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Evaluation of Factors Affecting Contractor Health and Safety Performance of Construction Projects in Abuja

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Abstract

The occurrence of incidents or accidents at construction sites have caused numerous drawbacks of project performance, such as increase in project cost, delay in completion of project, and reduce productivity and creating negative impressions about the business.The study determined the factors influencing health and safety performance and evaluated contractors health and safety management practices on construction projects. A well-structured questionnaire was employed using purposive sampling in the selection of contractors who managed and supervised ongoing and completed building projects in Abuja. The data was analysed using descriptive statistics (frequencies and mean score). Result revealed that implementation of Personal Protective Equipment (PPE), implementation of safe working environment and system of work and inefficient safety training and enforcement systems with mean score of 4.36, 4.35 and 4.31 respectively, are the factors influencing health and safety performance on construction projects. Result on the health and safety management practiced mostly performed by contractors on construction projects were Personal Protective Equipment, safety communication, emergency response plan and first aid and welfare facilities with an average percentage of 94.23, 88.46 and 86.54 respectively. It was concluded that for an improvement in safety performance adequate attention should be given to the identified factors. It is anticipated that

stakeholder's awareness of the important factors and elements affecting safety will be enlighten and will result to dynamic efforts to reduce accidents on site.

Keywords: Construction, Contractor, Health and Safety management, Safety Performance and Safety practices.

Introduction

The construction industry is of vital importance to the economies of nations. It employs about seven percent of the global workforce but accounts for between 30 and 40 percent of all work-related fatalities, with developing countries recording more fatalities when compared to developed countries (Okonkwo, 2019). The situation in developing countries like Nigeria is worse than what prevails in developed countries because of lack of concern, accurate records and statutory regulations on health and safety (H&S) (Idoro, 2008 and Jimoh *et al*., 2017). According to an evaluation conducted by Idoro (2011) on 42 construction contractors in Nigeria, in 2006 the best safety record is 5 injuries per 100 worker and 2 accidents per 100 workers. These records are high whether compared to other countries or not (Idoro, 2011). The above situation cannot improve the H&S status of the Nigerian construction industry.

Improving safety in construction remains a major concern in almost every country all over the world, because the construction industry stands out among all other industries as the leading contributor to severe and fatal accidents (Ahmed *et al*., 2000). The construction industry is known as the most hazardous industry and has always been plagued with accident for a long time (Abas *et al*., 2020). The occurrence of incidents or accidents at construction sites have caused numerous drawbacks of project performance, such as increase in project cost, delay in completion of project, and reduce productivity and creating negative impressions about the business (Aba *et al*., 2020). The failure of health and safety management systems and the lack of safety culture within contractor organisations have been highlighted as factors responsible for the high rate of construction accidents in developing countries (Okonkwo, 2019). Improving safety performance in the construction industry is crucial because it represents not just the excellence of the executed projects, but more importantly the protection of life for people who work in the field (Amartey, 2014; Abas *et al*. 2015; Awwad *et al*. 2016).

Idoro (2011) described health and safety performance as the occupational health and safety condition of construction sites or projects. The quality of the safety related work can also be regarded as health and safety performance (Nawi *et al*., 2016). Which is referred to as the

effectiveness of effort made to achieve safety (Idoro, 2011 and Nawi *et al*., 2016). The measurement of health and safety management performance in any management process is a key step, as it provides information to identify the critical areas that require actions to achieve continuous improvement (Pera *et al*., 2023). In addition will lead to the capturing of perception on the factors that can influence the safety performance on construction sites. And further ensures company compliance with all current health and safety legislation in relation to design, construction and facilities management. This study intend to determine the factors influencing health and safety performance and to evaluate contractor's health and safety management practices on construction projects.

Literature Review

Safety management practices in construction industry

Safety management practice can be termed as the implementation of the safety management systems or the measures taken prior to the occurrence of an accident (Danquah, 2019). Cheng *et al*. (2012) describes safety management practices as a process within the construction industry that is a series of activities that help comprehend, avoid, and inspect unsafe activities and hazards. Famakin & Fawehinmi (2012) stated that safety practices are parameter to measure successful project delivery which is most paramount to the client because they greatly influenced in achieving efficiency and effectiveness amongst professionals and even workers in the construction industry. In order to continually improve safety performance on site, the identification of occupational health and safety management practices in construction industry is of necessity.

Factors affecting safety performance and practices in construction project

Factors influencing health and safety performance and management practices in construction projects have been identified by several authors as presented in Table 1.0.

