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ASSESSMENT OF OCCUPATIONAL SAFETY MEASURES AND AWARENESS AMONG THE LABORATORY AND TECHNICAL STAFF OF SECONDARY SCHOOLS IN KADUNA STATE

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Abstract

This research of Assessment of Occupational Safety Measures and Awareness among the Laboratories and Technical staff of Secondary Schools in Kaduna State, twenty secondary schools were randomly selected for this study in Kaduna State. The Schools spread across the three Senatorial zones of the state with eight in Kaduna North, seven in Kaduna Central and five in Kaduna South Two methods were adopted; on-the-spot assessment of the safety facilities in the selected schools and the analysis of response from questionnaires. Distributed to the workers. Thirty questionnaires (5-Likert scale) were distributed to the selected schools. Descriptive statistics software of version IBM 23 was used for the statistical analyses with t-critical at 1.96. The result of on-the-spot assessment show that 70% of the schools in the study area have no occupational safety measure in place for their laboratory and technical staff while 30% show varying degree of compliance to safety measures. The results of the statistical analysis of the questionnaires shows cumulative mean of 3.61; the awareness of technicians and laboratory staff has t-calculated value of 0.75 which is insignificant; while level of awareness among gender shows t-calculated of 0.41 which is also insignificant. Level of occupational safety awareness among the laboratory staff has t-calculated value of 29.54 which is very significant. The level of occupational safety awareness among this category of workers is high with level of education playing a significant role. It was therefore recommended among others that government at all levels should enact relevant laws to protect this category of workers in their work place. There is need for the secondary school laboratory workers to form registered labour union to enforce their right to occupational safety and demand better wages. To train the category of workers on hazard management and prevention

Keywords: Occupation, Safety, Laboratory Staff

Introduction

The vibrancy of any sector depends solely on the productivity of its worker. A worker cannot be productive if the working environment is not safe and conducive. This is why occupational safety is as important as the worker's productivity. Robert and John (2004) stated that;

Health refers to the general state of physical, mental and problems that impair normal human activities and Safety refers to protecting the well-being of people. According to Alli (2008) of the International Labour Office, Occupational Safety is defined as science of anticipation, recognition, evaluation and control of hazards arising in or from workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment. The world Health Organization and International Labour Organization according to Okechukwu (2014) jointly defines Occupational Safety as promotion and maintenance of the highest degree of physical, mental, social well-being of workers in all occupation.

The definitions above transcend very large area; from workplace hazard, environmental hazard to disciplines that need competent knowledge structures, skills and know-how capacity to actualize occupational safety. Occupational hazards vary depending on the situation, condition and kind of work in a particular industry/occupation. Raw materials, products, wastes (by-products), production processes sometimes do constitute health hazard (Achal, 2000). Workers across all sectors of Nigeria economy and all over the world are now more exposed to occupational hazards with a number of health problems ranging from accidents and injuries, deaths, diseases etc despite the improvement in occupational safety (Okechukwu, 2014).

The problem of fall in standard of education in Nigeria will not be solved without looking at some of the challenges at secondary school level of our educational system. These challenges include but not limited to how effective the laboratories/workshops are used. The laboratories/workshops are important educational tool for impacting knowledge at this level of education. Organisation and management are still big problems in Secondary School Laboratories as most of the Science Laboratories have no specialized workers to handle them (Daramola, 1985). For any Laboratory/Workshop to be effective, the contribution of the workers handling them will be in no small measure. There is no doubt that the occupational safety of these workers need to be taken serious by all stakeholders for optimum performance. Laboratory here refers to science laboratories (Physics Chemistry, Biology, Food and Nutrition/Home Economics, etc), while workshops refer to Metal, Wood and Electrical workshops. The role of these workers become more important now than ever as Vocation and Technical education will play a vital role in the diversification of our economy which may be the only thing that will save our country's economy from over dependent on oil. Due to job scarcity problem in the country, people go for any kind of job they are given without looking at the safety aspect of that job. This category of secondary school workers suffers a serious neglect over time in terms of condition of service, wages or salary and safety at workplace as they have no collective means through which their voice can be heard, nor do they belong to any trade union that can fight for their right; they are at the mercy of their employer only.

