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Effect of Health Education Intervention on Knowledge and Practice Among Sawmill Workers Towards Safety in Port Harcourt Rivers State

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Abstract: *This study investigated the effects of health education on knowledge and practices among Sawmill workers in Port Harcourt Rivers State Nigeria. sixteen sawmills located within four communities in Port Harcourt (mile1, mile 2, mile 3 and mile 4) in Rivers State was used. Purposive sampling was adopted for selection of the 4 sawmills locations, while systematic and simple random sampling was used to select 16 sawmill sites and 235 questionnaires were found to have been properly filled, giving a response rate of 94%. A self structured questionnaire titled knowledge and practices of sawmill workers questionnaires (KPSWQ) was used for data collection. Cronbach's alpha statistics was used to determine a reliability index of 0.79. Mean, percentage and standard deviation was used answer the research questions. The hypotheses were tested at 0.05 alpha levels using z-test, Likert's Scale and Analysis of Covariance (ANCOVA). The sociodemographic result revealed male accounting for (80.8%). Over half (62.9%) of respondents were age 26-35years, 42.5% had 9hours and above exposure and 43.4% were married, a notable percentage (54.4%) of sawmill workers had secondary and tertiary qualifications and relatively short experience in sawmill workers with over half (44.3%) having worked for 10 years or less. The findings on knowledge revealed that the control group pretest and post-test knowledge were 56.4% and 58.2% respectively while that of treatment pretest and post-test were 37.5% and 71.3% respectively. The percentage difference of control group pretest and post-test was 1.8% while that of treatment group was 33.8%. This showed that the treatment group gained 32% increase in knowledge of sawmill workers after the intervention. The practices result showed that the control group pretest mean sore was 2.69±0.998 while the post-test mean score was 2.72±1.081, the treatment group pretest mean score was 2.61±1.059 while the post-test mean score was 3.10±1.152. The pretest and post-test mean difference for control group was 0.03 while that of treatment group was 0.49. This implies that the treatment group practice was improved by the health education. It*

was concluded that safety training was possible among Nigerian sawmills workers and should be incorporated in Nigerian state sawmills in line with best practices as recommended by the Green World group NEBOSH.
Keywords: Health Education intervention, knowledge, practices, sawmills workers and safety

INTRODUCTION

Sawmilling is the process of converting logs from the forests into lumber by using a variety of machines. Some of the machines include band saws capable of breaking down logs into desired specifications and re-sawing machines for processing the cants and fitches into specified and marketable dimension Sargent et al (2022) sawmilling involves cutting of logs into planks which is associated with various hazards. The World Health Organization emphasizes that occupational safety and health (OSH) has been a longstanding concern due to the inherent hazards in various occupations. Workers' health and well-being are crucial for sustainable social and economic development globally, nationally, and locally. Occupational health and safety issues are increasingly diverse and severe, leading to serious diseases from exposure to multiple risk factors World Health Organization (2007)

According to Balkhyour et al. (2019), PPE plays a critical role in protecting workers from hazards, in the operational sector's provision of adequate safety gear is a positive step. Regular monitoring and evaluation are also necessary to ensure safety performance. Operational sector's safety practices included providing adequate safety gear, consistent with Balkhyour et al. (2019) argument that PPE is vital for worker protection. They also stressed the need for ongoing safety performance evaluation.

According to Vaishali et al., (2011) stated that the University of British Columbia, over 27,000 sawmills workers found correlations between working in a noisy environment and heart disease. Hare and hearty workers in a work place is enhanced through safety practices putting into action or effect learned/acquired knowledge, skills, attitude or behaviour related to safety to avoid accident, injury and damage to personal life and property

Mitchual et al (2015) The Code of Practice for Forest Operations notes that forest workers often fail to adhere to safety protocols and regulations due to inadequate training and a tendency to take unnecessary risks on the job

For safety to be practiced, the knowledge, skills and attitude must first be acquired. This acquisition is made possible through education. Safety education according to (Borz et al 2021) is the recognition and avoidance of hazards causing illness, disability or death in the workplace. Safety education is not about isolating young people from all hazards the bumps, cuts and bruises which are a normal part of growing up, but about equipping them to deal with a wide range of situations. Health education covers a wide area of knowledge about different aspects

of human life De Lima et al (2020). It involves the mastery of safety knowledge and its application in making decisions that enhanced the individual in any situation or environment in which he/she is operating. health education helps to reduce the vulnerability of individuals, especially workers, working in hazardous work environment such as sawmills De-Melo et al (2019). An analysis of numerous accident reports, where movement and exposure are involved in human endeavour, revealed that sound health education programmes have proven to be the most effective approach in accident reduction.

