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Assessing Workers' Knowledge, Attitudes, and Safety Practices on the Prevalence of Occupational Hazards among Quarry Workers in Ogun State, Nigeria

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ABSTRACT

This study assesses workers' knowledge, attitude, and safety practices regarding the prevalence of occupational hazards among quarry workers in Ogun State, Nigeria. The research aims to address the risk that these hazards pose to quarry industry workers and the paucity of research on them. A total of 180 structured questionnaires was randomly distributed to the workers from six selected quarry industries, with 162 completed questionnaires used for the analysis. The responses were summarized using measures of central tendency and variability, while relationships between variables and their significance were determined using Chi-square statistical tests. The sociodemographic characteristics show that permanent workers ranked highest under employment types, while smoking is the least favored activity among employees under social engagement, with 15 workers and approximately 67 employees having 5–10 years of working experiences. The level of knowledge among workers regarding occupational hazards tends to be insignificant, with a p-value of 0.551. At a p-value of 0.016, it was found that approximately 159 employees agreed with the attitude regarding the usage of personal protective equipment (PPE) and safety training, which significantly differs across all job categories. Also, there is a significant difference (p-value = 0.000) in the safety practices for equipment use and a safe workplace environment across all job categories. The study concluded that to sustain good safety practices and improve on areas of safety issues in the study area, quarry operators need to adopt a safety culture that places a high priority on active learning and strict adherence to operating procedures.

1. INTRODUCTION

Globally, there are significant differences in the health of workers resulting from occupational hazards, based on factors including knowledge, attitudes, and safety practices. With lack of these factors, employees' health and safety are seriously threatened by occupational hazards that arise from their nature of job and work schedule in the quarrying industry (Kaoje *et al.,* 2018). These hazards might

range from minor to more serious health issues, including respiratory diseases, loss of hearing, irritation of the eye and nose, etc. (Aigbkhaode *et al.,* 2011; Henry *et al.,* 2017).

A quarry is an open excavation site where stone is extracted from rock deposits (Alley *et al.,* 2019). Quarrying offers a variety of stones in different sizes, ranging from aggregates to blocks, as well as raw materials for various agro-industrial uses (Wilfried and Whiteman, 2021). The process of quarrying involves the use of equipment and explosives to detach large blocks of stones and crush them to produce different aggregate sizes. This process is linked to various occupational hazards, which are determined based on workers' knowledge, attitudes, and safety practices. For instance, about 13,150 injuries were reported for every 100,000 workers in Spain's quarry industry (Sanmiquel *et al.,* 2021). Approximately 60.8% of occupational hazards among Nigerian solid mineral employees were documented by Kareem *et al.* (2022), whereas 0.83% of industrial workplace hazards in 2019 were reported by the EU. In addition, the United States (Shkembi *et al.,* 2022), China (Li *et al.,* 2022), Ghana (Joe-Asare *et al.,* 2023), and Brazil (Ismail *et al.,* 2021) have all reported work-related hazards in the quarry industry. The identification of the causes and safety guidelines of occupational hazards may not be enough to stop them from happening.

However, by assessing workers' knowledge, attitude, and safety practices, one may acquire an improved view of why quarry workers are usually prone to occupational hazards. The existing research work on the construction sector (Oluwafemi *et al.,* 2018; Amadi *et al.,* 2023), health sector (Anozie, 2017; Aluko *et al.,* 2016), and industrial sector (Okafoagu *et al.,* 2017; Onowhakpor *et al.,* 2019) in Nigeria has demonstrated a thorough understanding of workers' knowledge of occupational hazards (KAS), while the quarry sector has received little to no attention. The study will give stakeholders criteria for evaluating workers' knowledge, attitudes, and safety practices in an effort to bridge this current gap. This will improve the creation of policies that will guarantee the best possible occupational hazards mitigation that may lead to preventing the loss of valuable manpower.

