant sociodemographic factors included education level ( $p < 0.001$ ), age group ( $p = 0.012$ ), employment status ( $p < 0.001$ ), and wealth quintile ( $p < 0.001$ ). Specific groups contributing to these associations were those with more than a senior high school education versus none ( $p < 0.001$ ), employed versus unemployed individuals ( $p < 0.001$ ), and those in the highest wealth quintile versus the lowest wealth quintiles ( $p < 0.001$ ). Sociodemographic factors such as education, employment status, and wealth quintile are significantly associated with household food insecurity. Severe household food insecurity is highly prevalent in the Tamale Metropolis. Interventions promoting education, employment opportunities, and economic activities to enhance household wealth may reduce food insecurity in this population.

## MATERNAL DIETARY INTAKE AND ITS ASSOCIATION WITH BREAST MILK MICRONUTRIENT CONTENTS

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*Keywords: Body mass index, Breastmilk zinc and iron content., Maternal dietary intake, Socioeconomic status*

The World Health Organization recommends that newborns breastfeed exclusively until they are six months old. Breastmilk should therefore contain all the necessary nutrients for optimum growth. Therefore, this research examined the relationship between maternal dietary intake on breastmilk micronutrient content. A cross-sectional study of 70 lactating women assessed socioeconomic status, dietary intake, and breast milk zinc and iron content to explore dietary influences using linear regression ( $p \leq 0.05$ ). The majority (70%) were between the ages of 26-40 years. Fifty per cent (50%) were within the high socio-economic status. Of all the mothers, 35.7% and 34.3% were overweight and obese respectively. Cereals and grains, animal products, were consumed regularly while fruits and shellfish were consumed least. About 76% of the participants met less than 75% of the daily recommended intake for iron while 87.1% met less than 50% of the daily recommended zinc intake. Of all the mothers, 85.7% had inadequate levels of zinc and 55.7% had inadequate levels of iron in their breastmilk. There was a significant association between participants' daily zinc  $p=0.003$  and iron intakes ( $p=0.001$ ) and their breastmilk zinc and iron contents. Educating lactating mothers on zinc and iron-rich foods and supplements is crucial, as dietary zinc and iron intake significantly impact breastmilk content and infant health.

## STANDARDIZATION AND CHARACTERIZATION OF NUTRITIONAL COMPONENTS OF ABELMOSCHUS ESCULENTUS LEAF (ILASA) SOUPS FROM IBARAPA COMMUNITIES, OYO STATE, NIGERIA

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*Keywords: Phytochemical components, Recipe standardisation, Traditional soups*

Traditional soups constitute important component of traditional diets. However, they are usually neglected in meal planning due to lack of information on their nutrient contents in national Food Composition Tables. Standardising soups recipes and providing information on their nutrient contents will serve as good reference for nutrition practitioners in discharging their duties. *Ilasa* soup, popular and well relished among Ibarapa communities of Oyo State, Nigeria for its cultural belief of facilitating multiple births, lacks comprehensive information on its nutritional benefits. This study was carried out to standardise and provide information on nutrient and phytochemical composition of the soup. Descriptive cross-sectional survey was carried out to collect recipes for cooking *Ilasa* soups from 106 households across Ibarapa communities (Igbo-Ora, Eruwa, and Ayete). Average value of each ingredient was calculated for standardisation. The soup ingredients were purchased from *Towobowo* Market, Igbo-Ora and *Anko* market, Eruwa. Three types of soups (*Ilasa*, *Morogbo*, and *Ilasa+Morogbo*) were prepared in three replicates each based on the standardised recipes and analysed chemically using the standard methods of AOAC. Data were analysed using descriptive statistics and independent t-test at  $p < 0.05$ . An 100g of the soup samples contained between  $59.93 \pm 0.01$ – $63.81 \pm 0.01$  g moisture,  $4.98 \pm 0.04$ – $5.57 \pm 0.04$  g protein,  $2.54 \pm 0.01$ – $3.69 \pm 0.01$  g fat,  $25.66 \pm 0.02$ – $26.74 \pm 0.07$  g carbohydrate,  $135.18 \pm 1.05$ – $175.52 \pm 0.74$  mg potassium,  $63.36 \pm 0.65$ – $83.19 \pm 1.33$  mg sodium,  $75.72 \pm 0.98$ – $98.90 \pm 0.57$  mg calcium,  $99.53 \pm 0.86$ – $125.92 \pm 1.39$  mg phosphorus,  $1.78 \pm 0.01$ – $2.12 \pm 0.01$  mg iron,  $1.32 \pm 0.01$ – $1.64 \pm 0.01$  mg zinc, and  $267.57 \pm 0.01$ – $314.80 \pm 0.02$   $\mu$ g  $\beta$ -carotene. The soups were very rich in phytochemicals, especially steroids ( $85.33 \pm 1.52$ – $110.66 \pm 2.51$  mg), flavonoids ( $45.00 \pm 2.00$ – $79.00 \pm 3.00$  mg), anthraquinone ( $40.66 \pm 2.51$ – $80.66 \pm 2.51$  mg), and polyphenols ( $249.00 \pm 2.00$ – $282.33 \pm 1.52$  mg)/100g, respectively. Significant variations

existed in nutrient and phytochemical contents of the soups, with *Ilasa+Morogbo* having the highest values. Standardisation of *Ilasa* soups ingredients provide accurate nutritional data which can be included on Nigerian Food Composition Table. Based on the nutritional values of the soups, their regular consumption is recommended for improved health.

## **KNOWLEDGE OF NUTRITIONAL IMPORTANCE OF FOOD LABELS IN RELATION TO HEALTHY FOOD CHOICES AMONG YOUNG ADULTS IN IBADAN METROPOLIS, OYO STATE**

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*Keywords: Healthy food choice, Knowledge of food labels, Young adults.*

Knowledge of food label is a collective resource that can guide populations towards more healthy food choices and better health outcome. Good dietary habit is the cornerstone of preventive healthcare, while understanding and utilizing food labels is a critical skill. This study was carried out to examine the knowledge, attitude, and practices of young adults in making healthy food choices through reading nutrition labels. The descriptive cross-sectional study involved online recruitment of 400 respondents aged 18–35 years. Information on socio-demographic and economic characteristics, knowledge of food labelling and dietary recommendations on food products, and relationship between respondents' understanding of food label information and informed choices were collected using adapted semi-structured, self-administered questionnaire. Respondents were provided nutrition label sample containing amount/100g of each nutrient in the food product and requested to classify the food as healthy/unhealthy option. Scores were awarded on level of correctness. Knowledge was scored on levels 1-5, levels 1, and 5 indicating lowest and highest understanding, respectively. Varying levels of label literacy was observed among respondents, with components like Best before date (73.0%) and Brand name (73.0%) being consistently noticed by respondents while others like Cooking instruction (31.0%), Nutrition facts/information (32.0%) and serving size information (25.0%) were less frequently observed by them. Fat content (25.0%) accounted for highest nutritional considerations, followed by calorie content (16.0%). Ingredient lists (24.0%), and sugar content (16.0%,) were significant factors considered in respondents' decision-making. Significant association existed between

educational attainment, marital and employment status, knowledge of nutritional importance of food labels, nutrition label scrutiny and healthy eating practices among the respondents. Strong association existed between knowledge of nutritional importance of food labels and healthy food choices among the respondents. Integrating nutrition education into school curricula is recommended.

### **A COMPARATIVE STUDY OF MATERNAL AND PATERNAL KNOWLEDGE AND ATTITUDES TOWARDS BREASTFEEDING IN BAUCHI METROPOLIS, BAUCHI STATE, NIGERIA.**

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*Keywords: Breastfeeding attitudes, Exclusive breastfeeding, Infant welfare, Maternal and paternal nutrition knowledge*

Breast milk is the most beneficial source of nutrition for newborns and mothers. Improved maternal and paternal understanding, and involvement in breastfeeding can contribute to its prolonged sustainability. This study aimed to compare the maternal and paternal nutrition knowledge and attitudes towards breastfeeding in Bauchi metropolis. A descriptive cross-sectional study of 238 participants (130 mothers and 108 fathers) used a semi-structured questionnaire to gather socio-demographic data, nutrition knowledge, and attitudes. Data were analyzed using SPSS 25, employing descriptive statistics and chi-square tests for comparison, with significance set at  $p < 0.05$ . Most mothers (80.0%) and fathers (71.3%) agreed breast milk is more easily digested than animal milk ( $p = 0.12$ ). The majority (61.5% of mothers, 59.3% of fathers,  $p = 0.72$ ) recognized colostrum's nutritional value. Both groups (88.5% of mothers, 91.7% of fathers,  $p = 0.84$ ) acknowledged breastfeeding's protective effects against illness. Participants (60.8% of mothers, 63.0% of fathers,  $p = 0.72$ ) supported breastfeeding during work hours. A significant difference ( $p = 0.01$ ) was observed in attitudes

towards mothers working while breastfeeding (69.2% of mothers and 72.8% of fathers disagreed). Notably, 56.9% of mothers and 48.1% of fathers ( $p=0.15$ ) disagreed with WHO's recommendation for exclusive breastfeeding duration. This study found no significant differences in most aspects of breastfeeding knowledge and attitudes between mothers and fathers, except for opinions on working while breastfeeding. Both groups demonstrated good knowledge and positive attitudes. However, there's a need for improved education on WHO recommendations. Encouraging expectant parents to embrace exclusive breastfeeding during pregnancy could significantly enhance infant welfare.

## **THE ROLE OF SOCIAL MEDIA IN INNOVATING AFRICA'S ANCIENT FOODS TO ENHANCE FOOD SECURITY IN THE MODERN WORLD**

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*Keywords: Indigenous crops, digital economy, food security, nutrition*

Africa has some of the world's oldest cultivated crops dating back 10,000 years since the dawn of agriculture on the continent. Despite many of these drought-resistant indigenous crops, they are still largely ignored or relegated to the informal sector. This is due to antiquated colonial attitudes towards indigenous crops and traditional food processing methods, as well as under-investment in farming them. This is a missed opportunity to progress towards sustainability and food security. But with the rise of social media and a new pop culture in the form of food influencers, content has been a catalyst for change. We explore whether this movement can be used as a medium of influence in creating awareness and stimulating technological intervention in farming, processing, and market access for indigenous foods today. The Indigenous foods covered include kormi, kocho, and the earliest cultivated crops including ensete, teff, Bambara groundnut, cowpeas, sorghum, and millet. This desk study presents a literature review relating to underutilized indigenous crops, social media influence, and how to stimulate market access in Africa. The digital content economy provides an opportunity to access readily available data on social media. Modern perceptions and attitudes towards indigenous foods are explored. Colonial attitudes towards indigenous foods are being overtaken by a new appreciation and thirst for cultural identity. Over the past 10 years, there has been an uptick trend when it comes to the digital content economy, with more and more creators sharing cultural content, covering indigenous foods. This inspires opportunities for

technical intervention, innovation, market access, and scale. Stimulating technologically assisted farming and processing of indigenous foods can improve food security. The influence of the digital content economy has made a positive impact on attitudes toward traditional foods. With more investment, processing and packaging can improve how indigenous foods are presented in the commercial marketplace.

## **CONTRIBUTION OF SCHOOL FOOD SYSTEMS ON IMPROVING NUTRITIONAL STATUS OF SCHOOL AGE CHILDREN: SCHOOL MALARIA AND NUTRITION SURVEY 2021**

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*Keywords: Food environment, malnutrition, public primary schools, school aged children, school feeding*

School food environments offer potential benefits and have been reported to influence the quality of dietary intakes and consequentially nutritional status of school-age children (SAC). Despite evidence suggesting that malnutrition is a significant problem among SAC, the influence of school food environments on their nutritional status has not been well explored. The purpose of this study is to assess the contribution of school food systems on improving nutritional status of SAC in Tanzania. A cross-sectional survey designed to collect information from public primary SAC, head teachers and households. A total of 64,465 SAC between 5 to 16 years from 650 public primary schools were recruited, 33% were randomly selected for interviews and tested for haemoglobin concentration, 10% of the interviewed SAC were linked with their households. Selected public primary schools were assessed to evaluate the status of School Feeding Program (SFP) and overall food environment. The prevalence of acute malnutrition among SAC was 20.2%, higher prevalence (48.4%) were observed among older age group 15-16 years. The prevalence of overweight/obesity and anemia was 3.8% and 32% respectively. Result indicated that 44% of surveyed schools were surrounded by food vendors selling unhealthy foods such as doughnuts and chips (87.5%), sweet snacks (82%), and carbonated drinks (70.5%). The majority (53.4%) of the surveyed primary schools lack SFP, with insufficient basic infrastructure necessary for its



implementation. Low community participation was identified as a significant barrier in implementing the SFP, as reported by 77.0% of respondents. Transforming school food environment offer opportunities to improve nutritional status of SAC, facilitating the availability of diverse and nutritious food while ensuring access to healthier choices. Further, the study recommends a comparison of school food environment in both public and private schools to inform policy and program planning as well as address the problem in holistic manner.

## **EFFECT OF A NUTRITION EDUCATION INTERVENTION ON FOOD SAFETY KNOWLEDGE, ATTITUDES AND PRACTICES OF MOTHERS OF UNDER 5 CHILDREN IN THE PERI-URBAN AREAS OF BOBO-DIOULASSO : BEFORE AND AFTER STUDY**

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*Keywords: Nutrition Education Intervention ; Knowledge Attitudes and Practices ; Food Safety ; Mothers of Children under 5 Years ; Burkina Faso*

This study assessed the effect of a nutrition education intervention. This intervention aimed to improve the knowledge, attitudes, and practices of mothers on food safety in the peri-urban areas of Bobo-Dioulasso in Burkina Faso. A total of 243 mothers of children under 5 years in the peri-urban of Bobo- Dioulasso were administered the FAO questionnaire for food safety knowledge, attitudes, and practices assessment during two cross-sectional surveys, before and after the intervention, in January and October 2017. The intervention included two components consisting of a theoretical phase (counselling and discussion) and cooking demonstrations implemented for ten months. To account for the before-and-after design of the study, the McNemar's test was used to assess the effect of the intervention on food safety KAP of mothers of children under 5 years. The mean age of mothers was  $29 \pm 6.2$  years and 50.6% of them were between 20 and 29 years old. One for knowledge (cooking thoroughly

with,  $p\text{-value} = 0.0001$ ) and another for attitudes (perceived benefits of reheating leftovers before eating them,  $p\text{-value} = 0.0001$ ), significantly increased after the intervention. In terms of food safety practices, all the indicators (cleaning of dirty surfaces, plates and utensils and storage of perishable foods) significantly increased (all  $p = 0.0001 < 0.05$ ). This study provided some evidence of an effective nutrition education intervention for improving maternal KAP on food safety for their child's feeding.

## **COMMONALITIES AND DIFFERENCES IN USES OF CASSAVA AS A FOOD MATERIAL BETWEEN URBAN AND RURAL AREAS: A CASE STUDY IN THE NORTH-WESTERN PART OF TANZANIA**

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*Keywords: cassava, cost, maize, seasonality, ugali*

Cassava is one of the most important food crops in Tanzania. Because of its characteristics of drought tolerance and high productivity, cassava is often associated with food security in case of famine. However, cassava is gradually commercialized to satisfy urban consumption. The objective of this study is to identify differences in the use and role of cassava for inhabitants in urban and rural areas. The study area is Kigoma region, which is the largest cassava producer in Tanzania. The survey methods include market research, participant observation of cooking ugali (stiff porridge), interviews and dietary survey. In both areas, cassava is eaten in three main ways: as tuberous root, cassava flour for cassava ugali, and an additive to maize ugali. In the rural area, what they eat mostly depends on what they get from their own fields. Therefore, ingredients of ugali in a year also change according to the times and volume of maize harvest, and cassava ugali is eaten much during off-crop season. In the urban area, most people must buy their foodstuff in the market, so their diets in a whole year do not largely change with the seasons and depend on their cash income. The cost of cooking cassava ugali is more expensive than maize when trying to get the same level of satisfaction due to the difference in the amount of flour used for ugali. Apart from cassava flour, cassava tuberous roots are so cheap and easy to fill up that they support urban livelihoods. The difference in channels to obtain food materials between rural and urban areas affects the uses of cassava. In the rural area, it depends on seasonality, while in the urban area, it is affected by the relative cost.

## ASSOCIATIONS OF PRIOR WASTING MALNUTRITION WITH LATER INDICATORS OF GLUCOSE TOLERANCE ACROSS FOUR COUNTRIES IN AFRICA AND ASIA: THE SAMPA STUDY

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*Keywords: Africa, Asia, Malnutrition, diabetes*

Prenatal or infant wasting malnutrition followed by later overweight is associated with increased risk of chronic diseases including type 2 diabetes. It is unclear whether malnutrition later in life is also associated with diabetes risk. We followed up two child and four adult cohorts in Tanzania, Zambia, India, and the Philippines. Participants had documented low birth weight or wasting malnutrition in childhood or as adults following HIV or tuberculosis infection. Anthropometry, body composition, and diabetes risk, indicated by HbA1c and glucose at 120 minutes (glucose<sub>120</sub>) in an oral glucose tolerance test (OGTT), were assessed 3-38 years after prior malnutrition (PM) and in not previously malnourished controls

(NPM). We investigated whether PM was associated with differences in diabetes prevalence. In adult cohorts, we investigated whether current nutritional status, assessed by body mass index (BMI), waist circumference (WC), and fat mass index (FMI), interacted with PM for associations with diabetes risk. There were few overall associations between PM and diabetes prevalence or plasma glucose during an OGTT. However, among participants currently obese, PM participants, compared to NPM, tended to have higher HbA1c (0.38%; 95% CI -0.10, 0.85%) and 2-hour glucose (0.57 mmol/L; 95% CI -0.40, 1.54 mmol/L). PM participants had higher HbA1c than NPM at both the highest and lowest terciles of FMI. PM, in early childhood and adulthood, amplifies the risk of diabetes in people who later become obese. The mechanisms require further study. Clinicians and public health managers should be aware of the risk and intervene to prevent excess weight gain in people previously malnourished.

## **COST OF HEALTHY DIETS AMONG WOMEN OF REPRODUCTIVE AGE IN THE HOHOE MUNICIPALITY**

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*Keywords: Cost, Dietary diversity, Food choices, Healthy diets, Nutrient adequacy*

The high cost of healthy diets significantly impedes access to nutritious food, not exempting the Hohoe Municipality. This study aimed to determine the cost of a healthy diet among women of reproductive age (WRA, 15-49 years) in Hohoe. This cross-sectional study involved 422 WRA in the Hohoe Municipality, Volta Region. Data on sociodemographic characteristics, food security, food choices, 24-hour recall, and dietary cost were collected using a semi-structured questionnaire. Nutrient intake and dietary diversity were analyzed using the food composition table, and dietary cost was determined using food price data and the West African Food Composition table conversion factors. Dietary diversity scores (DDS) were categorized as poor (<5 food groups) or good ( $\geq 5$  food groups). Associations between DDS and sociodemographic characteristics, nutrients, and food choices were examined using chi-square tests. A logistic regression model identified factors influencing healthy diet consumption, with significance set at  $p < 0.05$ . The mean age of participants was  $27.8 \pm 9.8$  years, with 69% experiencing food insecurity. Food choices were influenced by convenience, sensory appeal, and natural content. A significant proportion of women did not meet their

requirements for energy (81.5%), folate (73.9%), and vitamin C (45.7%). The main drivers of food prices in Hohoe were vegetables (GHC 19.8) and staples (GHC 16.2). Farmers were 10.8 times more likely to have a diverse diet compared to unemployed women [AOR=10.82 (95%CI=1.67–70.04),  $p=0.012$ ], and artisans were 2.5 times more likely [AOR=2.51 (95%CI=1.11–5.69),  $p=0.028$ ]. Women consuming carbohydrates were three times more likely to have a diverse diet [AOR=3.09 (1.79–5.33),  $p<0.001$ ], while vitamin A consumption increased the likelihood by 85% [AOR=1.85 (95%CI=1.24–2.77),  $p=0.003$ ]. Vegetables and staples drive the cost of diets in Hohoe. Employment status, carbohydrate, and vitamin A consumption significantly influence healthy diet consumption. Promoting homegrown farms is recommended to mitigate the high cost of healthy diets.

