frontiers in Communication

TYPE Original Research
PUBLISHED 26 March 2026
DOI 10.3389/fcomm.2026.1727485

OPEN ACCESS

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RECEIVED 17 October 2025
REVISED 19 November 2025
ACCEPTED 17 February 2026
PUBLISHED 26 March 2026

CITATION
Omale GE, Oyesomi KO, Oladosun M, Omojola O, Bamigbolayin-Afolabi F and Afolayan GAA (2026) Socio-demographic determinants of help-seeking behaviour for postpartum depression among women in Yobe and Niger states, Nigeria. *Front. Commun.* 11:1727485. doi: 10.3389/fcomm.2026.1727485

Socio-demographic determinants of help-seeking behaviour for postpartum depression among women in Yobe and Niger states, Nigeria

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Background: In Northern Nigeria, postpartum depression (PPD) remains a largely unspoken crisis, constrained by cultural norms and socioeconomic inequalities that hinder women's access to care.
Objective: This study examines how core demographic factors, age, income, education, and number of children influence women's help-seeking behaviour for PPD in Yobe and Niger States, Nigeria.
Methods: A community-based survey was conducted involving 519 women of reproductive age. Data were analysed using SmartPLS structural equation modelling to evaluate the relationships between demographic factors and help-seeking behaviour.
Findings: The results revealed that income was the strongest predictor (β = 0.463), followed by education (β = 0.301), age (β = 0.243), and the number of children (β = 0.171), collectively demonstrating a clear hierarchy of determinants shaping women's help-seeking behaviour.
Conclusion: Women's decisions to seek mental health support are strongly determined by their socioeconomic and demographic realities.
Recommendations: Integrated interventions combining economic empowerment, educational initiatives, and mental health literacy are essential.
Policy implications: The study advocates for subsidised maternal mental health services and the integration of psychological care into primary healthcare to ensure that support becomes accessible to all women, irrespective of income or status.

KEYWORDS
help-seeking behaviour, maternal mental health, postpartum depression, socio-demographic determinants, socio-demographic enabling model (SDEM)

Introduction

In the quiet, unspoken transition following childbirth, while postpartum depression is often framed as a clinical or individual problem, in Northern Nigeria, it reflects a deeper socio-demographic pattern where income, education, and parity dictate access to care. This study, therefore, interrogates how these factors collectively influence the likelihood of seeking professional

mental health support. Postpartum depression (PPD) is a pervasive global mental health challenge, affecting millions of women worldwide. Prevalence estimates suggest approximately 10–15% of mothers experience this condition (Abenova et al., 2022; Atuhaire et al., 2021). However, this global average belies a deeper, more troubling reality in regions where cultural stigma, scarce resources, and systemic barriers converge. While the conversation around maternal mental health is gaining momentum internationally, the voices of countless women in low- and middle-income countries remain muffled by silence and neglect (World Health Organisation, 2020).

This silence is most profound across the African continent, where maternal health efforts have historically been concentrated on reducing physical mortality, often at the expense of psychological well-being (Ackerman et al., 2024; Sawyer et al., 2010). In Nigeria, a nation with one of the world's highest fertility rates and projected to be the fourth most populous by 2050 (Oladosun et al., 2019), this gap is stark. The country bears a significant, yet poorly quantified, burden of PPD, with studies suggesting prevalence rates that far exceed global averages (Agbo and Esmaeilzadeh, 2024). The narrative becomes even more acute in Northern Nigeria, a region characterised by its rich cultural heritage but also by the highest total fertility rate in the country (TFR of 7.6) according to the Nigeria Population Commission (2019). Here, women face a perfect storm of risk factors: repeated multiple childbirths at short intervals, low levels of female education, pervasive poverty, and deeply entrenched cultural norms that may frame emotional distress as a personal weakness rather than a treatable medical condition (Ageeli et al., 2024; Johnson et al., 2024).

Within this complex tapestry, the act of seeking help for mental distress is not a straightforward decision but a labyrinthine process shaped by a woman's very place in society. Her age, her economic standing, her educational attainment, and the number of children she cares for are not mere demographic data points; they are the fundamental pillars of her agency. These socio-demographic determinants can either forge a pathway to care or erect formidable walls of obstruction. Does a younger mother, navigating the tumultuous waters of first-time parenthood, feel empowered to seek help? Does a woman with no independent income have the autonomy to access professional care? Can formal education illuminate the path through the fog of PPD, enabling a woman to name her struggle and seek a solution, as suggested by research on mental health literacy (Azale et al., 2016; Dada, 2019)?

The critical problem, therefore, is not merely the presence of postpartum depression, but the systemic and individual factors that prevent women from seeking the help they need and deserve. The silence surrounding PPD in regions like Yobe and Niger States is a public health imperative, reflecting a gap not only in healthcare delivery but also in our understanding of the nuanced interplay between a woman's demographic reality and her health-seeking behaviour.

This study is born from the urgent need to replace assumptions with evidence and silence with understanding. By employing a robust SmartPLS analysis, this research moves beyond simple correlations to unravel the intricate structural relationships between key demographic factors, age, income, education, and number of children and the help-seeking behaviour of women in Northern Nigeria. It seeks to humanise the data, to give statistical weight to the lived experiences of these women, and to illuminate the specific levers that can be activated to foster resilience and recovery. The findings of this inquiry are not just academic; they are a vital blueprint for crafting targeted, effective, and compassionate interventions that can empower mothers to seek and receive care, ultimately ensuring that the journey into motherhood is met with support, not silence.

Research gap

The silent struggle of postpartum depression in Northern Nigeria is increasingly acknowledged, our understanding of what ultimately moves a woman to seek help remains profoundly incomplete. While previous studies in Northern Nigeria have identified barriers to postpartum mental healthcare, little is known about how the interwoven realities of women's age, income, education, and childcare responsibilities collectively shape help-seeking behaviour. Existing research treats these factors in isolation, yet women experience them simultaneously. This study therefore bridges that gap by integrating these determinants within the Theory of Planned Behaviour and advancing a new Socio-Demographic Enabling Model (SDEM) that quantifies their relative and combined effects on help-seeking behaviour.

It employs a sophisticated SmartPLS analysis to dissect this complex interplay, testing the provocative null hypothesis that these foundational aspects of a woman's identity have no significant influence on her help-seeking behaviour.

By directly testing this null hypothesis, the research seeks to, the research seeks to fill a void in both methodology and understanding. It asks a question framed in the negative to uncover a powerful positive truth: Which strands of a woman's demographic reality are the strongest threads in the tapestry of her help-seeking behaviour? The answer is not just academic; it is the key to weaving more effective, targeted, and life-changing interventions for the mothers of Yobe and Niger States.

Research questions

1) To what extent do demographic factors (age, income, education, and number of children) influence women's help-seeking behaviour for postpartum depression in Yobe and Niger States, Nigeria.

Research hypothesis

> H_{01}: Demographic factors (Age, income, education, and number of children) do not significantly influence women's help-seeking behaviour for postpartum depression in Yobe and Niger States, Nigeria.

