



The Occupational Health Hazards Associated With Saw Mill Workers in Port Harcourt Metropolis in Rivers State, Nigeria

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ABSTRACT

This study investigates the occupational health hazards associated with saw mill workers in Port Harcourt Metropolis in Rivers State, Nigeria. A descriptive survey design was adopted as the research design for this study. The study population comprised of all the saw mill workers in five selected timber markets in Port Harcourt Metropolis. A multi-stage sampling technique was adopted to select 414 respondents for the study. The instrument for data collection was structured questionnaire with a reliability coefficient of 0.66. Data collected was analyzed using Statistical Package for Social Science (SPSS) version 20.0. Statistical tools such as frequency and percentage and Chi-square were used to analyze relevant variables. The result showed that occupational hazards associated with saw mill workers include noise from sawing machines 377(91.1%), exposure to wood dust from machine 368(88.9%), flying and falling objects like sharp woods 313(75.6%), vibration from sawing machine 269(66.7%), fumes or gases from operating machine 259(62.6%) and smoke from burning dust and wood pieces 124(30.0%). The tested hypotheses showed that exposure to occupational hazard have statistically significant relationship with use of personal protective wears and unsafe behaviour among saw mill workers. It was concluded that; sawmilling is associated majorly with hazards such as saw dust and noise. It was recommended that he managers in sawmill factories should ensure the use of personal protective wears among workers.

Keywords: Saw mill, Hazards, Port Harcourt Metropolis

INTRODUCTION

Saw milling is a profitable means of livelihood not only in Nigeria but globally. Nigeria being a developing country was one time the largest exporter of timber in West Africa with sawmills factories that employ quit a large number of workers who contribute immensely to the industry or factory. According to Mumuni (2015), timber products are on high demand in both local and export markets because of the availability of timber wood in Nigeria and workers in sawmill factories that does the processing of woods are frequently exposed to various allergenic, immunotoxic, pernicious, noxious, carcinogenic and toxic substances that arises from wood dust, bacteria and fungi growing on timber. This exposure causes lungs and nasal cancer, bronchitis, rhinitis, decline lung function, contact dermatitis, bronchial hyper responsiveness, asthma and allergic alveocolitis. To support this, Richard, Charles & Ciira (2017) study showed that saw mill workers had exposure to occupational health hazard such as wood dust (81%), and noise (78%). In the same vein, saw dust, mould, formaldehyde and noise has been reported by as the by- product of wood processing (Akinbode & Olujimi, 2014) and their health effects on the human body has been a major concern. The International

Labor Organization (2016) estimated that 2.02 million people die each year from work related incidents or injury and over 3.7 million people suffer from work related diseases while estimated 337 million fetal and non-fetal work related accident per year are all associated to occupational hazards. In response to this, the ILO constitution sets forth the principle that, workers should be protected from sickness, diseases and injury arising from their occupation.

The sawmill workers operate in an environment that is considered to be one of the most hazardous occupational setting. In addition to the usual work place related exposure, saw mill workers encounter diverse hazards due to their work related activities (Odibo, Nwaogazie, Achalu & Ughebo, 2018). The saw mill workers are constantly in contact with different types of wood logs that expose them to micro-organisms that cause infections and thus require proper protective measure such as the use of personal protective equipment (PPE) and safe working act to reduce their risk of acquisition of diseases or injury. However, despite the importance of personal protective devices in mitigating occupational health hazards, a study carried out by Osagbemi, La-kadri and Aderigbe (2010) showed that, less than 20% of sawmill workers used protective devices during work activities, which increases the risk of acquisition of health hazards. Olaoye (2013) reported that, occupational hazards as a result of inhalation of wood dust, noise and heat are some of the most common health risk faced by saw mill workers in Nigeria. However, to the best of the researchers' knowledge, study on the occupational health hazards of saw mill workers in Rivers State is scarce. Hence, this study will investigate the occupational health hazards associated with saw mill workers in Port Harcourt Metropolis in Rivers State, Nigeria.

Research Design

The research design adopted for this study is a descriptive cross-sectional survey design. According to Elendu (2010), the descriptive cross-sectional design is one that generates data from a selected population, studying and describing events as they occur in their natural setting at a particular time. This design was considered appropriate for this study because it was successfully used by several scholars to conduct studies on the subject matter.