Sawmill workers worldwide face significant safety risks, risk life and limb just to earn a living, facing numerous hazards daily due to exposure to heavy machinery, sharp objects, and falling timber. Prolonged exposure to loud machinery, leading to hearing loss and exposure to wood dust, chemicals, and other hazardous substances which may finally result to musculoskeletal injuries from manual handling and repetitive tasks Thepakson et al (2019). This is a struggles and risks sawmills workers face to provide for themselves and their families Poisson & Chinniah (2016). Need for Improved Safety Measures. Based on these premises this study was aimed at investigating the Effect of Health Education intervention on knowledge and practice among sawmill workers towards Safety in Port Harcourt LGA in Rivers State

Aim and Objectives

This study aimed to investigate the effect of health education intervention on knowledge and practice among sawmill workers towards Safety in Port Harcourt Rivers State. Specifically, the following objectives guided this study

1. To identify the socio demographic variables of sawmills workers in Port Harcourt Rivers Nigeria.
2. To determine the knowledge of sawmill worker toward safety in Port Harcourt Rivers Nigerian
3. To ascertain the safety practice among the sawmill workers in Port Harcourt Rivers Nigeria

Research Questions

1. What are the sociodemographic variables of sawmills workers towards Safety in Port Harcourt, Rivers Nigeria
2. What is the knowledge of sawmills workers towards Safety in Port Harcourt, Rivers Nigeria
3. What are the sawmill workers practices towards safety in Port Harcourt. Rivers Nigeria

Hypotheses

The following hypotheses were tested at 0.05 alpha level of significance.

1. Health Education does not have a significant effect on Sawmill workers 'knowledge of safety in Rivers Nigeria
2. Health Education has no significant effect on sawmills workers practices in relation to safety at the Rivers Nigeria
3. Health Education has no significant effects on knowledge of sawmill workers towards safety in Rivers Nigeria based on gender, age, class level and location;
4. Health Education has no significant effects on sawmill workers practices as regards safety in Rivers Nigeria based on gender, age, class level and location.

MATERIALS AND METHODS

This study adopted quasi-experimental design aimed at assessing the sawmill workers knowledge and practices among four purposively selected location in Port Harcourt in Rivers State of Nigeria before and after training in safety. Two hundred and fifty sawmill workers were drawn from the four locations (mile1, mile 2, mile 3 and mile 4 respectively).

population of the Study and Sample

The studied population consisted of 235 timber sawmill workers who log large woods into pieces sell woods, boards, loaders and technical staff in the four major markets mile 1 timber Sawmill workers, mile 2 sawmill workers, mile 3 timber markets t and mile 4 timber market

Research Instruments

The instruments used in the study for the pretest and post-test data collection was questionnaires and checklists from health and safety organisation of Nigerian. copies of the self-administered questionnaire were given to the participants before and after the training in safety to respond to. At the end of the exercise,.235 questionnaires were found to have been properly filled, giving a response rate of 94%.