2. MATERIALS AND METHODS

2.1. Study Area

Ogun State, which happens to be in the southwest of Nigeria and is bounded to the north by Oyo State and to the south by Lagos State, has latitude and longitude of approximately 7.1604° N, 3.3528° E. The geology of Ogun State is widely known for its diversity, particularly in relation to the abundance of mineral resources including limestone, granite, and marble. The majority of the state's geology is composed of sedimentary and igneous rocks, although granite and limestone stand out because of their extensive use in the construction and manufacturing industries. The state's proximity to the Nigerian basement complex, which has led to the development of thriving quarry operations in the region, further adds to its geological significance. Quarry operations have attracted both domestic and foreign investment due to the rapidly growing economy of the neighboring states and the growing need for building materials. These quarries employ a sizable workforce in a variety of operating positions and are dispersed around the state. Also, the state is famous for its thriving economy, which has been greatly aided by the mining, manufacturing, and agricultural industries. In addition to offering a profitable quarry operation, the region's geological makeup poses difficulties for the industry's employees in terms of environmental effects, loss of land, and occupational safety. Six distinct quarry industries in Ogun State, Nigeria, were the focus of the evaluation of occupational hazards among quarry workers. Table 1 lists the names and locations of the quarry industries. To ascertain how these quarries' employees contributed to the health and safety of quarry operations, their status with regard to the knowledge, attitudes, and safety practices on occupational hazards was assessed.

Table 1: Name and location of the selected quarries in Ogun Sate

Name and address	Latitude (N)	Longitude (E)	Quarry type	Ownership
Sanxin Quarry, Okeyemi Community, Ijebu Ode	07°08'45"	3°22'15"	Granite	Foreign
CNC Construction Company, Ijalemo Community, Ijebu Ode	07°09'30"	3°28'15"	Granite	Foreign
XVE GAO Nigeria Ltd, Laderin village, Odeda.	07°13'30"	3°22'30"	Granite	Foreign
A&B Global, Ogafemi Owode local govt.	07°06'45"	3°29'15"	Granite	Foreign
FW Quarry, Iporo village Odeda local govt.	07°14'45"	3°29'45"	Granite	Foreign
Blaco Nig Ltd, Akiegun Community, Obafemi Owode local govt.	07°08'45"	3°22'15"	Granite	Foreign

2.2. Sampling Techniques

Six quarry firms in Ogun State, Nigeria, were selected for the study using a stratified random sampling approach. The above was possible by creating distinct categories among the workforce with respect to quarry firm identity, which guaranteed that every company was fairly represented in the sample. Based on this, the study used Cochran's (1963) sample size ratio formula to select respondents for the survey, as shown in Equations (1). This process enhanced the universality of the study's findings to a larger group by selecting a total of 162 participants who represented the varied experiences and opinions of quarry workers from selected quarry firms.

$$F = \frac{Z^2 \times p\,(1-p)}{e^2} \tag{1}$$

Where F= population of infinite size, Z= 95% confidence level, p= population proportion of 0.5, and e = 5% permitted margin of error.

2.3. Measurement of Variables

A number of variables pertaining to occupational hazards among quarry workers in Ogun State, Nigeria, were measured in this study. The variables were sociodemographic activities, workers' knowledge, attitude, and safety practices on occupational hazards. To guarantee reliability and uniformity in data gathering, each variable was properly defined and expressed. Sociodemographic activities, such as workforce distribution, were divided into permanent, contract, and casual workers relative to the nature of their job, while social engagement included cigarette and alcohol consumption and using addictive medications. The number of years spent in the industry was used to estimate experience levels, while a variety of relevant questions were used to evaluate workers' KAS on occupational hazards. The intricate patterns of occupational hazards among quarry workers have been effectively portrayed in this study by explicitly describing and quantifying these variables.

2.4. Methods of Data Collection and Analysis

The study assessed workers' knowledge, attitudes, and safety practices about workplace hazards in the quarry industry using a structured questionnaire written in basic English. The questionnaire comprised the four sections, which are sociodemographic characteristics, workers' knowledge, attitudes, and safety procedures regarding occupational dangers in the quarry industry. Questions related to sociodemographic characteristics include work experience, social involvement, and types of employment. Knowledge questions were scored as either "yes" or "no," while attitude questions were scored on a five-point Likert scale ranging from "strongly agree" to "strongly disagree." A four-point Likert scale, with "never" to "always" as the ratings, was used to score safety practices. Descriptive statistics were employed to analyze the questionnaire results from the survey to emphasize the relevant, unique characteristics of the dataset. A summary of the responses' distribution across various variables was presented by the computation of measures of central tendency and variability. Further statistical tests, such as the likelihood ratio and chi-square, were utilized to explore relationships between variables and determine their significance. To shed light on the quarry workers' knowledge, attitudes,

and safety practices on occupational hazards in Ogun State, the analysis findings were presented and reviewed in relation to the research goals. This aimed to pinpoint opportunities for enhancement and intervention.