Conceptual framework

This study is guided by a conceptual framework that seeks to move beyond viewing postpartum depression (PPD) help-seeking as a singular, clinical decision. Instead, we frame it as a behavioural outcome deeply embedded within a woman's lived reality. The framework posits that four key socio-demographic pillars, a woman's age, her level of education, her economic standing (income), and the number of

children in her care, collectively construct the landscape in which the decision to seek help is made.

We conceive of these factors not as isolated variables but as interconnected dimensions of agency and constraint. Age brings with it the weight of experience and, potentially, a stronger voice within one's household. Education acts as a lens, bringing clarity to confusing emotional states by fostering mental health literacy and challenging internalised stigma. Income is the most tangible enabler, determining whether a clinic visit is a manageable expense or an impossible financial burden. Finally, the number of children embodies a profound duality: it can signify greater familiarity with the postpartum experience, yet it also multiplies caregiving duties, often leaving little time or energy for a mother to attend to her own needs.

In essence, this framework visualises help-seeking behaviour as the culmination point, directly influenced by these demographic realities. It provides a structured, testable model to investigate how the very fabric of a woman's daily life, her resources, her roles, her responsibilities, shapes her path from silent endurance to active pursuit of care.

Interpretation of conceptual framework

The conceptual framework for this study positions a woman's help-seeking behaviour for postpartum depression not as an isolated event, but as the direct outcome of a confluence of personal and social realities. At its core, the model posits that specific demographic characteristics act as foundational determinants, either propelling a woman towards support or creating barriers that reinforce silence.

The logic of the framework flows from the premise that these demographic factors are not merely statistical variables but profound proxies for a woman's agency, resources, and social positioning. Age is hypothesised to influence behaviour through the lenses of life experience, maturity, and potentially greater exposure to health information. Educational attainment is positioned as a critical enabler of mental health literacy, empowering women to recognise symptoms, reduce internalised stigma, and navigate formal health systems. Income operates as a practical gateway, determining financial access to services and mitigating logistical barriers like transportation and childcare costs. Finally, the number of children represents the dual forces of accumulated parenting experience and the escalating demands of caregiving, which can simultaneously heighten awareness of PPD while constraining the time and energy available to seek help.,

In alignment with Ajzen (1985) Theory of Planned Behaviour, the framework conceptualises demographic factors as exogenous variables shaping women's attitudes, subjective norms, and perceived behavioural control regarding help-seeking behaviour.

In this integrated model, these four demographic characteristics are theorised to exert a direct and significant influence on the likelihood of help-seeking behaviour. The framework thus provides a testable structure to unravel how the concrete circumstances of a woman's life shape her capacity to transition from silent suffering to active help-seeking.

Literature review

The quest to understand help-seeking behaviour for postpartum depression (PPD) is set against a global backdrop where maternal mental health is increasingly recognised as a public health imperative. Worldwide, PPD affects a significant proportion of mothers, yet a formidable "treatment gap" persists, particularly in resource-constrained settings (World Health Organisation, 2020). This gap is not merely about the availability of services but is fundamentally shaped by the complex interplay of individual and societal factors that either facilitate or hinder a woman's journey to care (Hanson, 2022).

In the Nigerian context, and specifically in the northern regions, the literature paints a concerning picture. Studies indicate that the prevalence of PPD is high, exacerbated by factors such as high fertility rates and early marriage (National Population Commission (NPC) [Nigeria] and ICF, 2019). However, scholarly work has often focused on establishing prevalence or identifying general barriers, such as stigma and poor healthcare infrastructure (Jaiyeola and Abdulrazaq, 2022; Jidong et al., 2021; Mohamed et al., 2024; Tsiga-Ahmed et al., 2024). While crucial, this body of work often treats women as a homogeneous group, overlooking the critical ways in which internal diversities based on demographics create vastly different realities.

The role of socio-demographic factors as key determinants of health behaviour is well-established. Economic standing consistently emerges as a primary driver. Research by Sun et al. (2024) affirms that financial constraints are a monumental barrier, as poverty directly limits access to cost-prohibitive services and amplifies practical obstacles. Similarly, Studies across sub-Saharan Africa consistently highlight income as the most decisive determinant of help-seeking behaviour (Sun et al., 2024; Dada, 2019). However, in Northern Nigeria, where healthcare costs remain prohibitive, the moderating role of education has not been empirically quantified, a gap this study addresses using SmartPLS modelling.

In contrast, educational attainment functions as a powerful tool for empowerment. Educated women are more likely to possess the mental health literacy to recognise PPD symptoms, a finding supported by Adegboyega (2022), who linked higher education to reduced stigma and greater willingness to engage with formal support systems.

The influence of age and parity (number of children) is more nuanced. Older maternal age is often associated with greater health awareness and autonomy, potentially fostering help-seeking (Adegboyega, 2022). Conversely, a larger number of children presents a duality: it may increase familiarity with postpartum experiences, yet it simultaneously intensifies the caregiving burden and financial strain, creating a push-pull dynamic on a mother's capacity to seek help for herself.

This review identifies a critical gap: while these demographic factors are often discussed in isolation, there is a scarcity of research that models their collective and relative influence on help-seeking behaviour in a culturally specific context like Northern Nigeria. While global and regional studies have progressively highlighted the burden of postpartum depression, it is important to anchor these discussions within the foundational works that shaped the field. O'Hara's pioneering research on postpartum depression was instrumental in establishing the condition as a legitimate psychological and public health concern, distinguishing it from transient postnatal mood disturbances. Her studies provided a clinical and theoretical foundation for understanding the interplay between biological vulnerability and social context in shaping maternal mental health outcomes. Building on this legacy, Ajzen (1985) Theory of Planned Behaviour (TPB) offers a behavioural lens for explaining why women choose or hesitate to seek help when experiencing depressive symptoms.

The TPB posits that behaviour is influenced by attitude, perceived social expectations, and a person's sense of control over their actions.

When applied to maternal mental health in Nigeria, this theory helps explain how socio-demographic realities such as income, education, and age inform both perception and action. Thus, combining O'Hara's clinical insights with Ajzen's behavioural framework allows for a more nuanced understanding of postpartum depression as not merely a medical episode, but a behavioural response embedded within cultural, economic, and social structures.

The existing literature provides the notes but not the score. This study seeks to fill this void by employing a robust Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis to test the integrated influence of these demographic pillars, thereby moving from a fragmented understanding to a coherent model of agency and access for postpartum women.

Theoretical framework

To theorise the how and why behind the relationships proposed in our conceptual model, this study draws upon Ajzen (1985) well-established Theory of Planned Behaviour (TPB). The TPB argues that the best predictor of a person's behaviour is their intention to perform it, and that this intention is itself shaped by three core perceptions: their Attitude towards the behaviour (is it beneficial or harmful?), the Subjective Norms they perceive (what do important others think they should do?), and their Perceived Behavioural Control (how confident are they in their ability to perform the behaviour?).

