Asian Journal of Advanced Research and Reports

1(4): 1-11, 2018; Article no.AJARR.42776

Evaluation of Health, Safety & Environment Culture Perception by Construction Workers in Owerri Metropolis, Nigeria

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/AJARR/2018/v1i413088
Editor(s):
(1) Dr. Him Lal Shrestha, Associate Professor, Coordinator - UNIGIS Programme, Kathmandu Forestry College, Koteshwor, Kathmandu, Nepal.
Reviewers:
(1) Vic W. K. MOK, Hong Kong Institute of Vocational Education, Hong Kong.
(2) Williams Opeyemi Samuel, University of Technology, Malaysia.
(3) Murat Darçin, Gendarmerie and Coast Guard Academy, Turkey.
Complete Peer review History: http://www.sciencedomain.org/review-history/25802

Original Research Article

Received 19th May 2018
Accepted 23rd July 2018
Published 7th August 2018

ABSTRACT

The relevance of the construction industry to Nigeria's economy is premised on its potential to bridge the wide gap in infrastructural deficit in Nigeria and also provide numerous jobs for the teeming young population. However, Health, Safety and Environmental anomalies can significantly militate against human and environmental wellbeing if they are not adequately managed. On that note, the study aims at evaluating Health, Safety and Environment (HSE) culture perception by construction workers in Owerri metropolis, in order to understand how the individual facets (health, safety and environment), as well as HSE policy, is perceived by the construction workers. Relevant literature was reviewed on organizational culture, international perspective on HSE, European as well as Nigerian viewpoints on HSE. In order to achieve the study aim, a survey design was adopted for data collection through which 122 questionnaires were retrieved from construction workers randomly selected in the study area. Analysis of the study results shows that while most respondents understand what HSE means, they are unaware of government regulations on HSE policy. Furthermore, Pearson Chi-Square test statistic shows that awareness about government regulations on HSE does not have a significant association with an understanding of what HSE culture means (X^2 > = 0.747, P = .387). In addition, the study posits that there is a weak correlation

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between missed work days and length of time working in the construction sector (Spearman's correlation coefficient (*rho*) = .019 and *P* = .83). The study recommends instituting a comprehensive HSE regulatory framework in Nigeria which will go a long way in enshrining a positive HSE culture in the study area.

Keywords: Health; safety environment; culture; construction; HSE.

1. INTRODUCTION

The construction industry is very important in a developing country like Nigeria due to a significant deficiency in infrastructural development. This is because the construction industry has the prerogative to provide the manpower as well as the technical capacity required in revising these infrastructural deficiencies. In addition, the construction industry is critical in terms of employment creation particularly for young Nigerians who find it difficult to find jobs. This is due to the ease in entering the construction sector which requires little or no formal education for young people to be engaged in meaningful employment. However, the construction industry appears to have issues in terms of maintaining efficacious safety and wellbeing for all relevant stakeholders including the physical environment. According to Umeokafor, Isaac, Jones, & Umeadi [1], increasing fatalities in the Nigerian construction industry is attributable to poor enforcement of safety regulations as well as the low compliance levels by organizations and employees in the construction industry. These enforcement and compliance issues have affected the extent and quality of safety records available in Nigeria. This assertion is supported by Agwu & Olele [2] by their position that construction contractors are not appropriately reporting accidents and injuries to the authorities thereby resulting in a lack of a comprehensive and dependable database of fatalities in the Nigerian construction sector. On that note, the concept of Health, Safety & Environment (HSE) which is a combination of three facets might provide the platform which can be used in tackling all the relevant issues that affect the well-being of workers in the construction industry. According to Hoivik, Moen, Mearns & Haukelid [3], HSE can be optimally imbibed in the workplace when it is enshrined in the arrangement and design of organizational culture. This is because organizational culture encompasses all attitude and behavioural tendencies in any workplace. Therefore, the study aims at evaluating HSE culture perception of construction workers, so as to explicate how the individual facets (health, safety and environment), as well as HSE policy, is perceived by construction workers.