## **EFFECT OF NUTRITION EDUCATION ON DIETARY DIVERSITY AND ACADEMIC PERFORMANCE AMONG ADOLESCENT SCHOOL GIRLS IN NORTH SHOA ZONE, OROMIA, ETHIOPIA**

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*Keywords: Nutrition education, academic performance, adolescents, dietary diversity*

About 45% to 60% of adolescent school girls had inadequate food consumption and various preventable factors such as cultural values, parental ignorance, a negative attitude and a lack of basic facilities may influence it. There is a gender gap at all levels of the education system at the national level, and it is more pronounced in rural areas. Hence, this study was designed to evaluate the effect of nutrition education on the dietary diversity and academic performance of adolescent school girls in the north Shewa zone, Oromia, Ethiopia. A quasi-experimental study was done on adolescent school girls from February 1 to May 30, 2023. An individual 24-hour recall method was used to collect dietary diversity data. The academic performance of the adolescent school girls was measured using the mean mark score of all subjects' results from two consecutive semesters in the academic year of 2023. The intervention group participants received bimonthly nutrition education sessions for four months via the health belief model. The control group participants also received standard/routine information. Finally, measurements were taken at baseline and post intervention to evaluate program effectiveness on the outcome variables. This study revealed that there were statistically significant differences in good nutritional knowledge, 88.1% versus 69.2% ( $\chi^2 = 16.835$ ,  $P <$

0.001), good dietary diversity; 77.4% versus 45.9% ( $\chi^2 = 33.247$ ,  $P < 0.001$ ) and academic performance above average, 90.6% versus 65.4% ( $\chi^2 = 29$ ,  $P < 0.001$ ) among adolescent school girls between the intervention and control groups, respectively. Nutrition and health education should be provided for adolescent school girls through behavioral change communication to increase awareness towards nutrition and health-related information to ensure dietary intake and academic performance of adolescent school girls.

## **ASSOCIATIONS BETWEEN DIETARY PATTERNS AND INTESTINAL INFLAMMATION AMONG HIV-INFECTED AND UNINFECTED ADULTS: A CROSS-SECTIONAL STUDY IN TANZANIA**

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*Keywords: Diet, HIV, adults, intestinal inflammation*

The increased burden of non-communicable diseases is fueled by lifestyle factors including diet. This cross-sectional study explored among Tanzanian adults whether a potential

mechanism for increased diabetes risk is dietary patterns which lead to low-grade intestinal inflammation, bacteria translocation, and systemic inflammation, a risk factor for insulin resistance. The study included 574 participants, with both diet and inflammatory markers data. Dietary patterns were derived using principal component analysis and reduced rank regression, revealing three main patterns: vegetable-rich, vegetable-poor, and carbohydrate-dense diets. Fecal myeloperoxidase (MPO) and neopterin (NEO) and plasma lipopolysaccharide-binding protein (LBP), and C-reactive protein (CRP) were assessed as markers of intestinal and systemic inflammation. Ordinal logistic regression was used to assess associations between quintiles of the inflammatory markers and terciles of dietary patterns adjusting for potential confounders. High adherence to a vegetable-poor dietary pattern was associated with elevated MPO (adjusted OR, 1.7 95% CI 1.1, 2.8). NEO tended to be higher in people with high adherence to both vegetable-poor (adjusted OR, 2.6 95% CI 1.0, 6.4) and vegetable-rich patterns (adjusted OR, 2.7, 95% CI 1.1, 6.5). No associations were found between dietary patterns and systemic inflammation markers (LBP and CRP). We found links between dietary vegetable intake and intestinal inflammation but not systemic inflammation. These findings suggest that diet impacts non-communicable diseases through pathways other than the intestinal inflammation-intestinal permeability-systemic inflammation axis. However, the cross-sectional nature of the study limits establishing causality, emphasizing the need for further studies to understand how dietary habits influence diabetes in this population.

## **BREASTFEEDING KNOWLEDGE, PRACTICE AND PERCEIVED SOCIAL SUPPORT AMONG NURSING MOTHERS IN IBADAN, SOUTHWESTERN NIGERIA**

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*Keywords: Breastfeeding, Exclusive breastfeeding, Infant, Nigeria, Social Support*

Breastfeeding (BF) is universally acknowledged as the most beneficial practice for infant nutrition and development. However, despite its well-established advantages, there are

disparities and unexplored factors in breastfeeding knowledge and practice among nursing mothers in a developing urban city like Ibadan located in Nigeria's Southwest. The purpose of this study was to assess mothers' knowledge and practice of adequate infant feeding especially during the period of expected exclusive breastfeeding and associated factors influencing child feeding. The study design was a descriptive cross-sectional study conducted in 3 urban and 2 peri-urban local governments in Ibadan, Nigeria. Nursing mothers were interviewed using a questionnaire to elicit information. Descriptive and inferential analysis was done in SPSS vs23 and were used to explain the results with statistical significance held at  $p < 0.05$ . A total of 490 mothers were interviewed. Majority had adequate knowledge (87.3%) but a lower fraction had good practice (40.2%). About 63% received support during BF initiation but 21.8% experienced the difficulty of breast milk expression during initiation. There was a significant association between good BF knowledge and parity, the educational level of mother/spouse and income. Higher education of mother/spouse and breastfeeding counseling during antenatal were prominent variables that were inversely associated with practice. The majority of respondents (92.5%) reported receiving social support and 73% agreed that such support was needed for successful exclusive BF. The same fraction responded to perceived positive influence from the support received. However, results showed those who reported positive perceived social support influence (63%), had poor breastfeeding practices. Despite the high level of breastfeeding knowledge and perceived social support, breastfeeding practice was poor, especially among mothers with education and income advantage. In-depth ethnographic research is recommended to understand drivers of the practice of adequate infant feeding practices especially among educated mothers.

## **BARRIERS AND ENABLERS TO FRUIT AND VEGETABLE ACCESS IN THE UNIVERSITY OF IBADAN, NIGERIA**

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*Keywords: Access, Barriers, Enablers, Fruit and Vegetable*

In Nigeria, globalisation has shifted traditional dietary patterns, contributing to a rise in non-communicable diseases (NCDs). Despite the essential role of fruit and vegetable (FV)



consumption in reducing NCD risk, researches reveal suboptimal consumption levels, particularly among the populace of the University of Ibadan (UI). Termed a "FV desert," limited FV availability in the university's food environment exacerbates this issue. To address this, the study aims to identify barriers and enablers to FV access in UI. Utilising a mixed-method approach, this study surveyed 1038 students, interviewed FV vendors and administrators, and mapped FV retail points, with 90 students purposefully selected for barrier analysis. These participants were categorised as doers and non-doers based on purchase of FV within or outside UI. Findings were analysed using SPSS for quantitative data, Dedoose for qualitative data and barrier analysis calculator to identify barriers and enablers to FV access in UI. Results identified 14 retail points, mostly offering bananas and seasonal fruits. Majority of respondents (88% for fruits, 90.2% for vegetables) purchased FV outside the campus due to perceived difficulties in physical accessibility (44.6% for fruits, 43.9% for vegetables) and concerns about cost (76.9% for fruits, 75.9% for vegetables). Using differences between responses from doers and non-doers, the barrier analysis revealed that seasonality and consistent availability were significant barriers while affordability and proximity to vendors were significant enablers to FV access. Interview analysis found students advocating for strategic placement of FV on campus. Administrators and some students also emphasised the importance of customer relations, hygiene, food safety, and policy advancements. Additionally, the survey revealed that consumers were willing to pay about ₦100 for one portion of most of the fruits and vegetables. Overall, addressing multifaceted factors is crucial to improving FV accessibility and consumption, enhancing nutrition and health outcomes among university students.

## **DETERMINANTS OF INADEQUATE FEEDING PRACTICES AMONG SICK CHILDREN OF 0-23 MONTHS OLD IN CENTRAL ETHIOPIA: A CASE-CONTROL STUDY**

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*Keywords: Ethiopia, determinants, feeding practice, sick child*

Children's nutritional status can decline rapidly during or after a common childhood illness unless additional nutritional requirements are considered. Inadequate feeding of sick children has a heightened risk of infectious and non-infectious diseases. Therefore, this study aims to identify the determinants of inadequate feeding practices of sick children 0-23 months old in central Ethiopia. The study design was unmatched case-control study from February 01 to March 30, 2023. It comprised of selected mothers of 0-23 months old children with inappropriate sick child feeding practices according to the World Health Organization (WHO) definition with a control of selected mothers of 0-23 months old children with appropriate sick child feeding practice according to the WHO definition in pediatrics outpatient departments of all public hospitals in central Ethiopia, namely Salale University Specialized Hospital, Kuyu Hospital, Chanco Hospital, Muketuri Hospital, and Sheno Hospital. Interview was administered to a sample: 402 participants (201 cases and 201 controls) and the results were analysed using binary logistic regression. Overall, 201 cases and 201 controls were enrolled in the study. Mothers' education in primary grades (AOR = 1.90, 95%CI: 1.14, 3.17), female sex of the child (AOR = 1.59, 95%CI: 1.05, 2.43), absence of antenatal (ANC) visit (AOR = 3.14, 95%CI: 1.47, 6.67), not hearing information about complications of illness-related malnutrition (AOR = 1.92, 95%CI: 1.23, 2.99), and having poor knowledge on infant and young child feeding (IYCF) (AOR = 1.53, 95%CI: 1.01, 2.32) were significant determinants of sick child feeding practices. Different socio-demographic, healthcare services, and awareness-related determinants were found to heighten the odds of inappropriate sick child feeding practices. Therefore, strengthening knowledge of IYCF practices is significant to improve mothers' sick child feeding practices. Also, a scaling up of ANC service, targeting less educated mothers and those who gave birth to female children should be in place to improve sick child-feeding practices.

## ASSESSMENT OF COVERAGE OF VITAMIN A SUPPLEMENTATION, DEWORMING AMONG CHILDREN AGED 6-59 MONTHS IN MERU, THARAKANITHI, NYERI, NYANDARUA, AND KIRINYAGA COUNTIES OF KENYA

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*Keywords: Coverage, Deworming, Malezi-Bora, Vitamin A*

Globally, Vitamin A Deficiency affects 30% of under-5 children and is associated with 2% [1] of deaths while Soil-Transmitted Helminth impairs their nutrition status[2]. WHO recommends biannual Vitamin A supplementation (VAS) and deworming, targeting >80% coverage. The Ministry of Health Kenya delivers the interventions through routine health facility, Malezi Bora (MB) events, community outreaches, and early childhood development centres. A post-event coverage survey was conducted in July 2023 to estimate the true coverage. A cross-sectional survey employed the WHO (2018) two-stage stratified cluster using both quantitative and qualitative methods. Clusters were selected by probability proportionate-to-size sampling and households randomly selected. The survey had one stratum reaching 887 caregivers and 999 children, 78 CHPs and 71 health workers. The VAS and deworming coverages were 83% and 75% respectively. Reasons for non-receipt were CHPs not visiting homes (VAS=39%;OR=1.336;p=0.041], and deworming (=37%;OR=1.027;p=0.050) and caregivers not informed (VAS=31%;OR=1.161;p=0.039], and deworming =27%;OR=0.938;p=0.029]). The VAS MB coverage was +5.8% higher than the administrative coverage of June 2023. Less than <48% of the respondents were aware of MB through CHPs= 45% and health workers=25%. Caregivers' knowledge on Vitamin A was 87%, but variations exist in awareness on benefits and dosing frequency. VAS and deworming coverages were satisfactory (>80% national target). The coverages were significantly higher during the MB events. The low caregiver knowledge is associated with missed opportunities and low coverage rates. Therefore, with better planning, mobilization and documentation, more children will be reached with the two interventions.

## DIETARY STRATEGIES REGARDING WEIGHT MANAGEMENT AMONG POSTPARTUM WOMEN IN GHANA: A QUALITATIVE INQUIRY

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*Keywords: Postpartum women, dietary strategies, experiences, weight management*

There is a scarcity of literature concerning the dietary approaches that women employ during their postpartum phase to control their weight. This research explored the experiences of postpartum women in relation to dietary approaches for weight management following childbirth. Interviews were conducted among twenty-eight (28) participants across six (6) healthcare centers in Cape Coast, Ghana. A consecutive sampling method was used to recruit the study participants. Qualitative data analysis was performed using MAXQDA Analytics Pro 2020, employing Braun and Clarke's reflective thematic analysis method. Three themes emerged: (i) postpartum weight concerns; (ii) dietary modifications; and (iii) influence, support, and recommendations. Participants differed on when to start dietary changes, balancing breastfeeding considerations with cultural beliefs. Challenges included physical weakness, fatigue, and the demands of caring for newborns. Participants used natural remedies, healthy food choices, food timing, portion control, and exercise. Weigh-ins by health professionals often initiated weight management, but the lack of guidance led many to seek alternative nutritional advice. Cultural pressures and family recommendations sometimes conflict with personal goals, creating emotional struggles. Peer advice offered motivation and insights. The findings of our study highlight a complex interplay of cultural, social, and professional factors influencing postpartum dietary and weight management practices. There is a need for comprehensive support from health professionals to assist women during this period.

## DIETARY INTAKE AND INADEQUACIES AMONG WOMEN OF REPRODUCTIVE AGE IN RURAL NORTHERN TANZANIA

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*Keywords: Dietary intake, Tanzania, dietary inadequacy, mean probability of adequacy, women of reproductive age*

Dietary inadequacies among women of reproductive age (WRA) contribute to a cycle of malnutrition, disease, and poverty. This study aimed to characterise dietary intake and inadequacies among WRA in rural Tanzania. We used baseline data from the FRESH Tanzania End-to-End Evaluation, collected between October 2023 and January 2024. The analysis sample included WRA ( $n=2594$ ) residing in the Arusha and Kilimanjaro regions of Tanzania. Dietary intake was assessed using a 24- hour dietary recall (24hR) with the OpenDRS approach. The 24hR was repeated in a subsample ( $n=520$ , 20%) to adjust for the day-to-day variations in individual intake. The National Cancer Institute method was employed to estimate mean usual energy and nutrient intakes and the prevalence of adequate intake of micronutrients. The mean probability of adequacy (MPA) for 11 micronutrients was calculated. The mean age of the women was  $38.3 \pm 6.2$  years. Approximately 19.2% were lactating, and 4.4% were pregnant. The mean daily energy intake was 2415 Kcal/day (interquartile range (IQR) 2235, 2627), with carbohydrates, fat, protein, and dietary fibre contributing 62.2%, 24.6%, 9.9%, and 3.3% to daily energy intake, respectively. Almost all participants had insufficient calcium and vitamin B12 intakes (99%). Half or more respondents had insufficient vitamin C (57.8%) and folate (50.7%) intake, while about one-third had inadequate zinc (31.7%) and iron (27.6%) intake. Although vitamin A, thiamine, riboflavin, niacin, and vitamin B6 intakes were adequate on a population level, inadequacies in thiamine (24.6%), niacin (23.3%), and vitamin B6 (29.0%) were notable

among pregnant women and vitamin A (38.9%) among lactating women. The MPA was 64.3%, increasing with older age, primary or higher education, and wealth but decreasing with food insecurity. Dietary inadequacies were prevalent, especially in pregnant and lactating women, highlighting the need for targeted interventions among WRA in rural northern Tanzania.

## **FOOD SAFETY KNOWLEDGE AND PRACTICES AMONG FRESH FRUIT VENDORS AND MICROBIAL PRESENCE IN FRUITS IN IBADAN METROPOLIS**

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*Keywords: Food Safety, Fruit Vendors, Knowledge, Microorganisms, Practice*

There is an increasing awareness of the daily consumption of fruits and vegetables, resulting in a steady increase in consumption practices. However, due to the increasing busy nature of populations, fast and convenience foods are usually resorted to. Cut fruits are easily accessible and cheaper to purchase, but there is a continuous report of foodborne illness associated with fresh fruits. The aim of this study was to assess the food safety knowledge and practices among fresh fruit vendors and the microbial presence in fruits in Ibadan metropolis, Ibadan, Oyo State, Nigeria. We randomly selected and interviewed 180 fruit vendors using a structured questionnaire. A 21-point and 14-point set of questions were used to obtain information on vendor knowledge and practices, respectively. Microbial population was assessed by total colony forming unit. SPSS V.25 was used to analyse data. The majority of fruit vendors were males (60.5%), 20-29 years (36.5%), of the Hausa tribe (41.0%), and were stationary (81.5%). The study revealed that 54.0% had poor knowledge and 49.0% had good practices. When asked about their practices, vendors never washed hands after handling money (29.0%), always washed hands after handling spoiled or contaminated fruits (45.0%), always discarded spoilt and contaminated fruits (56.6%), but never washed hands before and

after rubbing nose or scratching the body (22.0%). Among respondents with poor knowledge, 72.4% had poor food safety practices ( $p=0.00$ ). The probable microorganisms identified included *E. coli*, *Camphylobacter spp*, *Salmonella spp*, *Shigella*, and *Staphylococci*. More than half of the vendors had poor knowledge of food safety, and their practices were not supportive of food safety and hygiene. This was further demonstrated by the probable microorganisms identified in the fruits purchased. Improved environmental sanitation and periodic education and monitoring of fruit vendors are recommended.

## **INDIRECT EFFECTS OF CO-CREATED NUTRITION-SENSITIVE INTERVENTIONS ON WOMEN'S AND CHILDREN'S DIETARY DIVERSITY IN TWO SUB COUNTIES OF TURKANA, KENYA: A SPATIAL ANALYSIS OF SPILLOVER EFFECTS**

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*Keywords: Turkana County, children, co-creation, dietary diversity, spatial, spillover, women*

Study aimed to investigate spillover effects of nutrition-sensitive interventions co-created with communities in the arid Turkana County, Kenya, using a community-based participatory approach for development. Quasi-experimental study design was employed, with 17 communities randomly allocated to intervention ( $n=10$ ) and comparison ( $n=7$ ) groups. Within intervention communities, direct beneficiaries participated in co-creation workshops to develop and implement interventions to improve diets; indirect beneficiaries were not directly involved but lived in the targeted communities. Data were collected at baseline from intervention and comparison communities. At endline, the sample was stratified into comparison, direct, and indirect beneficiary groups. Outcomes were assessed using the dietary diversity scores for Women (WDDS, 10 food groups) and Children (CDDS, 7 food groups). Spatial analysis using mixed-effects models examined the relationship between distance from the training venues and the outcomes. Indirect beneficiaries had significantly higher dietary

diversity scores compared to the comparison group, with a statistically significant increase of 0.79 food groups for women and 0.78 food groups for children (both  $p > 0.001$ ). Direct beneficiaries experienced even greater improvements, with additional increase of 0.35 food groups for women and 0.30 food groups for children compared to indirect beneficiaries. Spatial analysis revealed significant negative association between distance from the intervention venue and both WDDS ( $\beta = -0.18$ ,  $p = 0.006$ ) and CDDS ( $\beta = -0.20$ ,  $p = 0.002$ ), with a decline in dietary diversity observed up to approximately 10 kilometers, valid both for baseline and endline, indicating that distance matters but that the training location did not impact dietary diversity. These findings also demonstrate a presence of positive spillover effects from the co-created interventions in both WDDS (Wald  $\chi^2 = 225.84$ ,  $\beta = 0.79$ ,  $p < 0.0001$ ) and CDDS (Wald  $\chi^2 = 218.77$ ,  $\beta = 0.78$ ,  $p < 0.0001$ ). This study demonstrates the effectiveness of the community-based participatory approach for development and provides insights for targeting and scaling up such interventions in resource-limited settings.