It is on this note that the research assesses the occupational safety measures put in place for this category of secondary school workers. Also examined the level of awareness of occupational Safety and health among them.

Research Methodology:

Twenty secondary schools were randomly selected for this study in Kaduna State. The Schools spread across the three Senatorial zones of the state with eight in Kaduna North, seven in Kaduna Central and Five in Kaduna South. Two approaches were adopted in this work, these are;

- i. On the Spot assessment.
- ii. Use of questionnaire (5-Likert scale) to extract information from the workers for analysis.

On the Spot assessment: The researchers visited the selected schools to assess the level of occupational safety measures put in place for these workers. Upon arrival in any school, the team first meet with the management and explain to them the aim of visiting the school. The researchers convinced them that the information obtained from them is confidential and will not be used against them and their Schools. Also their names and that of their school will not be mention in any public presentation and publications of this study. The outcome will be beneficial to all such as policy makers, donors, other stakeholders in education to improve the quality of

education. The researchers note, assess and rate the followings:

- i. Laboratory/Workshop (Standard or Improvised)
- ii. Staffing
- iii. Presence of fire extinguishers (functional/non-functional).
- iv. First Aid box (functional/non-functional)
- v. Emergency exit (functional/non-functional)
- vi. Protective wears/gadgets (lab. Coats/uniforms/aprons, Helmets, Hand gloves, protective goggles, face masks etc)
- vii. Safety Charts/Guidelines
- viii. Labeling of items.
- ix. Shelves and cupboards
- x. Tool box/wrack
- xi. Presence of store in the facility
- xii. Walk-way
- xiii. Source of power

Each of the item listed above is assigned a rating of; six (6) if available and functional, three (3) if available and not functional and zero if not available. The total in percentage (%) for each of the visited school gives its performance rating.

The questionnaire was designed and distributed to extract information from the respondents on their level of awareness about occupational safety, hazards and the associated health risk. To achieve this, the study was structured along specific objectives to which three research questions were answered and three research null hypotheses tested. The questionnaire was adopted from Skryabina and Reid (2002). According to Skryabina and Reid (2002), the type of summated scale most frequently used in the study of social attitudes follows the pattern devised by Likert. We therefore decided to use the Likert-type scale. In the Likert type scale, the subjects are asked to respond to each item in terms of given degree of agreement or disagreement. The 'awareness' statements being the Likert-type scale, were scored on points ranging from 1 to 5: 5 points stands for strongly agree, 4 points for agree, 3 points for undecided, 2 points for disagree and 1 points for strongly disagree. This type of questionnaire has been validated so, there is no need for validation. Because of the importance attached to the information and to avoid the fear of victimization, name of the respondent is excluded from the bio-data section of the questionnaire. But age, sex and other personal data are requested for. Questions were structured to assess the level of awareness on basic occupational safety for such category of secondary school workers. The team took time to enlighten the respondents on the need to be fair and be just in their responses before the questionnaires were given to them. This helped to strengthen the reliability of this instrument. A total of thirty (30) questionnaires were distributed and collected in the 20 schools visited. The data was analysed with statistical package of version IBM 23. The analyses were presented in sections. The first section presents the frequency and percentage distribution of the bio data variables of the respondents which include gender, qualification, age and rank. The second section tests the three research questions using descriptive mean statistics of each groups, tests to determine differences existence. The third section test the three null hypotheses with inferential statistics. Hypothesis one and two were tested with the independent t test while three was tested with the chi square statistics. All the hypotheses were tested at 0.05 alpha level of significance.

Results And Discussion:

The results of the On-the-Spot assessment from the various schools were analyzed and the performance rating of the schools in terms of occupational safety is presented in Fig. 1.