Study Population

In this study, the target population comprised of all the saw mill workers in five selected timber markets in Port Harcourt Metropolis of Rivers State which include; Ekwelle sawmills, Okwator sawmills, rumuosi sawmill, Alu sawmill, marine base sawmill and mile three sawmills.

Sample Size Estimation

The minimum sample size required was estimated using Fisher's formula:

$$n = z^2 pq/d^2$$

Where, n = the desired sample size

z = the standard normal deviate set at 1.96 [95% confidence level (CI)]

P = the proportion in the target population estimated to (28.1%) Osagbemi et al (2010).

$$q = 1-p (1-0.281 = 0.719)$$

d = desired level of accuracy, set at 0.05 287.6 3.8416

$$n = 1.96^2 \times 0.281 \times 0.719/0.05^2$$

$n = 310$. This was increased to 414 to improve the power of the study.

A multi-stage sampling technique was adopted for the study. The technique involved three stages. At the first stage, the simple random sampling technique was used to select the five different locations in Port Harcourt Metropolis; at the second stage one saw mill each was taken from the selected locations through a simple random sampling technique; and at the third stage, the purposive sampling was used to select the saw mill workers.

Instrument for Data Collection

The instrument for data collection was a structured questionnaire, titled occupational health hazards associated with sawmill workers (OHHASMW) questionnaire. The questionnaire consisted of three sections A, B, and C which addressed the variables of the study.

Methods of Data Collection and Analysis

The researcher employed the help of two trained research assistants in the administration of the questionnaire to the respondents. A face-to-face communication was adopted to explain the content of the questionnaire. Introduction of self and purpose of the study was made, questions asked were answered and willing respondents were administered the instrument for data collection. The questionnaires which were filled were retrieved immediately. The data collected were analyzed using the statistical package for social sciences (SPSS) version 20.0. Data analysis was done using some statistical tools such simple percentages, frequency, chi-square and binary logistic regression for relevant variables at 95% confidence interval and 0.05 alpha levels.

RESULTS

The results of the study are presented in Tables based on the research questions.

Research question 1: *What are the occupational health hazards associated with saw mill workers in Port Harcourt metropolis?*

Table 1: Occupational health hazards associated with saw mill workers

Hazards	Frequency (F)	Percentage (%)
Physical Hazards		
Exposure to vibration from sawing machine	269	66.7
Exposure to noise from sawing machines	377	91.1
Exposure to flying and falling objects like sharp woods	313	75.6
Exposure to wood dust from machine	368	88.9
Exposure to heat from machine	122	29.5
Chemical hazards		
Exposure to pesticides	81	19.6
Exposure to insecticides	95	22.9
Exposure to fumes or gases from operating machine	259	62.6
Exposure to fungicides	59	14.3
Exposure to smoke from burning dust and wood pieces	59	14.2
Biological hazards		
Exposure to fungi/mould	138	33.3
Exposure to parasitic organism	167	40.3
Exposure to general waste	162	39.1
Exposure to airborne pathogens	268	64.7
Exposure to insect	136	32.9
Ergonomic hazards		
Heavy lifting and pulling movements of logs	252	60.9
Poor body position or awkward position	321	77.5
Repetitive work or movement	366	88.4
Uncomfortable work station	117	28.3
Being caught in or struck by operate machine	187	45.2
Psychosocial hazards		
Loss of sleep due to high emotional demand	96	23.2
Persistent fatigue or tiredness due to work related activity	284	68.6
Long working hours	211	51.0
Work place violence	95	22.9
Occupational stress	331	80.0
Others	106	25.6

+Others include: fire and sparkling (7.5%), cut and injury (2.4%), and fall (15.7%).

Table 1 show the occupational hazards associated with saw mill workers in Port Harcourt Metropolis. Physical hazards included: exposure to noise from sawing machines 377(91.1%), exposure to wood dust from machine 368(88.9%), exposure to flying and falling objects like sharp woods 313(75.6%), and

exposure to vibration from sawing machine 269(66.7%). Chemical hazards found were fumes or gases from operating machine 259(62.6%), smoke from burning dust and wood pieces 124(30.0%). Biological hazards found include: exposure to airborne pathogens 268(64.7%). Ergonomic hazards include: repetitive work or movement 366(88.4%), poor body position or awkward position 321(77.5%), heavy lifting and pulling movements of logs 252(60.9%), and being caught in or struck by operate machine 187(45.2%). Psychosocial hazards found were: Occupational stress 331(80.0%), persistent fatigue or tiredness due to work related activity 284(68.6%) and long working hours 211(51.0%).