1.1 What is HSE Culture?

Before looking at HSE culture, it is pertinent to explicate culture as a concept. Edgar Schein, a renowned scholar in organizational culture studies posits that culture includes those characteristic sequences of opinions acquired and tested over time by a group in its quest to surmount its intrinsic and extrinsic deficiencies, which have become acceptable and inculcated in its members [4]. The postulations of Schein's work are corroborated and expounded by many researchers in organizational culture [5,6,7,8,9,10,11,12,13]. Organizations cannot exist without people interacting to achieve stated goals and objectives. Harste [14] looked at organizational culture based on the theories on human beings in organizations and culture by renowned philosopher Immanuel Kant. Though Schein [15,16] highlight the monolithic and integrated nature of organizational culture, Martin [17] states that culture is quite multifaceted and outlined that culture can be unitary, distinguishing and uneven. According to Hofstede & Hofstede [18], multinational corporations in their quest to acclimatize with cultures where they operate, develop a mixed culture that includes both the overall organizational culture of the corporation as well as the individual national cultures where they operate.

On that note, Safety culture can be identified as a component of organizational culture used to reduce mishaps in the workplace. It tries to describe an individual as well as corporate features that affect how employees perceive health and safety issues in the workplace [19]. For safety culture to be effective, it has to be positive. Similarly, Fernandez – Muniz et al. [20] in their analysis of the dimensions of safety culture perceived positive safety culture as predispositions exhibited by members of a group which usually stem from established procedural guidelines that are aimed at alleviating accidents that may result in harm to all category

individuals within the group. Furthermore, Beck & Woolfson [21] describes safety culture as a tool used by management to control attitudes, perceptions and understanding of safety issues by employees in a workplace. Employees in high-risk industries often see safety culture issues as constraints in the discharge of their duties [22]. Therefore, Cooper [23] points out that in order to reverse this trend, an integrated methodology should be put in place in organizations in high-risk industries. According to Richter and Koch [24], though safety culture is part of organizational culture, it has several facets which make up its characteristic qualities. On that note, Emetumah [12] asserts that safety culture now includes health and environmental facets which resulted to the concept of HSE culture. This expansion was mostly due to the realization that safety, health and environment issues are better handled in the workplace when they are holistically integrated.

1.2 HSE: International Perspective

The quest for the protection of workers as well as the environment from hazardous risks is not new. Several frameworks have been developed over the years which resulted in the current state of HSE culture. In 1950 (revised in 1995), the International Labour Organization (ILO) and the World Health Organization (WHO) Joint Committee on Occupational Health described the aims of occupational health: to maintain and encourage the protection of workers from hazards, physical and psychological risks that could result in harm or ill health due to tools or conditions they have to face in the cause of undertaking their duties [25]. In addition, the World Earth Summit of 1992 in Rio de Janeiro, Brazil resulted in the promulgation of 21 principles that cover all aspects of sustainable development. The 4th principle pronounced that: '*In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it*'. [26]. Furthermore, in line with international declarations, conventions and agreements on environmental and occupational health laws, the International Financial Corporation (IFC) has over the years provided performance guidelines that will ensure that companies all over the world do not only abide by these international agreements but also maintain integrated sustainable practices in all aspects of their operation [27]. The strategic themes of the guidelines which cover all facets of HSE include Environmental, Occupational Health & Safety, Community Health & Safety and Construction and Decommissioning. Morgera [27] asserts that a critical evaluation of all the issues covered by the guidelines' themes demonstrate that they provide a complete life cycle analysis of all the activities in an industrial setting that can be hazardous to people, machinery and the environment, from when operations begin till when the facility ceases production. However, the fundamental problem relies on whether organizations are willing to abide by these guidelines.

1.3 HSE: European Perspective

In European Union (EU) member countries, legislations are designed from directives established by the EU Commission; implementing these directives are binding on all signatory members. Though there is no comprehensive directive covering HSE management in the EU, the European Agency for Safety and Health at Work [28] asserts that there are several EU directives that make adequate provisions for occupational safety and environmental protection. A good example is the European framework directive on safety and health at work (EU Directive, 89/391 EEC) which guarantees minimum health and safety for employees in the EU: it defined the 'working environment' and introduced measures for adequate risk prevention or reduction as far as possible. In the United Kingdom, the Health Safety at Work etc. Act 1974 provides the framework for the protection employees at work through several regulations and a regulatory body (The Health and Safety Executive). The objectives of the Act cover the protection of employees' health, safety and welfare at work as well as people outside the workplace who may be negatively affected by what goes on in the workplace and adequate control of substances that may harm or lead to harm of employees and people [29]. On the other hand, the Environmental Protection Act 1990 provides the fundamental structure used to cover environmental issues from the control of emissions to waste management through established regulations which guide activities in high-risk sectors like the construction industry [30]. Similarly, the Control of Major Accident Hazards (COMAH) Regulations 1999 is an important statutory instrument that helps the government with the prevention and reduction of accidents from hazardous substances in

industries, which can cause harm to humans as well as the environment [31].