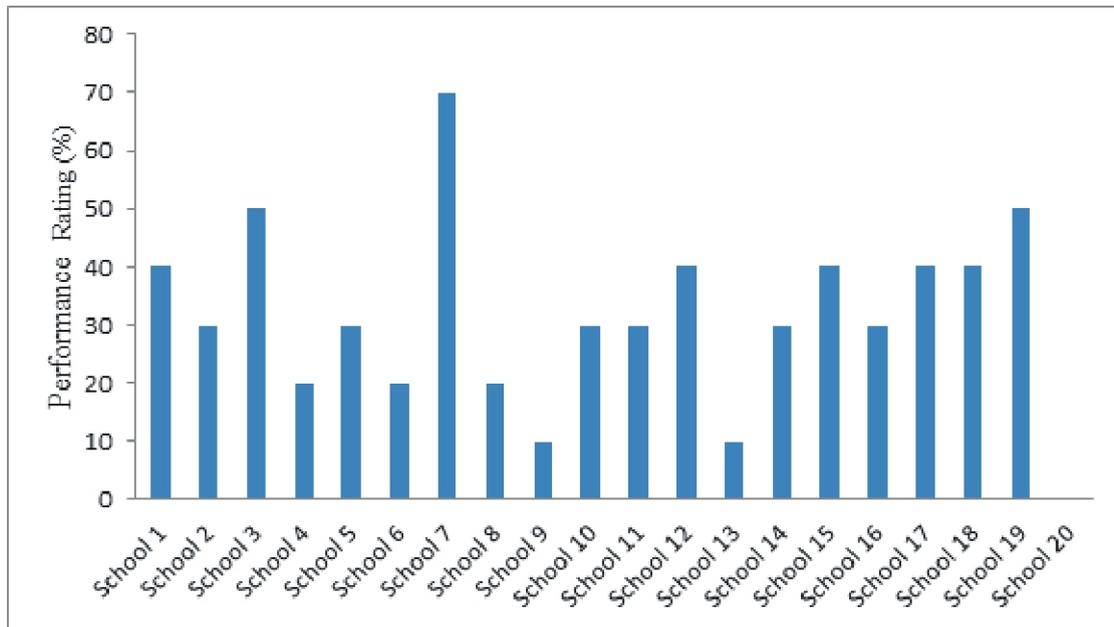


Fig 1: Performance rating of the selected Schools

From Fig. 1, only one school has performance rating of 70% in terms of occupational safety measures., three schools had 50% and above. Seventeen schools have below 50% while one school has zero meaning it has no any occupational safety measure at all. The average performance rating of all the selected schools is 32.5% which is very low when compared with any International best practices.

Table 1 contains the analysis of the occupational safety measures in all the selected secondary schools

Table 1: Analysis of Occupational Safety Measures in all the selected Schools

S/N	Occupational Safety Measures	Number of Schools (%)
I	Standard Laboratory/Workshop	5
Ii	Staffing	60
Iii	Fire-extinguisher (functional/non-functional).	30
Iv	First Aid box (functional/non-functional)	5
V	Emergency exit (functional/non-functional)	5
Vi	Protective wears/gadgets (lab. Coats/uniforms/aprons, Helmets, Hand gloves, protective goggles, face masks etc)	45
Vii	Safety Charts/Guidelines	30
Viii	Proper labeling of items.	50
Ix	Shelves and cupboards	50
X	Tool box/wrack	25
Xi	Walk-way	5
Xii	Power supply	5
xiii	Store	25
xiv	Water supply.	15

From Table.1, only 5% of the schools have standard laboratory, 70% has improvised laboratory/workshop structures while 25% has no lab. 60% of the schools visited have at least one laboratory/workshop staff. Out of the 30% that has fire-extinguisher, none of them is functional. 5% has first aid box, 25% has the box hanging empty while the remaining have nothing to show as far as first aid box is concerned. Only 5% had emergency exit, while the remaining operates with one door which serves as entrance and exit to the laboratory/workshop. 45% has at least one safety gadget with protective wear dominating. Only 5% provided safety chart or guidelines, 50% labeled the items they have. 25% had store for keeping items, 25% had shelves/cupboards on which items are arranged and only 10% has toolbox or tool-wrack for keeping working tools while working.

Analysis of the bio data of the questionnaires show that the level of education of the workers (respondents) enhance the level of awareness of occupational safety in them as those that have Senior Secondary Certificate Examination (SSCE) certificate among them (90%) respond very well showing high level of awareness. 10% of this secondary school workers are with primary school certificate.. Only 10% have rank of 'Laboratory/Workshop Attendant', 10%'technician' but the remaining 80% have no rank, some are junior workers while others are casual worker. In terms of gender, it was 50% male and 50% female. Also 90% of these workers are above 40years of age. This means that youth don't like the job probably due to poor remuneration and high level of health risk.