Research question 2: *What is the relationship between use of personal protective wears and exposure to occupational hazards among saw mill workers in Port Harcourt metropolis?*

Table 2: Relationship between use of personal protective wears and exposure to occupational hazard among saw mill workers

PPE	Exposure to hazards		Total	r-value	Decision
	High	Low			
Helmet	27(56.2)	21(43.8)	48(100)	.016	Very low
Face shield	15(65.2)	8(34.8)	23(100)		
Nasal mask	135(76.3)	42(23.7)	177(100)		
Safety boot	67(74.4)	23(25.6)	90(100)		
Safety eye goggle	127(76.0)	40(24.0)	167(100)		
Hand glove	184(77.3)	54(22.7)	238(100)		
Ear plug/ear muff	28(59.6)	19(40.4)	47(100)		
Coverall	41(70.7)	17(29.3)	58(100)		

*Multiple response

Table 2 reveals the relationship between use of PPE and exposure to occupational hazard among saw mill workers. The table shows that PPE has a very low positive relationship with occupational hazards among saw mill workers ($r = 0.016$).

Research question 3: *What is the relationship between unsafe act and exposure to occupational hazards among saw mill workers in Port Harcourt metropolis?*

Table 3: Relationship between unsafe act and exposure to occupational hazard among saw mill workers

Unsafe act*	Exposure to hazards		Total	r-value	Decision
	High	Low			
Lack of maintenance of equipment	59(74.7)	20(25.3)	79(100)	-.011	Very low
No good housekeeping	54(85.7)	9(14.3)	63(100)		
Working under suspended load	106(72.1)	41(27.9)	147(27.9)		
Non-use of PPE during work activities	127(62.9)	75(37.1)	202(100)		
Failure to replace faulty equipment	67(81.7)	15(18.3)	82(100)		
Working under influence of alcohol or drugs	35(61.4)	22(38.6)	57(100)		
Indulge in horse play during work	14(87.5)	2(12.5)	16(100)		

*Multiple responses

Table 3 reveals the relationship between unsafe act and exposure to occupational hazard among saw mill workers. The table shows that unsafe act has a very low negative relationship with exposure to occupational hazards among saw mill workers ($r = -0.011$).

Hypothesis 1: There is no significant relationship between use of personal protective wears and exposure to occupational hazard among saw mill workers in Port Harcourt metropolis

Table 4: Chi-squared test showing significant relationship between use of personal protective wears and exposure to occupational hazard among saw mill workers

Availability of PPE*	Exposure to hazards		Total	df	X ² -value	P-values	Decision
	High	Low					
Yes	136(82.9)	28(17.1)	164(100)	1	18.003	.000	Rejected
No	127(62.9)	75(37.1)	202(100)				
Total	263(71.9)	103(28.1)	366(100)				

*Non responses excluded

The null hypothesis states that there is no significant relationship between use of personal protective wears and exposure to occupational hazard among saw mill workers in Port Harcourt metropolis. The finding of the study revealed a significant relationship between the two variables ($p < 0.05$, $df = 1$, $X^2 = 18.003$). The null hypothesis is therefore rejected (Table 4).

Hypothesis 2: There is no significant relationship between unsafe behaviour and exposure to occupational health hazard among saw mill workers in Port Harcourt metropolis

Table 5: Chi-squared test showing significant relationship between unsafe behaviour and exposure to occupational health hazard among saw mill workers

Unsafe act*	Exposure to hazards		Total	Df	X ² -value	p-value	Dec
	High	Low					
Poor maintenance of equipment	59(74.7)	20(25.3)	79	2	9.075	.011	Rejected
No good housekeeping	54(85.7)	9(14.3)	63				
Working under suspended load	106(72.1)	41(27.9)	147				
Non-use of PPE during work activities	127(62.9)	75(37.1)	202				
Failure to replace faulty equipment	67(81.7)	15(18.3)	82				
Working under influence of alcohol or drugs	35(61.4)	22(38.6)	57				
Indulge in horse play during work	14(87.5)	2(12.5)	16				

Table 5 shows the significant relationship between unsafe behaviour and exposure to occupational health hazard among saw mill workers. The null hypothesis states there is no significant relationship between unsafe behaviour and exposure to occupational health hazard among saw mill workers in Port Harcourt metropolis. The findings of the study revealed that there is a significant relationship between the two variables ($p < 0.05$, $df = 1$, $X^2 = 9.075$). The null hypothesis is therefore rejected.