Questionnaires

The research instrument employed for data collection was a Self structured questionnaire titled: Knowledge and Practice sawmill Questionnaire (KPSQ). The questionnaire was structured to collect data from the respondents on knowledge, practices and skills with regards to occupational safety practices. The questionnaire consisted of Three sections: Section A, focused on socio-demographic data of respondents, section B sought information on the variables of knowledge, section C, sought information on safety practices. Data collection for this study was in two stages with the first stage being the pre-intervention stage which involved the collection of safety practice baseline data of the respondents with respect to their knowledge and practices. The second stage was the post-intervention stage, where safety education

modules/tutorials were designed to teach and train experimental group as intervention for ten weeks. This duration of intervention is in agreement with the I.E.C. Public Health, Guideline for Conducting Knowledge, Attitude and Practice (KAP)

The questionnaire was designed by the researcher based on the criteria for OSH in the Occupational Safety and Health Act, 1997, GFC Code of Practice for Forest Operation [6], GFC Code of Practice for Wood Processing Facilities (2012) and based on questions asked in the previous study done by Boston et al. [2020]. OSH is defined as "the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact

Reliability of Instrument

A Pilot Study was conducted on December, 2024 where twenty (20) questionnaires were administered at a sawmill out of the selected sawmills. This was done to improve the questionnaire and test its consistency validity and 0.79 reliability index was gotten. Also, it was done to ensure that all relevant questions were asked and that the sawmills workers were able to understand the questions.

Study Area

Port Harcourt Local Government Area (PHALGA) is located in Rivers State, Nigeria, and serves as the administrative seat of the city of Port Harcourt. Here are some key facts about PHALGA is situated in the Niger Delta region, Port Harcourt LGA is bounded by Okrika to the south, Eleme to the east, Obio-Akpor to the north, and Degema to the west. The LGA covers an area of 109 square kilometres (42 sq mi). As of 2011, the population was recorded at 638,360 people, with estimates suggesting over 1.8 million people in the city proper as of 2023. Mile 1 Sawmills is a popular area in Port Harcourt, with several sawmills and timber markets. Mile 2 is another significant area in Port Harcourt, with sawmills and timber markets. Mile 3 is also home to sawmills and timber markets in Port Harcourt and Mile 4 timber market.

Method of data analysis

The completed copies of the questionnaire were collated, coded and analysed using descriptive statistical software called Social Package for Social Sciences (SPSS) version 27. Descriptive statistics was used to present the results. Frequency and percentage (%) were used to represent personal data. with simple percentage for research questions using mean, standard deviation. The criterion mean was (4+3+2+1) 10/4 = 2.5 for practice. The hypotheses were tested at 0.05 alpha levels using Z-test, Likert's Scale and Analysis of Covariance (ANCOVA). Cronbach's alpha Coefficient was used for test and retest reliability coefficient index of 0.79. The checklists were assessed by comparing each score obtained by the sawmills to 100% which was calculated

to be the mean percent, in order to determine whether the sawmills were above or below average when it comes to putting control measures in place that are required by sawmills.

RESULTS

Table1: Distribution of sociodemographic variable of sawmill workers in Port Harcourt Rivers Nigeria.

S/N	Sociodemographic variables	Frequency F=(235)	Percentage %(100)
1	**Sex**		
	Male	190	80.8
	Female	48	19.2
2	**Age**	58	24.6
	15-25years	148	62.9
	26-35years	20	8.50
	36-45years	12	5.00
	>46years		
3	Hour of exposure Duration	48	20.4
	3-5hours	90	38.2
	6-9hours	100	42.5
	>9hours		
		58	24.6
4	**Designation**	120	51.1
	Technical staff	12	5.00
	Operator	40	17
	Administrator		
	Loader		
		98	41.7
		102	43.4
5	**Marital Status**	15	6.4
	Single	23	9.8
	Married		
	Divorced	2	0.85
	Widowed	35	14.9
		128	54.4
6	**Educational Background**	71	30.2
	Non formal education		
	Primary school	104	44.3
	Secondary school	96	40.8
	Tertiary	20	8.5
		8	3.4
7	**Years of experience**		
	<10years		
	11-20years		
	21-30years		
	>30years		

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Table 1: The study's results show that males dominated the sawmill business, accounting for (80.8%). Over half (62.9%) of respondents were age 26-35years, 42.5% had 9hours and above exposure and 43.4% were married, a notable percentage (54.4%) of sawmill workers had secondary and tertiary qualifications and relatively short experience in sawmill workers with over half (44.3%) having worked for 10 years or less

Table 2: Summary analysis of the effect of health education on knowledge on safety among sawmill workers in Port Harcourt Rivers state. Nigeria.

