



**OCCUPATIONAL RISKS AND HAZARDS EXPOSURE, KNOWLEDGE OF OCCUPATIONAL HEALTH AND SAFETY PRACTICE AND SAFETY MEASURES AMONG WORKERS OF A NIGERIAN BOTTLING COMPANY PLC, MAIDUGURI, BORNO STATE**

**Salamatu Umar Aliyu<sup>\*</sup>, Ibrahim Muhammad Auwal**

Department of Medical Rehabilitation (Physiotherapy), College of Medical Sciences, University of Maiduguri, Nigeria

**Abstract-**

**Background:** Working in an industry is full of potential risks and hazards that can be mitigated through proper occupational health and safety practices or adoption of safety precautionary measures and use of personal protective equipments among workers. **Aim:** The purpose of this study was to investigate exposure to occupational risks and hazards, knowledge of occupational health and safety practices, safety precautionary measures and use of protective equipments among workers at a Nigerian bottling company. **Method:** A close-ended structured questionnaire adapted and modified from the Weymouth and Portland health and safety questionnaire was used to investigate health and safety of the workplace. The questionnaire consists of four sections which sought information on workers sociodemographic characteristics, occupational risks and hazards exposure, knowledge of occupational health and safety practices and safety precautionary measures and use of personal protective equipments among workers. Sample of convenience was used to recruit a total of 231 workers at the Nigerian bottling company Plc Maiduguri. **Result:** It is a male dominated workplace comprising of 226(97.8%) males with mean age  $25.2 \pm 7.1$  years. About 50.6% of the participants were permanent staff, while 43.3% had a diploma. Exposure to occupational risks and hazards in this bottling company was majorly moderate among workers (48.5%) with (24.7%) high exposure among workers. Significant association was found between occupational risks and hazards exposure and age ( $p < 0.05$ ). No association was found between the level of exposure of occupational risks and hazards, gender ( $p > 0.05$ ) and educational status of the participants ( $p > 0.05$ ). The workers have a good level of knowledge of occupational health and safety practices (66.7%). Significant association was found between knowledge of occupational risks and hazards, age ( $p = 0.05$ ) and educational status ( $p < 0.001$ ). Participants in this bottling company also have good adoption of safety precautionary measures and use of personal protective equipments. **Conclusion:** The study revealed more than a quarter of the workers were exposed to high occupational risks and hazards exposure among workers at the Nigerian bottling company Plc. Also majority of the workers have good knowledge of occupational health and safety practice with good adoption of safety precautionary measures and use of personal protective equipments. It is recommended that government should enforce compliance to health and safety measures in industries so as to minimize to minimum the level of occupational risks and hazards. In the same light government and supervising institutions should enforce compliance to occupational health and safety measures in the industries.

**Keywords -** Occupational Risks and Hazards Exposures, Occupational health and safety practice, Personal protective equipment, Safety precautionary measures.

**Introduction:** Working in the industry is fraught with potential risks and hazards which are categorized into occupational, environmental and public health<sup>1</sup>. Hazard is defined as the presence of a material or condition that has the potential for causing loss or harm<sup>2</sup>. Bello and Mijinyawa<sup>3</sup> defined work-related hazards as the risk to the health of a person usually arising out of employment. According to Kalejaiye<sup>4</sup> work-related hazards are brought about by unsafe work conditions and unsafe work behaviors. Johnson<sup>2</sup> also defines risk as the combination of the severity of consequences and likelihood of occurrence of undesirable outcomes. In other words, risk is the likelihood that harm or injury will occur to specific individuals or groups exposed to hazard<sup>1</sup>. Occupational risks and hazards are the health problems employees' face in their work environment and how those health problems affect the health status of employee and their family.<sup>5</sup> It can also be defined as diseases, accidents and other hazards arising from the work environment or situations that arise in the attempt to perform tasks in any occupation. It is a compensable disease that arises out of and in the course of employment.<sup>6</sup>

Globally, there are 2.9 billion workers who are exposed to hazardous risks at their work places.<sup>7</sup> Kalejaiye<sup>4</sup> reported that there has been annual mortality rate of 1,249 per 100,000 workers in Nigeria in the past decade. Varieties of hazards exist, almost as numerous as the different types of work, including chemicals, biological agents and adverse ergonomic conditions.<sup>8</sup> Annually there are two million deaths, attributable to occupational diseases and

injuries and 4% of Gross Domestic Product (GDP) is lost due to occupational diseases and injuries.<sup>8</sup>

