

# Utilization of Personal Protective Equipments (PPEs) among Wood Factory Workers in Calabar Municipality, Southern Nigeria

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**Abstract:** A descriptive cross-sectional study was employed to determine the utilization of PPE among wood factory workers in Calabar municipality, Southern Nigeria. Multi-stage sampling technique was used to select 400 workers from two timber markets (Akim and Eight-Miles timber markets). A structured questionnaire was designed to generate quantitative data from the respondents. Data were analysed using SPSS version 20.0 and results were presented in tables and charts. The results of this study showed that ages of study participants ranges from 15-60 years with those between 45-49 years 111(27.8%) constituting majority of the study participants. Most respondents were males 363(90.7%), married 261(56.2%), Christians 397(99.2%) and had primary education 188(47.0%). A larger proportion of the respondents 316(79.0%) reported that PPE was available, while 273(86.4%) said they had use PPE at their workplace. PPE mostly used were hand gloves (33.4%) and safety boots (32.5%). Reasons given by respondents for non-adherence to PPE use were PPE not adequate, PPE not necessary and inconvenience. All respondents indicated that they need training on the use of PPE. Intensifying awareness on the health implications of inhaling wood dust would increase the uptake of PPE use among wood factory workers.

**Keywords:** Personal protection equipments, Wood dust, Factory workers, Timber markets, Nigeria

## 1. Background of the Study

Exposure of occupational hazard within the work environment has been reported to have a significant influence on health especially among factory or industrial workers. Most often, industrial workers are exposed to inhalable substances such as fumes, dust, smoke, smog, smoot, etc., which may consequently lead to occupational lung diseases. In some instance, factory workers are exposed to severe injuries at workplace leading to disability, morbidity and mortality. Their source of livelihood may equally be affected.

In wood factories or industries, wood dust is the main form of hazard to the health of workers especially among those directly involved in the processing of woods. Studies have shown that workers constantly exposed to wood dust are increasingly susceptible to respiratory problems, nasal and lung cancer, eye irritation, dermatitis, etc (Ige and Onadekon, 2000; Feron et al, 2001).

The use of PPE by wood factory workers has become imperative with the sole aim of protecting workers from occupational injuries and health hazards. Although, studies in Nigeria on PPE use among industrial workers are sparsely reported, few studies have highlighted that PPE availability, access and use still suffers a setback especially in third world countries. Hence, the objective of this study is to determine the level of utilization of PPE among wood factory workers in Calabar municipality, Southern Nigeria.

## 2. Methodology

### Study setting

The study was carried out in Calabar Municipality. Essentially, Calabar is the capital of Cross River State, within the rainforest belt of Nigeria. Calabar is located on latitude 04<sup>o</sup>.57<sup>o</sup> West and longitude 08<sup>o</sup>.20<sup>o</sup> East. The city is bounded westward by the Calabar River, to the North by Odukpani Local Government Area, to the near east stretches the Great Qua River and Akpabuyo Local Government Area and to the South by Calabar South Local Government Area. Calabar Municipality has an area of 142km<sup>2</sup> with an estimated population of 179,392 and 10 political wards (NPC, 2006). Most occupants of the area are civil servants, small, medium and large scale entrepreneurs and fishermen. Christianity is the predominant religion with few Muslims and traditionalists. The languages widely spoken are English, Efik/ibibio and Quas. Calabar Municipality is a cosmopolitan city that embraces virtually all the major ethnic groups in Nigeria.

### Study Design

A descriptive cross-sectional study was employed to determine the level of utilization of PPE among wood factory workers in Calabar municipality, Cross River State.

### Study Population

The study population comprised all workers directly involved in wood milling processes in the study area. The workers comprised of 363 males and 37 females with different age groups ranging from 15 to 60 years and above.