## **BARRIERS AND FACILITATORS OF VITAMIN A SUPPLEMENTATION PROGRAMME IN NIGERIA WITH FOCUS ON EBONYI AND OYO STATES**

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*Keywords: Vitamin A supplementation, barriers, coverage, facilitators.*

Vitamin A Supplementation (VAS) is a low-cost, short-term strategy to combat vitamin A deficiency (VAD), having the ability to reduce all forms of child mortality by 12-24%. In Nigeria, VAD affects 30% of under-five children notwithstanding the stakeholders' efforts at controlling micronutrient deficiencies. This study was aimed to evaluate the barriers and facilitators of Vitamin A supplementation programme in selected states of Nigeria. A mixed-method design was adopted. Data on VAS and under-five mortality were accessed from National Primary Health Care Development Agency and UNICEF databases for trend analysis. In-depth interviews with stakeholders at different levels and focus group discussions among beneficiaries in Ebonyi and Oyo states were conducted to explore barriers and facilitators of VAS programme. Interviews were recorded, transcribed verbatim and analyzed using Nvivo version 14. VAS coverage fluctuates with 91%, 56%, and 67%, in



2010, 2016, and 2022, respectively, alongside steady decline in under five mortality from 135.5 -107.2/1000 live births during 2010-2022. Major facilitators include development partners' support in funding, training of health workers, facilitating collaboration, and supply of capsules. Prominent barriers included beneficiaries' financial situations, lack of transportation, misuse of vitamin A capsule, non-availability as routine service, poor logistics, competing priority, lack of well-trained health workers, community and beneficiaries' attitude etc. Suggested strategies to improve VAS programming include incentivizing performance, adopting community-led, tailored cultural and religious implementation initiatives, intensified media use for publicity, early education and resource mobilization, integration with existing health programmes, and availability of feedback mechanisms. Vitamin A supplementation coverage is fluctuating amidst declining under-five mortality in Nigeria. Development partners support in funding, provision of vitamin A capsules, and capacity building of health workers facilitate successful programming amidst myriads of barriers including poor government support, misuse of vitamin A capsule, security concern, and non-supportive community and beneficiaries' attitudes.

## **INVESTIGATING THE EFFECT OF WALNUT CONSUMPTION ON THE BIOMARKERS OF DIABETIC NEPHROPATHY IN STZ-INDUCED TYPE 2 DIABETES FEMALE WISTAR RATS**

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*Keywords: KEY WORDS: Plukenetia conophora; diabetes; diabetes nephropathy; Nrf2; walnut diet*

Diabetes nephropathy presents significant health challenges, particularly in individuals with type 2 diabetes, leading to renal impairment and exacerbating cardiovascular risks. This study determined the ameliorative effects of walnut (*Plukenetia conophora*) consumption on diabetic nephropathy in female Wistar rats. The study employed an in vivo experimental design with 30 female Wistar rats, divided into five groups: Control (CTL), Diabetes-Induced

+ Standard Diet (DIS), Walnut Diet No Diabetes (WND), Diabetes-Induced + Walnut Diet (DIW), and Walnut Diet + Diabetes Induction (WDD). A 40:60 walnut powder and standard feed diet were used. Type 2 diabetes mellitus (T2DM) was induced using streptozotocin after 14 days of a fructose-water solution. Biomarkers of oxidative stress (MDA, GSH, and Nrf2), inflammation (CRP), and renal function (plasma urea, creatinine, albumin, and UA) were measured using established methods. MDA: CTL lowest (1.27 umol/ml), DIS highest (2.43 umol/ml). GSH: DIS lowest (46.21 umol/ml), WND highest (71.65 umol/ml). NRF2: WDD highest (60.79 pg/ml), WND lowest (52.00 pg/ml). Plasma urea: WND (154.25 mg/dl), DIW (211.20 mg/dl), WDD (195.36 mg/dl), and DIS (226.61 mg/dl). DIS showed significantly higher urea levels than CTL (166.82mg/dl). Plasma creatinine: CTL lowest (2.99 mg/dl), DIS highest (6.03 mg/dl). Albumin: WND lowest (14.99 mg/dl), DIS highest (29.32mg/dl).UA levels: WDD (3.11 mg/dl), DIW (3.77 mg/dl), and DIS (5.88 mg/dl). Plukenetia conophora consumption positively affects glucose homeostasis, lipid profile, oxidative stress, and inflammatory biomarkers. Consumption of Plukenetia conophora significantly ameliorates diabetic nephropathy in female Wistar rats with type 2 diabetes mellitus.

## **NUTRITIONAL STATUS OF THE ELDERLY IN THE BOSOMTWE DISTRICT, ASHANTI REGION, GHANA: DETERMINANTS AND THE EFFECTS ON GENERAL HEALTH.**

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*Keywords: Elderly, Geriatric Nutrition, Malnutrition, Nutritional status*

Malnutrition among the elderly, particularly in developing countries, poses significant public health challenges exacerbated by age-related medical, psychological, social, and economic factors. The study aimed to investigate the nutritional status of 250 individuals aged 60 and above in the Bosomtwe District, Ashanti Region, Ghana. The Nestle Mini Nutritional Assessment (MNA) and anthropometric measurements were used to assess nutritional risk. Results revealed 26.9% malnourished, 57.0% at risk of malnutrition, and 16.1% with

normal nutrition status. The Body Mass Index (BMI) emerged as the sole significant predictor of nutritional status. Despite high independence (99.6%) and mobility (94.0%), fruit and vegetable consumption were low (83.5% did not consume daily). These findings underscore the pressing need for health policies targeting older individuals, emphasizing nutritional improvement and healthcare accessibility. Moreover, there's a call for enhanced tools to monitor their nutritional status. The Ministry of Health, Ghana, should prioritize funding for large-scale public health nutrition studies to address these challenges. Caregivers are urged to vigilantly monitor older individuals' health to mitigate nutritional decline. Collectively, concerted efforts are essential across public health sectors to meet the nutritional needs of older populations in Ghana, both in this study setting and nationwide.

## **FOOD SAFETY KNOWLEDGE, PERCEPTIONS, AND SELF- REPORTED PRACTICES AMONG RURAL AND URBAN CONSUMERS: A CROSS-SECTIONAL STUDY IN KENYA.**

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*Keywords: Food safety, Foodborne diseases, food environment, food safety concerns, perceptions*

Foodborne diseases are a public health concern and contribute to global healthcare costs. Food safety knowledge, perceptions, and practices can help reduce the risk of foodborne illness. This study investigated knowledge, perceptions, and practices toward food safety among urban and rural consumers in Kenya. A cross-sectional study was conducted in Nairobi and Makueni, representing urban and rural households, respectively. Within the respective study areas, we randomly selected 631 households for Nairobi and 205 for Makueni. Women responsible for food acquisition and preparation were interviewed in the selected households.

Eleven questions were used to assess food safety knowledge. Perceptions were assessed based on consumers' risk concerns about six hazards measured on a five-point Likert scale – scored 0 to 4. Practices to reduce food safety risks were assessed using 11 items scored on a three-point Likert scale – scored 0 to 2. Statistical analyses comprised t-tests, Cronbach's alpha, and regression models. About 83% and 86% of rural and urban consumers, respectively, answered at least half of the knowledge questions correctly, based on a sum score. The least correctly answered question was about how to store raw meat. The risk concern score was significantly ( $p<0.001$ ) higher among urban consumers than among rural consumers. About 80% and 91% of the rural and urban respondents, respectively, achieved at least half of the total score for food safety-related practices. Both food safety knowledge ( $\beta = 0.03844$ ,  $p<0.001$ ) and perceptions ( $\beta = 0.006133$ ,  $p<0.001$ ) significantly influence food safety-related practices ( $p<0.001$ ). The construct reliability for perceptions and practices related to food safety were 0.88 and 0.68, respectively. The study's findings suggest that urban consumers have higher food safety knowledge and are more concerned about food safety hazards than rural consumers. This disparity could be addressed through targeted educational campaigns and interventions.

## **RELATIONSHIP BETWEEN MATERNAL PERICONCEPTIONAL DIET AND OROFACIAL CLEFTS IN GHANA**

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*Keywords: Dietary Patterns, Folate, Nutrient Intake, Orofacial Clefts, Periconceptional Nutrition*

Orofacial clefts (OFCs) are congenital anomalies involving the face and upper lip and/or palate. This study aimed to determine the association between dietary patterns and nutrient intake during the periconceptional period and risk of OFC in Ghana. A case-control study involving 103 case-mothers with children having OFCs and 103 control- mothers of children without OFCs used triplicate 24-hour dietary recall and a targeted food frequency questionnaire to obtain dietary information, with principal component analysis identifying

dietary patterns. The study identified three dietary patterns: Traditional Ghanaian, High Protein and Fat, and Fruits and Vegetables. The Fruits and Vegetables Diet was associated with higher intakes of folate (250 µg/day,  $p < 0.01$ ). The Traditional Ghanaian Diet had lower amounts of folate (150 µg/day,  $p < 0.05$ ) while the High Protein and Fat Diet showed higher intakes of protein (75 g/day,  $p < 0.01$ ) and fat (85 g/day,  $p < 0.01$ ) but the lowest folate (130 µg/day,  $p < 0.01$ ) levels. Dietary diversity scores significantly differed across patterns, with the Fruits and Vegetables Diet having the highest scores ( $p < 0.001$ ). About 40% of the case group and 20% of the control group were food insecure ( $p < 0.05$ ). The Traditional Ghanaian Diet and High Protein and Fat Diet were associated with a higher risk of OFCs (OR = 2.5, 95% CI: 1.8-3.2,  $p < 0.001$ ) compared to the Fruits and Vegetables Diet (OR = 0.8, 95% CI: 0.6-1.1,  $p < 0.05$ ). Our findings suggest that diets rich in fruits and vegetables contain the highest folate associated with the lowest risk of orofacial clefts, highlighting its potential role as a viable tool against OFC risk.

## **RELATIONSHIP BETWEEN FOOD SECURITY, COMPLEMENTARY FEEDING PRACTICES AND DIETARY PATTERNS WITH LINEAR GROWTH, COGNITION AND OCULAR HEALTH IN INFANTS (6-23 MONTHS OLD)**

*by Fiifi Amoako Atta Panyin Essiam / Mary Amoako / Kwadwo Owusu Akuffo / Helena Nti / Kwame Nkrumah University of Science and Technology, Ghana / Kwame Nkrumah University of Science and Technology, Ghana / Kwame Nkrumah University of Science and Technology, Ghana / University of Health and Allied Sciences, Ghana*

*Keywords: Food security, cognition, dietary patterns, growth, vision*

Despite progress in global efforts to improve child health and nutrition, disparities persist with many infants facing issues such as food insecurity and suboptimal feeding practices. This study examines the relationship between food security, complementary feeding practices, dietary patterns, and linear growth, cognition, and ocular health in infants aged 6 to 23 months. This cross-sectional study recruited 270 infants and their caregivers from the Bosomtwe district. Qualitative and quantitative data were collected on sociodemographics, food security, complementary feeding practices, dietary patterns, cognitive development and visual acuity were all collected. A total of 76.7% households were food insecure. Prevalence of stunting (21.3%), underweight (21.5%), microcephaly (13.3%) and wasting (23.7%) were

considerably high among the infants. Complementary feeding practices were sub-optimal, with only 48.9% exclusively breastfed until 6 months and 85.1% breastfeeding within one hour of birth. Food insecurity was positively associated with poor visual acuity ( $\beta = 1.078$ , 95% CI: 1.009-1.151) and increased risk of stunting ( $\beta = 1.49$ , 95% CI: 1.000-1.7100). Early initiation of breastfeeding was positively associated with improved cognition ( $\beta = 0.415$ , 95% CI: 0.176-0.980), while continued breastfeeding was also positively associated with improved cognition ( $\beta = 5.079$ , 95% CI: 2.348-10.987) and reduced stunting ( $\beta = 0.224$ , 95% CI: 0.094-0.525). Finally, home-prepared meals were positively associated with a reduced risk of stunting ( $\beta = 0.675$ , 95% CI: 0.579-0.953). These findings emphasize the importance of addressing food insecurity and promoting optimal complementary feeding practices for infant health and development. Interventions targeting improved access to nutritious foods, breastfeeding support, and early initiation of complementary feeding may mitigate the risk of malnutrition and developmental delays in vulnerable populations.

## **SENSORY EVALUATION, MICROBIOLOGICAL ASSESSMENT AND PROXIMATE COMPOSITION OF MILLET-SOYBEAN SPICED WITH GINGER DRINK AS A GALACTAGOGUE**

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*Keywords: Galactagogue, Microbial quality, Proximate composition, Sensory evaluation*

Despite the cultural connotation breastfeeding represents and its near-global acceptability, within the Ghanaian context, a lot more mothers still experience breastfeeding challenges. Plant-based galactagogues like pearl millet, soybean and ginger are of interest due to perceived benefits and cultural acceptability. However, their nutritional and microbial profiles of these home-made galactagogues remain largely unexplored. In this study, we evaluated the sensory attributes, microbial quality and proximate composition of home-made millet-soybean spiced with ginger drink as a potential galactagogue. The millet, soybean and ginger were procured from the Tamale Central Market and prepared into three formulations.

Proximate analysis involved moisture, ash, fat, protein, fiber, and carbohydrate determination. Sixty participants evaluated sensory analysis using a 9-point hedonic scale, while microbial analysis was conducted using culture media and biochemical tests. Proximate analysis indicated high moisture content (89.09%), moderate protein (1.16%) and carbohydrate (8.84%), low ash (0.48%) and fat (0.35%) content and absence of crude fiber. An overall caloric value of 43.87 kcal per 100 ml was recorded. Microbial analysis detected low levels of pathogens like *E. coli* and *Salmonella* still indicating the need for improved hygiene during production. Sensory evaluation revealed that all samples of the millet-soya spiced with ginger drink were generally accepted, with the sample containing higher millet content scoring the highest. The favorable sensory profile, particularly in the millet-rich sample, suggests promising acceptability. Nutritionally, the drink offers a low-fat, moderate protein, and carbohydrate content, suitable for consumers seeking healthier options. However, microbial analysis highlights the importance of stringent hygiene measures to ensure product safety. Further research is warranted to optimize processing methods and enhance microbial safety while maintaining sensory and nutritional quality. This study contributes to the limited scientific literature on food galactagogues and provides an empirical biochemical basis for classifying these feeds as such.

## **EFFECT OF OKRA-BASED NUTRITION EDUCATION ON HEMOGLOBIN CONCENTRATION AND NUTRITIONAL STATUS OF PREGNANT WOMEN IN OKRA-PRODUCING AREAS OF WESTERN ETHIOPIA: QUASI-EXPERIMENTAL STUDY DESIGN**

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*Keywords: Anemia: okra: mid-upper arm circumference: health belief model: maternal nutrition.*

The study focused on locally available food sources that are easily affordable, and natural and have a role in improving food and nutrition security in developing countries like Africa. This research mainly focused on filling the gaps related to Okra consumption, Promotion, and advocacy of this nutritious food source which has a crucial role in improving the food security situations of rural communities. Furthermore, it addresses the importance of this cultural food

source for pregnant women and the health of future generations. The findings of this study go in line with the Global Nutrition Targets and also Food and Nutrition Policy of Ethiopia to reduce maternal malnutrition and ensure sustainable production for food security.

## **DIETARY DIVERSITY AND HEALTH STATUS OF PRESCHOOL CHILDREN IN NORTH CENTRAL NIGERIA**

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*Keywords: MDD\_C, Meal quality, Nigeria, Preschoolers, Wasting*

Food insecurity and malnutrition contribute significantly to many preventable health outcomes across many developing countries. Poor dietary quality among preschool children due to unhealthy food choices and suboptimal eating habits accounts for increased morbidity and mortality rates, which are often undocumented, especially in North-central Nigeria. The paucity of information on the association between the health status and meal quality of preschoolers is worrisome. A cross-sectional study was conducted among preschool children aged 3-5 years in Niger State, Nigeria, using semi-structured questionnaires and focus group discussions. A seven-day food frequency questionnaire (FFQ) and minimum dietary diversity score for children (MDD\_C) were used to assess dietary intake; anthropometric indicators were assessed based on WHO z-scores for wasting, stunting and underweight. Logistic regression analysis was used to determine the association between health status and MDD\_C ( $p < 0.05$ ). A total of 450 preschoolers were enrolled. More than half (51.9%) of the respondents did not meet their MDD\_C, while few (20.2%) met their MDD\_C between once to twice per week. Consumption of Vitamin A fruits and vegetables (54.2%), milk and milk derivatives (55.8%), meat /fish (57.1%), eggs (59.8%) were less than three times per week while cereals (61.3%), sweets (36.2%) and snack (44.9%) were consumed more than three times per week. The majority (69.1%) were moderately wasted, 57.8% were moderately underweight, and 44.0% were moderately stunted. MDD\_C was significantly associated with wasting and stunting among preschoolers ( $p < 0.05$ ). The odds (AOR=1.458; 0.865-2.052 95% CI;  $P=0.000$ ) of being wasted decreased significantly with increased MDD\_C. Sufficient intake of a variety of meals is associated with the good health status of preschool children in North Central Nigeria. There is a need for intervention targeted at reducing poor meal diversity, malnutrition and child mortality.



## ENHANCING SCHOOL HEALTH AND NUTRITION THROUGH COMPREHENSIVE SCHOOL FEEDING PROGRAMS

*by Adjii Diop / Counterpart International*

*Keywords: Academic Performance, Child Nutrition, Community Engagement, Program Implementation, School Feeding*

School feeding programs promote health and nutrition among school-aged children, particularly in low-resource settings. These programs improve students' nutritional status and academic performance, enhancing school attendance and retention rates. Despite the benefits, many regions still need help implementing effective school feeding initiatives. This study examines the impact of comprehensive school feeding programs on the health and nutrition of children in underserved communities, highlighting key factors that contribute to successful program implementation. This research employs a mixed-methods approach, combining quantitative data from nutritional assessments and academic performance records with qualitative insights from interviews and focus groups with students, parents, teachers, and program administrators. Data were collected from schools participating in a feeding program over the academic year. Nutritional status was assessed using anthropometric measurements and dietary intake surveys, while academic performance was evaluated through standardized test scores and attendance records. Qualitative data were analyzed using thematic analysis to identify recurring themes and factors influencing program outcomes. The findings indicate that school feeding programs significantly improve children's nutritional status, with marked increases in height-for-age and weight-for-age z-scores. Academic performance also showed notable improvement, with higher test scores and increased attendance rates compared to control schools without feeding programs. Qualitative data revealed several critical factors for successful program implementation, including community involvement, consistent food supply, and culturally appropriate meals. Challenges such as funding limitations and logistical issues were also identified, highlighting areas for program enhancement. Comprehensive school feeding programs effectively enhance the health and nutrition of school-aged children, leading to improved academic outcomes and overall well-being. The study underscores the importance of community engagement, sustainable funding, and culturally relevant interventions to maximize the impact of these programs. Policymakers and stakeholders should prioritize developing and supporting school feeding initiatives to address

malnutrition and promote educational attainment in underserved communities.

## **CENTRAL OBESITY AND ITS ASSOCIATED FACTORS AMONG BANK EMPLOYEES IN SOUTHWEST ETHIOPIA**

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*Keywords: Bank employees, Central Obesity, Ethiopia., factors*

Central obesity, characterized by an excessive buildup of fat around the abdomen, especially visceral fat, poses significant health risks such as cardiovascular disease and metabolic syndrome. Despite being recognized as a growing public health concern worldwide, its prevalence and factors contributing to it among office workers remain largely understudied. Hence the study assesses the magnitude of central obesity and associated factors among bank employees in southwest Ethiopia, 2022. An institution-based cross-sectional study was conducted among 403 randomly selected bank employees in Southwest Ethiopia from April to May 2022. Data were collected via face-to-face interviews using a structured questionnaire. Central obesity was assessed through waist circumference. The collected data were entered into Epidata 4.6 and exported to SPSS version 26 for analysis. Bivariable and multivariable logistic regression models were fitted. An odds ratio and 95% confidence intervals were calculated to assess the strength of associations. Statistical significance was set at a p-value of less than 0.05. A total of 373 respondents were included in the study making a response rate of 92.6%. The overall magnitude of central obesity among Bank workers in the study area was 54.7%. Hours of sitting at workplace ( $\geq 5$  hours) (AOR=2.91 (95% CI: (1.64, 5.16)), being female (AOR=3.26 (95% CI: (1.74, 6.05)), age (40-49 (AOR=4.52, 95% CI: (1.79, 11.36)),  $\geq 50$  years (AOR =5.91, 95% CI: (1.81,19.29)), Physically inactive (AOR=4.59, 95%CI: (2.31, 9.13), consumption of Snacks (AOR=4.52, 95%CI: (2.58, 7.91)), alcohol consumption (AOR=2.32 95%CI: (1.21, 4.46)) were factors associated with central obesity. Central obesity is notably high among bank employees, with several key factors identified as significant contributors. To address this issue effectively, promoting physical activity and adopting a healthy lifestyle are essential measures that should be encouraged among bank

workers in the region.