We adapt this theory to the context of PPD help-seeking in Northern Nigeria. We propose that a woman's socio-demographic position fundamentally shapes these three psychological antecedents. For instance, higher income and education may directly strengthen her Perceived Behavioural Control by making services seem financially and logistically accessible. Education may also foster a more positive Attitude towards professional help by dispelling myths about mental illness. Furthermore, Subjective Norms are not formed in a vacuum; an older woman with several children may perceive different familial expectations than a younger, first-time mother.

Thus, the TPB serves as the psychological bridge connecting the structural realities of a woman's life (her demographics) to her ultimate action (or inaction). It allows us to hypothesise that demographic factors exert their influence not just directly, but also indirectly, by moulding the attitudes, social pressures, and sense of control that culminate in the decision to seek help.

Materials and methods

This research is based on a survey conducted with women across the communities of Niger, North-Central, and Yobe States in North-Eastern Nigeria.

Research design

Our initial design envisioned a mixed-methods approach of quantitative (survey) and qualitative (focus group discussion), the FGD were designed to compliment the survey; however, due to ethical constraints and to uphold the highest ethical standards regarding sensitive mental health disclosures and limited participant consent for recorded group discussions, qualitative narratives could not be fully incorporated into the final analysis. The authors acknowledges that while qualitative perspectives enriched field understanding, The rich, statistical data from the surveys provided a comprehensive and reliable foundation for our analysis, even without the planned qualitative component.

Population of the study

Nigeria is the seventh most populous country in the world and is estimated to be the fourth most populated by 2050 (Oladosun et al., 2019; Akanbi et al., 2021). The study population included women of childbearing age (WCBA; 18–49 years) residing in Niger and Yobe States, estimated at 134,752 and 53,500 respectively, making it a total of 188,252 in both states (National Population Commission (NPC) [Nigeria] and ICF, 2019).

Sample size and techniques

A multi-stage sampling approach was used, while a total of 519 respondents were selected proportionally across Niger and Yobe states, which were distributed across four LGAs, two LGAs from each state, and eight wards, two from each local government area (LGA) in a state, making eight wards from both states. The sample size estimation was derived using Taro Yamane's Formula:

$$N = \frac{N}{1 + N\left(e^2\right)}.$$

Where: n = Sample size, N = Total population, and e = Margin of error (typically 5% or 0.05). The result yielded 399, which was further boosted by 30% to arrive at 519 sample size for both states.

It is important to note that the sample size was initially calculated using Taro Yamane's formula, which yielded 399 respondents. To strengthen the study's reliability and ensure adequate representation across multiple communities, the figure was increased by 30%. This adjustment accounted for potential non-responses, incomplete questionnaires, and variations in population distribution at the ward level. It also enhanced the statistical power of the analysis, ensuring that subgroup comparisons within the SmartPLS model remained valid and meaningful.

Furthermore, at the ward level, respondents were selected using a systematic random sampling technique. In each selected ward, a starting point was randomly selected, and then every third household was approached for screening. This process continued until the required sample size for that ward was met. Where more than one eligible respondent was present, simple random selection (ballot method) was used to maintain fairness and randomness in respondent inclusion. For instance, we wrote 'Participant 1' and 'Participant 2' on separate slips of paper, placed them into a container, and had a neutral party, like a child, draw one to ensure a fair and random selection. This approach ensured balanced representation across the selected local government areas while reducing selection bias.

Inclusion and exclusion criteria

The study focused on women of reproductive age (18–49 years) who had given birth within the previous 12 months and were

permanent residents of the selected communities in Niger and Yobe States. Only respondents who were willing to participate and provided informed consent were included. This ensured that participants had recent postpartum experiences relevant to the study's objectives.

Women who had experienced pregnancy loss, severe medical complications unrelated to postpartum depression, or who were unable to complete the questionnaire due to literacy or language barriers were excluded. These criteria were applied to maintain ethical sensitivity and to ensure that responses accurately reflected postpartum experiences related to help-seeking behaviour.

Method of data collection and analysis

The research team collected data using a field data collection tool known as Kobo Toolbox. While the Smart-SEM (Structural Equation Modelling) were utilised to analyse quantitative data. The SmartPLS was preferred over covariance-based SEM because the study sought to maximise predictive accuracy and accommodate the non-normal distribution of survey data, typical in community-based research (Table 1).

Pilot test

The reliability of the questionnaire was established by running both the results of the pilot test with Split-Half and Cronbach's Alpha.

Ethical approval

This study was conducted in strict adherence to the highest ethical standards. Informed consent was obtained from all participants, with guarantees of confidentiality and the right to withdraw without penalty. Ethical approval was granted by the Covenant University Health Research Ethics Committee (CHREC; Approval Number CHREC/1129/2025).

Presentation of results response rate

Five hundred and nineteen copies of the questionnaire were distributed to women in Niger and Yobe states, Nigeria. It must be noted that at the first instance of data collected, only 499 copies of the questionnaire were retrieved. However, the researcher went back to the field to administer an additional 20 copies of the questionnaire to meet up with the sample size. It is very imperative to note that the study recorded 100% sample size intended for the study. During the data cleaning phase, specific missing data were found and fixed.

The respondents' cross tabulation demographic profile from the two selected states is presented in Table 2.

TABLE 1 Internal consistency statistics.

Statistic/measure	Value	Number of items
Part 1	Value	0.775
	No. of items	39[a]
Part 2	Value	0.773
	No. of items	39[b]
Total no. of items		78
Correlation between forms		0.621
Spearman-Brown	Equal Length	0.766
	Unequal Length	0.766
Coefficient		
Guttman Split-Half Coefficient		0.764

[a]represents the number of items in Part 1 of the questionnaire, [b]represents the number of items in Part 2. These labels were generated to distinguish the two subsets of items used in calculating the Split-Half reliability statistics.

Demographic profiles of respondents

The respondents' cross tabulation demographic profile from the two selected states is presented in Table 2.

The respondents' cross tabulation demographic profile from the two selected states is presented in Table 2.

Table 2 depicts the socio-demographic characteristics of respondents from Yobe and Niger States. The distribution of respondents by age reveals that the majority (42.6%) were between 26 and 33 years, with a higher proportion (32.6%) from Niger State compared to 10.0% from Yobe State. This is followed by respondents aged 34–41 years, who accounted for 29.9% of the total sample, with 20.4% from Niger State and 9.4% from Yobe State. The 18–25 years age group constituted 14.8% of the total respondents, while the least represented age category was 42–49 years (12.7%), indicating that most respondents were relatively young and within their economically active age range.

Regarding educational qualifications, most respondents (44.5%) reported having obtained the Senior Secondary Certificate Examination (SSCE), with a significant 38.9% from Niger State and 5.6% from Yobe State. This is followed by those with Ordinary National Diploma (OND), representing 17.5% of the sample, and Higher National Diploma (HND), which accounted for 14.5%. A small proportion (9.8%) possessed bachelor's degrees (B. Sc., B. Ed., or B. Tech), while only 2.5% held postgraduate qualifications (M. A., M. Sc., M. Ed., M. Phil., or PhD). Notably, 5.6% of the respondents reported having no formal education.