3. RESULTS AND DISCUSSION

3.1. Sociodemographic Characteristics Study Area

The sociodemographic characteristics across various job categories are presented in Table 2. Based on this survey, the three categories of employment that exist for employees are permanent, contract, and casual. Permanent employment takes the lead with 78 workers, followed by contract with 64 and casual with 20, respectively. The driver/operator/maintenance have the largest portion of the staff, with 27 out of 78 permanent employees belonging to this group. This implies that maintenance and operational positions are essential to the sector and typically draw more permanent workers. Drilling also has a considerable number of permanent staff, totaling 18, while the least were observed in others positions with three permanent workers. In contrast, the group labeled "Others," under the casual workers, has the highest number of workers, accounting for 17 out of 64 employees, while none are designated under the manager/supervisor category. Meanwhile, contract employment has the fewest number of workers, totaling just 20 employees. Among 20 employees, the majority are in the crushing category with 11 employees, while there are no employees in the manager/supervisor categories.

Data on workers' social engagement shows that smoking is the least popular activity among employees, with only 15 participants in total across all job categories (Table 2). Drilling has the most smokers, with 6 employees, while blasting and crushing each have 2 smokers. On the other hand, drinking is more common, with 38 employees participating. Among them, the driver/operator/maintenance group has the most drinkers, with 8 employees. Meanwhile, no employees in any job category are using addictive drugs. The group labeled as "other category" with unspecified social engagement has the highest number of participants, totaling 109. The driver/operator/maintenance category has the most participants, with 28 employees, followed by crushing with 22 employees.

A large number of employees, 67 out of 162, which is about 41% of the total workforce, have 5–10 years of experience in various job categories (Table 2). The next biggest group consists of employees with less than 5 years of experience, making up 28% of the total workforce (45 people). The category with the most employees is Driver/Operator/Maintenance, which has a total of 37 workers.

Table 2: Sociodemographic characteristics across various job categories

		M/S	S/E	DRI	BLA	CRU	DOM	Others	Total
Employment Type	Permanent	13	5	18	5	7	27	3	78
	Casual	0	5	5	18	11	8	17	64
	Contract	0	1	3	3	11	2	0	20
	Total	13	11	26	26	29	37	20	162
Social Engagement	Smoking	1	3	6	2	2	1	0	15
	Drinking	5	4	7	7	5	8	2	38
	Drugs Addictive	0	0	0	0	0	0	0	0
	Others	7	4	13	17	22	28	18	109
	Total	13	11	26	26	29	37	20	162
Years of Experience	Below 5	3	3	7	3	3	10	16	45
	5 - 10	5	7	11	13	15	14	2	67
	11 - 15	4	1	5	6	6	7	1	30
	16-20	0	0	0	1	2	2	0	5
	Above 20	1	0	3	3	3	4	1	15
	Total	13	11	26	26	29	37	20	162

M/S (Manager/Supervisor), S/E (Safety/Environment); DRI (drilling), BLA (Blasting), CRU (crushing), DOM (Driver/ Operator/ Maintenance)

The majority of employees (14) possess 5 to 10 years of experience, while 10 employees have less than 5 years of experience. The Crushing category has 29 employees. Among them, 15 employees have 5–10 years of experience, and 6 employees have 11–15 years of experience. There are 26 employees in both the blasting and drilling categories. In the blasting category, the highest number of employees, which is 13, have 5–10 years of experience, while in the drilling category, 5 employees have 11–15 years of experience. The "other" group category includes 20 employees, with the majority (16 employees) having under 5 years of experience. The remaining employees are spread out thinly, with only 2 employees in the 11–15 year category.