1.4 HSE in Nigeria

HSE as a concept is understood in Nigeria through the oil and gas sector perspective; international oil companies operating in Nigeria (particularly Royal Dutch Shell) domesticated the concept in the 90s mainly because it was already something that is institutionalized in their home countries [32]. Furthermore, global emerging issues concerning climate change and greenhouse gas emissions have found their way into the top management boardrooms around the globe [33]. The concept of HSE provides the integrated approach required to deal with these issues as they are fundamental to every organization that wants to succeed in the world today. In addition, HSE culture is in line with the Brundtland Commission sustainable development report of 1987 which postulates that all human development should be sustainable in all ramifications, as far as possible [34]. According to Kalejaiye [35], implementation of health and safety laws in Nigeria is still highly unregulated considering that there is no comprehensive legislation to guide the process. Unlike her former colonial master United Kingdom which has an all-inclusive legislation in the Health & Safety at work Act 1974, Nigeria is yet to have a similar approach which will go along in providing the required direction in effectively managing HSE issues. Even though the Labour, Safety, Health and Welfare (LSHW) bill of 2012 is a proposed legislation that should guide HSE particularly in the construction sector, it has not been signed into law by the Nigerian president [36]. In addition, Akpan [37] posits that health and safety policy regulation and enforcement is the preponderance of government who is expected to guide how organizational culture is able to integrate HSE issues. Therefore, it is important to understand how HSE culture is perceived by construction workers since they are the ones exposed to the risks and hazards plaguing the construction industry.

2. METHODOLOGY

The aim of the study is to evaluate the perception of health safety and environment culture by construction workers working within Owerri metropolis. In doing this, the aim will try to determine what HSE culture as well as its individual facets (Health, Safety and Environment) mean to construction workers in the study area and also ascertain how government policy affects HSE culture perception. The study was undertaken in Owerri metropolis which covers the capital territory of Imo state Nigeria. Owerri metropolis is situated in geographical coordinates that lie between latitude 5°29' 0" North and longitude 7°2' 0" East on the eastern heartland of southeast Nigeria. The study area is a rapidly urbanizing zone currently witnessing significant growth in the construction sector; increasing population growth over the past 2 decades implies that is a correspondent increment in construction particularly residential housing. The researcher was able to retrieve records of 265 registered construction companies in Owerri from the state government registry; these construction companies have over 1550 skilled, semi-skilled and unskilled workers whose employment status varies from temporary, part time and full time.

Primary data collection for the study was carried out using the questionnaire survey design. A sample of 200 construction workers was randomly selected from the 3 local government areas within Owerri metropolis (Owerri north, Owerri west and Owerri municipal). Since the study aims at evaluating HSE culture perception, many of the questions in the survey were Likert type question so as to elucidate the required information. It took about 2 months to disseminate and retrieve the questionnaires from the respondents which were concluded by February 2018. Out of the 200 mail questionnaires distributed, 122 were valid and used for the study analysis. IBM SPSS 21 was used in describing and analyzing data gathered for the study.

3. RESULTS AND DISCUSSION

Fig. 1 contains demographic information which shows the level of education of the study's respondents. While only 2.46% of the respondents did not get any formal education, majority of the respondents have secondary education. Furthermore, 22.95% and 13.93% of the respondents have primary and diploma education respectively. In addition, 8.20% of the respondents have a university degree. From the information elicited in the pie chart, over 90% of the respondents have formal education. This shows that construction workers in Owerri metropolis are generally literate which may facilitate their understanding as well as participation in the study.

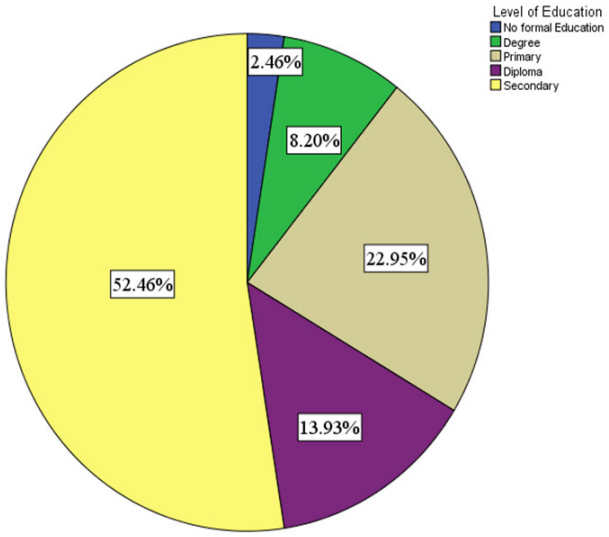

Fig. 1. Respondents' level of education

Fig. 2 shows the age bracket of the study's respondents. While about 59% of the respondents are between the ages of 18 and 30, 23.77% are between the 31 and 40 years. Furthermore, about 11% of the respondents are above 41 years while only about 5% are below 18 years of age. The age distribution of the respondents shows that most construction workers in the study area are young people.