		Control group = 235				**Treatment group = 235**				
s/n	**Knowledge about sawmill safety**	**Pretest Correct (%)**	**Incorrect (%)**	**Posttest Correct (%)**	**incorrect (%)**	**Pretest correct (%)**	**Incorrect (%)**	**Posttest Correct (%)**	**Incorrect (%)**	**Remark**
1	Hazard is anything or situation that has potentials to cause accident (damage to property or injury) to workers in a worker in a workplace.	**17(7.23)**	**218(92.8)**	**25(10.6)**	**210(89.4)**	**35(14.9)**	**200(85.1)**	**135(57.4)**	**100(42.6)**	+effect
2	Are there occupational hazards in the sawmill?	**205(87.2)**	**30(12.8)**	**200(85.1)**	**35(14.9)**	**138(58.7)**	**97(41.3)**	**169(71.9)**	**66(28.1)**	-effect
3	Sawmilling processes such as debarking, sawing, stacking of wood generate hazards.	**196(83.4)**	**39(16.6)**	**190(80.9)**	**45(19.1)**	**121(51.5)**	**114(48.5)**	**196(83.4)**	**39(16.6)**	+effect
4	Are you aware that hazard in sawmills can lead to health problems and injuries.	**205(87.2)**	**30(12.8)**	**205(87.2)**	**30(12.8)**	**49(20.8)**	**188(79.2)**	**177(75.3)**	**58(24.7)**	+effect
5	Unsafe sawmill experienced noise, closely followed by heat and injuries	**124(52.8)**	**111(47.2)**	**136(57.9)**	**99(43.1)**	**83(35.3)**	**152(64.7)**	**190(80.9)**	**45(19.1)**	+effect

6	Proper sawmill exposure to hazards could be reduced by limiting their work hours to a maximum of 8 hours per day	**48(20.4)**	**187(79.6)**	**65(27.7)**	**170(72.3)**	**103(43.8)**	**132(56.1)**	**139(59.1)**	**96(40.9)**	+effect
	Aggregate	**132.5(56.4)**	**102.5(47.6)**	**136.8(58.2)**	**97.7(41.76)**	**88.2(37.5)**	**146.8(62.48)**	**167.7(71.3)**	**67.3(28.7)**	
	% gain difference	**1.80%**				**33.8%**				

Table 2 showed the analysis on the effects of health education on the knowledge of sawmill workers in Port Harcourt in Rivers State. The result revealed that the control group pretest and post-test knowledge were 56.4% and 58.2% respectively while that of treatment pretest and post-test were 37.5% and 71.3% respectively. The percentage difference of control group pretest and post-test was 1.80% while that of treatment group was 33.8%. This showed that the treatment group gained 32% increase in knowledge of food safety after the intervention.

Table 3: summary analysis of the effect of health education on practices among sawmills workers on safety in Port Harcourt Rivers State

		Control				**Treatment**				
		Pretest		**Posttest**		**Pretest**		**Posttest**		
s/n	Practice	**Mean**	**Std**	**Mean**	**Std**	**Mean**	**Std**	**Mean**	**Std**	**Remark**
1	I wear hard hats to protect against falling object and head injuries	2.23	1.209	2.21	1.204	2.56	1.202	2.55	1.191	+effect
2	I put on safety glasses to prevent eye injuries from flying debris	3.60	0.834	3.54	.883	3.05	1.080	3.11	1.082	+effect
3	I use respirator if I don't forget most times during sawmilling process	2.04	1.287	2.11	1.283	2.52	1.243	2.60	1.102	+effect
4	I think steel-toed boots PPE protect feet from heavy objects and equipment	3.07	1.257	3.06	1.247	3.24	1.056	3.06	1.117	+effect
5	I think it is important to prevent cuts abrasions, and others hand injuries with gloves PPE	3.79	0.604	3.76	.664	3.27	.983	3.23	1.162	-effect
6	I think Proper hygiene and sanitation is indiscriminately disposed of waste wood	2.14	1.115	2.17	1.158	1.89	.970	2.29	1.281	+effect
	Aggregate Mean and Std	**2.69**	**0.998**	**2.72**	**1.081**	**2.61**	**1.059**	**3.10**	**1.152**	
	Mean difference	**0.03**				**0.49**				