### Sample Size Determination

The sample size for this study was determined using Daniel's (1979) equation which is given as follows;

$$n = \frac{Z^2 pq}{d^2}$$

Where:

n = desired sample size

Z = confidence interval at 95% (1.96)

p = Proportion of workers utilizing PPE (0.5)

q = (1-p) Proportion of workers not utilizing PPE(1-0.5 = 0.5)

d = precision or absolute sample error (0.05)

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5}{0.05^2} = 384.16$$

To account for attrition problem, the sample size was increased to 400 which became the actual sample size for the study.

### Sampling procedure

Multi-stage random sampling technique was used and the procedure is described as follows;

**Stage 1:** Simple random sampling technique was employed to select two functional timber markets (that is, Akim and Eight miles timber markets) out of the three in the study area through simple balloting without replacement.

**Stage 2:** After a preliminary survey of the two functional timber markets, a total of 52 functional wood processing plants were identified (38 wood processing plants in Akim timber market and 14 wood processing plants in eight-miles timber markets).

**Stage 3:** Simple random sampling was used to select 292 workers from Akim timber market and 108 workers in Eight-miles timber market. Only workers who were at workplace and gave their consent to participate in the study were interviewed.

### Instrument for data collection

A structured questionnaire consisting 15 items was administered to 400 respondents in the study area. The questionnaire was compartmentalized into different sections to elicit information on socio-demographic data and use of personal protective equipment by workers. Pre-testing of the questionnaire was conducted among 20 wood workers at Okomita in Akamkpa Local Government Area. The pre-test was to confirm the viability, correctness and possible amendment of the questionnaire.

### Data collection procedure

Four hundred copies of the questionnaires were interviewer-administered to respondents in the study area by four trained field assistants. The field assistants were trained for two days on handling, distribution, consistency in interpretation and collection of the questionnaires. The questionnaire administration was carried out within three days. Respondents were properly guided and assisted by the

interviewer on how to fill in their responses on the questionnaires administered to them.

### Method of data analysis

Data generated were collated, and analysed using statistical packages for social sciences (SPSS version 20.0). Results were calculated in percentages and presented in tables and charts.

### Ethical considerations

A letter of introduction was obtained from the department of Public health, University of Calabar, Calabar. This letter facilitated the issuance of ethical approval from Ethics Committee Calabar Municipal Council. Verbal consent was duly sought and obtained from the respondents and they were assured of confidentiality of the information they provided.

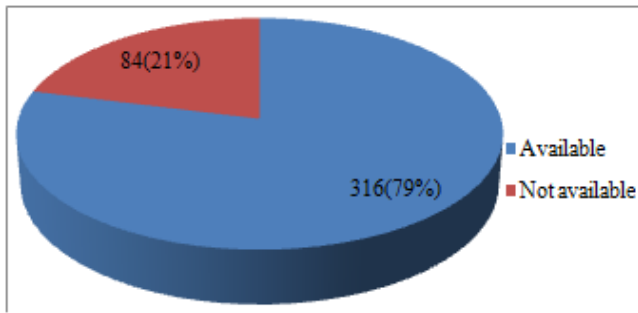
## 3. Results

The result of this study showed that most respondents were within the age range of 45-49 years 111 (27.8%) followed by those within 40-44 years 102 (25.5%), then 50-54 years 48 (12.0%) and 35-39 years 43 (10.8%). Predominantly, males 363 (90.7%) participated more than females 37 (9.3%). Majority of the respondents were those who had attained primary level of education (47%), were married 261 (65.2%) and were Christians (99.2%) (Table 1).

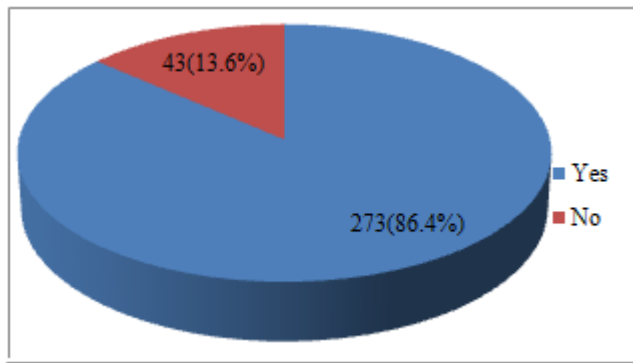
**Table 1:** Socio-demographic characteristics of respondents (n=400)