3.2. Knowledge of Occupational Hazard in the Quarry Industry

Table 3 demonstrates that 158 (98%) people in different job categories have knowledge about the occupational hazards in quarry work. A contrary result was obtained in manual stone crushing in Sokoto, where only 25% had good knowledge of workplace hazards (Kaoje *et al.,* 2018). After conducting statistical analysis using the Pearson Chi-Square test, the study obtained a value of 4.944 with a p-value of 0.551. This indicates that workers in the quarry sector have similar levels of knowledge, which are evenly spread across all job categories. The high level of knowledge of occupational hazards across all job categories may be attributed to the significant number of permanent workers (78) with long-term experience ranging from 5 to over 20 years (117). This aligns with the study conducted by Mučenski *et al.* (2015) that the frequency of occupational hazards is influenced by workers years of experience.

Similarly, a good number of workers (97%) across all job categories displayed knowledge of the causes of slips, trips, and falls (SFT), noise, dust, heat, and chemical exposure in the workplace (Table 3). The Chi-Square value of 3.845 and a p-value of 0.698 were obtained, indicating that there are no significant differences in knowledge levels among different job types. Interestingly, the results of previous studies in Edo and Ebonyi States are aligned with this finding (Aigbkhaode *et al.,* 2011; Henry et al., 2017). Comparing this study to those conducted in other countries, it was shown that Zimbabwean gold mines had an average knowledge of 52.6% about the causes of STF, whereas Spanish quarries have a lesser knowledge of 15.8% (Sanmiquel *et al.,* 2021). Similar knowledge to this study was also shared by other nations, including the United States, Ghana, Australia, and China, regarding the causes of the occupational hazards in their mining industries (Shkembi *et al.,* 2022; Tian *et al.,* 2022; Baraza *et al.,* 2023; Joe-Asare *et al.,* 2023).

The research also shows a high level of knowledge of injuries sustained in the body parts like the head, eye, leg, and finger (Table 3). In total, 159 (98%) people have knowledge about injuries sustained in the body parts, while only three did not. The Chi-Square test showed a result of 9.844 with a p-value of 0.131, indicating that differences in knowledge are not significant. Comparable result of substantial knowledge of hand injuries (80.0%) was reported in the quarry industry in Kaduna State (Sufiyan and Ogunleye, 2012), but low knowledge of eye injuries (34.5%) was reported in Sokoto State (Kaoje *et al.,* 2018). Similarly, the Serbian mining industry reported little knowledge (20.2%) of head injuries, while the Iranian mining industry reported inadequate knowledge (28.3%) of eyes, head, and neck injuries (Ivaz *et al.,* 2020; Saranjam *et al.,* 2022).

There was broad knowledge of the use of personal protective equipment (PPE), first aid, and medical facilities, with 158 (98%) respondents expressing knowledge of them (Table 3). The Chi-Square test gave a value of 7.659 with a p-value of 0.222, indicating no significant difference in knowledge levels across the participants. In comparison, only 2.0% of workers in Ogun State had no knowledge of using PPEs, first aid, and medical facilities in the quarry sector, while a quarry in Cross River State had a considerably higher number of 84.6% responding to not usage of PPE, 91.5% no first aid, and 96.5% no health care facilities (Ekong *et al.,* 2020). Based on research conducted by Ashuro *et al.* (2021), sociocultural and religious opinions, illiteracy, and an absence of regulation were cited as causes of inadequate knowledge of how to use PPE, first aid, and medical facilities.

A total of 152 (94%) participants demonstrated knowledge of safety training, rules, and regulations, with 10 indicating otherwise (Table 3). The Chi-Square value was 3.755, with a p-value of 0.710, indicating no significant variation in knowledge levels across occupational categories. The high knowledge of safety training, rules, and regulations in Ogun State may be responsible for the low rate of occupational hazards recorded in the quarry industry. This was established by Oginyi (2010) and Cao *et al.* (2023), who stated that adequate knowledge of safety training, rules, and regulations prevent hazards and equip employees with the necessary skills to manage hazards. Meanwhile, Onoyan-Usina *et al.* (2019) claim that a strong knowledge of safety training, rules, and regulations aids employees in spotting potential hazards ahead as well as assists management in resolving hazards-related issues.