However, the importance of occupational health and safety practice is often overlooked. This is because, the level of occupational Health and safety in Africa is low compared with the rest of the world.<sup>8</sup> In Sub-Saharan Africa public health problems of child mortality, malaria, water quality and HIV/AIDS have overshadowed occupational health problems.<sup>9</sup> According to available literature, risk factors leading to injuries are present in every occupation and among all occupations with industrial and agricultural workers having the highest risks.<sup>10,11</sup> Governments in developing countries have apathy to occupational health and safety issues<sup>12</sup>, and all the stakeholders, ranging from the management, workers and government do not appreciate the problems that can be solved or mitigated through occupational safety and health.<sup>1</sup> Accidents can cause various forms of disabilities; loss of man-power leading to decreased productivity and in severe cases may lead to death.<sup>13</sup> The few companies in Nigeria who recognize occupational health and safety are the big multinationals who are running the policies constituted in their parent countries of origin.<sup>14,15</sup> Occupational health and safety practice is still at infancy in most indigenous organizations in Nigeria.<sup>16</sup> There is a dearth of literature in the area of occupational risks and hazards among industrial workers in Nigeria and also limited studies among industrial workers in the northern part of Nigeria, and none in the North-Eastern part of the country. This study therefore seeks to assess the level of exposure to occupational risks and hazards, the level of knowledge of occupational health and safety practice and precautionary measures and use of personal protective equipment among workers in a northeastern Nigerian Bottling Company Plc. (NBC) Maiduguri, Nigeria.

**For Correspondence:**

ptsalaliyu@yahoo.com

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## Materials and Methods

### Participants and sampling procedure

Sample of convenience was used to recruit 231 permanent and casual workers in a Nigerian Bottling Company Plc. (NBC) Maiduguri Plant, Borno State. The design of the study is cross-sectional.

**Procedure:** The instrument used for this study was a close-ended structured questionnaire adapted from the Weymouth and Portland health and safety questionnaire used to investigate health and safety of the workplace.<sup>17</sup> The questionnaire was however, modified by adding three items, while an item was removed. Items added to the questionnaire were statements relating to the risk of burn by hot water from a boiler and another relating to the prolonged exposure to solar radiation, as well as statements regarding the use of personal protective equipment (PPE) at work. Item removed from the questionnaire were statements relating to injury to the eyes due to direct contact during welding. A test-retest reliability evaluation of the questionnaire was conducted on 20 of the participants and reliability of the questionnaire was 0.7 Cronbach's alpha. The questionnaire is a 43-item questionnaire divided into four sections: Section I consist of 5 questions which elicits information on the socio-demographic characteristics of the participants. Section II consists of 25 questions that elicit information on risks and hazards in the workplace. Section III consists of 7 questions which elicits information on level of knowledge of occupational health and safety among participants in the workplace. Section IV consists of 6 questions on safety precautionary measures and use of protective equipments in the workplace. The questionnaire is designed in a yes or no format and each section is scored according to the number of questions it contains. Section B has 25 questions with a total

score of 32, scoring 21-32 indicate high exposure to occupational risks and hazards, score of 11-20 indicate moderate exposure and score of 1-10 indicate low exposure. Section C contains 7 questions with a total score of 7; scoring 5-7 indicate good knowledge of occupational health and safety practice, scoring 1-4 indicates poor level of knowledge. Section D contains 7 questions with total score of 11. Scoring 8-11 indicate high level of safety and precautionary measures and use of personal protective equipment, score of 5-8 indicate moderate level of safety and precautionary measures and use of personal protective equipment and 1-4 indicate low level of safety and precautionary measures and use of personal protective equipment.

An ethical approval was sought from the University of Maiduguri Teaching Hospital joint ethical committee prior to commencement of the study. The questionnaire was researcher administered by visitation to their working place during working hours. Their consent was sought and obtained; confidentiality was also assured, and the protocol of the study explained to each participant. Upon consenting, all participants were encouraged to answer the questionnaire in the presence of the researcher so as to be able to reduce items misinterpretation, and maximize the return rate.

**Statistical Analysis:** Socio-demographic characteristics of the participants were described using descriptive statistics of mean, standard deviation and percentages. Level of exposure of Occupational risk and hazards, knowledge of occupational health and safety practice and safety precautionary measures and use of protective equipments among workers were summarized as percentages. Chi-square statistic was used to analyze proportional differences in the level of exposure to occupational risks and hazards among workers by different sociodemographic characteristics.

