



# Knowledge, Risk Perception of Occupational Hazards and Safety Practices amongst Carpenters in Southern Nigeria: A Cross-sectional Study

Simon Alain Inah<sup>1</sup>, Jimmy Ebi Eko<sup>2\*</sup>, Eze James Nwachukwu<sup>2</sup>,  
Fidelis Takim Otu<sup>1</sup>, Nkese Obot<sup>2</sup> and Bassey Archibong<sup>1</sup>

<sup>1</sup>Department of Public Health, Faculty of Allied Medical Sciences, University of Calabar, Calabar, Nigeria.

<sup>2</sup>Department of Sociology, Faculty of Social Sciences, University of Calabar, Calabar, Nigeria.

## Authors' contributions

*This work was carried out in collaboration among all authors. Authors JEE and SAI designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript.*

*Authors BA and EJM managed the analyses of the study. Authors FTO and NO managed the literature searches. All authors read and approved the final manuscript.*

## Article Information

DOI: 10.9734/AJARR/2019/v6i230146

### Editor(s):

(1) Dr. Choon Wah Yuen, Senior Lecturer, Department of Civil Engineering, Faculty of Engineering, University of Malaya, Kuala Lumpur, Malaysia.

(2) Dr. Folk Jee Yoong, Lecturer, SEGi University, Malaysia.

(3) Dr. Azizur Rahman, Department of Chemical and Physical Sciences, University of Toronto, Davis Building, Canada.

### Reviewers:

(1) Romel Gilberto, Autonomous University of Yucatan, Mexico.

(2) Helder Cesar Tinoco, Instituto Federal de Educação, Ciência e Tecnologia do Rio de Janeiro, Brazil.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/50998>

Original Research Article

Received 01 July 2019

Accepted 03 September 2019

Published 25 September 2019

## ABSTRACT

**Background:** Occupational Hazards has been identified as one of the primary cause of disability and mortality among the working population globally. Estimates also show that 8% of unintentional injuries and more than 10 million disability-adjusted life years or healthy years of life lost either to disability or premature death is primarily caused by occupational injuries.

**Objective:** The study was aimed at determining the knowledge level, risk perception of occupational hazards and safety practices amongst carpenters in Southern Nigeria.

**Methods:** The study adopted a descriptive cross-sectional study design. Snowball sampling technique was used to select 200 carpenters to participate in the study. A pre-tested semi-structured questionnaire was used to generate data from the selected respondents at their

\*Corresponding author: Email: jimmyeko25@gmail.com;

workplace (workshops). The questionnaire was subjected to face validation and test of reliability using the test-retest method before it was used. Data generated was synthesized and analyzed using Statistical Packages for Social Sciences Software (SPSS version, 2010). Results were calculated in percentage and presented in tables and charts.

**Results:** The results showed that 195 (97.5%) were males, 73 (36.5%) were aged between 26-35 years, 88 (44.0%) had secondary education, 83 (41.5%) were single and 133 (66.5%) learnt their trade through apprenticeship. Most respondents 142 (71.0%) recorded good knowledge of occupational hazards and exhibited low risk perception towards occupational hazards. Of the 63 (44.4%) respondents who have heard of Personal Protective Equipment (PPE) and 61 (43.0%) confirmed to have used PPE at workplace. Types of PPE used were mostly disposable nose mask 61 (43.0%), face mask/eye Google 58 (40.8%) and ear plug 47 (33.1%). Barriers to PPE use highlighted by the respondents were mostly lack of knowledge on how to use PPE 43 (53.1%), inconveniences 38 (46.9%), non-availability of PPE 42 (51.9%) and lack of money to buy PPE 33 (40.7%).

**Conclusion:** Institutionalizing appropriate regulatory authorities in Nigeria is imperative to ensure adequate availability and use of PPE for workers at workplace to minimize their exposure to workplace hazards and punishment should be accorded to defaulters. Public health experts and health educators should take up the responsibility to educate carpenters about the adverse health effects of occupational hazards, control measures and the operationalization of PPE available for them.