Table 3: Knowledge of occupational hazard in the industry

		M/S	S/E	DRI	BLA	CRU	DOM	Others	Total (%)	PCS
General knowledge of occupational hazards in quarry industry	Yes	13	10	25	25	29	37	19	158(98)	4.944 (0.551)
	No	0	1	1	1	0	0	1	4(2)	
	Total	13	11	26	26	29	37	20	162(100)	
Knowledge of causes of slips/trips/fall (STF), noise, dust, heat and chemical exposure	Yes	13	11	24	25	29	36	19	157(97)	3.845 (0.698)
	No	0	0	2	1	0	1	1	5(3)	
	Total	13	11	26	26	29	37	20	162(100)	
Knowledge of injuries sustained in the body parts	Yes	13	11	26	26	28	37	18	159(98)	9.844 (0.131)
	No	0	0	0	0	1	0	2	3(2)	
	Total	13	11	26	26	29	37	20	162(100)	
Knowledge in use of PPEs, first aid, and health care facilities	Yes	13	10	25	24	29	37	20	158(98)	7.659 (0.222)
	No	0	1	1	2	0	0	0	4(2)	
	Total	13	11	26	26	29	37	20	162(100)	
Knowledge of training, and safety rules	Yes	13	10	25	25	28	33	18	152(94)	3.755 (0.710)
	No	0	1	1	1	1	4	2	10(6)	
	Total	13	11	26	26	29	37	20	162(100)	

M/S (Manager/ Supervisor), S/E (Safety/ Environment); DRI (drilling), BLA (Blasting), CRU (crushing), DOM (Driver/ Operator/ Maintenance), PCS (Pearson Chi-Square and p-value)

3.3. Workers' Attitude towards Occupational Hazards

The attitudes towards occupational hazards and safety measures within the quarry industry, focusing on the perspectives of respondents' job categories, are presented in Table 4. The table shows that most respondents agreed that preventing occupational hazards is a shared responsibility between employers and employees. However, the Chi-Square and p-value (32.946 and 0.170) suggest that there are no significant differences in how workers in different job categories perceive this shared responsibility. This implies that quarry workers express a similar attitude toward occupational hazards across all job categories.

Table 4 shows that there was broad agreement on the attitude towards use of PPEs and having safety training, with most respondents strongly supporting the policy. The Chi-Square value of 24.790 and p-value of 0.016 indicate that there are significant differences in responses based on different job categories. This suggests that the attitude toward using PPE and receiving safety training may vary depending on the specific hazards that workers encounter in their jobs. By comparing the attitudes towards the use of PPEs in this study with a quarry in Edo State, it was found that workers in Edo have a low attitude towards PPE usage. Specifically, 28.6% of workers consistently use PPEs, 33.4% use them occasionally, and 41.0% never use PPEs (Aigbkhaode *et al.,* 2011). Workers' attitudes toward PPE use are influenced by related training and their knowledge of the risks of not wearing them (Gonzalez-Delgado *et al.,* 2015). Previous studies from various states in Nigeria found that the willingness to use PPE is influenced by factors such as availability of funds to purchase them, employee negligence, lack of awareness about the benefits of using PPE, religious convictions, and inadequate supervision (Kaoje *et al.,* 2018; Afolayan *et al.,* 2021; Ashuro *et al.,* 2021). Similarly, adequate training

eliminates hazards and improves all other factors that contribute to occupational hazards (Cao *et al.,* 2023). Hence, broad agreement recorded on the attitude towards safety training among the quarry operators in Ogun State has led to a reduction in occupational hazards. Unlike what was reported in Ondo State, where about 82% express a low attitude toward safety training in the quarry industry (Kareem *et al.,* 2022). According to oral interviews conducted in the study area, attending safety-related conferences and seminars improved attitudes toward safety training, which is consistent with the findings of the study by Aigbkhaode *et al.* (2011).