In terms of employment status, artisans formed the largest group, representing 38.2% of the sample, with Niger State contributing the highest proportion (35.5%). This is followed by self-employed individuals, who accounted for 20.2% of the total respondents, and students (10.2%). Entrepreneurs constituted 8.7%, while white-collar job holders and unemployed individuals accounted for 9.8 and 12.9%, respectively. This suggests that a significant portion of the respondents were engaged in informal or vocational occupations.

Monthly income distribution shows that a majority (53.9%) earned less than ₦50,000, with Niger State accounting for 48.0% of this group. About 18.7% of the respondents earned between ₦50,001 and ₦100,000, while 16.8% reported earning between ₦200,001 and.

₦300,000. A smaller proportion earned between ₦100,001 and ₦200,000 (7.3%), and only 3.3% reported earning ₦300,001 and above. This income distribution highlights the prevalence of low-income earners among the respondents. With respect to marital status, a vast majority of respondents (88.2%) were married, comprising 69.9% from Niger State and 18.3% from Yobe State. Singles accounted for 7.9%, while divorced and widowed individuals each constituted 1.9% of the total sample. This distribution suggests that most respondents were married and likely to have family responsibilities. In terms of religious affiliation, Islam was the dominant religion, with 88.2% of the respondents identifying as Muslims, compared to 9.8% who identified as Christians and 1.9% who practised traditional

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TABLE 2 Demographic Profile of the Respondents (Survey) n = 519.

Category	States		
	Yobe state (%)	Niger state (%)	Total (%)
Age			
18–25	5.4%	9.4%	14.8%
26–33	10%	32.6%	42.6%
34–41	9.4%	20.4%	29.9%
42–49	3.9%	8.9%	12.7%
Total			100%
Educational qualifications			
No formal education	2.3%	3.3%	5.6%
Primary school leaving certificate	1.9%	3.7%	5.6%
SSCE	5.6%	38.9%	44.5%
Ordinary national diploma	5.4%	12.1%	17.5%
Higher national diploma	7.7%	6.7%	14.5%
B. Sc, B. Ed, B. Tech	3.7%	6.2%	9.8%
M. A., M. Sc., M. Ed., M. Phil., PhD.	2.1%	0.4%	2.5%
Total			100%
Employment status			
Entrepreneur	2.3%	6.4%	8.7%
Artisan	2.7%	35.5%	38.2%
White collar job	4.8%	5%	9.8%
Student	5.6%	4.6%	10.2%
Unemployed	7.1%	5.8%	12.9%
Self-employed	6.2%	14.1%	20.2%
Total			100%
Monthly income			
Less than 50,000 Naira	6%	48%	53.9%
50,001 to 100,000	8.1%	10.6%	18.7%
100,001 to 200,000	5%	2.3%	7.3%
200,001 to 300,000	6.6%	10.2%	16.8%
300,001 and above	3.1%	0.2%	3.3%
Total			100%
Marital status			
Single	7.3%	0.6%	7.9%
Married	18.3%	69.9%	88.2%
Divorced	1.5%	0.4%	1.9%
Widowed	1.0%	1.0%	2%
Total			100%
Religion			
Christianity	6.9%	2.9%	9.8%
Islam	19.8%	68.4%	88.2%
Traditional	1%	1%	2%
Total			100%
Number of children			
None	1.9%	0%	1.9%

(Continued)

TABLE 2 (Continued)

Category	States		
	Yobe state (%)	Niger state (%)	Total (%)
1–2	4.6%	5.2%	9.8%
3–4	11.9%	30.1%	42%
5 and above	19.1%	27.2%	46.3%
Total			100%

religion. The distribution of children shows that 88.2% of respondents had 1–2 children, 42.0% had 5 or more children, while only 9.8% reported having no children.

Test of hypotheses

This section is devoted to empirically testing the research hypotheses. All hypotheses were extensively examined using the Smart PLS statistical tool, which helps determine the significant effect of independent variables on dependent variables. Hypothesis testing tries to determine whether there is adequate statistical evidence to support or disprove the hypotheses proposed in this study.

In this study, data analysis included predicting structural and measurement models. The study used path coefficients and the bootstrapping approach with 5,000 bootstrap samples to analyse the risk communication, information sources and postpartum depression experiences among women in Niger and Yobe states in Nigeria. It must be noted that all components and items in the measuring model must be reflective, with loading factors more significant than 0.70. Notably, all components exceeded the minimum criterion of 0.70. In the hypotheses, the analysis considered path coefficients, R-squared values, and levels of significance. In addition, it is essential to note that bootstrapping is one of the most successful non-parametric strategies for assessing the model's influence in PLS-SEM. This study used bootstrapping estimates to improve result accuracy while determining the relationship between the variables under consideration.

> H_0: Demographic factors (Age, income, education, and number of children) do not significantly influence women's help-seeking behaviour for postpartum depression in Yobe and Niger States, Nigeria.

The hypothesis examined the relationship and resultant effect of Demographic factors (Age, income, education, number of children) on women's help-seeking behaviour for postpartum depression. A standardised questionnaire with a five-point Likert scale was used to collect data from women in Yobe and Niger State. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to examine the influence of Demographic factors (Age, income, education, and number of children) on women's help-seeking behaviour for postpartum depression. Figure 1 depicts the influence of Demographic factors on women's help-seeking behaviour for postpartum depression. All the measures related to Demographic factors (Age, income, education, number of children and help-seeking behaviour) for postpartum depression among women showed factor loadings higher than the minimum threshold of 0.70, as shown in Table 2. Also, the SmartPLS software used for the analysis produced the construct validity and reliability found in Table 3. As stated in the literature, the figure must be more than 0.5 to determine AVE. While the Cronbach alpha value must be 0.7 and above, the standard for composite reliability must be above 0.8 (Figure 2).

Table 3 shows the factor loadings for each measurement item regarding help-seeking behaviour among women in Yobe and Niger State. The study assessed the validity and reliability of the instrument using Composite Reliability (CR), Average Variance Extracted (AVE), and Cronbach's Alpha (CA), applying threshold values of 0.80, 0.50, and 0.70, respectively. Moreover, convergent validity was examined to determine the construct validity of the instrument. Convergent validity reflects the degree to which the constructs specifically help-seeking behaviour among women in Yobe and Niger States are related. The factor loadings ranged from 0.701 to 0.866, demonstrating a strong level of reliability.

The Variance Inflation Factor (VIF) was employed to assess the presence of common method bias (CMB). While a VIF value of 1 indicates a complete absence of collinearity, many studies recommend a threshold of 5.0 for acceptable levels. According to James et al. (2013), the safest and most conservative range lies between 2.5 and 5. As shown in Table 3, the VIF values for all components across the evaluated variables are well below the conservative benchmark of 5.0. This indicates that collinearity is minimal and confirms that the study is not significantly influenced by common method bias. However, the interplay between demographic profile and help-seeking behaviour among women in Yobe and Niger State is depicted in Figure 3.