## **FORMULATION AND QUALITY EVALUATION OF ALTERNATIVE BOUILLON CUBES USING LOCALLY SOURCED INGREDIENTS AND BINDERS**

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*Keywords: Bala Fish, Bouillon Cube, Crab, Monosodium Glutamate, Oyster*

Bouillon cubes have been reported to contain high amount of Monosodium glutamate (MSG) and which can be related to high blood pressure, stroke etc. Most of the ingredients used in the production of bouillon cubes in Nigeria are not locally sourced, whereas there are local ingredients and condiments that can be used as alternatives. Successful use of locally sourced ingredients to produce bouillon cubes will draw the attentions of manufacturers to locally made ingredients and introduce consumers to bouillon cube with improved flavour. Oyster (*Crassostrea graser*), crab (*Callinectes sapidus*), ‘Bala fish’ (*Balantiocheilos melanopterus*) and crayfish (*Atya gabonensis*) were processed differently to make bouillon cubes and were binded with two different binders- cornstarch and ‘achi’ (*Brachystegia eurycoma*). Commercially sold bouillon cube served as the control. Proximate and mineral analysis was carried out on the samples as described by Association of Official Analytical Chemists (AOAC). The bouillon cubes were used to prepare soups, and sensory analysis were carried out. Statistical analysis was carried out using SPSS version 26. The protein content of the locally produced bouillon cubes was higher than the control, while the carbohydrate and ash contents of the control was higher than the locally sourced bouillon cubes. The zinc and iron contents of the locally produced bouillon cubes were higher than the control, while the control recorded higher sodium content. Sensory analysis showed that the control recorded the highest overall acceptability. The use of oyster, crab, cray fish and ‘bala fish’ as for bouillon cube alternatives showed to be feasible and have good nutrient content, as compared to the commercially sold cubes. The bouillon cubes produced with ‘achi’ as binders had more nutrient than the cornstarch.

## PODUCTION AND QUALITY EVALUTION OF CUSTARD SUPPLEMENTED WITH SOURSOP

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*Keywords: Custard, Functional Properties, Pasting Properties., Soursop Flour*

There are concerns over the health effects of poor-quality carbohydrates foods which includes those containing low amount of fibre and high glycemic index. Consumption of diets rich in antioxidants is generally associated with various health benefits. Soursop fruit is rich in antioxidant compounds that contributes its remarkable health boosting properties. Custard is high in sugar and lacks bioactive compounds, thus, supplementing with soursop could improve its nutritional profile. Custard was produced from maize, and soursop flour was produced from mature unripe *Annona muricata* fruit. The custard and soursop flour were mixed at varying proportion- 90:10 (sample B), 80:20 (sample C), 70:30 (sample D) and 60:40 (sample E), while 100:0 served as the control (sample A). Proximate and antioxidant content (vitamin C) analysis were carried out on the samples as described by Association of Official Analytical Chemists (AOAC). Functional and pasting properties of the samples were determined. Sensory evaluation was carried out on of pudding produced from the samples. Statistical analysis was carried out using SPSS version 26. There was significant increase in the protein, crude fibre, and ash content of the custards supplemented with soursop flour. There was no significant difference ( $p < 0.05$ ) in the bulk density and dispersibility of the samples. The viscosity and peak time of the samples increased on inclusion of soursop flour, while the pasting time reduced. The control recorded the best score for overall acceptability, followed by samples B and C. This study reveals that the inclusion of soursop flour to custard powder improved the nutrient content of custard as there was observed increase in the vitamin C content of the supplemented samples, while fat and carbohydrate contents reduced. Soursop supplemented samples gave the best solubility, and will do well for use for infant food formula.

## **SALT USAGE AND CONSUMPTION IN A CLUSTER- RANDOMISED SCHOOL EDUCATION AND BEHAVIOR TRIAL IN RURAL AND URBAN MALAWI**

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*Keywords: Non-communicable Diseases, Randomized Control Trial, and Salt.*

Excessive salt consumption contributes to non-communicable diseases (NCDs) like hypertension. Despite the World Health Organization's (WHO's) recommendation of 5 grams of salt per day for adults, global intake remains high. In Malawi, where hypertension is prevalent, addressing dietary habits, especially among adolescents and adults, is crucial. Our study aimed to reduce salt intake among adolescents and their households in rural and urban Malawi. In this randomized control trial, dietary data was collected through 24-hour recalls and household questionnaires to assess salt usage. The study included 732 adolescents and 1238 adults, randomly assigned to intervention and control groups. Data were collected at baseline, 12 weeks, and 52 weeks post-intervention. The intervention involved educational sessions on salt reduction incorporated into the science curriculum for standard 6 students in primary schools in Lilongwe and Karonga districts. Household salt usage was tracked using provided containers. Baseline data indicated that most salt consumption came from home-cooked meals. Follow-up assessments showed a decrease in processed food consumption among adolescents in the intervention group. Participants primarily consumed salt from home-cooked meals, with a noted decrease in table salt addition among adolescents in the intervention group. Analysis showed significant behavior changes related to reduced salt intake in the intervention group compared to the control group ( $p=0.018$ ). Adults in the intervention group were less likely to consume processed foods ( $p=0.014$ ). Adolescents in both sites showed reduced odds adding table salt, with significant intervention effects. Reported household salt usage in the intervention group decreased from  $14.7 \pm 11.1$  g at baseline to  $12.7 \pm 8.9$  g at midline ( $p=0.0276$ ), weighed salt usage showed no significant differences between groups. The study found minimal change in salt intake despite the intervention. The trial underscores the difficulty in changing salt consumption patterns and the need for innovative strategies to promote healthier dietary practices.

## **SENSORY EVALUATION AND ACCEPTABILITY OF READY- TO-USE FOOD AMONG SCHOOL-AGED CHILDREN IN THE KETU SOUTH MUNICIPALITY, GHANA.**

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*Keywords: Ready-to-Use Supplementary Food (RUSFs), acceptability., cowpea, nutritious, sensory Attributes*

Appearance and rheological properties influence children's acceptability of novel food products. Poor food preferences lead to the selection of nutritionally poor and potentially harmful foods. To promote the consumption of healthy foods, we undertook a sensory evaluation study, aimed at assessing the sensory attributes and overall acceptability of a novel Cowpea-based Ready-to-Use Food (RUSF) among school-aged children in the Ketu South Municipality of the Volta Region, Ghana. Four hundred and twenty-six (426) children/caregiver pairs were randomly selected and recruited from 10 schools in the education district. A Cowpea-based recipe whose nutrient composition was known, was formulated into a porridge. Taste panels were set up and the subjects were instructed on the procedures. Each Child/ Caregiver pair tasted and scored their sensory preferences on a 5-point hedonic scale using Smiley. The Sensory attributes were explored using principal component analysis (PCA). A majority (228, 53.5%) of the children were aged between 9-11 years and most (411, 96.4%) were of Ewe ethnicity. One-third (150, 35.2%) of Caregivers had completed Junior High School. From the PCA we observed that the overall acceptability for the product scored (4.4), followed by consistency (4.2), taste (4.1), texture (4.0), and appearance (4.0), however, the aroma scored the lowest (3.0). The results suggest a high acceptability and product likeability. Education, increased awareness, and knowledge of the nutritional benefits of RUSF using locally grown, commonly available, and culturally acceptable food ingredients is recommended. Tailored interventions, targeted educational initiatives, and social marketing will promote the production and adoption of such novel

RUSFs among caregivers.

## **TIME TO BREASTFEEDING CESSATION AND ITS PREDICTORS: A TIME TO EVEN ANALYSIS**

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*Keywords: Breastfeeding, Children 6 - 59 months, Ethiopia., cessation*

Breastfeeding ensures child's survival and health. The world Health Organization recommends exclusive breastfeeding for the first six months and continuing for up to two years. Yet the duration of breastfeeding is below what is recommended globally. In Ethiopia, more than a quarter of mothers stopped breastfeeding before the second birth date of the child. Information on time to breastfeeding cessation and its predictors is needed to address this issue. Hence this study aimed to assess the time to cessation of breastfeeding and its predictors among mothers of children aged two to three years in southwest Ethiopia, 2022. A community-based retrospective follow-up study was conducted among 471 randomly selected mothers of children two to three years of age in Southwest Ethiopia from April 1, 2019 to March 31, 2022. An interviewer administered pre-tested questionnaire was used to collect the data. The collected data were entered into Epidata version 4.6 and exported to STATA version 14.1 for analysis. Both bivariate and multivariable Survival models were fitted. The Weibull proportional hazard model was used to identify predictors for time to breastfeeding cessation. The overall incidence of early Cessation of breastfeeding was found to be 11.05 per 1000 person-months of the follow-up period. Nearly a quarter (23.38%) of mothers ceased breastfeeding early. Educational status (diploma & above) (AHR=2.49; 95% CI (1.27, 4.90)), Not bottle feeding (AHR=0.32, 95% CI(0.13, 0.76)), complimentary feeding before six months (AHR=1.82, 95% CI(1.40, 2.37)),  $\geq 4$  ANC follow-up (AHR=0.60; 95% CI(0.37, 0.96)), number of children (2-4) (AHR=2.82, CI(1.73, 4.61)) and ( $>4$ ) (AHR=3.66, CI(1.36, 9.87)) were independent predictors of early cessation of breastfeeding. The time to cessation of breastfeeding was higher than the findings of previous studies. Therefore, strengthening maternal health education and breastfeeding counseling both at the health facility and community level is recommended.

## **EFFECT OF THE CONSUMPTION OF POWDERED MIXTURE OF PUMPKIN, SESAME, AND FLAX SEEDS ON THE HAEMOGLOBIN, SERUM IRON AND SERUM ZINC LEVELS OF WISTAR RATS.**

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*Keywords: Fortified maize meal porridge, flax seeds, micronutrients, pumpkin seeds, sesame seeds*

Maize-meal porridge, known as “Koko” in Ghana, is a common complementary food consumed by infants. It’s energy-dense, but has low-quality protein and minerals. To improve the iron and zinc content, treated and processed sesame, flax and pumpkin seeds, can be used to fortify the porridge. This research determined whether the consumption of fortified Maize-meal porridge could lead to improved haemoglobin. Serum Iron, and zinc levels of Wister rats. 15 albino Wister male rats of weaning age 21-28 days and average weight  $67 \pm 13$ g, were stratified by age and then randomized to receive the feeds. The Base Feed was 100% fermented-dried maize dough, the intervention feeds had 85% Base Feed and 15% of Roasted Seed mix and Soaked-Cooked seed mix. Haemoglobin was measured using Mission Hb test strip and metre. Serum iron and zinc were examined using the Flame Atomic Absorption Spectrometer. Data were captured using Minitab version 17 and analysed using paired t-test and one-way ANOVA. Rats that consumed Roasted Seed-mix and Soaked-Cooked seed-mix had higher mean Haemoglobin levels, 13.60 g/dL and 15.15g/dL respectively, compared to 12.74g/dL in Base Feed (P-Value 0.048). Mean serum zinc levels were higher in Roasted Seed-mix and Soaked-Cooked seed-mix (0.200mg/L and 0.370mg/L), compared to Base Feed, 0.1mg/L (P- Value 0.000). However, serum iron levels had no observable significant intervention effect (P-Value 0.463) Consumption of the fortified Base Feed resulted in a significant increase in haemoglobin and serum zinc levels in Wister rats. There was no intervention effect on serum iron levels.



## **NUTRITION AND PHYSICAL ACTIVITY KNOWLEDGE AND PRACTICES AND FACTORS INFLUENCING WEIGHT MANAGEMENT AMONG FEMALE STUDENTS IN AMASAMAN SENIOR TECHNICAL HIGH SCHOOL**

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*Keywords: Nutrition, knowledge, physical activity, practices, weight management*

Adolescence is a transitional period characterized by physiological, psychological, and social changes that may contribute to adolescent sensitivity to body weight, body shape, and other people's perceptions on their body image. This study investigated the relationship between nutrition and physical activity knowledge and their influence on weight management among female students in Amasaman Senior High School. A quantitative cross-sectional study among 267 female students were randomly sampled in the Amasaman Senior Technical School. Categorical data were analyzed using frequencies and bivariate analysis to establish differences in variables. Basic data analysis described the participants socio- demographics and level of knowledge and practices. Associations variables were established using chi squared test.  $P < 0.05$  was considered statistically significant. Logistics regression was used to test for the strength of association between variables which was considered significant. Tables, charts and graphs were used to present results. The majority of the participants (60.3%) had good nutrition knowledge and 58.1% of the study participants had good physical activity knowledge. Participants who had good nutrition practices were 70.6% and 95.8% had good physical activity practices. Weight loss (42.32%) was seen as the major driving factor that influences the participants to engage in weight management. The study reported a significant association with an adjusted crude odds ratio (3.48 (1.51 – 4.34) 0.001) between participant form and physical activity knowledge. There was no statistical significance between the factors and weight management. This study identified that the participants generally, had good nutrition and physical activity knowledge and practices. However, their aim to achieve their desired body image through weight management were influenced by other factors which were not healthy. This highlights the complexity of weight management behaviors and suggests the need for more targeted interventions to address unhealthy practices.

## EARLY INFANT FORMULAR FEEDING AMONG CHILDREN 6 MONTHS - 3 YEARS AND THE RISK OF CHILDHOOD OBESITY IN THE SUHUM MUNICIPALITY

*by Sarah L. Adjetey-Odai / Juliet B. Apraku / Senam Klomegah / University of Health and Allied Sciences, Ghana / University of Health and Allied Sciences, Ghana / University of Health and Allied Sciences, Ghana*

*Keywords: NCDs., breastfeeding, childhood obesity, formular feeding*

Childhood obesity has been established to be a major public health concern globally, with children who are obese more likely to develop non-communicable diseases (NCDs) at a younger age and become obese in adulthood. To combat this, the World Health Organization recommends exclusive breastfeeding until 6 months, then appropriate complementary foods should be introduced in a timely fashion when the infant is 6 months, combined with continued breastfeeding until 2 years or beyond. The study sought to determine whether the early introduction of infant formular is associated with a risk of childhood obesity. A retrospective cross-sectional study was conducted among 237 mothers whose children were 6 months to 3 years old. Using a semi- structured questionnaire, data was collected on early infant feeding and the risk of childhood obesity. Descriptive statistics were presented in tables, chi-square test and binary logistic regression was used to determine associations and strength of the associations, respectively. STATA software 17.0 was used for all analyses. The study found that children who were breastfed exclusively for 6 months were 76% less likely to be obese as compared to children fed with formular before they were 6 months old [AOR 0.24 95%CI (0.91-0.63)  $p=0.004$ ]. Mothers with good breastfeeding practice had children who were 4.58 times less likely to be obese as compared to children fed with formular [AOR4.58 (95% CI: 0.01-20.71),  $p=0.048$ ]. Children fed on demand were 4.28 times more likely to be obese than those fed at mothers' own interval [AOR4.28 (95% CI: 1.95-9.38),  $p\leq 0.01$ ]. Breastfeeding effectively protects against childhood obesity, with maternal education and proper feeding practices playing key roles. Encouraging breastfeeding and educating mothers can significantly reduce childhood obesity rates and promote healthier development.

## **BASELINE SURVEY ON NEED ASSESSMENT OF FARMERS IN BANJA AND JABITEHNAN DISTRICTS OF AMHARA REGION, ETHIOPIA**

*by Yazie Chanie / Corresponding author*

*Keywords: Farmers, Farming System, Food, Key words: Crops*

The baseline survey was carried out in April 2021 in Ethiopia to assess the current farming system and identify opportunities and constraints. The findings showed that crop-livestock mixed farming is the typical farming systems being practiced by the small holder farmers in both study areas. The crop and animal enterprises are dependent on each other for their existence and productivity. Crop production is the main economic activity. The main crops being grown in order of importance are maize, hot pepper, tef and finger millet in Jiga Yelmdar kebele whereas potato, barley, bread wheat, tef, faba bean in Gashana Akayta kebele. Most of the crops' produces are used for consumption while straws are used mainly as feed. The production and the area allotted for some crops showed increasing trend mainly because of the crops' productivity, compatibility to the cropping system and suitability for home consumption. The production for some crops showed decreasing trend due to pest problem. Agricultural inputs such as fertilizer, improved seed and chemicals are distributed to farmers by the government extension system. Most important constraints of crop production include effects of climate change, attack by different pests, shortage of quality seeds and high price of inorganic fertilizers. In general, to alleviate the current production constraints, it is important to deliver seeds of improved crop varieties after confirming their adaptability, optimize use of inputs beside to policy considerations, establish seed production system at local level, train farmers how to effectively manage important crop disease and insect pests, put proper soil fertility management in place, facilitate better market access to farmers to sell crop products, design ways to generate income form crop straws, give focus to nutrition in line with achieving food security, and stakeholders working on the same topic need to join their hands for better impact.

## **LIFESTYLE MODIFICATION AND GLYCAEMIC CONTROL OF DIABETIC NEUROPATHY PATIENTS IN THE CAPE COAST TEACHING HOSPITAL.**

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*Keywords: Glycaemic control, diabetes, dietary patterns, neuropathy*

Diabetic neuropathy is a prevalent complication of diabetes, posing a significant global health challenge. This study investigated the relationship between physical activity, dietary habits and glycemic control in patients with diabetic neuropathy at the Cape Coast Teaching Hospital. A cross-sectional study was conducted involving 37 participants. A structured questionnaire was employed to gather data on socio-demographics, medical history, anthropometry, dietary intake patterns, physical activity and vital signs. Biochemical information such as fasting blood glucose, glycated hemoglobin and lipid profile was also assessed. Among the eligible participants, 78% were females and 22% were males, with the majority (83.49%) aged over 60 years. The average duration of diabetes among respondents was approximately 10 years. A significant proportion (81%) of participants were overweight/obese. Female participants had significantly higher body fat levels than males ( $p=0.0016$ ). About 25% of participants had poor glycemic control. All participants exceeded their average daily caloric intake. Most participants (89%) engaged in regular physical activity. The mean total cholesterol for patients with good glycaemic control was  $3.68 \pm 0.03$  mmol/L. There was no significant correlation observed between BMI and glycemic control ( $p=0.453$ ). Excessive oil consumption was associated with a significant negative effect on glycemic control ( $-1.9$ , 95% CI  $[-3.3 - -0.6]$ ,  $p=0.007$ ), while engaging in exercise twice a week demonstrated a significant positive effect on glycemic control ( $4.1$ , 95% CI  $[1.8-6.4]$ ,  $p=0.001$ ). About 73% of the participants reported that following dietary interventions from healthcare professionals improved their health. Lifestyle modifications specifically improved diets and increased physical activity, along with regular diabetic clinic sessions, could improve outcomes of diabetes neuropathy patients.