Also, Table 4 demonstrates that respondents strongly support the attitude towards adhering to safety policies and regulations in the quarry industry. This includes reporting hazards, not skipping safety procedures, and refraining from using illegal drugs or alcohol while at work. The study indicates significant differences in workers' opinions across job categories, with a Pearson Chi-Square value of 36.304 and p-value of 0.006. This suggests that some employees may not view reporting hazards as their responsibility or may not consider it a violation when experienced workers bypass safety protocols or use drugs or alcohol while on the job because of their chosen field of employment. This study contradicted the research conducted in Umuoghara, Ebonyi State, which found that 82.4% of quarry workers supported the use of illicit drugs or alcohol on the job (Nwibo *et al.,* 2012). In support to the study by Njaka *et al.* (2023), the strong consensus among Ogun State quarry workers against the use of illicit drugs or alcohol has therefore enhanced their reasoning skills, increased their focus, and helped them regulate their body temperature.

Table 4: Attitude towards occupational hazards

		M/S	S/E	DRI	BLA	CRU	DOM	Others	Total	PCS
Attitudes toward preventing occupational hazards between employers and workers	Strongly Agreed	11	7	13	19	16	23	17	106	32.946 (0.170)
	Agreed	2	3	13	7	13	14	2	54	
	Disagreed	0	0	0	0	0	0	1	1	
	Strongly disagreed	0	1	0	0	0	0	0	1	
	Total	13	11	26	26	29	37	20	162	
Attitude towards use of PPEs and having safety training	Strongly Agreed	10	8	11	19	23	26	17	114	24.790 (0.016)
	Agreed	3	3	15	7	6	8	3	45	
	Disagreed	0	0	0	0	0	3	0	3	
	Strongly disagreed	0	0	0	0	0	0	0	0	
	Total	13	11	26	26	29	37	20	162	
Attitude towards adhering to safety policies and regulations	Strongly Agreed	10	6	12	19	17	21	18	103	36.304 (0.006)
	Agreed	3	4	14	7	12	13	2	55	
	Disagreed	0	0	0	0	0	3	0	3	
	Strongly disagreed	0	1	0	0	0	0	0	1	
	Total	13	11	26	26	29	37	20	162	

M/S (Manager/ Supervisor), S/E (Safety/ Environment); DRI (drilling), BLA (Blasting), CRU (crushing), DOM (Driver/ Operator/ Maintenance), PCS (Pearson Chi-Square and p-values)

3.4. Workers' safety Practices on Occupational Hazards

The workers' safety practices on occupational hazards across different job categories are presented in Table 5. The table showed that 151 out of 162 participants stated that workers often or always receive sufficient safety training and supervision. The Pearson Chi-Square test resulted in a value of 12.312, and the p-value was 0.831, showing no significant variances in training approaches among various job categories. In accordance with Cao *et al.* (2023), adequate training and supervision help prevent hazards, whereas Alaba (2018) asserted effective training and supervision ensure worker safety by giving them the knowledge needed to prevent hazards. This could explain why there are relatively few records of occupational hazards in the quarry industry in Ogun State, despite the presence of many quarries in the area. This opposes the research conducted by Aigbkhaode *et al.* (2011) in Edo State, Nigeria, and Kashiri (2020) in the Mutoto rural district council of Zimbabwe. In their studies, quarry workers reported insufficient training and supervision, leading to a high number of occupational

hazards. Based on this, those involved in the quarry industry should implement a training program to offer the necessary knowledge for reducing hazards.

Most participants (157 out of 162) reported either often or always engaging in the practices of using PPE, first aid, and health care facilities (Table 5). The Chi-Square value of 23.589 and a p-value of 0.155 indicate no significant differences in the safety practices of using PPEs, first aid, and health care facilities across the job categories, meaning that the use of protective equipment, first aid, and health care facilities is widespread and consistent. The results of this study are consistent with studies showing that PPEs help reduce the high levels of dust and noise produced by quarrying operations, which over time can lead to a number of respiratory and hearing disorders (Britannica, 2011; Mankar *et al.,* 2019). Additionally, the availability of first aid and healthcare services in this research corresponds with the International Organization for Standardization (1996), which suggests that medical and physical preventative measures should be implemented to decrease health hazards from exposure to physical and chemical hazards in the quarry industry.