Evaluation of the inner structural model and fitness

The significance of the inner structural model was evaluated using path coefficients. In Partial Least Squares Structural Equation Modelling (PLS-SEM), bootstrapping plays a crucial role in determining the statistical significance of the model's relationships. This study employed the default bootstrapping procedure with 5,000 subsamples. Table 4 presents the inner structural model, which demonstrates the relationship between demographic factors and help-seeking behaviour. All model fit indices for the measurement model fell within acceptable ranges and exceeded the established cutoff thresholds, as shown in Table 4.

To establish the model, this study used absolute fit measures, incremental fit measures, and parsimony fit measures in line with the recommendations of Hair et al. (2010). For example, absolute fit indices help in assessing how well the sample data align with the model's theoretical projections and predictions. Also, the SRMR (Standardised Root Mean Square Residual) is engaged to help in calculating the average difference between the observed and model-implied correlation matrices; it evaluates how well a suggested model captures the

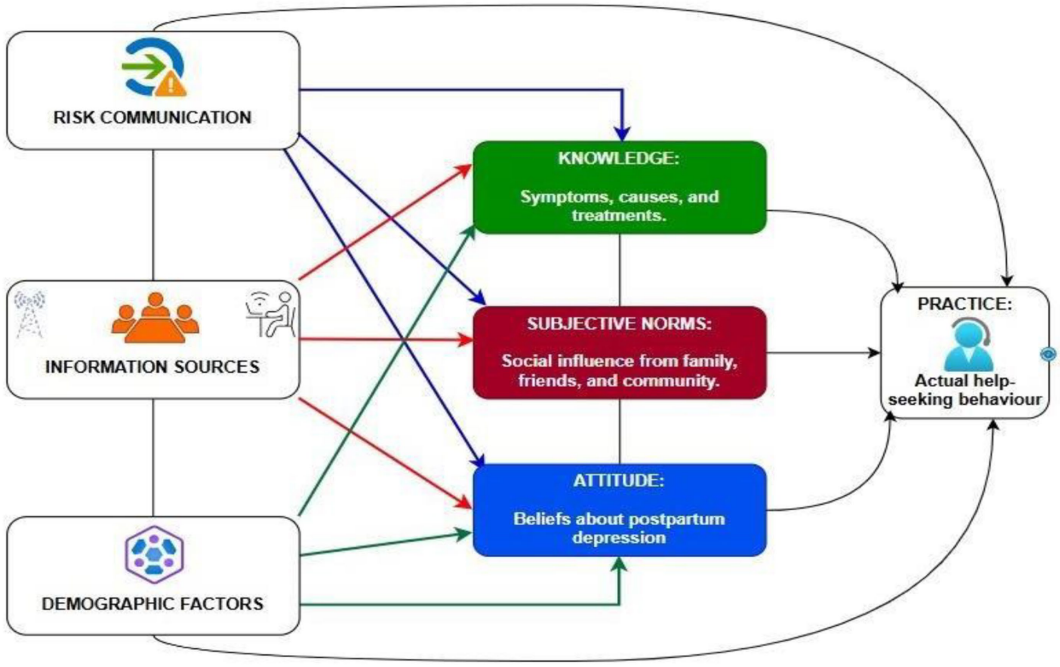

FIGURE 1
Conceptual framework Omale et al. (Author's work, 2025).

TABLE 3 Construct validity and reliability statistics demonstrating the adequacy of measurement model indicator.

Constructs	Loading	VIF	*p* value	AVE	Composite Reliability	Cronbach's Alpha
	≥ 0.7	<3.0	<0.05	≥0.5	≥ 0.8	> 0.7
Help-seeking behaviour (HSB)				0.641	0.951	0.943
HSB1	0.770	1.564	0.000			
HSB2	0.840	1.973	0.000			
HSB3	0.836	1.567	0.000			
HSB4	0.720	1.767	0.000			
HSB5	0.791	1.873	0.000			
HSB6	0.707	2.330	0.000			
HSB7	0.747	1.770	0.000			
HSB8	0.815	1.864	0.000			
HSB9	0.846	1.800	0.000			
HSB10	0.866	1.554	0.000			
HSB11	0.851	2.037	0.000			

observed data. The SRMR value for information sources and postpartum depression demographic factors, and help-seeking behaviour was 0.068, which is below the 0.08 threshold. This implies that the model is an acceptable fit. The Goodness-of-Fit Index (GFI) was also used to establish the model fit. This helps in measuring the accuracy with which a statistical model captures the observed data. It calculates the difference between the model's predictions and the data; greater GFI values signify a better fit. The GFI for this hypothesis was 0.940, exceeding the 0.90 benchmark, further confirming model adequacy. The CMIN/DF, which depicts the minimum discrepancy of the model value, also indicates a good model fit.

Incremental fit indices provide useful information beyond that provided by statistical significance tests. It evaluates the extent to which the proposed model improves over a baseline model in which

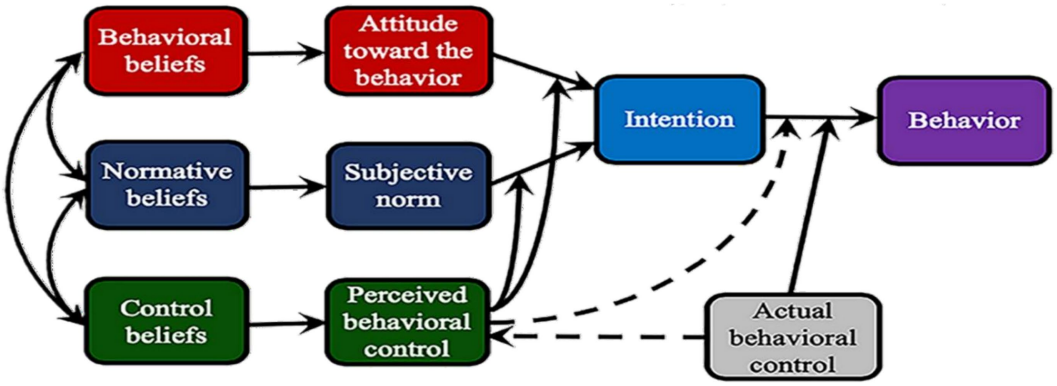

FIGURE 2
The theory of planned behaviour source: Ajzen (1985).