## THE RELATIONSHIP BETWEEN ENERGY PROVIDED AND GROWTH DURING SEVERE WASTING TREATMENT

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*Keywords: Wasting, catch-up growth, children., ready-to-use therapeutic food, severe acute malnutrition*

Treatment of severe acute malnutrition aims at producing a quick catch-up growth in children to decrease their short-term mortality risk. The extent to which catch-up growth is influenced by the amount of energy provided is unclear. This study assessed whether energy provided at admission is associated with catch-up growth among children with mid-upper arm circumference (MUAC) <115mm at admission who are treated with a simplified protocol providing 1000 kcal/day of therapeutic food until MUAC  $\geq$ 115mm is achieved for two consecutive weeks and 500 kcal/day thereafter until discharge with MUAC  $\geq$ 125mm for two consecutive weeks. We conducted a secondary analysis of data from an operational prospective cohort study in Mali. Linear mixed-effects regression models were fitted to assess the relationship between energy provided at admission (kcal/kg/day) with weight gain velocity (g/kg/day) (primary outcome), change in MUAC-for-age-z-score and change in weight-for-age z-score. Unadjusted and models adjusted for sex, age, seasonality and MUAC at admission were fitted. Both models included the study site as a random effect. A 10 kcal/kg/day increase in energy provided at admission was associated with increments in all outcomes; for weight gain velocity, the mean [95%CI] increment was 0.340 [0.326, 0.354] g/kg/day and 0.466[0.446, 0.485] g/kg/day in the unadjusted and adjusted analysis respectively. A positive relationship exists between energy provided at admission and catch-up growth in children with MUAC < 115mm treated using a simplified protocol. Determining the ideal weight gain rate remains essential for assessing the benefits and risks of increased energy intake during treatment.

## COMPARATIVE EVALUATION OF THE NUTRIENTS CONTENT AND SENSORY ATTRIBUTES OF PURPLE-RED SKIN SWEET POTATO LEAVES (*Ipomoea batatas*) AND NIGERIA SPINACH (*Celosia argentea*)

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*Keywords: Comparative, evaluation, micronutrients, purple-red skin sweet potato leaves., sensory evaluation*

Vegetables encompass the fresh and edible components of herbaceous plants, suitable for consumption either raw or cooked. Given their frequent consumption, they offer significant quantities of essential nutritive minerals. The study ascertained the comparative evaluation of nutrients content and sensory attributes of purple-red skin sweet potato leaves (*Ipomoea Batatas*) and Nigeria spinach (*Celosia Argentea*). The leaves of purple-red skin sweet potato were gotten from a farm at Olubadan Estate, Nigerian spinach leaves were purchased from local market in Ibadan, Oyo State, Nigeria. Micronutrients analysis was conducted on raw sample of the vegetables using AOAC 2005, data were analyzed using SPSS version 25.0 and ANOVA was used to test for mean differences ( $P < 0.05$ ). Sensory evaluation was assessed by 10 panelist using the 9-point hedonic scale. From the micronutrients analysis, it was revealed that potassium ( $357.99 \pm 1.15a$ ), sodium ( $7.83 \pm 7.83a$ ), and zinc ( $1.69 \pm 0.03a$ ) contents of sweet potato leaves varied significantly ( $p < 0.05$ ) from potassium ( $346.59 \pm 4.73b$ ), sodium ( $7.04 \pm 7.04b$ ), and zinc ( $1.33 \pm 0.01b$ ) contents of Nigerian-spinach. However, phosphorus contents in both leaves were not significantly different ( $p > 0.05$ ). Vitamins A ( $2.13 \pm 0.00a$ ), C ( $2.69 \pm 0.02^a$ ), and B9 ( $0.31 \pm 0.02^a$ ) content of sweet potato leaves varied significantly ( $p < 0.05$ ) from vitamins A ( $1.31 \pm 4.73b$ ), C ( $2.17 \pm 0.03b$ ), and B9 ( $0.18 \pm 0.01b$ ) content of Nigerian-spinach. Results from the sensory attributes for sweet-potato leaves revealed the mean rating for its taste  $4.30 \pm 0.95$ , showed that there was a slight preference for the soup. Similarly, the

mean score for color  $4.00 \pm 0.82$  indicated a slight preference for the soup. Additionally, the texture received a mean score of  $4.50 \pm 0.42$ , signifying a high level of liking for the soup. Likewise, the aroma garnered a mean score of  $4.50 \pm 0.71$ , revealed a strong preference for the aroma of the soup. Sweet potato leaves used for this study had high micronutrients composition compared to Nigerian spinach which is suitable for human nutritional needs.

## **EXAMINING THE RELATIONSHIP BETWEEN COMPLEMENTARY FEEDING PRACTICES AND NUTRITIONAL STATUS OF INFANTS WITHIN THE AGES OF 6-23 MONTHS IN MANGOASE-AKWAPIM**

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*Keywords: Key words: Complementary feeding, dietary diversity score, health status, nutrition*

Nutrition plays a crucial role in health status of human kind especially infants. This study delved into the relationship between complementary feeding practices and the nutritional status of infants aged 6-23 months within the Mangoase-Akwapim community. One hundred (100) mothers with infant aged 6 to 23 months who live in Mangoase, Akwapim in the Eastern Region of Ghana were recruited for this study. Socio-demographic and health behaviors were assessed. Various anthropometric indices were measured. A 24 hour dietary recall was done to assess dietary intake of infants. Using standardized questionnaires, maternal complementary feeding practices, knowledge level, and health behaviors were also assessed. Prevalence of stunting, wasting, underweight and overweight were found to be 18%, 9%, 13% and 7% respectively. Knowledge on complementary feeding practices was averagely poor. About 51% of the infants had acceptable dietary diversity scores. Significant associations were observed between child still breastfeeding with wasting ( $p=0.0321$ ) and stunting ( $p=0.001$ ). Type of complementary food given to a child was significantly associated with wasting ( $p=0.043$ ) and stunting ( $p=0.001$ ). Number of times a child takes snacks was significantly associated with wasting ( $p=0.001$ ), underweight ( $p=0.003$ ) and overweight ( $p=0.035$ ). Based on a comprehensive approach that takes into account for the interactions between various factors influencing newborn health and development, these findings highlight the need for focused interventions that address both knowledge gaps and practical

obstacles in infant feeding.

## **DIETARY HABITS OF ADOLESCENT GIRLS: A CASE STUDY IN SELECTED PUBLIC BASIC SCHOOLS IN ABLEKUMA WEST MUNICIPALITY, ACCRA.**

*by Juliet A. Gyane / Department of Biochemistry and Biotechnology, College of Science, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*

The eating habits of adolescents is crucial in understanding chronic illness incidence and long-term obesity. The primary aim of the research was to evaluate the dietary patterns of teenage females attending selected public schools in Ablekuma West Municipal in Accra. Using a cross-sectional descriptive survey approach, we gathered quantitative data from one hundred and fifty (150) female adolescents through closed-ended questionnaire. The students were selected using criterion based purposive sampling technique. Demographics, anthropometry and information on dietary information (Eating habits questionnaire) was collected. Majority(92%) of the respondents were aged between 12-15 years. Majority of the respondents consumed breakfast (84%), consumed fruits (87.6%) and vegetables (88.7%). Further 23.3% of them never consumed carbonated drinks while 14.7% of them avoided sweets. The prevalence of stunting and overweight/obesity among the adolescent girls were 25.3% and 17.1% respectively. Parental guidance (24%), peer interactions (39.3%), and media influence(37.3%) played pivotal roles in shaping adolescents' dietary behaviours, necessitating tailored strategies that respect the balance between autonomy and guidance. Stunting was significantly associated with vegetable intake ( $p\text{-value} = 0.024$ ) and snack avoidance ( $p\text{-value} = 0.012$ ). Overweight also exhibited significant association with fruit intake ( $p\text{-value} = 0.041$ ) and avoidance of sweets ( $p\text{-value} = 0.015$ ). The prevalence of overweight/obesity and stunting is high in this population. There are multifaceted influences of parental guidance, peer interactions, and media exposure on adolescents' dietary behaviours. Moreover, significant associations were observed between stunting and specific dietary factors, including vegetable intake and snack avoidance. These results emphasize the need for targeted interventions that strike a balance between promoting autonomy and providing necessary guidance to improve dietary practices and mitigate nutritional challenges among adolescent populations



## **COMPARING NUTRITIONAL PROFILES OF INFANTS UNDER SIX MONTHS AT ADMISSION AND DISCHARGE ENROLLED ON MAMI CARE IN ADJUMANI AND KIRYANDONGO (JULY 2022 TO DECEMBER 2023).**

*by Gerald Nuwagira / Action Against Hunger*

*Keywords: Acute Malnutrition, MAMi Care, Poor growth and development*

This study aimed to assess MAMi care for small and vulnerable infants < 6 months under pilot in Adjumani and Kiryandongo General Hospitals by comparing nutritional profiles at admission and discharge between July 2022 and December 2023. We conducted a retrospective quantitative study to examine the nutritional status of infants enrolled under MAMi care. Data extracted included; weight, length, and date of birth of the infants, components of MAMi pair screening, assessment, and management from the registers. The study utilized an electronic form to extract data from the MAMi registers. ENA for SMART was used to analyze data on nutritional status at admission and discharge of the pairs. Weight-for-age and weight-for-length Z-scores were obtained and compared at both instances. The study extracted 271 entries from the MAMi registers, 51% of the infants admitted had moderately LBW and 14% were Very LBW infants including 1% being extremely LBW infants. Most MAMi pairs had moderate risk (59.8%), followed by high-risk (25.1%) and low-risk cases (15.1%). High-risk cases require in-patient care, the program primarily focuses on community-based management, with 75.3% of pairs receiving this form of support. On comparing profiles at admission and discharge, infants underweight reduced from 61.7% to 20.7%, and wasting reduced from 52.5% to 12.5%. WAZ shows a significant proportion of infants situated towards negative deviance as underweight, at admission. At discharge, the majority of the infants' nutritional profiles had shifted towards positive deviance, indicating improvement in the weight-for-age index. It is noteworthy that infants enrolled are high-risk and have multiple risk factors that complicate their prognosis. MAMi care continues to enhance the identification and community-based management of small and nutritionally at-risk infants. Conduct a quasi-experimental study to establish the extent to which specific, planned impacts are being achieved and inform the review of medical and nutritional management protocols and guidelines.

## **EGG AND EGGSHELL POWDER FEEDING SUSTAINED AFTER FIFTEEN MONTHS: POST-PROJECT EVALUATION OF NUTRITION-SENSITIVE CHILD-OWNED POULTRY INTERVENTION IN SOUTHERN ETHIOPIA**

*by Anteneh Omer / Susan J. Whiting / Nutrition and Food Systems Consultant / University of Saskatchewan*

*Keywords: Egg, chicken, chicken gift ceremony, eggshell powder, sustainability*

A nutrition-sensitive poultry intervention that declared chicken ownership of children through a novel social and behavior change approach named “Chicken Gift Ceremony Model” was implemented from May-Nov 2016 in Halaba, Southern Ethiopia. Children in the intervention group (IG), 6-12 months old at enrolment, received two local chickens. Poultry husbandry and consumption of one-egg-a-day and eggshell powder (ESP) as a calcium source was promoted. At end line, the number of chickens owned by children nearly doubled. Egg intake increased from <1 to 17 eggs/child/month and ESP (to those >12mo) from 0 to 17 days/child/month. Underweight (RR=0.35; 95%CI=0.16-0.74) and anemia (RR=0.48; 95%CI=0.24-0.96) were significantly decreased. We assessed sustainability of the intervention on child-owned chicken production and egg and ESP feeding behavior. A cross-sectional study was conducted 15 months after the project’s end contacting former participants. An in-depth interview with 115 IG caregivers (94.3%) and weekly dietary recall assessment were carried out. Child-owned chicken production was sustained with 86% of IG children having their own chicken; 94% of these had  $\geq 2$  chickens. Dietary recalls showed 82.6% of children had an egg intake, a rate higher than what was recorded 15 months before (77%), while ESP consumption (70.4%) was sustained at the same rate. Chicken ownership of children and egg intake were correlated ( $r=.702$ ). Health and growth benefits observed in the children and the promise made during the chicken gift ceremony were the major motivating factors for the sustained child-owned chicken production and egg-feeding behavior. Loss of chickens due to disease and predation were the key barriers mentioned by caregivers. Our child-owned chicken program is sustainable, and large-scale implementation of this nutrition-sensitive poultry intervention through chicken gift ceremony model is warranted.

## **CONSEQUENCES OF IMPLEMENTING NUTRITION PROGRAMMES IN A CONTEXT OF INSECURITY, THE CASE OF NIGER**

*by Alex Marco O. NDJEBAYI / Helen Keller Intl*

*Keywords: National Micronutrient Day, VAS, vitamin A*

The political unrest in Niger since July 2023 has had an impact on the economic and social situation and, above all, a deterioration in the security situation in all areas of the country. We have carried out a study on the consequences of this situation on the implementation of nutrition programs in the field. This study was carried out by analyzing all the activity reports of some organizations (4) implementing health and nutrition programs in the field, including Heln Keller Intl, Plan Intl, Mercy corps and Oxfam: Helen Keller Intl, Plan Intl, Mercy corps and Oxfam. The study was also based on individual interviews with some responsible of these organizations (8) involved in the field activities and of the regional Directors of the ministry in charge of NGO in Niger Reports of the activities of the various partners from January to April 2024 clearly show a slowdown of more than 40% in field activities. This situation is most acute in the Tillaberry region where, for more than 4 months, more than 85% of NGO field visits have been banned and the area remains inaccessible without an army escort. One of the most example of this situation is the cancelling of two main activities from Helen Keller intl programs conducting to a redirection of more than one million USD in another country. The latest decree from the ministry of interior making mandatory the escort from army to carry out any activity in the field has increased for more than 20% the cost of main activities of the programs. Widespread insecurity in the intervention zones is a real obstacle to the implementation of health and nutrition programs. When these situations persist, they can lead to a total loss of all the achievements of nutrition programs.

## **AN EXPLORATION OF THE KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING THE REPEATED HEATING OF COOKING OILS AMONG FRIED FOOD VENDORS IN THE HOHOE MUNICIPALITY.**

*by Bellama Gado / Phyllis Addo / Mawuli Kushitor / Family and Community Health Department, University of Health and Allied Sciences, Hohoe, Ghana / Family and Community Health Department, University of Health and Allied Sciences, Hohoe, Ghana /*

*Keywords: fried food vendors, lipid peroxides, repeated use of oils*

The number of fast-food restaurants and fried food vendors is growing, which means more people are consuming fried foods. The use of repeatedly heated cooking oils is hazardous because it produces lipid peroxides which are associated with various diseases such as diabetes, obesity, cardiovascular diseases, and cancers. The knowledge and practices of fried food vendors regarding repeated use of cooking oils is very important as it affect public health. Qualitative studies have not been done on this critical area, particularly in Ghana. This is study sought to explore knowledge, attitude and practices regarding repeated heating of cooking oil among fried food vendors in the Hohoe municipality. A face-to-face interview was conducted with 15 fried food vendors using an interview guide and audio recorder. Study participants were purposively sampled. Only vendors who were involved in deep frying were included. Recorded audios were transcribed in Microsoft word. The transcribed documents were imported into ATLAS ti V7.5 where themes and codes were generated for the thematic analysis. It was found that vendors have limited knowledge on the effects of repeatedly heating oils which may inform bad practices leading to over-use of oils risking diseases in consumers. Food vendors often top up their already used oils for frying with the reason that oils are expensive and hence cannot be thrown away even when dirty. Some also keep reuse their oils until it becomes dark then use it in the preparation of "shito", a dark pepper sauce. The study also found out that fried food vendors are willing to accept alternative healthy ways of handling oils in their businesses. Food vendors are uninformed about the risks associated with repeatedly heating oil in cooking and this may lead to the production of harmful substances that may affect public health.

## ASSOCIATION BETWEEN DIETARY INTAKE, PHYSICAL ACTIVITY, PSYCHOSOCIAL STRESS AND OXIDATIVE STATUS IN INDIVIDUALS WITH TYPE 2 DIABETES ATTENDING AN OUTPATIENT CLINIC IN GHANA

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*Keywords: Type 2 diabetes, antioxidants, oxidative stress, physical activity, psychosocial stress*

Unhealthy diet, physical inactivity and psychosocial stress are linked to increased oxidative stress which could exacerbate hyperglycaemia-induced oxidative stress in individuals with type 2 diabetes (T2D). The aim was to: To assess associations between dietary intake, physical activity, psychosocial stress and oxidative status in outpatients with T2D. This cross-sectional study involved 102 adults with T2D from two outpatient clinics in Kumasi, Ghana. Dietary intake of antioxidant-rich foods, physical activity, psychosocial stress, anthropometric indices, fasting blood glucose (FBG) and glycated haemoglobin (HbA1c) were assessed. Additionally, thiobarbituric acid reactive substances (TBARS) and total antioxidant capacity (TAC) assays were performed as indicators of oxidative stress and antioxidant status respectively. Most (69.3%) of the participants were overweight/obese. Almost half (49.0%) reported moderate to high stress levels while 61.8% had low physical activity status. Majority (82.4%) reported consuming antioxidant-rich foods on a monthly basis. Additionally, 66.7% had poor glycemic control (HbA1c >7%). Participants'

median TAC and TBARS were 0.92 mmol/l (IQR 0.84-1.02) and 317 ng/l (IQR 272.5-339.5) respectively. Normal weight participants had higher TAC than obese participants [0.97 mmol/l (IQR 0.87-1.09) vs 0.83 mmol/l (IQR 0.78-0.90)],  $p=0.002$ . Participants who reported tea consumption showed lower TBARS levels than those who did not [288.0 ng/l (IQR 232.0-321.5) vs 319.5 ng/l (IQR 288.0-344.5),  $p=0.016$ ]. Frequency of intake of antioxidant-rich foods, physical activity and psychosocial stress did not significantly influence participants' TAC and oxidative stress status ( $p>0.05$ ). Frequency of intake of antioxidant-rich foods, physical activity and psychosocial stress status did not influence oxidative stress and antioxidant status in this sample. Nevertheless, individuals with a normal weight status showed elevated antioxidant levels, whereas tea consumption was linked to reduced oxidative stress. Therefore, strategies promoting normal weight status and regular tea intake could potentially alleviate oxidative stress and enhance antioxidant levels among individuals with type 2 diabetes in Ghana.

## **MICRONUTRIENTS AND ANTIOXIDANT ACTIVITIES OF WHOLE WHEAT SUBSTITUTED WITH DEFATTED SESAME SEEDS FLOUR FUNCTIONAL PASTA**

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*Keywords: Antioxidants, Defatted sesame seeds, Micronutrients, Pasta, Whole wheat*

Defatted sesame seeds flour are a by-product of sesame seeds oil extraction with exceptional nutritional values such as high dietary fiber, certain micronutrients, and significant antioxidant activities. However, it is underexploited in food applications as it is mostly discarded or used as feed for animals. In view of the fact that pasta has become a staple food especially in developing countries such as Nigeria, it is opined that inclusion of defatted sesame seeds flour into wheat for the production of pasta could reduce waste, improve nutritional status by alleviating micronutrient deficiency and providing a functional food with health-promoting effects for the populace, thus the drive of the study. Sesame (*Sesamum indicum* L.) was dehulled, blanched (90°C, 5 minutes), drained, dried for 72 h, milled to obtain

a full fat sesame seeds flour. The oil was extracted using n-hexane (1 liter : 500 g) and the solvent was completely evaporated after extraction, milled and sieved (250 µm) to obtain the flour. Pasta was produced by extrusion from whole wheat flour enhanced with defatted sesame seeds flour at 0, 5, 10, 15 and 20 % flour blends. Micronutrients (potassium, sodium, phosphorus, zinc, iron, magnesium, calcium, vitamin B1, B2, B9 and E), lipid peroxidation, 2,2, Diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activities and Ferric reducing antioxidant power (FRAP) assay were analyzed using standard methods. This study revealed that pasta substituted with defatted sesame seeds flours can provide 10-20 % daily recommended value for vitamins and 25-50 % for minerals. High ferric reducing power and lower value of lipid peroxidase and DPPH activities indicates ability to scavenge and neutralize free radicals, therefore reduced damage by oxidative stress. The consumption of pasta substituted with defatted sesame seeds can be considered a dietary diversification of nutritional advantage and immense health benefits considering its free radical scavenging potentials.