Chi-square statistic was also used to analyze proportional differences in knowledge of health and safety practices among workers by different sociodemographic characteristics. Statistical level of significance was set at  $p \leq 0.05$ .

**Results and Discussion:** A total of 231 workers of the Nigerian Bottling Company Plc Maiduguri participated in this study. It is a male dominated occupation comprising only 5 (2.16%) females and 226 (97.84%) males with a mean age of  $25.21 \pm 7.1$  years. About 50.6% of the participants were permanent staff, while 43.3% had a diploma. The detailed socio-demographic characteristics of the participants were shown in table 1.

Table 2 shows the level of exposure of the participants to occupational risks and hazards in their working place. The result showed that the majority of workers (48.5%) in this setting were moderately exposed to occupational risks and hazards with almost equal level of high and low level exposure to occupational risks and hazards (24.7%) and (26.8%) respectively. The result showed a statistical significant difference in the level of exposure to occupational risks and hazards among workers of different age group ( $p < 0.05$ ) with workers in the lower age group being more highly exposed (38.5%) to occupational risks and hazards in the work place. About 53.5% of the casual and 43.6% of the permanent workers were exposed to moderate occupational risks and hazards. Level of exposure to occupational risks and hazards was not statistically significant ( $p > 0.05$ ) with type of appointment. The result indicates no significant difference ( $p > 0.05$ ) in the level of exposure to occupational risks and hazards by gender, with (60%) of the females being exposed to high level occupational risks and hazards while (48.7%) of the males were majorly exposed to moderate level of occupational risks and hazards. Educational

level of the participants also was not statistically significant when compared with occupational risks and hazards, with (37.5%) of those having the highest educational level (Bachelor's degree) exposed to high level of occupational risk and hazard.

Table 3 shows the Level of Knowledge on occupational Health and Safety practice of the Participants. More than half of the participants had good knowledge (66.7%) of occupational health and safety practice. Significant difference was observed in the level of knowledge of occupational health and safety practice among workers of different educational level ( $p < 0.01$ ). Surprisingly, participants that attended secondary school (73.8%) and participants with a diploma (72.0%) had good knowledge of occupational health and safety practice compared to (18.8%) of those with a much higher educational level (degree).

More than seventy-six percent of participants in the age-group of 18 and 25 years had good knowledge of occupational health and safety practice than those in the much lower age-group ( $< 18$  years, 53.8%). The result showed a marginal significant ( $p = 0.05$ ) between age and knowledge of occupational health and safety practice among workers. Majority (70.1%) of the permanent workers though not significant had good knowledge of occupational health and safety practice when compared to about (63.2%) of the casual workers.

Table 4 shows the frequency and percentages of precautionary measures and use of personal protective equipment among workers. The result showed that (10.4%) of the participants minimally make use of safety precautionary measures and personal protective equipment while working. While majority of the workers ( $n = 133$ , 57.6%) make use of safety precautionary measures and use of personal protective equipments at workplace.

**Table 1: Socio-demographic Characteristics of the Participants**

<b>Characteristics</b>	<b>n</b>	<b>%</b>
<b>Gender</b>		
Male	226	97.8
Female	5	2.2
<b>Age Group (years)</b>		
<18	13	5.6
18-25	128	55.4
26-35	64	27.7
>35	26	11.3
<b>Educational Level</b>		
None	11	4.8
Primary	20	8.7
Secondary	84	36.4
Diploma	100	43.3
Degree	16	6.9
<b>Appointment</b>		
Permanent	117	50.6
Casual	114	49.4

**Table 2: Chi square test for Difference in level of Exposure to Occupational Risks and Hazards by socio-demographic characteristics**

<b>Characteristics</b>	<b>Level of exposure</b>						<b>p-value</b>
	<b>high</b>	<b>moderate</b>	<b>low</b>	<b>high</b>	<b>moderate</b>	<b>low</b>	
	<b>(n)</b>			<b>(%)</b>			
<b>Overall exposure level</b>	57	112	62	24.7	48.5	26.8	
<b>Age group</b>							
<18	5	7	1	38.5	53.8	7.7	0.01*
18-25	19	62	47	14.8	48.4	36.7	
26-35	24	30	10	37.5	46.9	15.6	
>35	9	13	4	34.6	50.0	15.4	
<b>Gender</b>							
Male	54	110	62	23.9	48.7	27.4	0.98
Female	3	2	0	60.0	40.0	0.0	
<b>Educational Level</b>							
Never	4	5	2	36.4	45.5	18.2	
Primary	1	12	7	5.0	60.0	35.0	
Secondary	22	37	25	26.2	44.0	29.8	0.15
Diploma	24	49	27	24.0	49.0	27.0	
Degree	6	9	1	37.5	56.2	6.2	
<b>Appointment type</b>							
Permanent	33	51	33	28.2	43.6	28.2	0.28
Casual	24	61	29	21.1	53.5	25.5	