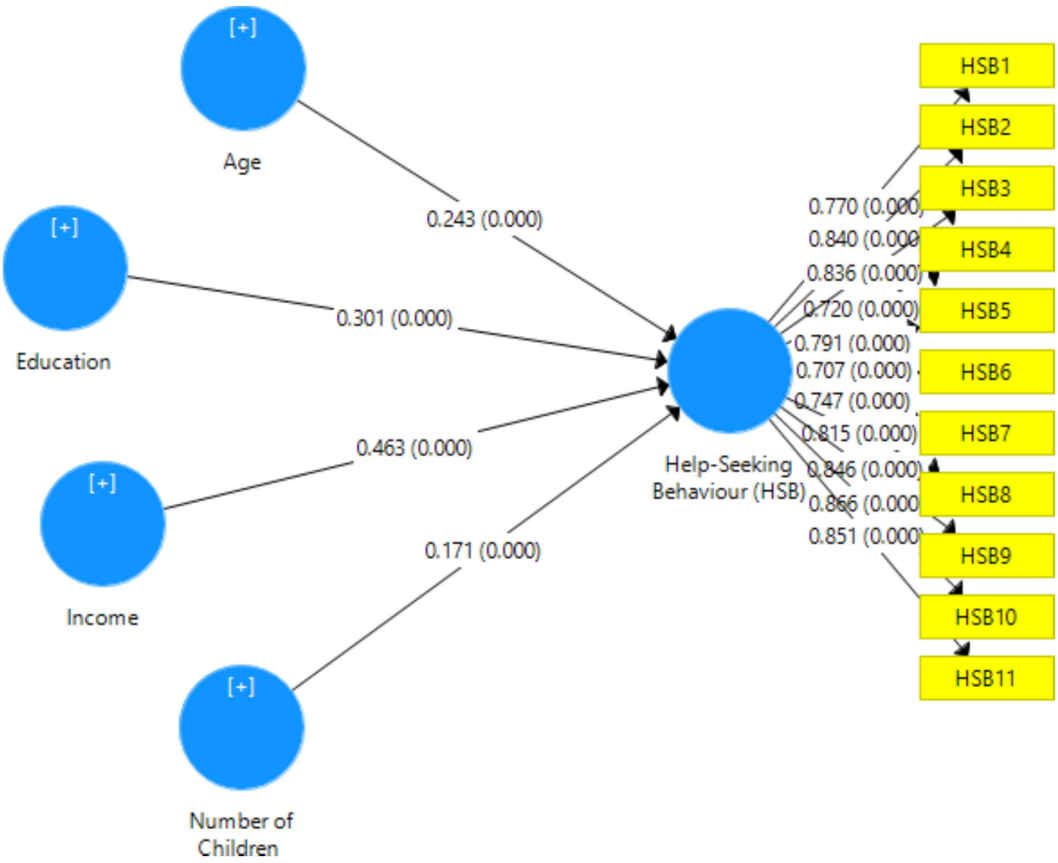

FIGURE 3
Structural path model showing the relationship between key demographic factors (age, education, income, and number of children) and women's help-seeking behaviour for postpartum depression in Yobe and Niger States. Path coefficients and *p*-values derived from SmartPLS (Author's computation, 2025).

all variables are assumed to be uncorrelated. Both the Normed Fit Index (NFI) and the Comparative Fit Index (CFI), with a minimum threshold of 0.90, signify an acceptable fit as established in the literature. The NFI value of 0.944 in this study suggests that the model is appropriate to the data.

Parsimony Fit Indices (PFI) were used to evaluate the fit of statistical models while also considering their complexity. This enables the comparison of models and assesses their efficiency in representing the population. The PCFI value of 0.610 exceeds the minimum threshold of 0.50. Also, RMSR (Root Mean Square Residual), which helps in evaluating the quality of predictions, is 0.068, which falls within the acceptable range, while the CMIN/DF value of 2.115 remains below the upper threshold of 3.0, thus confirming a satisfactory model fit.

Predictive relevance and effect size

The Q^2 values are used to assess the predictive relevance of constructs and the data points of their indicators. A Q^2 value greater

TABLE 4 Model fit.

Model fit index	Measures	Benchmark	Model value
Absolute fit index	SRMR	< 0.08	0.068
	Chi-Square	<3.0	2.115
	GFI	≥ 0.90	0.940
Incremental fit index	CFI	≥ 0.90	0.951
	NFI	≥ 0.90	0.944
Parsimony fit index	PCFI	≥ 0.50	0.610
	d_ULS	≥ 0.50	0.647
	d_G	≥ 0.50	0.580

than 0 indicates predictive relevance. In this study, the Q^2 value for postpartum depression attitude as the dependent variable was 0.712. This suggests a considerable predictive validity for these variables. Also, effect sizes were evaluated using the f^2 (f-square) statistic. The study by Fornell and Larcker (1981) classified f^2 values as follows: values ≥ 0.02 indicate a small effect, ≥ 0.15 a medium effect, and ≥ 0.35 a large effect. The f^2 values for age, education, income and number of children are 0.771, 0.692, 1.432 and 0.452. These values reflect substantial effect sizes, indicating that the model demonstrates strong practical significance.

Table 5 presents the path coefficients showing the effect of demographic variables age, education, income, and number of children on help-seeking behaviour among postpartum women. All four demographic variables demonstrated statistically significant relationships with help-seeking behaviour, as indicated by *p*-values less than 0.05.

Specifically, income had the strongest positive influence on help-seeking behaviour ($\beta = 0.463$, $t = 10.021$, $p = 0.000$), with an R-squared value of 0.214, suggesting that income alone explains approximately 21.4% of the variance in help-seeking behaviour. This indicates that women with higher income levels are more likely to seek help for postpartum depression, possibly due to better access to healthcare services and reduced financial barriers.

Education also showed a significant positive effect ($\beta = 0.301$, $t = 6.984$, $p = 0.000$), contributing to an R-squared value of 0.091. This implies that educated women are more likely to recognise symptoms and utilise mental health services, possibly due to greater mental health literacy and reduced stigma.

Furthermore, Income and education, as proxies for perceived behavioural control and attitude, respectively, significantly enhance women's intention to seek help, confirming TPB's predictive validity within the Northern Nigerian context.

Age had a moderate but significant effect on help-seeking behaviour ($\beta = 0.243$, $t = 4.904$, $p = 0.000$), explaining 5.9% of the variance. This suggests that older women may be more inclined to seek help, perhaps due to increased maturity or previous experiences with healthcare systems.

Also, the number of children significantly influenced help-seeking behaviour ($\beta = 0.171$, $t = 3.817$, $p = 0.000$), although the contribution was relatively low (R-squared = 0.029). This indicates that women with more children may exhibit slightly higher tendencies to seek help, possibly due to accumulated parenting stress or awareness of postpartum symptoms from previous childbirth experiences.

Discussion of findings

The study examined the influence of demographic factors such as age, education, income, and number of children on women's help-seeking behaviour for postpartum depression. The findings indicate that all four variables significantly predict help-seeking tendencies, with income showing the highest influence, followed by education, age, and number of children.

Income emerged as the strongest predictor of help-seeking behaviour. This finding suggests that women with higher income levels are more likely to seek professional help when experiencing symptoms of postpartum depression. This can be attributed to their enhanced ability to access mental health services, afford treatment costs, and overcome logistical barriers such as transportation or childcare. Consistent with this, Agbo and Esmaeilzadeh (2024), observed that income positively affects health-seeking behaviour, as women with financial stability are better positioned to access healthcare resources and are less hindered by cost-related challenges. In low-income settings, like many communities in Northern Nigeria, poverty remains a significant barrier to maternal mental healthcare, and this finding underscores the urgent need to subsidise or provide free mental health services to postpartum women in underserved areas.