Variables	Number of Respondents	Percentage (%)
<b>Age (in years)</b>		
15-19	14	3.5
20-24	17	4.3
25-29	22	5.5
30-34	27	6.8
35-39	43	10.8
40-44	102	25.5
45-49	111	27.8
50-54	48	12.0
55-59	12	3.0
60 and above	4	1.0
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Sex</b>		
Male	363	90.7
Female	37	9.3
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Educational level</b>		
No formal education	20	5.0
Primary education	188	47.0
Secondary education	152	38.0
Tertiary education	40	10.0
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Marital status</b>		
Married	261	65.2
Single	127	31.8
Divorced/separated	9	2.2
widower	3	0.8
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Religion</b>		
Christians	397	99.2

Muslims	0	0.0
Traditional religion	3	0.8
<b>Total</b>	<b>400</b>	<b>100</b>



**Figure 1:** Availability of personal protective equipments (PPEs) at workplace as reported by workers



**Figure 2:** Proportion of workers using personal protective equipments at workplace

Most respondents 316 (79.0%) indicated that they had on-site PPE whereas 84 (21.0%) had no form of PPE at their workplace (**Figure 1**). Among those who reported to have PPE, about 273 (86.4%) had used PPE, while 43 (13.6%) had not used PPE (**Figure 2**). Type(s) of PPE used were face mask 38 (5.6%), respirator 93 (13.7%), hand gloves 227 (33.4%), coverall 84 (12.4%), boot 221(32.5%) and eye goggles 17 (2.5%) (**Table 2**).

**Table 2:** Types of personal protective equipment (PPE) used by respondents (n=400)

Variables	Number of Respondents	Percentage (%)
<b>PPE used by respondents *Multiple responses*</b>		
Face mask	38	5.6
Respirator	93	13.7
Hand gloves	227	33.4
coverall	84	12.4
Boots	221	32.5
Eye goggles	17	2.5
Protective shield	0	0
<b>Total</b>	<b>680</b>	<b>100</b>

Reasons for non-usage of PPE as reported by the respondents include; no provision by employer 64(31.1%), had no money to buy the PPE 21(10.2%), inconveniences 37(18.0%), not necessary 41(19.9%) and no idea of PPE 12(5.8%). About 31(15.1%) who were employers indicated that reason for not using PPE was because workers did not buy for themselves. However, virtually all respondents

400(100%) accepted the need for adequate training on the use of PPE (**Table 3**).

**Table 3:** Reasons for not using PPE and need for training on use of PPE by respondents (n=400)

Variables	Number of Respondents	Percentage (%)
<b>Reasons for not using PPE *Multiple responses*</b>		
No reason	12	5.8
No provision by employer	64	31.1
No money to buy PPEs	21	10.2
Not necessary	41	19.9
Inconvenience	37	18.0
Workers should buy	31	15.0
<b>Total</b>	<b>206</b>	<b>100</b>
<b>Need for training on use of PPE</b>		
Yes	400	100
No	0	0.0
<b>Total</b>	<b>400</b>	<b>100</b>

Table 4 showed that among 316 respondents who used PPE, 152 (48.1%) shared PPE among themselves. Reasons for sharing PPE as reported by the respondents was majorly limited quantities of PPE 118(77.6%). About 23(15.1%) had no reason for sharing PPE whereas 11(7.2%) gave other reasons. The type of PPE shared among respondents were face mask 38(18.5%), respirators 43(21.0%), hand gloves 111(54.2%) and eye goggles 13(6.3%). In terms of safe maintenance of PPE used by respondents, 311(46.4%) said they do regular cleaning of the PPE, 39(5.8%) said they repaired or replaced worn-out or damaged parts of PPE, while 321(47.8%) indicated proper storage when not in use.