*Keywords: Occupational hazards; safety practices; risk perception; carpenters.*

## 1. INTRODUCTION

Occupational hazards has been identified as one of the primary cause of disability and mortality among the working population globally [1]. It is currently the 10<sup>th</sup> leading cause of morbidity and mortality worldwide [1]. Occupational health hazards are common in many economic sectors and significantly affects a larger numbers of industrial workers. According to World Health Organization, a decline in a country's Gross National Product (GNP) by 10-20% is largely attributed to poor health status and reduced working capacity of workers [2]. Estimates also show that 8% of unintentional injuries and more than 10 million disability-adjusted life years or healthy years of life lost either to disability or premature deaths is primarily caused by occupational injuries.

In contemporary society, there is hardly any occupation or human activity that is not associated with occupational hazards which could adversely affect the health of workers. This is why companies and industries have been employed by regulatory authorities to prioritize safety measures to protect the health of workers at workplace. Exposure to workplace hazards increases workers' susceptibility to infection, disease, injury or accidents.

Carpentry is a profession specialized in using wood for different purposes especially furniture making and building construction. It is an age-

long practice and primarily a mean of livelihood for carpenters and their families. However, while carpenters benefit from the profession, there is evidence that most carpenters or woodworkers are exposed to a number of workplace hazards which constantly deteriorate their health on daily basis [3-6]. Hazards from carpentry activity are multifactorial and could originate from the wood, work environment, worker, and management [7]. Carpenters face their own unique set of occupational hazards which may include; injuries from the use of various machinery and tools, exposure to fungi toxic molds and bacteria; cancer from exposure to solvents as well as formaldehyde in pressed wood and wood dust; performing repetitive tasks and lifting which could lead to musculoskeletal pains; exposure to extreme temperatures; working outdoors with heat stress and frostbite risks; risk of eye injury from flying particles; risk of falling from working at heights, stress and increases risk of injury from shift, work and extended work days [8].

Studies have shared a consensus about the hazards associated with carpentry activity which includes; wood dust, chemicals, fungi and bacteria in raw barks and wood, musculoskeletal pain, stress, cut/wound/injuries, falls and accident (peculiar to building construction), eye and skin irritation as well as noise. All of these hazards have been linked to diverse occupational illnesses including cancers, cataracts, deafness, nasal tumours, lung disease and allergic disorders [6,9].

Carpenters needs to be fully aware of the hazards occasioned their activities so as to adopt protective measures against adverse health effects which could be instigated by the workplace hazards. Occupational health and safety is one of the most important aspects of human concern. It aims at promoting and maintaining the highest degree of physical, mental and social wellbeing of workers in all occupations [10]. The health status of the workforce in every country has an immediate and direct impact on national and world economics [11]. Total economic losses due to occupational illnesses and injuries are enormous. A country's development is largely dependent on the health status of the workforce. Increase productivity and wealth creation is dependent on a healthy, well trained and motivated workforce [11]. This means that poor health status of the workforce could significantly lead to poor economies.

The drive towards safety measures at workplace is been prioritized to mainly protect and keep workers safe from any danger, harm or accident. The use of Personal Protective Equipment (PPE) has been recommended to minimize workers' exposure to workplace hazards. However, for effective use of PPE, management of workplace environment should ensure PPE are readily available in different shapes and sizes and adequate for all workers [7]. Training of workers on the use of PPE and its safe maintenance after use is critical for consistent practices. A study conducted in Southern Nigeria reported that wood factory workers confirmed availability and high use of PPEs but 48.1% workers stated that they share PPE due to limited [12]. To encourage consistent use of PPE and raise the consciousness of hazards occasioned by wood making activities among carpenters, this study seeks to assess the knowledge and risk perception of carpenters about occupational hazards and their safety practices to mitigate their exposure to these hazards.

## 2. METHODOLOGY

The study area was Calabar South Local Government Area. It is situated in the southern part of Cross River State and Nigeria and its headquarters are in the town of Anantigha. Calabar South has 12 political wards and cover an area of 264 km<sup>2</sup> with an estimated population of 191,630 persons [13]. It is bounded by Calabar River to the West, Akpabuyo Local Government Area to the East, Odukpani Local Government Area to the North and Atlantic

Ocean to the South. The Efiks, Quas and the Efuts are the three dominant ethnic groups in the area [6,14,15]. English and Efik are the languages widely spoken. Christianity is widely practiced in the area with few Muslims and Traditional Religious Groups. Most occupants of the area are civil servants, business tycoons, artisans (including carpenters) and petty traders. The area also has a number of micro, small and medium furniture making outlets mainly managed and owned by individuals. The study design adopted was a descriptive cross-sectional study design. This study design was preferred because it practically entails collection of data from a representative sample of a universal population at a particular point in time. The Bluman's formula [16] was used to determine the sample size which is expressed as:  $n = Z^2pq/d^2$ .