\*-significant at p&lt;0.05

**Table 3: Chi-square test for Difference in Level of Knowledge of Occupational Health and Safety practice and socio-demographic characteristics**

Characteristics	Level of knowledge				p- value
	good (n)	poor	good (%)	poor	
<b>Overall knowledge level</b>	154	77	66.7	33.3	
<b>Age group</b>					
<18	7	6	53.8	46.2	0.05*
18-25	98	30	76.6	23.4	
26-35	35	29	54.7	45.3	
>35	14	12	53.8	46.2	
<b>Gender</b>					
Male	150	76	66.4	33.6	0.50
Female	4	1	80.0	20.0	
<b>Educational Level</b>					
Never	5	6	45.5	54.5	0.001*
Primary	12	8	60.0	40.0	
Secondary	62	22	73.8	26.2	
Diploma	72	28	72.0	28.0	
Degree	3	13	18.8	81.2	
<b>Appointment</b>					
Permanent	82	35	70.1	29.9	0.26
Casual	72	42	63.2	36.8	

**Table 4: Safety precautionary measures and use of personal protective equipments**

Variables	n	%
<b>Safety Precautionary Measures and Use of Personal Protective equipments</b>		
Good	133	57.6
Fair	74	32.0
Poor	24	10.4

**Discussion:** This study was aimed at determining the exposure level of occupational risks and hazards, knowledge of occupational health and safety practice, safety precautionary measures and use of personal protective equipments among workers at the Nigerian Bottling Company Plc. Maiduguri. Majority of workers in the bottling company were moderately exposed to occupational risks and hazards (48.5%) whereas (24.7%) of the

workers were highly exposed to occupational risks and hazards in the industry. The high exposure to occupational risks and hazards (24.7%) among this cohort group of workers is similar to a study carried out among small and medium scale industrial workers (32.4%) in Ethiopia.<sup>18</sup> A higher value (44.1%) than that reported in the present study was found by <sup>8</sup> in their study among workers of a Kaduna Refinery and petrochemical company in

Nigeria. Much higher prevalence of 69.6% was discovered among workers in Abeokuta in Nigeria.<sup>19</sup> This variation in level of exposure among the various workers might be attributed to differences in occupation types, physical demand in operating heavy machines and moving heavy loads and other job demands in these industries.

The study found significant association between the level of exposure to occupational risks and hazards and age. This is consistent with studies by<sup>18,20,21</sup> that found exposure to occupational risks and hazards to be significantly associated with age among workers. In this study participants in the age group of <18 years reported higher exposure to occupational risks and hazards than respondents in other age-groups. Reasons for this might include lack of information, lack of training, lack of supervision, lack of experience on the job, lack of knowledge and skill among these age group. Also as workers begin work at an early age and often without safety training they are at greater risk to occupation risks and hazards exposures at the workplace. According to Belin et al.<sup>22</sup> younger workers have less experience and maturity in their job, which puts them at risk of overestimating their physical capacities or underestimating the safety and health risks associated with their tasks they concluded that overall, young workers have a 40% higher rate of non-fatal injuries than older workers in all sectors, buttressing findings from the present study of higher level of exposure among the much younger workers. The workers in this study are majorly male as the industry is male dominated. This perhaps might be attributed to the high level of physical labor needed as nature of the job entails lifting heavy loads and use of heavy vibrating machines.