Table 1 shows responses on an understanding of the HSE concept by construction workers in Owerri metropolis. The responses to each statement are arranged using a 5 point-Likert scale with respondents expected to indicate their understanding of HSE with strongly agree as the highest level and strongly disagree with the lowest level. Responses to the statement 1 indicate that over 80% of the respondents accept

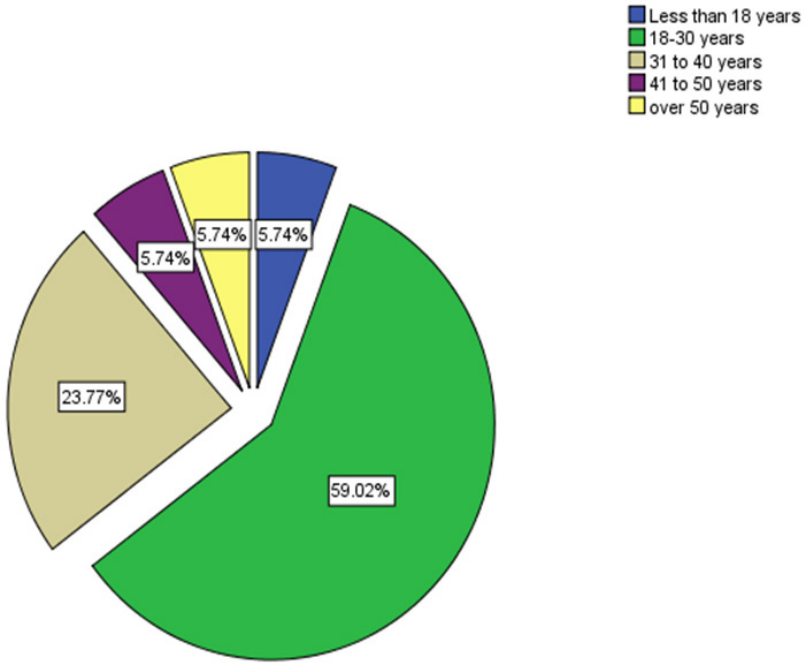

Fig. 2. Age bracket of respondents

Table 1. Understanding of the HSE concept

Statement	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1) HSE Culture covers those characteristic health safety & environment opinion acceptable by staff members of our company	64 (52.55%)	40 (32.8%)	9 (7.4%)	6 (4.9%)	3 (2.5%)
2) HSE culture is not very important in making our jobs easier and more enjoyable	11 (9%)	25 (20.5%)	7 (5.7%)	38 (31.1%)	41 (33.6%)

that HSE culture in their organization is based on acceptable opinion among their employees. Therefore, HSE culture encompasses the overall character and attitude of employees in an organization. This assertion agrees with the position of Schein [4] that organizational culture is determined by a combination of value system within a particular organization. Statement 2 was aimed at identifying if HSE culture eases job performance. While most respondents (over 60%) agreed that HSE culture improves job performance, a significant minority (0ver 30%) established that HSE culture does not increase job performance. That a significant minority agrees that HSE improves performance aligns with the work of Kalejaiye [35] which stated that HSE is rudimentary in terms of its acceptance in Nigeria.

Table 2 deals with the perception of respondents on safety issues pertinent to explicating HSE culture. Statement 3 looks at the importance of safety in ensuring safe work practices. While 98 (over 75%) respondents affirm that safety is very important in endearing workplace efficiency, just fewer than 8% of them disagree with the statement. This shows that despite the rudimentary level of HSE development in Nigeria, construction workers still realize the essence of safety in the workplace. This position concurs with Fernandez – Muniz et al. [20] in their study of the dimensions of safety culture which showed that employees usually strive to eliminate risks and hazards so as to protect themselves. Statements 4 and 5 looked at use PPE as a tool of safety management. While most of the respondents (over 70%) avowed the relevant of PPE during work hours, about 80% of them affirmed that management is not providing adequate PPE as well as training on safe work practices. This is in line with the study by Umeokafor [36] which opined that lack of a comprehensive legislation on Health and Safety discourages employers from providing adequate protection for all employees in the construction sector.