Where n = desired sample size

z = Confidence level at 95% (standard value of 1.96)

p = proportion of carpenters exposed to occupational hazards (0.5)

q = 1- p = proportion of carpenters exposed to occupational hazards (0.5)

d = margin of error (0.07)

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.07^2} = 196$$

The calculated sample size was increased by 2 percent to account for non-response rate and attrition bias to give an actual sample size of 200 (i.e. 196/0.98 = 200).

Snowball sampling technique was used to locate 200 carpenters at their workshops who were selected to participate in the study. A pre-tested semi-structured questionnaire was used to generate data from the respondents. The questionnaire was subjected to face validation and test of reliability using the test-retest method before it was used. A reliability index of 0.72 was obtained after the analysis indicating that the value is within the acceptable range. Data generated was synthesized and analyzed using Statistical Packages for Social Sciences Software (SPSS version, 2010). Results were calculated in percentage and presented in tables and charts. Informed consent was obtained from the respondents before they participated in the study. Anonymity and confidentiality of information respondents provided were maintained throughout the period of the study.

### 3. RESULTS

Of the two hundred respondents 195 (97.5%) were males, 73 (36.5) were aged between 26-35 years, 88 (44.0%) had secondary education, 83 (41.5%) were single and 133 (66.5%) learnt their trade through apprenticeship (Table 1).

**Table 1. Socio-demographic data of the respondents (n=200)**

Variables	n (%)
<b>Sex</b>	
Male	195 (97.5)
Female	5 (2.5)
<b>Age</b>	
15-25	67 (33.5)
26-35	73 (36.5)
36-45	38 (19.0)
46+	22 (11.0)
<b>Marital status</b>	
Single	83 (41.5)
Married	88 (44.0)
Divorced	25 (12.5)
Widowed	4 (2.0)
<b>Education</b>	
No formal education	34 (17.0)
Primary	51 (25.5)
Secondary	88 (44.0)
Tertiary	27 (13.5)
<b>Method of carpentry training</b>	
Apprenticeship	133 (66.5)
Technical training	37 (18.5)
Others	30 (15.0)

#### 3.1 Knowledge of the respondents on occupational health hazards

Results in Table 2 showed that 142 (71.0%) respondents indicated that they have heard about occupational hazards; 83 (58.47%) defined it as any agent that can cause harm in the workplace while 38 (26.76%) defined occupational hazards as wellbeing of carpenter. A reasonable proportion of the respondents 114 (80.28%) admitted that occupational hazards can affect their health as carpenters and major sources of information on occupational hazards were co-workers 41 (28.9%) and radio/television 38 (26.8%).

Most respondents 121 (85.2%) indicated that they knew the various hazards carpenters are exposed to in their work place of which wood hazards 82 (67.8%), noise 63 (52.1%), accidents/injuries/cuts 62 (51.2%) and other

physical hazards (dust inhalation, eye irritation, musculoskeletal pains) were the major hazards highlighted (Fig. 1).