Table 3: showed the analysis on the effects of health education on practice among sawmill workers in Port Harcourt Rivers State safety. The result showed that the control group pretest

mean sore was 2.69±0.998 while the post-test mean score was 2.72±1.081, the treatment group pretest mean score was 2.61±1.059 while the post-test mean score was 3.10±1.152. The pretest and post-test mean difference for control group was 0.03 while that of treatment group was 0.49. This implies that the treatment group practice was improved by the health education.

SUMMARY OF FINDINGS

1. The Sociodemographic result revealed male accounting for (80.8%). Over half (62.9%) of respondents were age 26-35years, 42.5% had 9hours and above exposure and 43.4% were married, a notable percentage (54.4%) of sawmill workers had secondary and tertiary qualifications and relatively short experience in sawmill workers with over half (44.3%) having worked for 10 years or less.
2. The findings on knowledge revealed that the control group pretest and post-test knowledge were 56.4% and 58.2% respectively while that of treatment pretest and post-test were 37.5% and 71.3% respectively. The percentage difference of control group pretest and post-test was 1.8% while that of treatment group was 33.8%. This showed that the treatment group gained 32% increase in knowledge of sawmill workers after the intervention.
3. The practice results also showed that the control group pretest mean sore was 2.69±0.998 while the post-test mean score was 2.72±1.081, the treatment group pretest mean score was 2.61±1.059 while the post-test mean score was 3.10±1.152. The pretest and post-test mean difference for control group was 0.03 while that of treatment group was 0.49. This implies that the treatment group practice was improved by the health education.

DISCUSSIONS OF FINDINGS

This study investigated the effect of health education intervention on knowledge and practice among sawmill workers towards Safety in Port Harcourt Rivers State. This study's results on sociodemographic characteristics show that males dominated the sawmill business, accounting for (80.8%). Of course, this suggests the high level of physical strength and manual labour involves physically demanding tasks, such as lifting, and operating heavy machines and moving timber in the sawmill industry. This study has historically been male dominated, with men making up the majority of the workforce. This study is consistence with the study of Boston et al (2020) whose study was on Perception of Sawmill Workers towards Occupational Health and Safety at Linden/Soesdyke Highway, Guyana and Uthman et al (2019) whose study was on the utilization of personal protective equipment among sawmill workers in Ilorin metropolis, North-central Nigeria. This study is also similar with studies conducted Faremi et al. [2014]

Over half (62.9%) of respondents were age 26-35years, in this study. This age group indicating a significant presence of young to middle-aged workers. The study reveals that 42.5% of sawmill workers had 9hours and above exposure to their environment, which could include physical labour, machinery operation, or other hazardous conditions. This suggests prolonged exposure to hazardous conditions can increase the risk of worked-related injuries illnesses or long-term health problems, fatigue and productivity and extended work hours may impact workers personal lives leading to stress, burnout, or other issues. This study is consistence with Thepakson et al (2018) on occupational exposure to wood dust.

43.4% were married in this study, this indicates that nearly half of the workforce has family responsibilities and married workers may have additional family responsibilities, which can impact their work-life balance and overall well-being.

A notable percentage (54.4%) of sawmill workers had secondary and tertiary qualifications. This study is consistence with the study of Agbana et al (2016) Most respondents in the control group and nearly half in the study group had completed secondary school as their highest educational attainment. This mirrors findings from Awoyemi's study in Ilorin, North Central Nigeria, where secondary school completion was prevalent among sawmill workers.