S/N	Authors	Factors influencing health & safety performance and practices
1	Fang *et al.* (2004)	Safety inspection, safety meeting, safety regulation enforcement, safety education and safety communication
2	Ng *et al.* (2005)	Project management commitment, hazard management, information, training, and promotions, administrative and management commitment, H&S training, selection and control subcontractors, safety review, accident record and legislation, codes and standards
3	Fernandez-Muniz *et al.* (2007)	Management commitment and involvement and employee involvement and empowerment through risk assessments, inspections, audits, training, hazard reporting and completing corrective actions.

4	Lee & Jaafar 2012	Safety inspection, Head Quarter (HQ) Management attitude towards safety, safety regulation enforcement, safety communication, safety meeting and safety training and education.
5	Zekri (2013)	Work environment, safety signals, signs and barricades, project cost, the role of government and engineering societies, and PPE. safety and health policy, risk assessment, and safety and health inspection which should be more valuable for the rest of categories.
6	Shittu *et al.* (2016)	Provision of first aid box, provision of personal protective equipment, keeping of safety record keeping and follow-ups, provision of procedures for investigating accidents and near misses and Existence of formal health and safety policy.
7	Nawi *et al.* (2016)	Inadequate Personal protective equipment (PPE); lack of communication between manager and workers; Lack of supervision; not well educated; differences in age; with different level of awareness, and no safety briefing/ toolbox meeting.
8	Durdyev *et al.* (2017)	Poor safety awareness among top management and insufficient promotion of safety awareness, lack of experienced project managers and lack of personal protective equipment, provision of a safe site environment and lack of technical guidance, ineffectiveness of current safety policies.
9	Razali *et al.* (2018).	Management commitment, safety training, worker's involvement, safety communication and feedback, safety rules and procedure, safety promotion and policy
10	Agyekum *et al.* (2018)	Insufficient communication of safety programmes'; 'lack of workers' self-protection and awareness'; 'contractors ignoring safety due to the time pressures of the project schedule'; 'poor personal attitudes towards safety', and 'ineffective laws and lack of enforcement'.
11	Wong & Son (2019)	Personal protective equipment, role of government and engineering societies, signs, signal and barricades, safety educating and training, and emergency planning and preparation
12	Abas *et al.*, (2020)	Safety training, implementation of safe working environment, implementation of safe working plant and equipment and safety review for site safety policy.

Research Methodology

The study adopted quantitative research by utilizing questionnaire survey for the collection of data. Collis and Hussey (2003) described survey as a positivistic methodology that draws a sample from a larger population in order to draw a conclusion about the population. A well-structured questionnaire was developed and

administered to seek the opinion of construction contractors which are professionals such as project managers, Quantity surveyors, site Engineers, Health and Safety managers who managed and supervised construction projects in Abuja. They were ask to assess contractor's health and safety performance on construction projects with a view to generalize the results and to make inferences. Purposive sampling technique was adopted for the collection of data for the study. Purposive sampling technique is described as a non-probability method used in choosing cases for a study based on the judgement of the researcher for the appropriate cases, such as selecting a variety of types of cases for in-depth investigation (Blaikie, 2010). The choice of purposive sampling technique hinged on its ability to provide a representative sample of the sampled elements based on certain specified criteria, such as the possession of precise knowledge and experience required by the study (Patton, 2001). Respondents sampled were those who were accessible and willing to participate in addition where having on-going building projects or projects that were completed within two years. This was because the questions in the questionnaire were based on building construction projects which is the unit of analysis for the study.

Method of Data Collection

The questionnaire was designed to determine the factors that influence health and safety performance of construction projects and to evaluate contractor's health and safety management practices on construction projects in Abuja. The questionnaire comprised of three sections. The first section captured information on the respondent's background which include: Academic qualification, year of experience and size of work force. While the second section determined the factors that influence health and safety performance of construction projects and the third section evaluated contractor's health and safety management practices on construction projects. The respondents were asked to rank the second sections using a Likert scale of 1-5 where 1 = Not very important; 2 = Not important; 3 = moderately important; 4 = Important and 5 = Very important for factors influencing health and safety performance of construction projects. A scale of 1-2 was provided for the third section where 1=Yes and 2= No, for contractor's health and safety management practices on construction projects. Ninety eight (98) copies of questionnaire were distributed to respondents and a total of fifty-two (52) questionnaire were retrieved representing a responses rate of 53.06%

Data Analysis

Data was analysed using descriptive statistics, inform of mean score. The mean score ranks respondents responses according to the central tendency as presented in the equation.

$$\frac{5n^5+4n^4+3n^3+2n^2+1n^1}{n^5+n^4+n^3+n^2+n^1} \quad (1$$

Results and Discussion

Analysis of respondents' profile

The basic information concerning the respondents' background is presented in this section, as shown in Table 2.0.