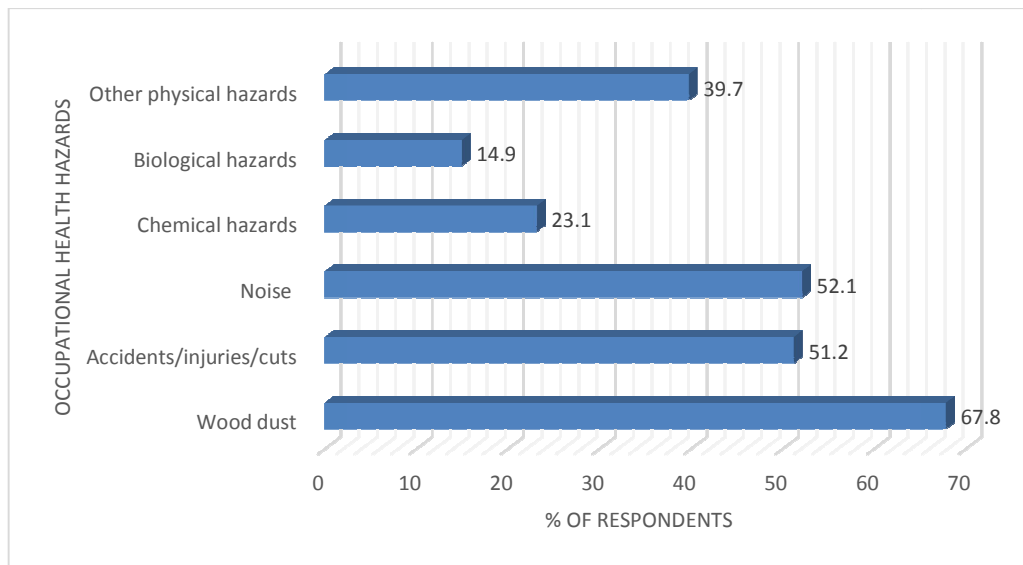
**Table 2. Knowledge of occupational health hazards among respondents**

Variables	n(%)
<b>Ever heard of occupational hazards</b>	
Have heard	142 (71.0)
Have not heard	58 (29.0)
<b>Total</b>	<b>200 (100)</b>
<b>Definition of occupational hazards</b>	
Agent that cause harm	83 (58.4)
Wellbeing of carpenters	38 (26.8)
Don't know	21 (14.8)
<b>Total</b>	<b>142 (100)</b>
<b>Occupational hazards affect my health as a carpenter</b>	
Agree	114 (80.3)
Disagree	23 (16.2)
Do not know	5 (3.5)
<b>Total</b>	<b>142 (100)</b>
<b>Source of Information about occupational hazards*</b>	
Newspaper/magazine	13 (9.1)
Radio/Television	38 (26.8)
Health worker	23 (16.2)
Co-worker	41 (28.9)
Family/friends	29 (20.4)
Others	22 (15.5)
<b>Knowledge of the various occupational health hazards carpenter are exposed to</b>	
Have knowledge	121 (85.2)
Do not have knowledge	21 (14.8)

\*Multiple responses

#### 3.2 Perceptions of Respondents about Occupational Hazards

Results in Table 3 showed that respondents opined that themselves 62 (43.7%) and the Government 31 (21.8%) were largely responsible for occupational health hazards at work place. With regards to respondents view(s) about occupational health hazards, 48 (33.8%) opined that there is no hazard in their workplace; 51 (35.9%) indicated that God protects them from hazards; 39 (27.5%) felt hazards can't affect them; 33 (23.2%) opined that they are not at risk of any hazard at workplace and 31 (21.8%) felt hazards can lead to illness and death. Over half of the respondents 86 (57.7) indicated that occupational health hazards can be prevented.



**Fig. 1. Knowledge of occupational hazards carpenters are exposed to**  
**Perceptions of respondents about occupational hazards**

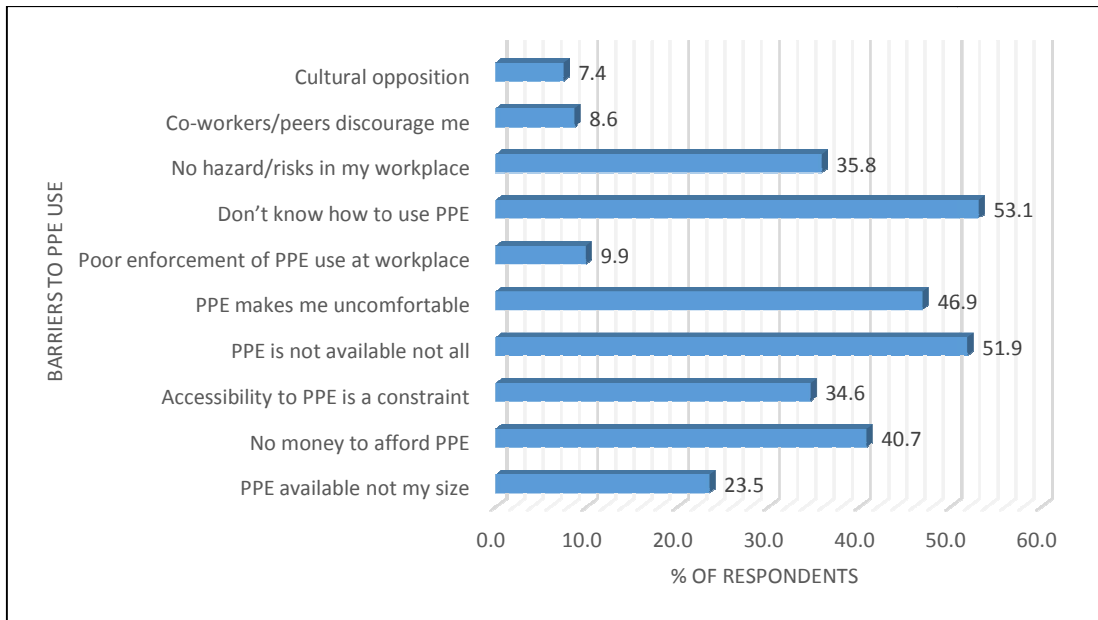
**Table 3. Perceptions of respondents about occupational health hazards**