Many respondents had limited formal education, with some having only primary education or none at all in the control group. Given the unskilled nature of their work, which often requires apprenticeships rather than formal education, these findings are not unexpected. And relatively short experience in sawmill workers with over half (44.3%) having worked for 10 years or less in this study. This result is contrary to Mitchual et al. [2015], whose results revealed that

primary education was the highest level attained by workers on the study on Awareness and willingness to utilize health and safety measures among woodworkers of a timber processing firm in Ghana. This study is also opposite to Boston et al (2020)

The analysis on the effects of health education on the knowledge of sawmill workers in Port Harcourt in Rivers State. The result revealed that the control group pretest and post-test knowledge were 56.4% and 58.2% respectively while that of treatment pretest and post-test were 37.5% and 71.3% respectively. This study's findings showed significant percentages increase in both the treatment group (33.8%) and control group (1.8%) at post-test. The training approach, which combined health education intervention with apprenticeship, demonstrated effectiveness in promoting inclusive education. However, a limitation of this approach is that trainees are limited to the knowledge and expertise of their trainers. Specifically, the items results revealed that 57.4% had good knowledge definition of hazard in the treatment group while in the control group had 10.6%, 85.1% in the control group knows there is occupational hazards in the sawmill process while in the treatment group 71.9%, 80.9% know about sawmilling process in the control group and 83.4% in the treatment group. 87.7% in the control group are aware that hazard in sawmills can lead to health problems and injuries while 75.3% in the treatment group. This study is opposite to the study of Agbana et al (2016) who study the knowledge of sawmill workers on occupational hazards was low, 61.7% of the respondents had poor knowledge, whereas 15.8% had good knowledge. This could be due to difference methods of research design, data collection, location and data analysis methods. Though this study-controlled group only 27.75 participants knew that exposure to hazards could be reduced by limiting their work hours to a maximum of 8 hours per day and more than half participants knew better in the treatment group. This study result is consistence with Agbana et al (2016)

More than half and more than three-quarters of this study participants had experienced noise, closely followed by heat and injuries in control and treatment study group which was also similar to Agbana et al (2016)

Sawmill workers in Port Harcourt. Rivers Nigeria commonly faced work-related hazards, including noise, heat, injuries, and electric shock, consistent judging from this study findings which is similar with studies in Ilorin, Osogbo, and Colombia scholars (Osagbemi et al, 2010; Bamidele et al., 2011; Bello & Mijinyawa, 2010). The prevalence of these hazards may be attributed to the workers' reliance on apprenticeship training, which often depends on the master's knowledge and expertise. Limited formal training may leave workers unaware of occupational hazards and necessary precautions, increasing their vulnerability to wood dust-related health issues and occupational diseases. This finding was opposite to what was obtained in a related study done in Kota Bharu, (Turkey), and Kelantan that reported poor knowledge of occupationally related hazards among sawmills workers. Daves et al (2007)

The practice results also showed that the control group pretest mean sore was 2.69±0.998 while the post-test mean score was 2.72±1.081, the treatment group pretest mean score was 2.61±1.059 while the post-test mean score was 3.10±1.152. The pretest and post-test mean difference for control group was 0.03 while that of treatment group was 0.49. This implies that the treatment group practice was improved by the health education six months training programme. This study is consistence with Odibo et al (2018) study who did a similar work at Delta State despite difference dimension of methodology but had high improvement. This study was opposite Kevin et al (2016) finding on occupational hazards and safety practices. This could be because difference methods of analyses were used. Sawmill workers in our environment face heightened health risks, accidents, and safety challenges, underscoring the importance of ongoing education and strict enforcement of protective equipment use for all workers, regardless of experience. Numerous studies globally Ochire- Boadu et al (2014), Adeoye et al (2015), Faremi, et al (2014), Mitchual et al (2015), Odibo et al (2018) & Osaigbemi, et al (2010) have highlighted that many sawmills' workers lack access to or fail to utilize first aid boxes, and only a small percentage seek medical attention at hospitals for work-related injuries or illnesses. This poor safety practice worsens the risks associated with irregular and improper use of personal protective equipment (PPE), a common issue in developing countries. The operational sector provided safety gear as part of its occupational safety practices, and evidence suggested that the gear was adequate. This finding aligns with Balkhyour et al. (2019) assertion that personal protective equipment (PPE) protects workers from workplace hazards. Moreover, they emphasized the importance of regular safety performance monitoring and evaluation to mitigate potential threats and risks