The statements in Table 3 are directed at eliciting information on the health facet of HSE. On the importance of employee health on meeting organizational goals, over 80% of the respondents agreed on the importance of healthy employees, while about 8% disagreed. Understatement 7, about 30% of the respondents affirmed that management is doing enough to protect employee health while about 56% did not agree with the statement. Furthermore, over 80% of the respondents agreed that more efforts need to be made in improving employee health and wellbeing as posited under statement 8. This

Table 2. Perception on the safety aspect of HSE

Statement	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
3) Safety is very important in making sure we get our job done	47(38.5%)	51(41.8%)	14(11.5%)	4(3.3%)	6(4.9%)
4) Management provides adequate protective equipment and training on safety issues	7(5.7%)	10(8.2%)	7(5.7%)	52(42.6%)	46(37.7%)
5) It is important that personal protective equipment (PPE) is used at all times during work hours	62(50%)	47(38.5%)	4(3.3%)	6(4.9%)	3(2.5%)

Table 3. Perception on Health aspect of HSE

Statement	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
6) The health of employees is important in meeting company goals and objective	68(55.7%)	36(29.5%)	8(6.6%)	5(4.1%)	5(4.1%)
7) Management is doing well to ensure the maintenance of good health among employees	33(27%)	6(4.9%)	14(11.5%)	63(51.6%)	6(4.9%)
8) Overall, more efforts are required to improve employee health and wellbeing	64(52.5%)	41(33.6%)	8(6.6%)	1(0.8%)	8(6.6%)

agrees with the assertions of Hoivik et al. [3] that HSE culture is an important part of the organizational culture in any company, where the former is subservient to the latter.

Table 4 contains statements designed to enable respondents to explicate their understanding of environmental issues affecting HSE culture in their organization. Statement 9 is intended to ascertain how strongly the respondents felt about protecting the flora and fauna in their work environment. While 111 (about 90%) respondents affirm the importance of environmental protection in the workplace, only 5 respondents (less than 5%) did not agree with the statement. Similarly, statements 10 and 11 looked at whether or not adequate provisions are made for environmental pollution and toileting respectively. The responses show that more respondents (59.8%) do not agree that management makes adequate provisions for toileting in the workplace. In the same vein, 71.3% of the study respondents are of the opinion that adequate provisions are not made to mitigate environmental pollution in the workplace. This position agrees with assertions of Emetumah [12] that environmental pollution is the key challenge in the Nigerian workplace as efforts made in assuaging them are not producing the desired results.

Table 5 looks at the perception of respondents with respect to HSE policy. Statement 12 was aimed at identifying whether or not respondents are acquainted with any specific policy instituted to manage HSE issues in their organization. While only 22 respondents (about 18%) agreed with the statement, most respondents (78%) were not aware of any specific policy designed to manage HSE issues. However, most respondents (about 90%) confirmed the significance of having a specific HSE policy in their organization. In addition, most respondents affirmed the importance of complying with government regulations on HSE policy. In terms of government regulations, 25.4% of the respondents were aware of government regulations on HSE policy while about 54% were not aware of government regulations on HSE policy. This position agrees with the assertions of Akpan [37] that government policy on health and safety can improve organizational output only when it is enforced and publicized.

Table 4. Understanding of environmental aspect of HSE

Statement	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
9) Protection of the work environment is vital in improving work conditions	67 (54.9%)	44 (36.1%)	6 (4.9%)	1 (0.8%)	4 (3.3%)
10) Adequate provisions are made for managing environmental pollution in the workplace	11 (9%)	14 (11.5%)	10 (8.2%)	61 (50%)	26 (21.3%)
11) Adequate provisions are made by management for toileting in the workplace	9 (7.4%)	15 (12.3%)	25 (20.5%)	30 (24.6%)	43 (35.2%)

Table 5. Perception on HSE policy

Statement	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
12) I am aware of a specific policy designed to manage HSE issues in our organization	9(7.4%)	13(10.7%)	22(18%)	36(29.5%)	42(34.4%)
13) It is important to have a specific policy designed to manage HSE issues in our organization	80(65.6%)	30(24.6%)	3(2.5%)	7(5.7%)	2(1.6%)
14) I am aware of government regulations on HSE policy	22(18%)	9(7.4%)	25(20.5%)	32(26.2%)	34(27.9%)
15) It is important that government regulators ensure we comply with our HSE policy	66(54.1%)	45(36.9%)	3(2.5%)	4(3.3%)	4(3.3%)

3.1 Hypotheses Testing

In order to explicate the aim of the study, the following hypothetical statements were made:

H_{01}: Awareness about government regulations on HSE does not have a significant association with Understanding of what HSE culture means

(Since this hypothesis looks at categorical variables, Chi-Squared (X^2) will be used in carrying out the test).