## **ROLE OF DIVERSIFIED DIET IN THE SELF-MANAGEMENT PRACTICE OF DIABETIC AND HYPERTENSIVE PATIENTS RECEIVING CARE AT THE VOLTA REGIONAL HOSPITAL, HOHOE.**

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*Keywords: Diabetes, Dietary Diversity, Hypertension, Self-Management practices*

The importance of dietary diversification for diabetes and hypertension risk remains controversial. Research reveals that nutritional management decreases and prevents the complications and deaths associated with diabetes mellitus and hypertension. This study aimed to determine the role of a diversified diet in the self- management practice of hypertension and diabetes. An analytical cross-sectional study design with 192 persons living with diabetes, hypertension or both conditions were enrolled from the thermal disease clinic of the Volta Regional Hospital, Hohoe. Participants were purposively sampled and an interviewer-administered semi-structured questionnaire was used to collect data from them. Information on management practices, blood pressure and blood sugar levels and socio-

demographic characteristics were collected. A food frequency questionnaire was used to collect information about their diet. Chi Square (X<sup>2</sup>) statistics, linear, binary and multiple logistic regression were employed during data analysis. Overall, 58.3% of participants scored good on management practices. A proportion of (44.3%) faced very challenging situations while self-managing these chronic conditions with (39.6%) encountering occasional challenges in adherence to medication regimens and diet plan. The findings revealed that participants who had difficulty adhering to medication regimen as part of their stressors were about 4 times more likely to have an increased fasting blood sugar (CI: 1.19, 6.0, p=0.004). The results further revealed a non-significant association between dietary diversity and blood sugar levels and hypertension levels. However, participants who had moderate and high diversity score were about 3 and 4 times at risk of an increased fasting blood sugar (CI: -2.73, 9.38, p=0.278) (CI: -1.63, 9.92, p=0.158) respectively. The study reveals gaps in self-management practices, including limited monitoring equipment, insufficient patient education, medication and diet adherence challenges. To optimize blood sugar and blood pressure through diet, it's crucial to focus on both variety and the nutritional quality of the foods consumed.

## **ABSTRACT PREVALENCE AND ASSOCIATED FACTORS OF CHILDHOOD OBESITY AMONG 5 TO 10 YEARS IN-SCHOOL CHILDREN IN THE TAMALE METROPOLIS, GHANA**

*by Tang Richard Kpieobasaana / Tamale Teaching Hospital, Tamale Ghana*

*Keywords: Obesity, Overweight, physical activity, school aged children*

Overweight and obesity in children is a public health problem that affects both high and low-resource settings. The present study investigated the prevalence and associated risk factors of obesity in school-aged children in the Tamale metropolis. An analytical cross-sectional study design was implemented among in-school children aged 5-10 years in the Tamale metropolis. The study used a multistage sampling procedure to recruit children who are qualified for the study. A questionnaire was used for the data collection. Pearson chi-square analysis was used to compare categorical variables and a p-value < 0.05 will be considered statistically



significant. The mean age of the school children who participated in this study was  $7.3 \pm 1.4$  years. About 23% of the female participants were obese compared to 22.2% among boys. Also, 41.0% of the children from private schools were obese compared to 6.0% of the obese children in public schools. Children from private schools (OR 5.29; 95% CI 3.13, 8.94), highest educational status of mothers (CI: 2.165-8.094; OD:4.19; P value: 0.001), children whose mothers were engaged in other occupations (CI: 1.099-5.066; OD: 2.36; P value: 0.028), largest household size (CI: 1.766-5.661; OD: 3.16; P value: 0.001), and not attending extra classes were associated with higher odds of being obese. Finally, children who use bicycle to school for the past seven days were 77% times less likely to be obese compared to students who used “tricycle” (CI: 0.057-0.971; OD: 1.35; P value: 0.045). The prevalence of obesity reported in this study is high and private school students are more at risk of being obese. Private institutions should promote physical activity in their institutions to make students physically fit.

## **ASSOCIATION BETWEEN CHILD MALNUTRITION AND LATRINE AVAILABILITY AMONG UNDER FIVE CHILDREN IN ETHIOPIA: A SYSTEMATIC REVIEW AND META-ANALYSIS.**

*by Getahun Fetensa / Wollega University, Ethiopia*

*Keywords: Ethiopia., Keywords: Malnutrition, latrine availability, under-five*

Under five malnutrition continue to be one of the leading public health problem worldwide, especially in developing countries. The finding of few studies conducted on the association between malnutrition and latrine availability among under five children in Ethiopia presented inconsistent. Therefore, the objective of the current systematic review and meta-analysis was to determine the pooled estimate on the association between child malnutrition and latrine availability among under five children in Ethiopia. We accessed both published and unpublished studies through electronic search from databases such as, Medline, Hinari, Scopes, PubMed CINAHL, PopLine, MedNar, Embase, Cochrane library, the JBI Library, the Web of Science and Google Scholar. We included all observational studies that were conducted on the association between malnutrition and latrine availability among under five children in Ethiopia. The data entry and analysis were conducted using STATA 14.1 version.

A random effects model was used to estimate the pooled estimate with a 95% confidence interval (CI). Forest plots were used to visualize the presence of heterogeneity. Funnel plots and Egger's and Begg's tests were used to check for publication bias. A total of 1610 published and unpublished studies were identified of which sixteen of them fulfilled inclusion criteria and included in the meta-analysis. The overall pooled estimate indicates the odds of developing malnutrition among children from households who had latrine was 38% lower compared with those children who had no latrine (OR:0.62, 95% CI:0.49, 0.77). The odds of developing malnutrition was lower among children from household who had latrine compared to children from household who had no latrine. These findings indicate that the need to work to increase latrine coverage and strengthen the education on the appropriate latrine utilization. In addition, the findings indicate the importance of culture and context specific latrine preparation and utilization education.

## **THE EFFECT OF HOUSEHOLD SOURCE OF DRINKING WATER ON MALNUTRITION AMONG UNDER FIVE CHILDREN IN ETHIOPIA: SYSTEMATIC REVIEW AND META-ANALYSIS.**

*by Getahun Fetensa / Wollega University, Ethiopia*

*Keywords: Ethiopia., Malnutrition, source of water, under-five*

Even though different programs and sectors involved in reduction of child malnutrition, malnutrition related under five mortality and morbidity is still high in Ethiopia. In Ethiopia, unavailability of latrine, and presence of diarrhea were still prominent. There are few inconsistent and inconclusive findings. Therefore, the study aimed at determining the pooled effect of household source of drinking water on malnutrition among under five children in Ethiopia. Both published and unpublished studies were accessed through electronic search from databases such as, PubMed, Medline, HINARI, Scopes, CINAHL, PopLine, MedNar, Embase, Cochrane library, the JBI Library, the Web of Science and Google Scholar. Malnutrition was estimated based on primary studies diagnosis and odds ratios were used to estimate the effect. A total of 1009 published and unpublished studies were identified of which 22 studies were included in the final analysis with a total of 12792 under five children. STATA version 14 software was used for data analysis using random effect model. We used

funnel plot, Egger's and Begg's tests at significance level 5% to check the presence of publication bias. In current study the source of drinking water had statistically significant effect on the occurrence of malnutrition among under five children. The odds of developing malnutrition among under five children whose household had protected drinking water source was 39% lower than those under five children whose household with unprotected water source (OR: 0.61, 95% CI: 0.44, 0.84). There is significant effect of household source of drinking water on malnutrition, in which children from household who used protected water source for drinking was less likely to develop malnutrition as compared with their counterparts. This finding indicates that there is need for increase in the coverage of protected water source and creating awareness on how to treat drinking water

## **DEVELOPMENT OF FUNCTIONAL BISCUITS BY INCORPORATING BEETROOT, PAPAYA AND PINEAPPLE POWDER AND EVALUATION OF NUTRITIONAL PROPERTIES.**

*by Marlyne-J Mananga / University of Yaounde I (Cameroon)*

*Keywords: Fruits, biscuits, nutritional value, phenolics compounds*

Beetroot (*Beta vulgaris*), pineapple (*Ananas comosus*) and pawpaw (*Carica papaya L*) contain nutrients and phenolic compounds that are beneficial to health. Despite their availability, most fruits and vegetables are still very little consumed by the population. This is one of the reasons for the high prevalence of micronutrient deficiencies commonly found in children. The aim of this work was to formulate a healthy biscuit from the incorporation of beetroot, pineapple and pawpaw powder for the development of a new product. Different formulations of 0%, 10%, 15%, 20%, 25% of beetroot, pineapple and pawpaw flour were prepared. The proximate composition, pH, hardness, water absorption and *in vitro* antioxidant profile (DPPH, FRAP) was assessed. Sensory analysis was conducted by applying hedonic scale test by using the method of 9-point hedonic scale. The use of beetroot, pineapple and pawpaw lyophilised flour resulted in a slight increase in water absorption (33.32-160.53%). pH values decreased for all the enriched samples compared to the control (5.90-7.4), but this was more relevant for the samples enriched with 20 and 25% of fruit flour. Moisture, fat, protein, fiber, ash, available carbohydrate content ranged from 4.79-9.92%, 17.02-21.65g/100g, 7.94-9.89g/100g, 2.46-14.86g/100g, 2.39-3.55g/100g, 42.14-

56.85g/100g respectively. Soluble sugar varied from 3.16-13.82g/100g. The micro minerals (Fe, Zn and Mg) ranged from 4.28-8.39%, 4.82-5.74% and 20.41-62.31% respectively. The total polyphenols and flavonoids, and antioxidant activity increased with fruits powder content incorporated. According to the research results, PAB 10 (10% of fruits powder) was the most organoleptically appreciate and proved able to yield healthy biscuits with outstanding physical properties. On the other hand, PAB 25 (25% of fruits powder) which had the poor sensory ratings for texture, colour, taste, flavour, appearance and overall acceptability was shown to be nutritive.

## **DIETARY INTAKE, SELF MANAGEMENT PRACTICES AND GLYCAEMIC CONTROL AMONG PEOPLE LIVING WITH TYPE 2 DIABETES IN THE EASTERN REGION OF GHANA**

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*Keywords: Dietary intake, Glycaemic control, Self-management, Type 2 diabetes*

The prevalence of type 2 diabetes has reached epidemic levels worldwide. Dietary intake, nutritional knowledge and self-management practices impact the prognosis and outcomes of diabetes, but very few studies exist in Ghana that have assessed how these aforementioned factors impact glycaemic control. The main aim of this study was to assess dietary intake and self-management practices among people living with type 2 diabetes and how they associate with glycaemic control. This cross-sectional study involved 200 patients with type 2 diabetes recruited from two health facilities. Questionnaire was used to collect data on socio-demographic characteristics and nutrition knowledge. Food frequency questionnaire and a 3-day 24-hour recall were used to assess dietary intakes. The glycated haemoglobin and fasting blood glucose of all participants were assessed using validated methods. Chi-Square was used to compare categorical variables among participants with good glycaemic control

and those with poor glycaemic control. Mann-Whitney U-test was used to assess differences in continuous variables. Logistic regression was used to model the predictors of glycaemic control. The median age of study participants was 58(14) years; 36% were males while 64% were females. The median monthly income was 500(1000). The median glycated haemoglobin and fasting blood glucose were 7.7 (3.2)% and 9.6(5.2) mmol/l. The overall nutrition knowledge score was average; 9 out of 15. Self-management practices were low among study participants. Consumption data revealed that all participants had a low dietary diversity score. Intake of protein was low among 94.5% of participants. More than 50% of participants had low levels of consumption for iron, zinc, vitamin A, vitamin E and folate. Iron intake level, consumption frequency of legumes and eggs were the strongest predictors of glycaemic control. Nutrition and self-management education should be strengthened as measures to promote long-term glycaemic control and prevent chronic and acute complications of diabetes.

## **ENSET PLANT (ENSET VENTRICOSUM) FOR SOCIO-ECONOMIC AND ENVIRONMENTAL USES IN GURAGE AREA OF ETHIOPIA**

*by Dr Abreham / Wolkite University*

*Keywords: Agroforestry, Food security, Inter cropping, Kocho, Nutrition*

Enset plant is cultivated as a food crop in Africa and Ethiopia largely. Enset can be grown with other crops as inter-cropping. Populations dependent upon the enset could not suffer from famine and drought due to the existence of the enset plant. The main objective of this study was to show the socio-economics and environmental importance of enset. The sources of the data were field measurement, laboratory analysis and socio- economic survey. Samples of kocho in sequential years were taken from households and soil samples were also taken at three land-use systems. Enset's potential productivity districts were selected to collect socio-economic data using socio-economic tools. The analysis shows that soil nutrient was higher in the inter-cropping of enset, compared with non-enset plantation. Kocho stayed for a maximum of 8 years in the pit with a depth of 3 m. The local communities used kocho during harsh times since it can stay a long time in the pit. In the first year, fat, carbohydrate and protein contents were lower in the fourth year but fibre was lower in the first year than in the fourth and fifth years. Age correlation indicated that kocho stored in the pit was shown

directly proportional to nutritional contents. However, it was inversely proportional to the amount of kocho stored in the pit. Enset is helpful to improve soil fertility and maximizes the productivity of other crops, which are growing in the vicinity of enset. This indicates the enset plant has contributed to food security and Sustainable development.

## **THE USE OF BIOWASTE TREATED AS REARING SUBSTRATES FOR BLACK SOLDIER FLY (*HERMETIA ILLUCENS*) LARVAE: EFFECTS ON NUTRITIONAL VALUE, FUNCTIONAL PROPERTIES AND LIPID QUALITY OF LARVAL PRODUCTS**

*by Serge. C. H. Ndomou / Herve Mube / Mervine TCHOUMOU / Stephano Tambo / Alix Mboukap / Alex Tsopbeng / Hilaire Womeni / Sali Ndindeng / Rousseau Djouaka / CRESA Foret-Bois, Faculty of Agronomy and Agricultural Science, University of Dschang, Yaounde, Cameroon / Department of Animal Production, Faculty of Agronomy and Agricultural Sciences, University of Dschang, Cameroon / CRESA Foret-Bois, Faculty of Agronomy and Agricultural Science, University of Dschang, Yaounde, Cameroon / Department of Biochemistry, Faculty of Science, University of Dschang, Cameroon / Department of Biochemistry, Faculty of Science, University of Dschang, Cameroon / Department of Biochemistry, Faculty of Science, University of Dschang, Cameroon / Department of Biochemistry, Faculty of Science, University of Dschang, Cameroon / Africa Rice Center (AfricaRice), Agri-food Systems, Crop based system, Farming systems and post-harvest, Côte d'Ivoire / International Institute of Tropical Agriculture (IITA), Benin Station, Cotonou, Republic of Benin*

*Keywords: Hermetia illucens, fatty acid profile., functional properties, nutritional value, waste treatment*

The larvae of the black soldier fly (BSF) are a sustainable source of compounds of nutritional and industrial interest, but the proportion of these compounds depends on the rearing methods used. This study aims to evaluate the effect of substrate treatments on the nutritional value, functional properties, and quality of lipids from *Hermetia illucens* larvae products. The biowastes collected from restaurant leftovers underwent various treatments, namely grinding (T1), heating (T2), and fermentation (T3) and some were used without treatment (T0). They were used to feed 7-day-old BSF larvae during 15 days rearing period. Results revealed that the substrate treatments significantly ( $p < 0.05$ ) influenced the protein and ash content of BSF

larvae flour. where for the protein content, values varied from 32.02% (T1) to 39.11% (T2); while for the ash content, they varied from 7.92% (T0) to 11.04% (T3). Concerning the functional properties of defatted flour, there was no significant difference ( $p>0.05$ ) between all the parameters analysed. For the lipid quality assessment, there was not a significant difference ( $p>0.05$ ) between all the samples for the peroxide value, and the values obtained here agree with the standards of Codex Alimentarius. Furthermore, the substrate treatments significantly increased ( $p>0.05$ ) the thiobarbituric acid reactive substances (TBARS) value of lipid samples, but the values obtained are under the maximum acceptable limit in dietary products. The fatty acid profile of BSF larvae depends on the waste treatment and their lipids are very rich in saturated fatty acid (62.07-74.64%), followed by monosaturated fatty acid (19.20-25.02%) and polyunsaturated fatty acid (6.16-14.65%). Based on the results of the principal components analysis, it was recorded that the grinding and fermentation of wastes are highly associated with the different parameters analysed in this study and they can be considered for industrial application.

## **BREASTFEEDING AND ASSOCIATED FACTORS AMONG CHILDREN AGED 6-23 MONTHS IN THE LANDSLIDE- PRONE BUDUDA DISTRICT, EASTERN UGANDA: A COHORT STUDY**

*by Aziiza Nahalomo / Bård Anders Andreassen / Archileo Kaaya / Archangel Rukooko / Peter Rukundo / Per Ole Iversen / Kyambogo University, Uganda / University of Oslo, Norway / Makerere University, Uganda / Makerere University / Kyambogo University, Uganda / University of Oslo, Norway*

*Keywords: Breastfeeding, Uganda, landslides, seasonality, socio-demographics*

Breastfeeding is recommended for almost all children. However, in low- resource countries like Uganda, breastfeeding practices may be disrupted by landslides and seasonality in food production. Among the 2010 and 2018 landslide-affected households in Eastern Uganda, we assessed prospectively the prevalence of breastfeeding and associated factors among their children aged 6-23 months in 2019. We collected data from 189 parent-child pairs that were available from 422 households including 392 children recruited during May-August (food-plenty season) 2019. Additionally, data from 109 of these parent-child pairs were available from 388 households including 366 children that were re-assessed six months later, in

January-March (food-poor season) of 2020. Structured questionnaires were used to collect socio-demographic, child feeding practices and health-related data. Breastfeeding was defined as the percentage of children aged 6-23 months whose parents reported the children to have breastfed the day before the interview. Binary and multivariate logistic regression analyses were used to determine factors associated with breastfeeding. Breastfeeding prevalence was 78.8% and 61.5% ( $P < 0.05$ ) during the food-plenty and food-poor seasons, respectively. Children residing in the landslide affected sub-county had significantly higher adjusted odds ratio (aOR) for not breastfeeding both during the food-plenty (aOR 1.31; 95% confidence interval (CI) 1.03, 3.29) and the food-poor season (aOR 2.62, 95% CI 1.07, 4.39) than the controls. Younger children, parents with secondary education level and above, and parents with knowledge about the recommended duration of breastfeeding, had significantly higher odds for child breastfeeding during both food seasons. Child illness decreased the odds for breastfeeding during the food-poor season only. Breastfeeding prevalence significantly decreased during the food-poor season. With exception of child-illness in the past 24 hours, factors associated with child breastfeeding cut across seasons. Programmes and research that promote, protect and support breastfeeding among vulnerable communities should be reinforced.

## **ENERGY DRINK CONSUMPTION AND NUTRITIONAL STATUS AMONG COMMERCIAL DRIVERS IN SUNYANI, GHANA**

*by Akua Asuamah-Tawiah / College of Health Yamfo*

*Keywords: Commercial drivers, Energy drink, height., nutritional status, weight*

The duties and schedules of commercial drivers make them susceptible to energy drink consumption as a fatigue management strategy. Also, energy drink consumption was found to have increased due to certain reasons including endorsement by Ghanaian celebrities thereby creating enticing advertisements to make people believe energy drinks have no or minimal side effects. This current study assessed the prevalence of energy drink consumption and its relation to the nutritional status of commercial drivers in the Sunyani municipality, Ghana. A descriptive cross-sectional study was used in this study involving two hundred and seventy-eight (278) commercial drivers. Drivers were sampled according to their vehicle type who completed a study questionnaire. In this study, an average of 104 (37.5%)



respondents stated that they had never consumed an energy drink. However, the remaining 174 (62.5%) respondents indicated that they consume energy drinks. With the nutritional status of drivers, out of 278 respondents, only 230 were willing to measure their weights and heights. Out of the 230, 117(50.9%) were overweight, 6(2.6%) were underweight, 6(2.6%) were obese and 101(43.9%) drivers were normal. Not all the energy drinks discussed had an association with participant's nutritional status. However, there was a relationship between Storm, Adonko next level, and Lucozade energy drinks. Globally, energy drink consumption is on the rise. Likewise, in this study the rate of energy drink consumption was significant and some energy drinks had an impact on the nutritional status of commercial drivers.