DISCUSSION OF FINDINGS

The findings of this study in table 1 showed that the occupational hazards associated with saw mill workers include noise from sawing machines 377(91.1%) and exposure to wood dust from machine 368(88.9%). The findings of this study is in keeping with that of Osaghem, La- kadri and Aderibigbe (2010) which showed that the most perceived occupational hazards in the sawmill were dust and noise. This finding is expected because, hazards are peculiar to the nature of job done and occupational hazard varies across different vocations hence, this finding. Sawmill is known for cutting timber into planks or converting log from the forest into lumber by using a variety of machines, this process gives rise to saw dust and noise arising from the machine. This might be implicated for the similarity found in this study and the previous one where wood dust and noise were found as the prominent hazards respondents were exposed to. The findings of this study also showed that respondents were exposed to other hazards such as flying and falling objects like sharp woods 313(75.6%), vibration from sawing machine 269(66.7%), fumes or gases from operating machine 259(62.6%) and smoke from burning dust and wood pieces 124(30.0%). This finding corroborates Odibo et al (2016) who identified hazards such as vibrations from

machines, log falling from height, smokes, fumes, and burning dust from wood pieces among saw mill workers.

The findings of this study also identified chemical hazards such as exposure to pesticides and insecticides. This finding is similar to that of Townsend (2017) which showed that chemicals used in seasoning and preserving of freshly processed wood to prevent it from pest, insect, fungus and worms can be hazardous to the health of the workers. The findings of this study also showed that sawmill workers were exposed to airborne pathogens 268(64.7%), repetitive work or movement 366(88.4%), poor body position or awkward position 321(77.5%), heavy lifting and pulling movements of logs 252(60.9%), being caught in or struck by operate machine 187(45.2%) and occupational stress 331(80.0%), This finding is in support of Aiyelaja, Adedeji and Emerhi (2015) which showed that that sawmill workers are exposed to hazards during sawmill process like lifting of woods and moving of logs which can expose the worker to some ergonomic factors such as accident and injuries that can result to fall of the wood log on the worker. Work activities which are frequent and repetitive or activities with awkward posture can be stressful and sometimes painful to the body.

The findings of this study showed a significant relationship between use of personal protective wears and exposure to occupational health hazards among saw mill workers ($p < 0.05$, $df = 1$, $X^2 = 18.003$). The findings of this study is in line with that of Richard, Charles & Ciira (2017) which showed that saw mill workers were not adequately provided with personal protective wears and this influenced their exposure to occupational hazard. The findings of this study showed a significant relationship between unsafe behaviour and exposure to occupational health hazards among saw mill workers ($p < 0.05$). The finding of this study differs from that of Agbana, Joshua, Daikwo & Metiboba (2016) which showed that 13.8% had been exposed previously to occupational health hazard such as dust among 3.1% employed a safety practices such as attending formal technical training on the job and safety, and 50% identified a safety practice such as limiting of working hours. The difference in the study location and sample size might be implicated for the variation found in the present study and the present one.

5.2 CONCLUSION

Based on the data and the findings, it was concluded that; sawmilling is associated majorly with hazards such as saw dust and noise. Exposure to occupational hazards has statistically significant relationship with use of personal protective wears and unsafe behaviour among saw mill workers.

5.3 RECOMMENDATIONS

Based on the findings of this study the following recommendations were made:

1. The managers in sawmill factories should ensure the use of personal protective wears among workers.
2. The services of safety personnel should be employed in each sawmill factory to improve safety practices among sawmill workers.
3. Trade union and other relevant agencies should organize periodic workshops and training programmes on health and safety to cover proper information on workplace hazards among sawmill workers.

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