Variables	n (%)
<b>Persons/Organization responsible for occupational health hazards at work place (n=142)</b>	
Self	91 (64.1)
Government	31 (21.8)
Co-workers	11 (7.7)
Others	9 (6.3)
<b>View(s) about occupational health hazards*</b>	
No hazard at my workplace	48 (33.8)
Hazards can't affect me	39 (27.5)
God protects me from hazard	51 (35.9)
Hazards are for younger carpenters	18 (12.7)
Hazards can lead to illness and death	31 (21.8)
I am at risk of hazards	33 (23.2)
<b>Can occupational health hazards be prevented (n=142)</b>	
Can be prevented	82 (57.7)
Cannot be prevented	60 (42.3)

**Table 4. Safety practices against occupational hazards by respondents**

Variables	n (%)
<b>Ever heard of PPE (n=142)</b>	
Have heard	63 (44.4)
Have not heard	79 (55.6)
<b>Ever used PPE (n=142)</b>	
Have use	61 (43.0)
Have not use	81 (57.0)
<b>Type of PPE used*</b>	
Face mask/ Eye google	58 (40.8)
Ear plug	47 (33.1)
Disposable nose mask	61 (43.0)
Hand gloves/Safety boots	39 (27.5)
Apron	28 (19.7)

\*Multiple responses



**Fig. 2. Barriers to PPE use among respondents**

### 3.3 Safety Practices against Occupational Hazards by Respondents

The results in Table 4 of the 142 respondents who have heard of occupational health hazards, 63 (44.4%) have heard of PPE and 61 (43.0%) confirmed to have used PPE at workplace. Types of PPE used were mostly Disposable nose mask 61 (43.0%), face mask/eye google 58 (40.8%) and ear plug 47 (33.1%). Barriers to PPE use highlighted by the respondents were mostly lack of knowledge on how to use PPE 43 (53.1%), inconveniences 38 (46.9%), non-availability of PPE 42 (51.9%) and lack of money to buy PPE 33 (40.7%) (Fig. 2).

### 4. DISCUSSION OF FINDINGS

Most respondents were males (Table 1). This result is not surprising because all over the world especially in Nigeria, carpentry activity is predominated by men. This result is similarly reported by other studies where men dominated the wood factory or carpentry activities [6,7]. These men engage in carpentry primarily to generate income and largely as a mean of livelihood for their families. Skills in carpentry is mainly acquired via on-the-job-training where experienced carpenters and/or owners of carpentry outlets train and mentor the apprentices. This account for why two-third of the

respondents learnt their trade through apprenticeship (Table 1). This results was similarly reported by other Nigerian studies where most work factory workers learnt their trade via apprenticeship [17,18]. The current study also documented that respondents were mainly aged between 15-35 years indicating a relatively young workforce for increase economic productivity, growth and development.