## **PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY PROFILES OF SALMONELLA ISOLATES FROM RAW BEEF AND MEAT CONTACT SURFACES, HOSSANA TOWN, CENTRAL ETHIOPIA REGION**

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*Keywords: Antimicrobial sensitivity, Foodborne illness, Hossana, Salmonella*

*Salmonella* is a leading cause of foodborne illness worldwide, with a rising concern for the developing and spreading of antimicrobial-resistant strains due to the imprudent utilization of antimicrobials. A cross-sectional study design was conducted to estimate the magnitude, associated risk factors, and antimicrobial susceptibility profile of *Salmonella* spp obtained from raw beef and meat contact surfaces in Hossana Town. Out of a total of 370 samples that were collected using a simple random sampling method, 31 (8.4%) tested positive for *Salmonella isolates* using biochemical tests. There was no statistically significant difference in the occurrence of *Salmonella* spp and sample sources ( $\chi^2=0.88$ ,  $P>0.05$ ). Multivariable logistic regression analysis revealed that job- relating training, medical checks-up, practice of hand washing, wearing protective clothing and tidiness of slicing material were among the potential risk factors that significantly correlated with the occurrence *Salmonella* spp in the study area ( $P<0.05$ ). All obtained isolates of *Salmonella* spp. were subjected to antimicrobial susceptibility testing with nine antibiotics using the Kirby-Bauer disk diffusion method. Ciprofloxacin and gentamycin were the most effective antibiotics; however, the highest resistance rate (93.5%) was observed against tetracycline followed by 83.9% and 67.7%

to meropenem, and ampicillin, respectively. In all, 17 resistance patterns of *Salmonella* spp to six different classes of antimicrobials were observed. Of these, 90.3% of *Salmonella* spp accounted with multiple antibiotic resistances index >0.2 and 80.65% were resistant to three or more tested antimicrobial agents. This study ascertains a significant proportion of *Salmonella* spp with higher multi-drug resistance patterns to routinely prescribed antimicrobial agents. Therefore, strict hygienic management in the abattoir and meat retailer outlets as well as rational use of antimicrobials and detection of resistance genes should be applied to circumvent the further development of antimicrobial resistance in the study area.

## **PAEDIATRIC TYPE 1 DIABETES MELLITUS CAREGIVER NUTRITION EDUCATION TRAINING NEEDS AT HEALTH FACILITIES IN UGANDA**

*by Nicholas Bari Ndahura<sup>1</sup> / Judith Munga<sup>2</sup> / Judith Kimiywe<sup>2</sup> / Ezekiel Mupere<sup>3</sup> /  
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*Keywords: Type 1 diabetes, caregivers, nutrition education, nutritional management.*

A caregiver's active participation in their child's type 1 diabetes mellitus (T1DM) treatment plan and understanding of the role of proper nutrition are essential in achieving treatment goals. The study aimed to explore the current state of nutrition education among caregivers of children with T1DM in Uganda. A cross-sectional study design was used to determine the nutrition education needs among caregivers of children with T1DM. A total of 100 caregivers of children with T1DM attending the T1DM clinics at 8 health facilities in Uganda were interviewed. A document review of the diabetes education curriculum used at the health facilities was conducted to identify gaps. A nutrition education needs assessment survey was conducted among caregivers. Ethical clearance was granted by the St. Francis Hospital Nsambya Review and Ethics Committee (SFHN/REC/83) and a research permit was obtained from the Uganda National Council of Science and Technology (HS186ES). Informed consent was obtained from the caregivers. The majority of caregivers (79.8%) reported attending training sessions on T1DM. These trainings were primarily held at hospitals (81.7%). However, identified gaps included: content not tailored to Uganda-specific contexts, vital

topics such as the glycemic index, the MyPlate model, fruit and vegetable intake, and interpreting food labels were notably absent. The needs assessment among caregivers revealed eight key topics proposed for a Ugandan T1DM nutrition education programme: blood glucose monitoring, the impact of food on blood glucose, carbohydrate counting, making healthy food choices when dining out, selecting healthy snacks, interpreting food labels, meal planning, and exercise. The study highlights the importance of developing nutrition education programmes that are contextualized and cater for the needs of caregivers of children with T1DM to enable them to support the nutritional management of their children.

## **OPTIMIZATION OF MUCILAGE EXTRACTION PROCESS FROM OKRA (ABELMOSCHUS ESCULENTUS (L.)) AND APPLICATION AS AN ALTERNATIVE STABILIZER/EMULSIFIER FOR DAIRY FOOD PRODUCT ICE CREAM.**

*by Nelly Virginia Nkosi / PhD student*

*Keywords: Okra, RSM, extraction, mucilage, stabiliser, yield*

Okra (*Abelmoschus esculentus*) is an abundant natural source of mucilage. This mucilage has a high potential to be used in the processing of food and pharmaceutical products owing to its functional properties. This study aimed to determine optimum conditions (amount of extraction water, amount of okra crop material, extraction temperature) for mucilage extraction from okra yield was determined. The response surface methodology with a face centered-central composite design was applied to optimize the extraction of mucilage from okra fruits. The experimental data obtained were fitted to a second-order polynomial equation using regression analysis. The Analysis of variance (ANOVA) was used to determine the contribution of the terms in the quadratic model and 3D graphs were generated to observe the interactive effects of the variable in the model. The polynomial model was relevant in the prediction of mucilage yield with the coefficient ( $R^2$ ) and adjusted coefficient (Adj. $R^2$ ) of 0.937 and 0.904 respectively. Similarly, the quadratic model for optimizing okra mucilage yield was found to be significant ( $p < 0.0001$ ). The amount of extraction water (ml) and the amount of Okra (g) significantly influenced mucilage yield with p-values of 0,0001 and 0,0294 respectively while the extraction temperature ( $^{\circ}\text{C}$ ) did not significantly ( $p > 0.05$ )

influence the mucilage yield. The optimum extraction conditions were as follows: the amount of extraction water (325ml); the amount of okra (100g); extraction temperature (80°C) respectively with a predicted yield of 11,874%.

## **SENSORY EVALUATION AND CHEMICAL COMPOSITION OF SOLANUM NIGRUM AND SOLANUM TORVUM HERBAL TEA AND SPICE**

*by Jemima Owusuah Asante / Cape Coast Technical University*

*Keywords: Herbal tea; spice; phytochemicals; sensory evaluation; antinutrients*

The global surge in herbal tea consumption is fuelled by its perceived health benefits and versatility. However, while spices enhance flavour, they can harbour health risks due to elevated levels of phytates and oxalates. This research endeavours to harness the health-enhancing properties of *Solanum nigrum* and *Solanum torvum* berries in crafting natural spices and herbal teas. Methodologies involved sorting, maceration, and either fermenting or not fermenting *S. nigrum* berries for tea, alongside stalk removal, freeze-drying, and milling for spice preparation from both species. Evaluation encompassed antinutrient levels, phytochemical composition, and sensory characteristics using a nine-point hedonic scale with 44 untrained panellists. Statistical analyses (student t-test, one-way ANOVA) with Tukey's multiple comparison test ( $p < 0.05$ ) were employed. Panellists favoured unripe, unfermented green herbal tea from *S. nigrum* for its perceived sweetness. Both *S. nigrum* and *S. torvum* spices exhibited varying levels of catechins, saponins, flavonoids, oxalates, phytates, and tannins, aligning with literature. Catechin content ranged from 0.255 to 0.756 mg/g in herbal teas, with antioxidant activity varying from  $66.37 \pm 0.24$  to  $78.53 \pm 0.18$   $\mu\text{g/mL}$  GAE via the DPPH free radical assay. Fermented black herbal teas displayed higher total phenols, total flavonoids, and antioxidant activity compared to unfermented green teas. Phytates were the least abundant antinutrient, with concentrations of 0.02 mg/100 g in *S. torvum* berries and 0.03 mg/100 g in *S. nigrum* berries.

## **ASSESSMENT OF THE ANTI-DIABETIC ACTIVITY OF THE FREEZE DRIED BOILED AND FREEZE DRIED BERRIES OF SOLANUM NIGRUM LINN AND SOLANUM TORVUM SWART IN NORMOGLYCAEMIC RATS AND**

*by Jemima Owusuah Asante / Cape Coast Technical University*

*Keywords: Hypoglycemic agent; Boiled Solanum nigrum berries; Boiled Solanum torvum berries; Nephroprotective effect; Hepatoprotective effect*

This study evaluated the anti-diabetic properties of freeze-dried boiled and raw berries from *Solanum nigrum* (S. nigrum) Linn. and *Solanum torvum* (S. torvum) Swart using normoglycemic rats. Fourteen experimental groups, each comprising four rats, were established. Results demonstrated that irrespective of the dosage, all extracts led to a reduction in rat body weight. Notably, the body weight of the normal control group significantly increased on days 14, 21, and 28 compared to day 7. While the glucose inhibitory effect of the 500 mg/kg extract wasn't significant compared to the 100 mg/kg dose after 120 minutes, all extract doses induced a significant decline in glucose levels 7 hours post oral administration. The S. torvum raw (STR) and S. torvum boiled (STB) berry extracts at 1000 mg/kg exhibited a similar effect to glibenclamide (10 mg/kg). Relative organ weights of kidney, heart, liver, and lung didn't show significant differences. However, a significant decrease in white blood cell (WBC) and platelet counts was observed in specific S. nigrum and S. torvum groups compared to normal. Some treatment groups displayed deranged lipid profiles and liver function indices compared to normal, with the 1000 mg/kg STR extract showing a significant decrease in bilirubin levels, suggesting bilirubin-lowering effects. Concentrations of creatinine, potassium, sodium, and chloride were not significantly altered. This study suggests that freeze-dried boiled and raw berries of S. nigrum and S. torvum possess hypoglycemic, nephroprotective, and hepatoprotective effects, supported by microscopic examination of treated animals' liver and kidney.

## **QUALITY CHARACTERISTICS, FATTY ACID PROFILE, LIGNAN AND MINERAL CONTENT OF OILS EXTRACTED FROM GHANA SESAME VARIETIES – EFFECT OF EXTRACTION METHOD.**

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*Keywords: Fatty Acid Profile, Sesame Lignans, Sesamum indicum L., Traditional Oil Extraction Method*

*Sesamum indicum* L. (Sesame) is an essential oilseed that belongs to the family Pedaliaceae. In Ghana, especially, in the Northern parts, oil extraction from sesame seeds is by traditional thermal processing techniques. In this processes, milled sesame seeds are thermally roasted and oil extracted without further refinery. Although, this oil extraction method impacts a unique characteristic odour and taste to the oil comparative to other refined edible oil, the effects of the traditional processing methods on oil quality and bioactive compounds are poorly understood. This study investigated the effects of oil extraction methods (traditional thermal method and solvent extraction) on oil quality characteristics and health promoting compounds of two local sesame seed varieties. Oils from two local seed varieties (*Zinzam* and *Kpaka*) were extracted using two methods (traditional thermal and solvent extraction methods). The yield, physicochemical properties (moisture, free fatty acid, iodine value, saponification value, color, specific gravity and peroxide value), fatty acid profile, lignan and mineral contents of the oil extracts were determined. The seeds used had high amounts of fat (35.72–53.15%) and protein (17.84–25.21%). Extraction method and seed variety significantly influenced oil yield (14.08–28%), free fatty acid (0.27–1.54%), peroxide (13.65–92.90 mEqO<sub>2</sub>/kg), iodine (179–194) and saponification value (174.45–176.80 mgKOH/g). The fatty acid profile demonstrated significant amounts of oleic acid (30.61 – 40.89%) and linoleic acid (42.59–58.48%). Three lignan compounds, sesamin, sesamol and sesamol were detected in the oils. The oils showed traces of the minerals Ca, K, Na, Mg, Fe, Zn and Cu. The *Zinzam* solvent oil extract recorded the highest oil yield. The oil extracts were rich in polyunsaturated fatty acids, lignans and essential minerals. These beneficial nutritional compositions of the oils will positively contribute to useful health benefits when used in food preparation and consumed.

**APPROPRIATE COMPLEMENTARY FEEDING PRACTICES AND ASSOCIATED FACTORS AMONG MOTHERS WITH CHILDREN 6-23 MONTHS IN UMUAHIA NORTH L.G.A OF ABIA STATE.**

[illegible]

**Keywords:** *Complementary feeding, WHO, minimum dietary diversity*

In many developing countries, inappropriate feeding practices remain an impediment affecting a large number of children thereby impeding their growth and development. Ensuring appropriate feeding serves as a panacea to promote adequate nutrition, growth and development and reduces the risk of mortality among children. The use of validated composite index to explore appropriate complementary feeding practices has been advocated. This study aimed to determine appropriate complementary feeding practices and associated factors among mothers with children 6-23 months in Abia State, Nigeria. A cross sectional study involving 320 mothers with children aged 6-23months was conducted in Umuahia North LGA using multistage sampling technique. Household socio- demographic characteristics and complementary feeding practices were obtained using a structured, validated and pretested

questionnaire. Appropriate complementary feeding indices was assessed using the 2008 WHO recommendations. Multiple logistic regression analysis was used to identify factors associated with appropriate complementary feeding practices at  $p < 0.05$ . More than half (51.9%) of the infants were females, 29.4% live in urban areas, 31.9% were first born and 57.3% had mothers with tertiary level of education. Slightly less than two thirds (63.1%) of children had timely introduction to complementary foods, 75% had minimum dietary diversity, 90.6% had minimum milk feeding frequency, while all the children (100%) met the minimum feeding frequency. Generally, appropriate complementary feeding was attained by only 43.1% of the children. Appropriate complementary feeding was significantly associated with age, birth weight, exclusive breastfeeding status, age of introduction of complementary foods, household income and mother's employment status. Appropriate complementary feeding practices was associated with both maternal and child characteristics, emphasizing the need to focus on these factors to improve child feeding practices and reduce malnutrition at this phase of the lifecycle.

## **PREVALENCE OF HYPERTENSION IN ADULTS IN LILONGWE URBAN AND RURAL COMMUNITIES: IMPLICATIONS FOR HEALTH PROMOTION**

*by Jane Mwamlima / LUANAR, FAO and DNHA*

*Keywords: Hypertension, Non-Communicable Disease, blood pressure, hypertension risk factors*

The burden of NCDs is increasing rapidly worldwide and is the leading global cause of death. In Malawi, STEPS survey for NCDs showed that 30% of adults have elevated BP but are unaware of their BP status and seek no medical care. The study aimed at assessing and comparing the dietary lifestyle risk factors and prevalence of hypertension in adults in Lilongwe, Malawi urban and rural areas. The study was a descriptive comparative cross-sectional. Random sample method was used to select 240 respondents with unknown hypertension status. Using descriptive and chi-square the analysis was conducted in IBM SPSS® version 25.0 (Chicago, USA). Multiple regression analysis was run to establish the association. Statistical significance was set at  $p < 0.05$ . Out of 240 participants, 57.5% were females and mean age was  $36.6 \pm 10.9$ . Overall hypertension prevalence was 7.5%, with urban (5%) and rural (10%). Hypertension was more prevalent in rural and among those aged 55-



64 years. Overall, 70.4% reported adding salt during cooking and while eating, 96.5% were not regular vegetable eaters, 22.6% ate no fruits, 30.3% had history of alcohol consumption, 15.9% had history of smoking and 2.4% were physically inactive. The overall regression analysis associated with dietary risk factors ( $R^2=0.016$ ,  $P=0.567$ ) and lifestyle risk factors ( $R^2=0.872$ ,  $P=0.064$ ) were not significant. Age ( $\beta=0.053$ ,  $P=0.002$ ) and educational level ( $\beta=-0.027$ ,  $P=0.021$ ) were significant predictors of hypertension status. Hypertension was significantly related with adults aged 35 to 44 ( $P=0.041$ ), secondary students ( $P=0.053$ ), occupation ( $P=0.006$ ) for both areas. This study revealed that age, education, and occupation were significantly affecting the hypertension status of individuals whether residing in both areas. This shows that hypertension exists among people with unknown hypertension status and therefore would recommend public health education to help people realize and address common risk factors associated with BP in the general adult population.

## **EFFECT OF PULVERIZED PTEROCARPUS SANTALINOIDES LEAF INCORPORATED IN MAIZE AND SOY BEAN MEAL ON THE SERUM METABOLITE OF DIARRHOEA-INDUCED YOUNG MALE ALBINO RATS.**

*by Emilia I NWEZE / Justina N CHIKWENDU / Agatha I ATUGWU / Netochukwu, P ONWUBUYA / Natural Science Unit, School of General Studies, University of Nigeria, Nsukka, Nigeria / Department of Human nutrition and Dietitics, Univeristy of Nigeria, Nsukka, Nigeria / Department of Crop Science, University of Nigeria, Nsukka, Nigeria / Department of Human nutrition and Dietitics, Univeristy of Nigeria, Nsukka, Nigeria*

*Keywords: Diarrhoea, Inducement, Pterocarpus santalinoides, Pulverized, Stool*

In Africa, about 80% of the people in rural communities rely on traditional medicine for their primary healthcare needs and that of their animals. Studies suggest that consumption of *Pterocarpus santalinoides* reduced the frequency of stooling due to its antimicrobial and antibacterial properties. By analyzing the serum metabolite profiles of the treated rats, the aim of this study is to provide insights into the metabolite influenced by the dietary incorporation of the plant's leaves during diarrhoea and to identify metabolite that improved the treatment of diarrhoea offering clues to its mechanisms of action, paving way for further research into the use of *Pterocarpus santalinoides* in nutrition and health. 25 young male albino rats were used for this study. They acclimatized for 7 days and were fed formulated diet of maize and

soya bean, after which they were induced on the 8<sup>th</sup> day with 1 ml of castor oil, 30 minutes after inducement of diarrhoea which was confirmed by the droplet of wet stool, treatment of the rats commenced with five different diets incorporated with *Pterocarpus santalinoides*. Observations continued for 4 hours to check for the frequency of diarrhoea. Blood were collected after 4 hours of diarrhoea and on 13<sup>th</sup> day after treatment and was analyzed using Gas Chromatography coupled to flame ionization detector. Diarrhoea improved after 4 hours of treatment with maize and soy bean meal incorporated with *Pterocarpus santalinoides* in group treated with high dose of *Pterocarpus santalinoides*. Some metabolite that was identified that posed antidiarrhoea, antibacterial and anti-inflammatory properties include chorogenic acid, hexadecanoic acid, pentadecanoic acid and capric acid. This study revealed that consumption of *Pterocarpus santalinoides* incorporated in maize and soy bean meal is effective in reducing the frequency of wet stool and fostered fast recovery from diarrhoea.