Although, there was no significant difference in occupational risks and hazards exposure among workers of different educational level, workers that have higher educational qualification (Degree) were more highly exposed to occupational risks and hazards. The high

exposure to occupational risks and hazards among these workers might be due to their poor usage of safety measures and personal protective equipments. This is consistent with the finding of Samuel et al.<sup>23</sup> that found respondents with less than 12 years of education used hearing protection devices 2.6 times more than those with much higher education. In contrast, Ahmed et al.<sup>24</sup> in Saudi Arabia reported that the use of hearing protection devices was directly related to the years of education. The findings of this study also showed no significant difference in exposure to occupational risks and hazards among the permanent and casual workers. This is inconsistent with a study that reported higher (54.5%) exposure among unskilled workers.<sup>18</sup>

The study also reported a good level of knowledge (66.7%) of Occupational Health and Safety practice among this group of workers, which is consistent with several previous study that reported good level of knowledge of occupational health and safety practices among respondents working in various work places.<sup>8,19,25,26</sup> Higher level of knowledge of occupational Health and Safety practices among the participants in the present study might not be unrelated to efforts instilled through health and safety posters and policies around the company premises and conduction of safety induction programs to all new workers. Iden,<sup>14</sup> and Okojie<sup>15</sup> observed that the few companies in Nigeria who recognizes occupational health and safety are the big multinationals organizations who are running the policies constituted in their parents' countries of origin, like the present Nigerian bottling company. However occupational health and safety practice is still at infancy in most indigenous organizations in Nigeria.<sup>16</sup>

Our study reported a marginal significant good level of knowledge of occupational health and safety practice among workers of different age-groups. On the other hand no significant difference in level of knowledge of occupational health and safety practice among

male and female worker was found in the present study. This is in agreement with the study by <sup>8</sup> that reported no significant difference in the level of knowledge between male and female workers.

The study found significant difference in level of knowledge of occupational health and safety practice among workers of different educational background with higher portrayal of knowledge among workers that reported diploma or secondary school education as their highest educational qualification (73.8% and 72.0% respectively). The good level knowledge of occupational health and safety of the participants with diploma is in line with the study of <sup>8</sup> that reported (95%) of those that attended tertiary institutions have higher level of knowledge of occupational health and safety practice. Similarly, Adebola<sup>26</sup> and Osewa et al.<sup>27</sup> reported significant relationship between educational status and knowledge of occupational hazards and safety practice among their respondents. The good knowledge among the participants in this study might not be unrelated to the fact that majority of the participants have post primary school education. There was no significant association in level of knowledge of occupational health safety among workers of different appointment, although, a much higher number of permanent workers reported good knowledge (70.1%) than the casual workers (63.2%). This is consistent with the study of <sup>28</sup> who reported highest knowledge about occupational hazards among those who had worked for 10 years or more and the lowest was found among the newly employed workers. This is also consistent to a study on small and medium scale industrial workers that reported no significant difference in knowledge of occupational health and safety practice between the skilled and unskilled workers.<sup>18</sup>

Findings from this study show good adoption of safety precautionary measures and use of personal protective equipments (57.6%) among the participants, this is in line albeit lower than findings by (Aliyu and Saidu.<sup>8</sup> The good

adoption of safety precautionary measures and use of personal protective equipments among workers in the present study contrasted previous studies that reported poor adoption of safety precautionary measures and use of personal protective equipment among their respondents.<sup>19,25,27,29,30</sup> However, the present study found that more than 10 % of the participants minimally make use of personal protective equipment and safety precautionary measures at the workplace. This should be of concern and an important area for occupational health and safety intervention with regular monitoring and decisiveness with firm supervision by management of workers.

The study has some limitations even though the cross-sectional study design provides reliable and valid findings, longitudinal studies should be carried out in this area. There is also a need to target a larger population in bottling companies to be able to generalize findings. Despite the above limitations findings from this study has provided insight into the occupational risks and hazards exposure, knowledge of occupational health and safety practice, safety measures and their association with different socio-demographic characteristics among workers of a bottling company in Maiduguri, Nigeria.

**Conclusion:** The study concludes that more than a quarter of these workers are highly exposed to occupational risks and hazards in the bottling company. Significant association was found between occupational risks and hazards exposure and age. No association was found between the level of exposure of occupational risks and hazards, gender and educational status of the workers. The workers also portray a significant good level of knowledge of occupational health and safety practices. Significant association was found between knowledge of occupational risks and hazards, age and educational status. Participants in this bottling company also have good adoption of safety precautionary measures and use of personal protective equipments.



Based on the findings of this study, it is recommended that management of the NBC Plc should embark on educational programs for workers on prevention of occupational risks and hazards especially among the younger age group and among their casual workers. Management should re-enforce the use of personal protective equipments to be mandatory among workers to reduce exposure to occupational risks and hazards. Government and regulating institutions should enforce compliance to health and safety measures in the industries. Future studies could also be carried out in other parts of the country.

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