Educational attainment enhances a woman's perceived behavioural control by increasing her confidence to recognise depressive symptoms and navigate formal healthcare systems. In the context of TPB, education functions not only as a socioeconomic resource but also as a psychological enabler that transforms intention into action. This aligns with the findings of Tungchama et al. (2017), who reported that maternal education improves mental health literacy and reduces stigma associated with mental health conditions. In patriarchal and culturally conservative regions like Yobe and Niger States, where awareness about maternal mental health may be low, female education is a critical lever for improving mental health outcomes.

The study also found that age significantly influences help-seeking behaviour. Older women may be more willing to acknowledge emotional distress and seek help due to life experience, maturity, or greater exposure to childbirth-related health information. This contrasts with younger mothers who, despite being digitally savvy, may feel overwhelmed by stigma, lack confidence, or rely more on informal sources of support. Moreover, younger women may underreport symptoms due to fear of judgement or misinterpret PPD symptoms as a normative part of motherhood. This suggests the need for targeted awareness campaigns and peer support interventions that cater to younger mothers, especially first-time mothers who may be particularly vulnerable.

Also, the number of children was a significant, though comparatively weaker, predictor of help-seeking behaviour. Women with more children may have a greater understanding of the postpartum period and may recognise PPD symptoms more readily. However, a larger number of dependents might also mean increased responsibilities, time constraints, and financial strain factors that can hinder formal help-seeking despite heightened awareness. This duality highlights the complex interplay between caregiving burden and access to mental health services, especially in resource-poor settings.

In essence, these findings suggest that help-seeking behaviour for postpartum depression among women is not just a function of mental health awareness but also shaped by broader demographic and socioeconomic realities. Programmes aimed at improving maternal mental

health outcomes in Northern Nigeria must therefore adopt a multi-pronged approach, integrate economic empowerment, female education, and accessible mental health services, while addressing cultural norms and family structures.

Theoretical implications and theoretical contributions to knowledge based on findings from the study

We propose the Socio-Demographic Enabling Model (SDEM) in which socio-demographic resources, income, education, age, and parity constitute primary structural determinants that shape the psychological antecedents of help-seeking (Attitude, Subjective Norms, and Perceived Behavioural Control). These TPB constructs mediate the effects of resources on Help-Seeking Behaviour (HSB). Income and education also retain direct enabling effects on HSB, reflecting practical, non-psychological pathways (e.g., financing and literacy). The model further posits that caregiving burden and contextual access variables moderate resource effects, attenuating or amplifying their influence on HSB.

SDEM advances theory by repositioning socio-demographic variables from control covariates to central explanatory forces that generate psychological readiness and practical capacity for help-seeking. Empirically anchored by SmartPLS results from Niger and Yobe States, SDEM provides a falsifiable, policy-relevant framework linking structural inequity to maternal mental health behaviour, and offers actionable levers for intervention in low-resource settings (Figure 4).

Empirical implications

The findings of this study carry profound empirical weight, moving the discourse on maternal mental health in Nigeria from speculative to statistically substantiated. We have moved beyond acknowledging that barriers exist to precisely quantifying their force. The robust confirmation that income, education, age, and parity significantly predict help-seeking behaviour provides an evidence-based hierarchy of need and intervention. It empirically demonstrates that in the context of Northern Nigeria, socioeconomic empowerment is not merely adjacent to mental healthcare; it is a critical component of it. This forces a recalibration of future research, insisting that demographic variables be treated not as peripheral control variables but as central, explanatory factors in models predicting health-seeking behaviour. The success of the SmartPLS analysis further establishes a methodological pathway for future studies in similar contexts to unravel complex, latent constructs that govern human decision-making under constraint.

Implications for the application of the theory of planned behaviour

This study breathes critical, context-specific life into the Theory of Planned Behaviour (TPB). Our findings compellingly argue that the abstract constructs of TPB Attitudes, Subjective Norms, and Perceived Behavioural Control are not formed in a vacuum. They are concretely sculpted by a woman's demographic reality. A woman's

TABLE 5 Path coefficient for demographics factors and help-seeking behaviour.

Variables	Path co-efficient	R-squared	Std. dev	T-statistics	*p*-value	Remark
Age–help-seeking behaviour	0.243	0.059	0.050	4.904	0.000	Sig.
Education–help-seeking behaviour	0.301	0.091	0.043	6.984	0.000	Sig.
Income–help-seeking behaviour	0.463	0.214	0.046	10.021	0.000	Sig.
No. of children–help-seeking behaviour	0.171	0.029	0.045	3.817	0.000	Sig.

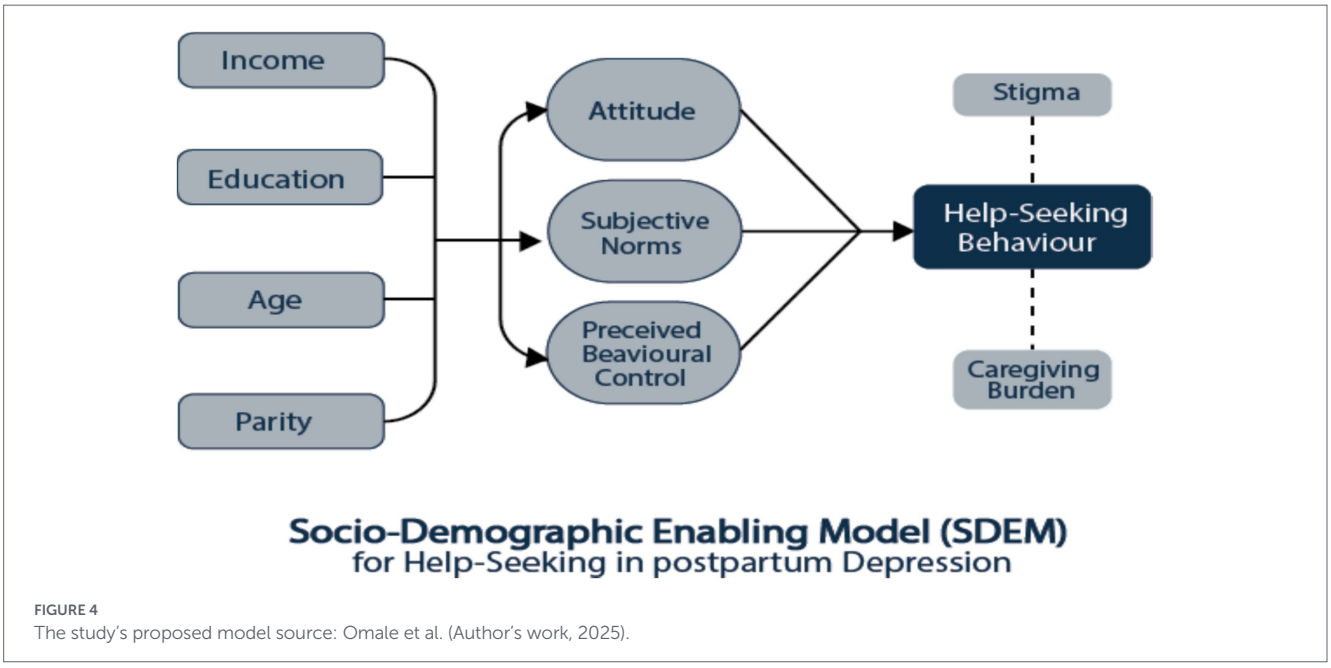

FIGURE 4
The study's proposed model source: Omale et al. (Author's work, 2025).

income and education directly amplify her Perceived Behavioural Control, transforming the notion of "seeking help" from an abstract intention into a tangible, achievable action. Conversely, a lack of these resources renders intention inert. Furthermore, education can reshape Attitudes by dismantling internalised stigma, while the number of children and age interact with Subjective Norms, influencing a woman's perception of her familial duties and her right to self-care. Thus, this research proposes a vital extension to the TPB: in resource-poor, culturally rigid settings, demographic structures are the fundamental architecture upon which psychological intention is built.