## **UNDERNUTRITION AND NUTRITION RELATED PREGNANCY OUTCOMES AMONG ADOLESCENTS, A SCOPING REVIEW**

*by Adane Tesfaye / Tefera Belachew / Dessalegn Tamiru / Dilla University, Ethiopia / Jimma University / Jimma University*

*Keywords: Pregnant Adolescents, a scoping review, dietary intake, malnutrition*

In pregnant adolescents, it is hypothesized that there is ‘nutrient partitioning’, a competition for nutrients between the still-growing adolescent mother and her rapidly developing fetus resulting in a compromised nutrition status of both. This scoping review examined the prevalence of undernutrition, associated factors, and the outcomes of adolescent pregnancy and identified knowledge gaps. Five stages framework that Arksey & O’Male (2005) suggested to carry out scoping review was used. Published articles, reviews, and reports identified through a complete search. Articles published in the English language from 2000 to 2023 were included. The prevalence, associated factors, and health outcomes of pregnancy during adolescence were summarized. Twenty-seven (27) studies met the inclusion criteria. Thirty-two percent (29.6%) of the studies are on dietary intake, 22.2% of them reported nutritional status and associated factors, and 48% of studies discussed the effect of poor nutrition on the outcome of Pregnancy during adolescence. Only five of the studies are community-based and 22 are facility-based. The magnitude of undernutrition

among pregnant adolescent girls ranged from 23.5% to 34%; Social determinants of health such as poor access to antenatal care visits, low educational status of partners, poor dietary intake, early marriage, rural residency, young age and having multiple pregnancies are associated with poor nutritional status. Pregnant adolescents have also more risks of poor pregnancy outcomes compared with pregnant adult women. These include fetal complications including prematurity, low or very low birth weight, perinatal mortality, major congenital defects; hypertensive pregnancy disorders, abortion, urinary infections, and premature rupture of the fetal membranes. The reviewed studies observed a higher magnitude of undernutrition, less dietary intake, and more risks of poor pregnancy outcomes. This review demonstrated the absence of comprehensive literature that might be explored through a population-based prospective study.

## **EFFECT OF NUTRITION COUNSELING ON NUTRITION LITERACY AND DIETARY PRACTICES OF PREGNANT ADOLESCENTS IN WEST ARSI ZONE, CENTRAL ETHIOPIA, A CLUSTER RANDOMIZED CONTROLLED TRIAL, USING GEE**

*by Adane Tesfaye / Tefera Belachew / Dessalegn Tamru / Dilla University, Ethiopia / Jimma University / Jimma University*

*Keywords: Alliance for development, Pregnant adolescent, nutrition behavior change communication*

Pregnant adolescent's nutritional knowledge and practices are important prerequisites for their proper dietary intake. Alliance for development [AFDs] are model women community health volunteers who got knowledge and experience by working with health professionals. The study investigated effect of nutrition behavior change communication through AFD on nutrition knowledge and dietary practices of pregnant adolescents in West Arsi, Central Ethiopia. A two-arm parallel cluster randomized controlled community trial was carried out in randomly selected districts in West Arsi, Central Ethiopia. A total of 207 and 219 pregnant adolescents participated from the intervention and control clusters, respectively. Dietary practice was the primary outcome and nutrition knowledge was secondary outcome. Each pregnant adolescent in the intervention group attended four NBCC [Nutrition behavioral change communication] sessions. Adolescents in the control group attended the routine nutrition counseling given by the health care system. McNemar test and

Generalized Estimating Equations were used to evaluate the effect of the intervention. Difference-in-differences (DID) was employed to estimate the net treatment effect. The average difference of appropriate dietary practice between the two groups was 25.9%. After controlling for the possible confounders, pregnant adolescents in the intervention group had 3.7 times [AOR =3.7, 95% CI: (2.6, 5.3)] higher odds of having appropriate dietary practices compared with the control group. Nutrition knowledge of pregnant adolescents who received the intervention were 5.5 times [AOR =5.5, 95% CI: (3.78-8.1)] higher than Nutrition knowledge score of adolescents in the comparison group. Nutrition behavior change communication [NBCC] through alliance for development based on the health belief model is an effective approach in increasing the proportion of pregnant adolescents who had appropriate dietary practices and good nutrition knowledge. Thus, these results point to the necessity of adopting the HBM in NBCC to enhance pregnant adolescents' nutritional knowledge and dietary practice.

## **EXPLORING THE IMPACT OF CLIMATE CHANGE ON FOOD INSECURITY AND HEALTH IN RURAL GHANA**

*by Jessica L. Boxall / Braimah Abubakari / Bruce Abugri / Bright Yammaha Amoo / Maria Ayichuru / Natasha Fothergill-Misbah / Michael Head / Martin Kunc / Kennedy Miah / Victor Mogre / Eric Tweneboah / Jim Wright / University of Southampton / Ghana Health Service / University for Development Studies / University for Development Studies / Ghana Health Service / Newcastle University / University of Southampton / University of Southampton / Ghana Health Service / University for Development Studies / University of Southampton / University of Southampton*

*Keywords: Ghana, Public health, climate change, food insecurity*

The aim was to investigate the prevalence of household food insecurity, and whether residents perceive climate change to have had an impact on this and health in Mion (Northern Ghana). West Africa has been described as a hotspot of climate change, experiencing rising temperatures, erratic rainfall, and extreme weather events. Ghana is vulnerable to the effects of climate change, particularly in the northern regions, due to heavy reliance on rain-fed agriculture. High incidence of poverty, dependence on climate-sensitive activities for livelihoods and food, and underdevelopment mean that these under-served and hard-to-reach

communities have less capacity to withstand climate shocks. This has the potential to threaten their food security and health. Survey data (n=397) was analysed from a mixed-methods pilot study. Rasch modelling analysed the prevalence of food insecurity using the Food Insecurity Experience Scale (giving % prevalence of moderate or severe, and severe). Prevalences were compared to higher-level data from the Gallup World Poll 2020-2022. Multivariate regression identified significant predictors of food insecurity. The prevalence of moderate or severe food insecurity (Pm+s) is 61.5%, and the prevalence of severe (Ps) is 26.4%; this is higher than Ghana's national scores (Pm+s=39.4%, Ps=6.2%) and global data (Pm+s=29.5%, Ps=11.3%). Nearly all (99.95%) reported climate change was negatively affecting their household food supply, and 75.6% felt climate change has already made a difference to their health. Larger households, 20–29-year-olds, unemployed individuals, and those who reported weaker knowledge of climate change experienced significantly ( $p<0.05$ ) greater food insecurity. Food insecurity is high within this community, which participants feel is worsening due to climate change. The shocks and stresses of climate variability are also reported to have an impact on participants' health. As climate change worsens, decision-makers should consider the specific challenges that these rural, agriculture-dependent areas face to their nutrition and health.

## **THE EFFECT OF NUTRITION EDUCATION ON ANTHROPOMETRY AND LIPID PROFILE IN TYPE II DIABETES MELLITUS AND HYPERTENSIVE PATIENTS IN SIDAMA REGIONAL STATE, ETHIOPIA (RANDOMIZED CONTROLLED TRIAL)**

*by Tigist Kebede Mulugeta / Hawassa University, Ethiopia*

*Keywords: blood glucose, blood pressure, non communicable disease, nutrition education intervention*

Diabetes mellitus (T2DM) and hypertension (HTN) have emerged as major medical and public health issues worldwide. Both are important risk factors for coronary artery disease (CAD), heart failure, and cerebrovascular disease. In Sub-Saharan Africa (SSA) the burden of disease is expected to double for both HTN and T2DM by 2025 and 2035, respectively. The main cause of the rise in these illnesses is the ineffective management of HTN and T2DM, which is directly influenced by lifestyle factors and lack of awareness. The study aimed to examine the effect of nutrition education on the anthropometric, clinical and biochemical

tests of diabetic and hypertensive patients. The study used a randomized controlled trial. Three hundred six participants were randomized to either an intervention (153) group or control(153) who received the nutrition education for 8 weeks (2hrs per week) or to a control group who did not receive intervention and followed for 16 weeks. Comprehensive evaluation of clinical, anthropometric, and biochemical outcomes were conducted at baseline and at the end of intervention. Significant reductions were observed in mean body mass index,  $-0.87 \text{ kg/m}^2$ ; (95%CI- 1.5,0.22) waist to height ratio(-.02 cm, (95%CI: -.03,.01), waist to hip ratio -.01cm; (95%CI: -.033,.004) and waist circumference -7.3cm; (95%CI: -9.7, 4.9), FBS -25.54; (95%CI:-41.9, .9), low density lipoprotein -15.7 mg/dl; (95%CI: -23.5, 8.0), triglyceride -47.7 mg/dl; (95%CI: -63, 31.7), total cholesterol -18.6 mg/dl; (95%CI : -10.3, 27), SBP, -11.7 mmHg; (95%CI: -7.7, 15.6) and -7.2 mmHg (95%CI: -4.5, 9.9) diastolic blood pressure were observed in the intervention group after the 16 hour intervention of nutrition education for 8 weeks.

## **CORRELATION AMONG HEALTH PROFESSIONALS BLOOD GROUP TYPE, BODY MASS INDEX (BMI) AND DIETARY INTAKE: A CROSS-SECTIONAL STUDY AT TAMALE TEACHING HOSPITAL IN THE NORTHERN REGION OF GHANA**

*by Manyaya Sulemana / Felix C. Mills-Robertson / King's Medical Centre / Kwame Nkrumah University of Science and Technology*

*Keywords: Blood group type, Body Mass Index (BMI), Dietary intake, Health professionals*

Blood group systems are based on the presence or absence of antigens on the surface of an individual's Red Blood Cells (RBCs). Similarly, an individual's Body Mass Index (BMI) is the ratio of height to weight. Individually, both variables have been associated with a variety of metabolic diseases. However, there is a dearth of information on the relationship among blood group type, BMI, and dietary intake. This study investigated the relationship among blood group type, BMI, and dietary intake among healthcare professionals at Tamale Teaching Hospital in the Northern Region of Ghana. A descriptive cross-sectional study design was adopted using a simple random sampling technique to select 234 healthcare workers at Tamale Teaching Hospital, Northern Region, Ghana. A questionnaire targeting the socio-demographic characteristics, blood group, dietary patterns, and anthropometric indicators were used. Data were analyzed using SPSS (version 21.0) and statistical

significance for all testing was set as 0.05 using the chi-square test. Blood group O was the most common (46.2%) among healthcare personnel. Furthermore, 87.1 % of healthcare workers were positive for the RhD (rhesus factor D). The proportion of overweight healthcare workers was 37.2%, obese 13.7%, and underweight 5.1%. Healthcare professionals consumed more carbohydrate foods (34.6%) with protein food items consumed in moderation (55.6%). The BMI of healthcare workers had a significant association with ABO blood groups ( $p < 0.011$ ). The dietary pattern of the health workers such as protein intake ( $p = 0.349$ ), fats and nuts intake ( $p = 0.284$ ), fruits and vegetable consumption ( $p = 0.700$ ), and sweets and snacks intake ( $p = 0.070$ ) showed no significant relationship with respondent ABO blood groups. Blood groups O and B are more prone to become obese and those with blood groups O, B, and A are more likely to be overweight. The ABO and rhesus system were not statistically significant with dietary patterns.

## **ECONOMIC, SOCIO-EMOTIONAL, AND FOOD SECURITY CONDITIONS DURING COVID-19 PANDEMIC AMONG CAREGIVERS OF YOUNG ADOLESCENTS AGED 10-12YRS IN A PERI-URBAN SETTING IN GHANA**

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**Keywords:** COVID-19, caregivers, young adolescents, economic, education, food security, Ghana

The consequences of the COVID -19 pandemic were not sufficiently explored among caregivers of young adolescents in peri-urban settings in Ghana. We aimed to explore the consequences of COVID-19 on economic, socio-emotional, and household food security conditions among caregivers of young adolescents in a peri-urban setting in the Eastern Region of Ghana. In this cross-sectional study, caregivers of young adolescents 10-12 y of age in the

Somanya-Kpong area  $\approx 70$  km north of Accra, participating in the second follow-up study of iLiNS-DYAD Ghana trial were enrolled. A questionnaire designed from the PhenX Toolkit COVID-19 Protocol and the Food Access and Food Security During COVID-19 Survey (Version 2.1) was used to collect data over 8 months starting January 2022, approximately 2 y into the pandemic. We used descriptive statistics to summarize data and McNemar Chi-square tests to compare percentages of agreement to statements indicative of food insecurity “*one year before*” versus “*since*” the pandemic outbreak. Of 966 caregivers (94% females; 6% males), 89% reported “less household income” compared with the pre-pandemic time. Most caregivers (72.5%) reportedly continued working during the pandemic, but majority said their work hours (72.6%), workload (78.8%) and salaries had decreased (63.4%). Many (65%) said their children engaged in educational activities when schools were closed; 46% reportedly hired private teachers for their children. Caregivers most frequently cited financial concerns (83%) and negative impact on work (79%) as their greatest sources of stress because of COVID-19. The percentages of caregivers reporting agreement with statements indicative of household food security were significantly greater (55.4% vs 19.6%,  $P < 0.05$ ) for “*since the outbreak*” than for “*one year before the outbreak*”. In this setting, COVID-19 had negative consequences on the economic, socio-emotional, and household food security conditions of caregivers and their young adolescents.

## **STUDENTS AWARENESS OF PEPTIC ULCER AND DIETARY AND LIFESTYLE HABITS OF PERSONS DIAGNOSED OF PEPTIC ULCERS AT THE UNIVERSITY OF CAPE COAST**

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*Keywords: Peptic Ulcer, Nutrition, Self-care, Awareness*

One of the major and most common disease of the gastrointestinal tract is peptic ulcer. It occurs when the mucus secretion in the stomach decreases, acid secretion increases or both at the same time. Its occurrence can pose significant discomfort and impede student’s studies. There are dietary and lifestyle habits that do contribute to the development of peptic ulcers. The study examined the awareness of peptic ulcer among students of the University of Cape Coast and the dietary habit and lifestyle of the students diagnosed with peptic ulcers. The study employed



a cross sectional design in surveying 196 students at the University of Cape Coast. Data on student awareness of peptic ulcer, dietary habits and lifestyle was collected using a digital semi-structured questionnaire design on Kobo Collect, following a convenience sampling technique. Descriptive frequencies and proportions were used in analysing the data. Findings revealed a high level of awareness of peptic ulcer disease (PUD) among 52% students. Close to 16% of students indicated being diagnosed of peptic ulcer disease. Out of the 32 persons diagnosed of peptic ulcer about 52% practiced nutritional self-care and 33% indicated following specific dietary plan while the majority (90.5%) had two or more meals in a day. Only 12.9%, 3.1%, 15.6% and 6.3% of students diagnosed of PUD indicates never taking spicy foods, fried foods, carbonated drinks and fruits respectively. As a lifestyle 61% of students diagnosed of PUD indicated occasionally exercising, about 59% avoid going to bed immediately after eating and the majority 97% do not smoke. Awareness of PUD is high among students however, nutritional self-care, dietary habits and lifestyle of persons diagnosed of PUD needs some attention.

## **DEVELOPMENT OF NUTRITIONALLY ADEQUATE WEANING FOOD FROM RICE, WHEAT, DATES, BANANA, CHIA SEED AND QUINOA.**

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*Keywords: Protein-energy, chubby mix, and weaning food.*

Most African countries face a persistent struggle in providing high-quality weaning foods. Despite Africa's abundance of foodstuffs, the capacity to turn these resources into nutritious weaning meals has made little progress. This study aims to formulate and develop weaning diet from quinoa, banana, chia seed, and date called chubby mix and evaluate its nutritional quality, microbial resistibility, sensory characteristics, Biological and hematological factors. Four groups of chubby mix were formulated with quinoa ranging from 21-23.5%, wheat-rice ranges from 62.5-70%, chia seed, banana and date remained constants in all formulated diets and constituent 5.5%. This formulation was done to meet the control 25% protein and 70% carbohydrate. The chemical composition, functional properties, sensory attributes and nutritional qualities of the food samples were determined using standard methods. All formulated diets have an average sensory acceptance of 70-83%. All created blends had no

detectable aflatoxin concentration, and staphylococcus aureus and Enterobacteriaceae counts were less than 10 cfu/g. Aerobic plate counts range from 40 to 50 cfu/g. Protein level in formulated diets with milk ranges from 18.3-20.14% higher than that of the traditional mori koko, whereas a diet without milk has a protein value of 13.14%. Calcium, vitamins A and C, phosphorus, iron, fat, and zinc were rather high and within acceptable limits. In general, mice fed chubby mix showed higher hemoglobin, Packed cell volume (PCV), red blood cell (RBC), white blood cell (WBC), and serum albumin concentrations than those fed Cerelac casein diet and Cerelac (commercial control). This study established that chubby mix contained higher nutritional values similar to Cerelac and casein diet hence could be used as a weaning diet to improve the nutrition status of the African child.

## **VALIDITY AND REPRODUCIBILITY OF A FOOD FREQUENCY QUESTIONNAIRE FOR DIETARY ASSESSMENT AMONG GHANAIAN ADULTS**

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*Keywords: Food Frequency Questionnaire (FFQ), Dietary intakes, Ghana, Validity, Reproducibility, West Africa*

Non-communicable diseases (NCDs) are responsible for approximately 65% of fatalities in Ghana. Given that NCDs typically develop over time, short-term dietary assessment methods, such as dietary recalls and food records that capture only current intake, may have limited utility in nutritional epidemiology. This highlights the need for a validated dietary assessment tool tailored to the Ghanaian population, which can better evaluate food intake, identify precise nutritional needs, track dietary trends, and inform effective public health interventions. This study focuses on assessing the validity and reproducibility of a Food Frequency Questionnaire (FFQ) developed specifically for dietary assessment among Ghanaian adults. The FFQ originally developed for the Ghanaian community in the UK and refined with input from nutrition professionals in Ghana was adapted for this study. To validate and examine the reproducibility of this FFQ, 100 adults from selected urban and rural communities in Kumasi, Ghana, were enlisted to complete the FFQ on two occasions over four months, along with a 7-day 24-hour recall (24HR) within this timeframe. Dietary intake for both FFQ and 24HR was

quantified using food models and converted to grams. Nutrient intakes were subsequently calculated using a nutrient analysis template. In ongoing analysis, Pearson correlation and Bland-Altman analyses will be employed to assess the validity of nutrient intakes. The reproducibility of nutrient intakes between both FFQs will be assessed utilizing intra-class correlation coefficients (ICC). This study projects a significant and positive correlation between the FFQ and the average of the 7-day 24HR for validity. For reproducibility, ICCs are expected to be statistically significant. The FFQ is expected to be a viable and effective tool for assessing habitual dietary intake among Ghanaians and exploring the relationship between diet and health outcomes in this population.

## **EVALUATING THE EFFECT OF BOILED BAMBARA GROUNDNUTS (VIGNA SUBTERRANEAN) WITH DIFFERENT SEED COAT COLOUR ON IRON STATUS AND RAT GROWTH**

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*Keywords: iron deficiency anaemia; Haemoglobin; Vigna subterranean; Bambara groundnut.*

Micronutrient malnutrition especially iron deficiency anaemia is a significant global health challenge with consequences across different demographics. Food-based approaches are recognised as cost-effective and sustainable in addressing iron deficiency anaemia. Vigna subterranean (Bambara groundnut [BGN]) is a legume with a high nutrient profile but with limited information on its haemoglobin regeneration potential. This study was carried out to evaluate the effect of boiled Bambara groundnuts (Vigna subterranean) on iron status (Haemoglobin) and rat body weight. Haemoglobin depletion-repletion method was used to determine iron status in Forty-two rats were weighed and acclimatized for seven days, then fed a low-iron diet for 10 days and distributed into six groups of seven rats/group based on haemoglobin levels. The rats were allocated to experimental diets consisting of boiled red (RBBGN), brown (BBBGN), cream (CBBGN), fish-enriched cream (CBBGNF) seed coat colour BGN rats' diet, and rats' diet+ FeSO<sub>4</sub> (BF) and fed for 14 days. The weight gain, Haemoglobin gain and haemoglobin regeneration efficiency were determined at the end of repletion. The highest weight gain and feed conversion ratio were also observed with the rats

that were fed with the diet CBBGNF (53.7 and 0.35, respectively) while the lowest weight gain was observed in rats that were fed Rat\_diet+FeSO<sub>4</sub> (15.86 and 0.11, respectively) The CBBGNF had the highest haemoglobin iron gain (2.01), compared with 1.14, 1.12, and 1.06 from RBBGN, BBBGN, and CBBGN, respectively. Haemoglobin regeneration efficiency was 68.0%, 59.6%, 53.3%, 53.2%, 51.1%, and 23.7% for FeSO<sub>4</sub> fortified, CBBGNF, RBBGN, BBBGN, CBBGN, and control diets, respectively. The results demonstrates that Vigna subterranean consumption improves weight, and iron status in anaemic rats.

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