5 Conclusion

Sawmill workers are exposed to increased health hazards, accidents, and safety risks, necessitating sustained education and rigorous enforcement of protective gear usage, the sawmill industry poses significant health and safety risks to workers, highlighting the need for continuous education and consistent use of protective equipment and to mitigate occupational hazards, sawmill workers require regular education and strict adherence to safety protocols, including the use of protective devices. The study's results demonstrate that safety education effectively enhanced sawmill workers' knowledge and safety practices, with significant positive changes observed post-intervention. Our findings suggest that the safety education intervention had a profound impact on sawmill workers' knowledge and practices, leading to improved safety outcomes and the intervention's success is evident in the significant improvement in sawmill workers' safety knowledge and practices, highlighting the effectiveness of targeted education

Recommendation

The following recommendation was made base on the findings of this study it is recommended

1. Sustenance Continuous in-shop house safety training and training is recommended for employers and employees of various sawmill workers.
2. Government should appoint qualified occupational health and safety experts to oversee and enforce safety regulations.

Conflicts of Interest Statement

There is no conflict of interest at all.

Funding Statement

This study was funded by the authors. It was performed as research paper for publication for enhancement and promotion in academic excellency toward Safety in the department of Health Promotion, Environmental and Safety Education.

Ethics Statement

Letters of permission were availed by all participating sawmills. The researcher assured the participants of confidentiality in handling their responses.

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REFERENCES

Adeoye, O.A., Adeomi, A.A., Abodunrin, O.L., Olugbenga-Bello, A. & Abdulsalam, S.T. (2015) Awareness of Occupational Hazards and Health Problems among Sawmill Workers in Osun State, Nigeria. *International Journal of Research & Review, 2*, 1-14.

Agbana, B. E, Oladele J.A; Daikwo, M. A ,& Metiboba, L. O., (2016) Knowledge of Occupational Hazards Among Sawmill Workers in Kwara State, Nigeria *NigerianPostgraduate Medical Journal 23(1) 25-32, DOI:* 10.4103/1117-1936.180176

Bamidele, J.O, Adebimpe, W.O, & Dairo, M.D. (2011) Pattern of hand injuries amongsawmill workers in Osogbo, Southwestern Nigeria. *Nigerian Quest Journal HospitalMedicine.;21*:64–9

Balkhyour, M.A, Ahmed, I & Rehan, M. (2019) Assessment of Personal Protective Equipment use and Occupational Exposures in Small Industries in Jeddah; Healthimplications for workers. *Saudi Journal of Biological Sciences 26* 653-659.https://doi.org/10.1016/j.sjbs.2018.06.017

Bello SR, & Mijinyawa Y. (2010) Assessment of injuries in small scale sawmill industry of Southwestern Nigeria Journal of Science Resource Development. 2010; 7:1–5

Borz, S.A, Oghnoum,.M, Marcu,.M.V., Lorincz,,.A, & Proto, A.R (2021) Performance of Small-Scale Sawmilling Operations: A case study on time consumption, productivityand main Ergonomics for a Manually Driven Bandsaw. Special Issue *Forest Sustainability Journal International Forest 12*(6) 12-13

Boston .C, Kurup, R. & Zaman, S (2020) perception of Sawmills Workers towards Occupational health and Safety at Linden/ Soesdyke Highway, Guyana. *Asian Journalof Advanced Research and Reports 9(*1) 14-22

Daves, K.V, Cecil D, Murray, F, Don S, Lawrence, K, & Paul V, (2007) Occupational exposure to chemical, biological and physical agents in Ontario saw mill and veneer/plywood plants *Journal Environment Public Health*. 1:16–20

De Lima, R.B., Ferreira, R.L.C.; Da Silva.J.A. ,Guedes,A., M.c; DA Silva D.S.A; De

Oliverira, C.P Galvao Rabelo, F, & Da Cruz S. L.f,,(2020) Effect of Species and logdiameter on the volumetric yield of Lumber in Northern Brazilian Amazonia: Preliminary Results. *Journal. Sustain. 39*. 283-299