**Table 4:** Sharing of PPE, reasons for sharing, type of PPE shared and maintenance among respondents (n=400)

Variables	Number of Respondents	Percentage (%)
<b>Sharing PPE with other workers</b>		
Yes	152	48.1
No	164	51.9
<b>Total</b>	<b>316</b>	<b>100</b>
<b>Reason(s) for sharing PPE</b>		
No reason	23	15.1
Limited quantity	118	77.6
Other reasons	11	7.2
<b>Total</b>	<b>152</b>	<b>100</b>
<b>Type of PPE shared * Multiple responses*</b>		
Face mask	38	18.5
Respirator	43	21.0
Handgloves	111	54.2
Coverall	0	0.0
Boots	0	0.0
Eyes goggles	13	6.3
<b>Total</b>	<b>205</b>	<b>100</b>
<b>Safe maintenance of PPE * Multiple responses*</b>		
Regular cleaning	311	46.4
Repairing/replacing worn-out/damaged parts	39	5.8
Proper storage when not in use	321	47.8
<b>Total</b>	<b>671</b>	<b>100</b>

#### 4. Discussion

In this study, most respondents 316 (79.0%) reported that PPEs were available at their workplace, out of which 273

(86.4%) respondents used PPE. This finding is comparable with other studies carried out in Nepal and Ethiopia where high use of PPE were equally recorded among industrial workers (Acharya, 2014; Tetemke et al., 2014). Personal protective equipment (PPE) used by respondents were hand gloves (33.4%), boots (32.5%), respirator (13.7%), coverall (12.4%), face mask (5.6%) and eye goggles (2.5%). This report clearly showed that majority of the respondents used hand gloves and boots (safety footwears). Easy accessibility and convenience in usage could largely account for high use of hand gloves and safety boots among respondents. Only 13.7% of the respondents used respirators while working. It is obvious that majority of the workers were exposed to inhalable wood dust during work. This finding corroborates with other studies where exposure of workers to wood dust in sawmills factories were reported (Oppliger et al., 2005; Fransman et al., 2003; Dutkiewicz et al., 2001 and Ugheoke et al., 2006).

Reasons given by respondents for not using PPE at work were majorly no provision by employer (31.1%), PPE not necessary (19.9%) and inconvenience (18.0%). Poor adherence to PPE use increases workers exposure to inhalable wood dust. Asuzu (2002) also confirmed that poor compliance and use of personal protective equipment by workers contributes to high cases of disability, morbidity, injuries and fatality from occupational activities. Most employers never saw the need to ensure adequate provision of PPE to its employees at work. Low educational status and lack of knowledge of PPE among employers of labour may largely contribute to non-availability of PPEs at workplace. Lack of knowledge of the importance of PPE use among workers in wood factory may influence low use of PPE at work. It was also observed in this study that profuse sweating with coverall and breathing problem with respirators sufficiently affected adherence to PPE use among workers. Workers inability to recognize wood dust as a known health hazard also influenced poor use of PPE. As stated by Ugheoke et al (2006), appropriate education and training of both employers and employees on PPE is crucial in promoting regular and proper use of PPE among wood factory workers.

Among PPE users, nearly half of the respondents (48.1%) reported that they have shared PPE with other workers with limited quantity of PPE as their main reason for sharing. Provision of PPE by employers in sufficient quantity and of good quality would prevent sharing of PPE, transmission of diseases from one person to another and encourage regular use of PPE at workplace. Respondents in this study also acknowledged that PPE could be maintained by proper storage when not in use (47.8%), regular cleaning after use (46.4%) and repairing/replacing worn-out/damaged parts (5.8%).

## 5. Conclusion and Recommendation

Exposure of workers to the hazard of wood dust is a reality in wood processing industries or factories. The use of PPE by workers at workplace is believed to minimize their exposure to work hazard and injuries. However, in this study, there was a noticeable gap between PPE availability, utilization and adherence to PPE use among workers at the

wood processing factories. Hence, education and proper training on PPE use is one most effective strategy in promoting PPE use among workers at their workplace. Intensifying awareness on the health implications of inhaling wood dust would also increase the uptake of PPE use.

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