Table 2: Perception of respondents on level of awareness on safety procedures in the laboratory

s/no	Items	Response categories					MEAN
		SA	A	UD	D	SD	
1	WORKING IN THE LABORATORY WITHOUT WEARING ANY PROTECTIVE WEARS IS NOT A GOOD HABIT	11	8	4	3	4	3.633
2	LABELLING OF ALL ITEMS IN THE LABORATORY/WORKSHOP IS VERY IMPORTANT	8	16	4	1	1	3.967
3	IN CASE OF ANY ACCIDENT FIRST AID TREATMENT IS REQUIRED BEFORE GOING TO THE HOSPITAL	10	10	6	2	2	3.800
4	ROUTINE HEALTH CHECK IS VERY VITAL TO LABORATORY/WORKSHOP WORKER	5	10	10	2	3	3.400
5	HAVING EMERGENCY EXITS IN THE LABORATORY/WORKSHOP IS VERY IMPORTANT	12	10	3	3	2	3.900
6	ALL HEALTH PROBLEMS SHOULD BE REPORTED TO A PHYSICIAN	8	9	6	4	3	3.500
7	LABORATORY /WORKSHOP SHOULD BE KEPT CLEAN ,TIDY AND WELL VENTILATED	6	9	6	5	4	3.267
8	TRAINING/WORKSHOP/SEMINAR SHOULD BE ORGANISED FOR ALL LABORATORY/WORKSHOP WORKERS AT LEAST ONCE A YEAR	9	11	4	4	2	3.700
9	THERE IS THE NEED TO HAVE SAFETY CHARTS /GUIDELINES IN THE LABORATORY/WORKSHIP	7	10	6	3	4	3.433
10	EFFECTIVE AND FUNCTIONING FIRE-EXTINGUISH SHOULD BE MADE AVAILABLE IN THE LABORATORY /WORKSHOP	8	9	5	5	3	3.467
	Cumulative mean						3.606

Decision mean = 3.000

It showed that their general level of safety awareness in the labs is high as the cumulative mean awareness level of 3.606 is higher than the decision/standard mean of 3.000. Specifically, they believe that labelling of all items in the laboratory/workshop is very important (highest mean response of 3.967 with details showing that while 24 were in agreement, 4 others were undecided and the rest 2 in disagreement). In the same vein, they also believe that having emergency exits in the laboratory/workshop is very important, as this item attracted the highest mean response of 3.900 as details showed that while 22 were in agreement with this statement 3 were undecided and only 5 disagreed. The level of awareness of the technicians and laboratory staff is high specifically as they unanimously believed that labeling of all items in the laboratory/workshop is very important and having emergency exits in the laboratory/workshop is very important among others

Research Question 1: Is there any difference between the level of awareness technician and lab staff?

Table 3: Independent test statistics on the difference between the level of awareness technician and lab staff

Variable	Rank	N	Mean	Std.De	Std.Err	Df	Mean differenc	T calculate	T critical	P
Awareness of safety measure	Technic	16	36.93	7.370	1.842	27	1.86	0.751	1.96	0.459
	Lab offi	13	35.07	5.574	1.546					

Calculated $p > 0.05$, calculated $t < 1.96$ at df 27

From table 3, the outcome of the descriptive statistics showed that there is no difference between the level of awareness of technician and lab staff on the safety procedures. Their computed mean level of awareness on safety procedures were 36.93 and 35.07 by technician and lab staff respectively. This implies a mean difference of 1.860 in favour of technician. Also, t-calculated of 0.751 is much less than t-critical of 1.96. all these show insignificance implying that both technician and the lab staff have the same level of awareness on safety procedures

Research Question 2: What is the difference between the level of awareness of male and female staff ?