Table 2.0 present information on respondent's profile, results on the academic qualification of respondents reveals that 53.85% were Master's Degree holders. While 44.25% are HND/Bachelor degree holders and 1.92% had PHD. This implies that the respondents are well knowledgeable to provide appropriate information required for the study. On the professional membership of respondent, 34.62% of the respondent are members of Nigeria Institute of Quantity Surveyor (MNIQS), 23.08% of the respondent are members of other profession not captured. 15.38% of the respondent are members of Nigeria Society of Engineers (MNSE), 13.46% of the respondent are members of Nigeria Institute of Architecture (MNIA), and 1.92% of the respondent are members of Nigeria Institute of Builders (MNIOB). This shows that respondent are competent to provide reliable information for the study. Result on the working experience of respondent, 36.54% had 5-10years experience, 32.69% had 11-14years experience and 28.85 had more than 15years experience. This indicates that the respondent are well experienced and suitable for the study.

Table 2.0: Background information of respondents

Table 2.0

Parameter	Variables	Frequency	Percentage
Highest qualification of respondent			
	HND/BSc/ BTech	23	44.23
	MSc/MTech	28	53.85
	PhD	1	1.92
Professional membership of respondent			
	MNIQS	18	34.62
	MNIA	7	13.46
	MNIOB	1	1.92
	MNSE	8	15.38
	Others	12	23.08
Year of experience in construction industry			
	5 - 10 years	19	36.54
	11 - 14 years	17	32.69

	More than 15years	15	28.85

Factors influencing health and safety performance on construction projects.

Twenty five factors influencing health and safety performance on construction projects were identified from literature and the top most important factors where determined. Result revealed that implementation of Personal Protective Equipment (PPE) was ranked first with mean score of 4.36. Second in the list was implementation of safe working environment and system of work with mean score of 4.35. Third was inefficient safety training and enforcement systems with mean score of 4.31. Implementation of safety officer and supervisor was ranked fourth with mean score of 4.22. While lack of safety inspection was ranked fifth with mean score of 3.93. The least important factors influencing health and safety performance on construction projects by respondents was extensive use of foreign workers with mean score of 2.93.

Table 2.1 Factors influencing health & safety performance of construction project

SN	Factors influencing health & safety performance of construction project	Mean Score	Rank	Interpretation
1	Implementation of Personal Protective Equipment (PPE)	4.36	1st	Important
2	Implementation of safe working environment and system of work	4.35	2nd	Important
3	Inefficient safety training and enforcement systems	4.31	3rd	Important
4	Implementation of safety officer & supervisor	4.22	4th	Important
5	Lack of safety inspection	3.93	5th	Important
6	Review of safety audit	3.71	6th	Important
7	Lack of health and safety facilities	3.47	7th	M important
8	Non-compliance with Health & Safety regulations & requirements	3.42	8th	M important
9	Absence of safety and health department in the company	3.42	9th	M important
10	Lack of accident records and official safety data	3.40	10th	M important
11	Non provision of structure for managing health & safety in site	3.31	11th	M important
12	Poor equipment maintenance	3.30	12th	M important
13	Lack of management commitment to safety budget allocation	3.28	13th	M important
14	Absence of incentives for employees	3.27	14th	M important
15	Lack of emergency response plan and procedure	3.20	15th	M important

16	Contractors ignoring safety due to the pressures of project schedule	3.18	16th	M important
17	Absence of site safety and health policy review	3.16	17th	M important
18	Lack of worker's self-protection and awareness	3.13	18th	M important
19	Poor personal attributes	3.13	19th	M important
20	Insufficient communication	3.12	20th	M important
21	Inadequate evaluation of safety program for employees	3.04	21st	M important
22	Uncooperative clients and inadequate work procedures	3.00	22nd	M important
23	Extensive subcontractor	2.98	23rd	M important
24	Poor personal motivation	2.98	24th	M important
25	Extensive use of foreign workers	2.93	25th	M important

Notes: M important = Moderately important

Evaluation of Contractor Health and Safety Management practices on Construction Projects

Fifteen contractor health and safety management practices on construction projects were identified from literature and the top mostly performed by contractors on construction projects where evaluated. Result revealed that Personal Protective Equipment was ranked first with an average percentage of 94.23%. Safety communication was ranked second with an average percentage of 88.46. Emergency response plan and first aid and welfare facilities were ranked third with an average percentage of 86.54%. While health & safety manager/officer was ranked fifth with an average percentage of 76.92% respectively. The least health and safety management practiced by contractors on construction projects was Formal safety incentive programme with an average percentage of 34.62%.