H_{02}: Length of time working in the construction sector does not have a correlation with the number of days construction workers missed work

(This hypothesis involves ascertaining the extent of association between ordinal variables; hence Spearman's rank-order correlation will be used in undertaking the test).

3.1.1 Testing H_{01}

Using a significance level of 5% (Alpha, α = 0.05), the decision rule is that H_{01} will be rejected if the *P* value is less than 5 % (0.05).

Table 6 shows the cross-tabulation of the two categorical variables used in testing H_{01}. The count values under the respective variables show that there is reasonable proximity between respondents' assertions on the questions posed. Furthermore, no cells had an expected count of less than five thus we can proceed with the Chi-Square test.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	**.747**[a]	1	**.387**
Continuity correction[s]	.449	1	.503
N of valid cases	122		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.22
b. Computed only for a 2x2 table

The Pearson Chi-Square test statistic calculated is .747 with no cells have expected count less than 5, while the estimated *p*-value is 0.387 (see Table 7). Since the calculated *p*-value (.387) is higher than the significance level (α = 0.05), we do not reject H_{01}. Therefore, we declare that awareness about government regulations on HSE does not have a significant association with an understanding of what HSE culture means (X^2> = .747, p = .387). This declaration agrees with Umeokafor [36] who posited that the lack of comprehensive government legislation is a barrier to understanding HSE issues in the Nigerian construction sector.

Table 6. Cross tabulation; understanding of HSE Concept * awareness of government HSE regulations

		Awareness about government regulations on HSE		Total
		Yes	No	
Understanding of HSE concept	Yes	41	42	83
	No	16	23	39
Total		57	65	122

Table 7. Spearman's rank correlation

			Number of days missed work	Length of time working in the construction sector
Spearman's *rho*	missed work days	Correlation Coefficient	1.000	**.019**
		Sig. (2-tailed)	.	**.831**
		N	122	122
	Length of time working in the construction sector	Correlation coefficient	**.019**	1.000
		Sig. (2-tailed)	**.831**	.
		N	122	122

3.1.2 Testing H_{02}

H_{02} will be tested using Spearman's rank-order correlation coefficient (*rho*). The correlation here will be measured based on the calculated values of *rho* ranging from +1 to -1. While a value of -1 point to a perfect negative correlation, a value of +1 indicates a perfect positive correlation with zero value showing no correlation at all.

Table 7 shows the correlation coefficient for the 2 ordinal variables being used in testing H_{02}. With a correlation coefficient (*rho*) of .019 and *P* value of .831, there is a positive correlation between the two variables. Therefore, we reject H_{02} and assert that there a correlation between missed work days and length of time working in the construction sector. However, it is pertinent to note that the extent of correlation is quite weak considering the proximity of calculated *rho* to zero.

4. CONCLUSION

HSE as a concept has become pertinent in the Nigerian construction sector, especially due to its potential to reduce hazards and risks during work processes. Most respondents to the study are literate especially considering that many of them are less than 35 years of age. In addition, most of the respondents seem to understand what HSE means but the issue of enforcement of HSE policy guidelines appears ineffective since most respondents are not aware of government regulations on HSE policy. While most respondents realize the importance of the HSE facets of Health, Safety and Environment, most of them agree that a lot more needs to be done in order to effectively manage HSE in their organizations. In conclusion, the study identified that understanding HSE does not affect the efficacy of government regulations.

On that note, the study recommends that a comprehensive health, safety and environment legal framework which recognizes the complexities of the Nigerian situation should be promulgated and adequately enforced. In addition, management in construction companies should ensure that adequate PPE, as well as commensurate HSE training, is provided for employees in order to improve HSE culture in their organizations. Furthermore, construction companies must realize the importance of HSE objectives towards achieving their economic goals and should make more financial investments that can improve the health, safety and environmental aspects of their work operations.

CONSENT AND ETHICAL APPROVAL

These are not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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