De-Melo,,R.R., Dacroce, J.M.F; Junior, F.R, Santos, .D & Lisboa, G: (2019) Cavalcante deJesus F.L Lumber yield of four native forest species of the Amazon region. FlorestaAmbiente

Faremi,, F.A., Ogunfowokan, A.A., Mbada C Olatubi, M.I., & Ogungbemi, A.V (2014). Occupational Hazard Awareness and Safety Practices among Nigerian Sawmill Workers. *International Journal Medical Science and Public Health, 3(2)*: 1244-1248.

Mitchual,, S.J., Donkoh, M. & Bih, F. (2015) Awareness and Willingness to Utilize Health and Safety Measures among Woodworkers of a Timber Processing Firm in Ghana. *Journal of Scientific Research & Reports, 6*, 178-188. http://dx.doi.org/10.9734/JSRR/2015/15786

Ochire-Boadu, K., Kusi, E. & Lawer, E.A. (2014) Occupational Hazards and Safety Practices: A Concern among small scale Sawmilling Industries in Tamale Metropolis,Ghana. *International journal of Scientific & Technology Research, 3,* 234- 236

Odibo A.A., Nwaogazie I.L., Achalu E.I., & Ugbebor J.N. (2018) Effects of Safety Intervention Practices among Selected Sawmill Workers in Sawmills in Delta State,Nigeria. *International Journal of Health, Safety and Environments (IJHSE) 4* (2),218-235

Osaigbemi, G.K., La-Kadri, R.T. & Aderibigbe, S.A. (2010) In a Study on the "Awareness of Occupational Hazards, Health Problems and Safety Measures among Sawmill Workers in North Central Nigeria. *TAF Preventive Medicine Bulletin, 9*, 325-328.

Kevin, C. D, Chukwuna, B.D, Anthony, C.L, Irene, A.M., Kenechi, A.U., Uche, R.O, Tope,

B.O., Ugochukwu C.M & Ikechi,O (2016) Occupational Hazards, Safety and Hygienic Practices among Timber Workers in a South Eastern State, Nigeria *Occupational Diseases and Environmental Medicine 4(*3) https://doi.org10.4236/odem.2016.43008

Poisson, P: & Chinniah, Y. (2016) Managing risk linked to machinery in sawmills bycontrolling hazardous energies. Theory and practice in eight sawmills. *Journal of Safety Science 84,*117-130

Sargent, R. (2022) Evaluating Dimensional Stability Unmodified Wood. An Experimental Comparison of test Methods. *Journal of forests 13*(4) 613-624

Uthman, M.M.B, Folarori, H.S, Rotimi, B.F, Oloyede,.H. K & Uthman. A. O, (2019)Utilization of personal protective equipment among sawmill workers in Ilorin Metropolis, North-Central. Nigeria. Research. *Journal of Health Sciences7*(2) 155-162

Vaishali, P.C, Deepak, S.D & Chandrakant, R.P (2011). Assessment and Control of Sawmill Noise. *International Conference on Chemical, Biological and Environmental Sciences* (ICCEBS'2011) Bangkok.World Health Organisation. Raising Awareness of Stress at work in developing countries 2007. (Retrieved November 28,2015) Available: http://www.who.int/occupational_health/publications/raisingawarenessofstress.pdf

Thepakson, P., Kaizumi, A., Harada, K., Sinwong, W., & Neitzel, R.L (2019) Occupational noise exposure and hearing defects among sawmill workers in the south of Thailand.*International Journal Occupational Safety Ergonomic, 25*,458-466

Authors' contributions

This study was carried out in collaboration among both authors. Authors Lois Erowo Obed-Ojukwu, and Ifeoma Vivian Ugwueke designed the study. Author LEO-O performed the statistical analysis and wrote the protocol. Author Ifeoma.V. Ugwueke wrote the first draft of the manuscript. Author LEO-O managed the analyses of the study. Authors LEO-O and IV.U managed the literature searches. Both authors read and approved the final manuscript.