Table 3.0 Health and Safety management (OHSM) Practice of contractor

SN	Health and Safety management Practice of contractor	H&S Practices available on site	H&S Practices not available on site	(%) of H&S Practices available on site	Rank
1	Personal Protective Equipment	49	3	94.23	1st
2	Safety Communication	46	6	88.46	2nd
3	Emergency response plan	45	7	86.54	3rd
4	First aid and welfare facilities	45	7	86.54	3rd
5	Health & safety manager/officer	40	12	76.92	5th

6	Written health & safety policy	39	12	75.00	6th
7	Insurance cover for sites	39	12	75.00	7th
8	Health and safety budget	33	19	63.46	8th
9	Top management involvement	32	20	61.54	9th
10	Documented hazard analysis and risk assessment programme	31	21	59.62	10th
11	Health & safety training program	30	21	57.69	11th
12	Formal health & safety training program	29	23	55.77	12th
13	Accident investigation and reporting system	27	24	51.92	13th
14	Safety audit	21	27	40.38	14th
15	Formal safety incentive programme	18	32	34.62	15th

Discussion of Findings

The top most important factors influencing safety performance in construction projects determined by the study were, implementation of Personal Protective Equipment (PPE). The findings of the study is in agreement with Zekri (2013) and Nawi *et al*. (2016) who confirmed that personal protective equipment is the most important factor that influence safety performance in construction projects in the industry. Personal protective equipment was described as the first line of protection to workers to severe injuries as it can protect the body parts from any hazardous elements.

Implementation of safe working environment and system of work. This is in agreement with Abas *et al*. (2020), who acknowledged that implementation of safe working environment and system of work will influence safety performance. Work process or system involves the use of equipment and machinery requiring well trained personnel in operating this equipment in a safe and conducive environment. Inefficient safety training and enforcement systems, findings of the present study agrees with previous studies (Ng *et al*. 2005 and Razali *et al*. 2018) that safety educating and training have influence on safety performance. By promoting worker's safety on the construction site through regular safety educating and training held to enhance safety performance thus will improve workers' awareness of potential dangers on the construction site. Implementation of safety officer and supervisor, the findings is in line with Fang, *et al*. (2004); Zekri 2013) who confirmed that regular safety inspection would improve safety performance by reducing the number of accidents on the construction site. Lack

of safety inspection, this result agrees with the position of Nawi *et al*. (2016) who confirmed that lack of supervision by the supervisor in charge is one of the potential contributor towards accident in the construction industry. A supervisor is employed as the intermediate facilitator to ensure safety practice in construction project. The good safety behavior of supervisor can influence on safety actions that prevent an unexpected accident.

Result on the health and safety management practiced mostly performed by contractors on construction projects were Personal Protective Equipment, findings are in line with Ismail *et al*. (2011) and Lee and Jafar (2012) who revealed that non-compliance with personal protective equipment agreement is an alarming trend as personal protective equipment is equivalent to the workers' safety. Safety communication, this is in consonance with the findings of Nawi *et al*., (2016) who asserted that Poor safety communication during construction can cause substandard workmanship, accidents, delays and misreporting. These in turn can cause extensive cost and time. Emergency response plan, the present study agrees with previous studies (Alaqqad 2009 and Wong and Soo, 2019) that emergency planning and preparation is an important health and safety management practices that will improve health and safety performance in the construction industry. The emergency planning and preparation includes the development of a plan to respond to emergencies and training worker to respond to emergency. A proper emergency planning and preparation is essential in minimizing the harmful consequences of an accident that happened on the construction site. An effective emergency planning and preparation would reduce the percentage of the accident happened and the severity of loss due to accidents on the construction site (Alaqqad 2009). First aid and welfare facilities, the findings of Okeola (2009) and Shittu *et al*. (2016) corroborates with the findings of this study because it revealed that first aid and welfare facilities are very important health and safety management practices because the provision of first aid kit on site and good welfare facilities improve efficiency.

Conclusion and Recommendations

The study determined twenty five factors influencing health and safety performance on construction projects and identified Implementation of Personal Protective Equipment (PPE), implementation of safe working environment and system of work, inefficient safety training and enforcement systems, implementation of safety officer and supervisor and lack of safety inspection as the top most important factors influencing health and safety performance on construction projects. In addition fifteen health and safety management practiced mostly performed by contractors on construction projects were Personal Protective Equipment, safety communication, emergency response plan and first and welfare facilities. It was concluded that for an

improvement in safety performance adequate attention should be given to the identified factors. Hence it is recommended that contractors should employ a qualified safety professional to closely monitor and enforce the regular usage of Personal Protective Equipment by workers as well as providing relevant safety education and training in order to maintain a safe working system and environment. Further study should be on the development of an effective emergency response plan which would respond immediately to any accidents on construction sites. It is anticipated that stakeholder's awareness of the important factors and elements affecting safety will enlighten professionals in the industry and will result to dynamic efforts to reduce accidents on site.

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