Interpretation of hypothesis test results

The decisive rejection of the null hypothesis (H_{01}) that demographic factors have no significant influence is more than a statistical outcome; it is a narrative of agency reclaimed. The path coefficients tell a powerful story: Income ($\beta = 0.463$) emerged as the strongest predictor, underscoring a brutal truth: the first barrier to mental healthcare is often economic. Before confronting stigma, a woman must confront cost. The significant effect of Education ($\beta = 0.301$) reveals knowledge as a key that unlocks both awareness and self-efficacy. The influence of Age ($\beta = 0.243$) suggests that with time and life experience comes a fortitude to prioritise one's own well-being. Finally, the role of the Number of Children ($\beta = 0.171$), while modest, illuminates the complex duality of motherhood where repeated experience may foster recognition of PPD, yet simultaneous caregiving demands can suppress the ability to act. Together, these results form an incontrovertible case: the journey to seeking help is paved, or blocked, by the circumstances of a woman's life.

Implications for policy and practise

For policymakers and health practitioners, these findings are a clear call for integrated, multi-sectoral action. We must move beyond siloed interventions and embrace a holistic model of maternal care.

1) Economic Integration: Mental health interventions must be bundled with economic empowerment programmes. This includes subsidising mental health services, integrating them into primary maternal care, and developing micro-finance initiatives targeted at postpartum women to bolster their financial autonomy and, by extension, their Perceived Behavioural Control.
2) Education as Prevention: Public health campaigns must be designed with literacy levels in mind. Leveraging community structures to disseminate information in local languages can reshape Attitudes and Subjective Norms. This is very important because misinformation can create confusion and deter women from seeking professional help (Aluko et al., 2024; Oyesomi et al., 2017). Furthermore, advocating for and investing in female education is, demonstrably, a long-term strategy for improving national mental health literacy.
3) Life-Stage Targeting: Support services must be tailored. Younger, first-time mothers may require more intensive peer support and normalisation of PPD, while older mothers with larger families need services that are logistically accessible, perhaps through community-based or mobile health units that reduce time and travel burdens.

Integrating theory and communication implications

The Socio-Demographic Enabling Model (SDEM) proposed in this study builds on the Theory of Planned Behaviour (TPB) by extending its explanatory scope beyond individual psychological factors to include the structural realities that shape them. While TPB emphasises attitudes, subjective norms, and perceived behavioural control as predictors of intention, the SDEM situates these within broader socio-demographic contexts such as income, education, age, and family size that enable or constrain behavioural expression. In this sense, SDEM complements TPB by linking personal agency to the material and social conditions that determine a woman's capacity to seek help.

From a communication perspective, these findings underscore that awareness and stigma reduction around postpartum depression are not merely about information dissemination but about strategically shaping attitudes and social norms through trusted channels. The strong influence of education suggests that mental health literacy campaigns are crucial. However, in contexts like Northern Nigeria with varying literacy levels, these campaigns must be multimodal and culturally resonant. Community radio, which reaches wide audiences in local languages, can be a powerful tool for normalising conversations about maternal mental health and challenging stigmatising beliefs. Furthermore, engaging existing social structures—such as women's associations, healthcare providers during antenatal visits, and faith-based networks—can leverage established trust to deliver credible information and promote timely help-seeking. These channels can effectively influence subjective norms by creating a community-level dialogue and strengthen perceived behavioural control by clearly signposting where and how to access confidential support. Therefore, integrating targeted health communication strategies that address both the psychological constructs of TPB and the structural enablers of the SDEM is essential for transforming intention into action.

The proposed Socio-Demographic Enabling Model (SDEM) extends the Theory of Planned Behaviour by positing that the core TPB constructs (Attitude, Subjective Norms, Perceived Behavioural Control) are not primary drivers but are themselves shaped by foundational socio-demographic realities. In this model, income, education, and parity, are the exogenous variables that enable or constrain the formation of positive help-seeking intentions.

Limitation of the study

Despite the statistical strength of the findings, the cross-sectional nature of the study limits causal inference. The observed relationships should therefore be interpreted as associations rather than direct cause effect links. Moreover, since data were self-reported, the possibility of social desirability bias cannot be ruled out, particularly given the cultural sensitivity surrounding mental health in Northern Nigeria. The authors acknowledges that the study was geographically limited to Yobe and Niger States, which may affect generalisability.

Conclusion

This study provides compelling evidence that a woman's decision to seek help for postpartum depression is not shaped in isolation but by the intersecting realities of her social and economic life.

Age, education, income, and family size jointly define her access to knowledge, autonomy, and resources, all of which determine whether she can move from silent suffering to active help-seeking.

Among these factors, income emerged as the most powerful determinant, highlighting that economic empowerment is central to maternal mental health. Education followed closely, reinforcing the role of mental health literacy in enabling early recognition of symptoms and reducing stigma. Age and number of children also played significant roles, illustrating how life experience and caregiving demands interact to shape behavioural choices.

The study thus reframes help-seeking for postpartum depression as both a health and social equity issue. To support mothers effectively, interventions must address the structural barriers that silence them: poverty, low literacy, and limited healthcare access. Policies should integrate economic empowerment programmes with routine maternal care, promote female education, and ensure that maternal mental health is embedded in primary healthcare delivery.

In conclusion, this research affirms that when women are empowered with knowledge, resources, and supportive systems, they are not only more likely to seek help but also better positioned to thrive in motherhood and beyond. This study provides empirical confirmation that structural inequities rather than attitudinal deficits remain the greatest barriers to maternal mental healthcare in Northern Nigeria, calling for interventions that are as socioeconomic as they are psychological.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: data was published in the Mendeley repository: https://data.mendeley.com/datasets/5msd75gyd3/1; doi: 10.17632/5msd75gyd3.1.

Ethics statement

The studies involving humans were approved by CHREC Covenant University Research Ethics Committee. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

GO: Conceptualization, Methodology, Writing – original draft. KO: Methodology, Supervision, Writing – review & editing. MO: Methodology, Supervision, Writing – review & editing. OO: Project administration, Writing – review & editing. FB-A: Project administration, Writing – review & editing. GA: Project administration, Writing – review & editing.

Funding

The author(s) declared that financial support was received for this work and/or its publication. We appreciate the Covenant University Centre for Research, Innovation and Discovery (CUCRID) for the financial support for this publication.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that Generative AI was not used in the creation of this manuscript.

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