The majority of participants (147 out of 162) either often or always ensure safety practices related to workplace environment and equipment usage in quarry industry (Table 5). The Chi-Square value of 45.035 and p-value of 0.000 indicate a significant difference in this safety practice, with some groups being more diligent in workplace safety and proper use of equipment than others. This finding is opposed to Osun State, where a significant portion of the workforce (74.3%) works in unsafe environment (Taiwo and Ogunbode, 2024). This study also contradicted those of Massonini *et al.* (2023), who found that one of the main causes of occupational hazards in quarries is unsafe use of equipment and lack of maintenance, which is often practiced by 76.25% of quarry workers. Previous research in the quarry industry has shown that working in an unsafe environment can lead to exposure to excessive noise and dust. This exposure can result in health issues such as hearing loss, skin and eye irritation, and respiratory problems (Afolayan *et al.,* 2021; Shkembi *et al.,* 2021). Therefore, it is important for the management of each quarry company to remain diligent in maintaining a safe work environment and proper equipment usage at their quarries.

Table 5: Workers' safety practices on occupational hazards

		M/S	S/E	DRI	BLA	CRU	DOM	Others	Total	PCS
Workers' safety practices on training and supervision	Never	0	1	2	0	0	0	1	4	12.312 (0.831)
	Rare	1	0	2	1	2	1	0	7	
	Often	1	1	2	2	2	5	2	15	
	Always	11	9	20	23	25	31	17	136	
	Total	13	11	26	26	29	37	20	162	
Workers' safety practices on the use of PPEs, first aid and health care facilities	Never	0	1	0	0	0	3	0	4	27.601 (0.068)
	Rare	0	1	1	1	1	0	0	4	
	Often	3	4	6	2	1	5	1	22	
	Always	10	5	19	23	27	29	19	132	
	Total	13	11	26	26	29	37	20	162	
Safety practices related to workplace environment and equipment usage	Never	0	2	0	0	0	0	0	2	45.035 (0.000)
	Rare	0	1	0	1	0	1	0	3	
	Often	1	3	2	1	1	1	1	10	
	Always	12	5	24	24	28	35	19	147	
	Total	13	11	26	26	29	37	20	162	

M/S (Manager/ Supervisor), S/E (Safety/ Environment); DRI (drilling), BLA (Blasting), CRU (crushing), DOM (Driver/ Operator/ Maintenance), PCS (Pearson Chi-Square and p-values)

4. CONCLUSION

This study assesses workers' knowledge, attitude, and safety practices regarding the prevalence of occupational hazards among quarry workers in Ogun State, Nigeria. The selected quarry industries employed a higher number of permanent workers (78) across all job categories as opposed to contract (64) and casual (20) workers. It is interesting to note that smoking (15) is less common among quarry

workers compared to drinking, which is reported by 38 workers. The highest reported activity among workers was unspecified social activities, accounting for 109 responses. This data highlights potential areas for health and social programs within the workforce. The majority of quarry industry workers (67) possess 5–10 years of experience, denoting a stable and moderately seasoned workforce. The statistical analysis showed that there were no significant differences in knowledge among participants in key areas such as general knowledge of occupational hazards (p-value = 0.551); causes of slips, trips, and falls; noise, dust, heat, and chemical exposure (p-value = 0.698); types of injuries sustained in different body parts (p-value = 0.131); utilization of PPE, first aid, and healthcare facilities (p-value = 0.222); as well as training and adherence to safety protocols (p-value = 0.710). This suggests that employees in the quarry industry possess consistent knowledge levels that are evenly distributed among different job categories. Furthermore, there were no significant differences in attitudes toward preventing occupational hazards between employers and workers (p-value = 0.170). This means that quarry workers share the same view on workplace hazards regardless of their specific job categories. On the other hand, there are significant differences in attitude towards using PPE and receiving safety training (p-value = 0.016). In addition, there are differences in the perspective on adhering to safety policies and regulations (p-value = 0.006). This indicates that workers' attitudes towards using PPE and receiving safety training may differ based on the hazards they face in their job categories. However, there are no significant disparities in safety practices based on workers' safety practices for training and supervision (p-value = 0.831) and use of PPEs, first aid, and health care facilities (p-value = 0.068). This indicates that safety protocols are commonly followed and uniform across all types of job categories. Meanwhile, there is a significant difference in safety practices related to workplace environment and equipment usage (p-value = 0.000). This shows that certain job types pay more attention to workplace safety and using equipment correctly compared to others.

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6. CONFLICT OF INTEREST

There is no conflict of interest associated with this work.

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