Table 4: Independent t -test statistics on the difference between the level of awareness of male and female staff

Variable	Male	N	Mean	Std.De	Std.Err	Df	Mean diff	T calculate	T critica	P
Awareness of safety measure	MALE	18	36.50	5.982	1.410	27	1.045	0.409	1.96	0.688
	FEMALE	11	35.45	7.724	2.329					

Calculated $p > 0.05$, calculated $t < 1.96$ at df 27

From table 4, the level of awareness among male and female staff regarding safety procedures in the laboratories is the same. Their computed mean level of awareness on safety procedures were 36.50 and 35.45 by male and female staff respectively. This implies an insignificant mean difference of 1.045 in favour of male staff. T-calculated of 0.409 is much less than t-critical of 1.96. all these show insignificance implying that there is no differences among male and female have the same level of awareness on safety procedures.

Question Three: is there difference in the awareness of safety procedures in the labs ?

Table 5: descriptive statistics differences in the awareness of safety procedures in the labs

One-Sample Statistics								
	N	Mean	Std. Deviation	Std. Error Mean	Df	t calculated	t critical	p
Awareness on safety procedures	30	36.1034	6.58106	1.22207	29	29.543	1.96	0.00

Outcome of the one sample t test statistics above showed that differences exist in the awareness of the different safety procedures among the staff. This is because the t-critical of 1.96 is much lower than the computed t value of 29.543. This shows a high level of significance Therefore the null hypothesis which state that there is no significant difference in the opinions of respondents on all the items of awareness of safety procedures in the lab is hereby rejected.

Health Risks Associated with the Absence of Each of the Occupational Safety Measure Above

Standard laboratory/workshop: improper waste discharge/disposal leading to contaminations and infection diseases. Also accident related injuries are very common because of inadequate spacing while tools are scattered everywhere within the lab/workshop without proper arrangement

Staffing: Tiredness, headache, fever, mental instability all resulting from over working due to fewer number of staff

Fire-extinguisher: Any incidents of small fire outbreak can lead to a bigger one causing burn, loss of properties and lives.

Functional First-Aid box: First-Aid services cannot be rendered, leading to too much loss of blood and even life when accidents occur.

Emergency Exit: Increases the risk of being trapped in case of any emergency evacuation.

Protective wear/gadgets: risk having direct contact with chemicals, injuries from sharp objects, electric shock, electrocution, inhaling dangerous gas.

Safety charts/guidelines: Electric shock, burns, frequent accident/injury, possible fire outbreak leading to loss of lives

Proper labeling of Items: mix up of items is inevitable, making identification difficult, foreign person find it difficult to work in the laboratory/workshop.

Cupboards/Shelves: Items will be scattered in the lab/workshop leading to frequent accident and injury, movement within the lab/workshop is restricted, risk of being trapped during emergency and sweeping/cleaning will be very difficult leading to the place being untidy,

Tool box/wrack: limited working space on the table, high accident/injury rate, frequent loss of working tools/equipments

Walk-way: risk being trapped during emergency, frequent accident/injury

Source of power: Poor lighting affects the eye, varicose veins, tiredness, headache, etc resulting from working manually.

Store: unnecessary exposure to dangerous chemicals/tools that can cause serious health problems like respiratory diseases, skin cancer, severe cut etc

Water supply: stress of long trekking to fetch water, general body pains etc.

Recommendations

This research should be carried out in all the States of the federation including Abuja (Federal Capital Territory). Government at all levels should enact relevant laws to protect this category of workers in their workplace. There is the need for the Secondary School Laboratory/Workshop workers to form a registered Labour/Trade Union to enforce their right to Occupational Safety and demand better Wages. There is the need for training this category of workers on hazard management and prevention.

Conclusion

From the results obtained through On-the-Spot assessment, it is obvious that the occupational safety measures put in place for laboratory/workshop workers in Secondary school is very low when weighed against the basic occupational safety measures required. About 70% of the secondary schools selected have no occupational safety measures in place for their laboratory/workshop workers while less than 30% shows varying degree of compliance. The analyses of the questionnaires reveal; that nomenclature (laboratory workers or technician) and gender (male or female) are not in any affecting level of occupational safety awareness. The level of awareness of occupational Safety among the laboratory/workshop workers among the secondary schools selected is high though it varies from worker to worker with the level of education of the worker playing a determinant factor. Those with SSCE certificate are more aware than those with primary school certificate. It is very important that every materials in the laboratory/workshop be labeled to avoid misrepresentation and every lab or workshop should have at least one exit door for escape in terms of any emergency

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