More than half of the respondents 83 (58.5%) knew the correct definition of occupational hazard as “any agent that can cause harm in the workplace”. Personal experiences at workplace and access to correct information son occupational hazards via technical training or formal education could largely account for their ability to correctly define occupational hazards. However, it is worrisome the 41.5% of the respondents could not correctly define occupational hazard. This signifies that effort should be geared towards educating carpenters on the intricacies of occupational hazards and safety measures. Sources of information on occupational hazards as documented in the current study were mainly from co-workers and radio/television. It is possible that during apprenticeship, the experienced carpenters and/or owners of carpentry outlets tutor and mentor the apprentices not just on the technical aspect of carpentry but also on the intricacies of

workplace hazards and its control measures. This may account for why co-workers appeared to be their main source of information on occupational hazards. While a reasonable proportion of the respondents 114 (80.28%) admitted that occupational hazards can affect their health, more than two-third of the respondents knew the various hazards carpenters are exposed to in their work place of which wood dust, noise, accidents/injuries/cuts and other physical hazards were the major hazards highlighted (Fig.1). This finding is in agreement with a study conducted in Kwara State, Nigeria where sawmill workers identified similar workplace hazards [18]. Personal experience of respondents, related event at workplace, access to appropriate and reliable information on occupational hazard as regards carpentry activity or woodwork may significantly account for high knowledge of respondents about occupational hazard documented in the current study.

With regards to risk perception about occupational hazards, a large proportion of the respondents opined that themselves (carpenters) were largely responsible for occupational health hazards at work place. This view is not surprising because they are directly involved in carpentry activities from which hazards are created at workplace. Contrarily, it is possible that respondents who share a different view that the government were responsible for workplace hazard lack the understanding and dynamics of workplace hazards. With regards to respondents view(s) about occupational health hazards, 86 (57.7%) respondents supported the statement that occupational hazards can be prevented and hazards can lead to illness and deaths. Respondents demonstrated low risk perception to workplace hazards with the view that there is no hazard in their workplace, God protects them from hazards, hazards can't affect them and they are not at risk of any hazard at workplace. The variation in respondent's perception about occupational hazards may be influenced by their belief system, knowledge level of occupational hazards, duration of exposure to the hazards and number of years of practice. Nonetheless, it possible that respondents who showed low risk perception towards workplace hazards are either apprentices who are not directly involved in carrying out the rigorous aspect of carpentry or those who are yet to experience the adverse health effects that results from repeated exposure to workplace hazards.

Raising the consciousness about the danger of workplace hazards to health and physical wellbeing may significantly address any widely held erroneous beliefs or misconception about occupational hazards amongst carpenters.

Regarding safety practices, amongst the respondents who have heard of PPE and 61 (43.0%) confirmed to have used PPE at workplace. The types of PPE used were mostly disposable nose mask, face mask/eye google and ear plug. This result is congruent with that of Osonwa et al. [12] where similar PPEs were used by work factory workers. PPE use by carpenters are peculiar to the type of hazards they experience at workplace. For instance, the disposable nose mask is used to protect the nose from inhaling wood dust; face mask/eye google are used to protect the face from flying sharp objects and eye injuries; ear plug is used to protect the ear from excessive noise pollution from machines used at workplace. Each of the aforementioned PPE play a significant to maintain occupational health and safety. Barriers to PPE use highlighted by the respondents were mostly lack of knowledge on how to use PPE, inconveniences, non-availability of PPE and lack of money to buy PPE (Fig. 2). This result is in accordance with a Nigerian study where similar barriers to PPE use were reported Osonwa et al. [12]. Effort should be geared towards addressing the identified barriers to PPE use such as provision of PPE at workplace in different sizes and enforcing regular use of PPEs among workers via routine monitoring and supervision as well as training on how and when to use the PPE. An intervention study confirmed that workers expressed enthusiasm to use PPE if they were trained on its usage [7].

## 5. CONCLUSION AND RECOMMENDATIONS

A country rely on a healthy workforce for increase economic productivity, innovation and development. To achieve this, occupational health and safety should be prioritized in all workplace environment including carpentry outlets or wood making factories. Findings in the current study showed that most respondents recorded good knowledge of occupational hazards and exhibited low risk perception towards occupational hazards. Also, safety practices was generally poor especially in workplace where PPE were not available at all or

not adequate. Hence, it is recommended that appropriate regulatory authorities in Nigeria should be institutionalized to ensure adequate availability of PPE for workers at workplace to minimize their exposure to workplace hazards and punishment should be accorded to defaulters. Also, public health experts and health educators should to up the responsibility to educate carpenters about the dangers occupational hazards, control measures and the functions of various PPE available for them.

### CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

### ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

### REFERENCES

1. World Health Organization, (WHO). Occupational Health country survey; 2016. Available: [https://www.who.int/occupational\\_health/en/](https://www.who.int/occupational_health/en/)
2. Kwesi A, Kwasi D. Occupational health and safety, key issues and concerns in Ghana. *Int J Bus Soc Sci.* 2003;2:119-24.
3. Adei D, Kunfaa EJ. Occupational health and safety policy in the operations of the wood processing industry in Kumasi, Ghana. *J Sci Tech.* 2007;27:159-69.
4. Pesch B, Pierl CB, Gebel M, Gross I, Becker D, Johnen G, et al. Occupational risks for adenocarcinoma of the nasal cavity and paranasal sinuses in the German wood industry. *Occup Environ Me.* 2008;65:191-6.
5. Ochire-Boadu K, Kusi E, Lawer EA. Occupational hazards and safety practices: A concern among small scale sawmilling industries in Tamale metropolis, Ghana. *Int. J Sci. Tech Res.* 2014;3:234-6.
6. Osuchukwu NC, Osuchukwu EC, Eko JE, Otareh OO. Occupational exposure to wood dust in Calabar Municipality, Cross River State, Nigeria. *International Journal of Science and Research.* 2015;4(5):1414-1420.
7. Ezeugwu L, Aguwa EN, Arinze-Onyia SU, Okeke TA. Health education: Health education: Effect on knowledge and practice of workplace personal hygiene and protective measures among woodworkers in Enugu, Nigeria. *Nigerian Journal of Clinical Practice.* 2017;7:867-872.
8. Canadian Centre for Occupational Health and Safety (CCOHS) Occupational health and safety answers fact sheets; 2014. Available: <http://www.CCOhs.ca/oshanswers/occup-workplace/carpenter>
9. Osagbemi GK, La-Kadri RT, Aderibigbe SA. Awareness of occupational, hazards, health problems and safety measures among saw mill workers in North Central Nigeria. *TAF Prev Med Bull.* 2010; 9:325-8
10. Takele T, Mengesha A. Occupational health and safety lecture notes, University of Gondar. Ethiopia; 2010.
11. World Health Organization (WHO). Principles of Fundamental Occupational Health and Safety; 2006.
12. Osonwa KO, Eko JE, Ozah HP. Utilization of Personal Protective Equipments (PPEs) among wood factory workers in Calabar Municipality, Southern Nigeria. *International Journal of Science and Research.* 2015;4(5):2639-2642.
13. National population commission. Population of Calabar South Local Government Area of Cross River State, Nigeria; 2006. Available: <http://www.citypopulation.de> (Retrieved on July 14, 2019)
14. Eko JE, Abeshi SE, Osonwa KO, Uwanede CC, Offiong DA. Perception of students' teachers' and parents' towards sexuality education in Calabar South Local Government Area of Cross River State, Nigeria. *Journal of Sociological Research.* 2013;4(2):225-240.
15. Osuchukwu NC, Osuchukwu EC, Eko JE, Samson-Akpan PE, Akpasa AO, Osonwa KO, Offiong DA. Perception of the determinants of maternal mortality in Calabar South Local Government Area of



- Cross River State, Nigeria. International Journal of Public Health, Pharmacy and Pharmacology. 2015;1(1):1-13.
16. Bluman AG. Elementary statistics. 5<sup>th</sup> Edition New York McGraw Hall; 2004.
17. Sabitu K, Iliyasu Z, Dauda MM. Awareness of occupational hazards and utilization of safety measures among welders in Kaduna metropolis, Northern Nigeria. Ann Afr Med. 2009;8:46-51.
18. Agbana BE, Joshua AO, Daikwo MA, Metiboba LO. Knowledge of occupational hazards among sawmill workers in Kwara state, Nigeria. Nigerian Postgraduate Medical Journal. 2016; 23(1):25-32.

---

© 2019 Inah et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*  
*The peer review history for this paper can be accessed here:*  
<http://www.sdiarticle4.com/review-history/50998>