

Occupational Hazards: Knowledge, Attitude, And Perception Of Medical Laboratory Scientists In Nigeria

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Abstract: The Medical laboratory facility is known for carrying out different activities such as diagnosis of diseases, screening, and research in health-related matters and thus it stands the chance of increasing the risk of injury or ill health on staff involved with routine work (Ajayi, 2006). These activities that endanger the lives of the workforce is controlled via the introduction of a process which aims at protecting the health and safety of staff in the healthcare industry such as the laboratory. This study sought to understand the level of awareness and perception of Medical Laboratory Scientists on occupational hazards. The study was conducted among Medical Laboratory Scientists attending the annual Scientific conference organized by the Association of Medical Laboratory Scientists of Nigeria which held in Kaduna state, Nigeria in November 2017. Data generated were analyzed using SPSS version 21 and results were presented as descriptive in the form of percentages and frequencies. The study revealed that out of the one hundred and twenty questionnaires administered to the participants, only 86 returned their surveys giving a response rate of 71.6%. Based on the sex distribution, 57(66.3%) were males while 29(33.7%) were females. Majority of the respondents 75(87.2%) identified recapping of needles as a significant cause of occupational hazard. A total of 80(93%) were aware of safety precautions against occupational dangers in contrast to 1(1.2%) that were not aware of safety practices to prevent the occupational hazard. The use of gloves 76(88.4%) and laboratory gowns 71(82.6%) were the most practiced safety measures against the occupational hazard. This study shows that the level of awareness of respondents on occupational hazards and safety practices is high. However, findings from the study suggest that factors that militate against the application of these safety measures include negligence and carelessness on the part of the respondents. There is, therefore, need for urgent intervention on proper implementation, monitoring, and evaluation of safety measures application from both employers and the regulating body for the practice of Medical Laboratory Science in Nigeria.

Keywords: Occupational hazards, Medical Laboratory scientists, Nigeria

I. INTRODUCTION

The Medical Laboratories are facilities saddled with the responsibility of providing medical, diagnostic and research findings that are necessary for disease control and interventions to avert different health issues. The laboratory as a healthcare facility plays a vital role in the area of providing

support for medical, surgical and other paramedical groups. This role is carried out by investigating body fluids such as blood, serum, urine, sputum, muscle tissues, etc. for elucidating the cause of a disease, monitoring of treatment and other research purposes. In addition to carry out these enormous roles, the laboratory workers are required to utilize various equipment and reagents such as microscopes, multiple

types of auto analyzers for hematological and biochemical investigations, cell and tissue processing machines and different chemicals either prepared or purchased for carrying out various assays.

According to the WHO, 2009 hazards associated with medical occupations such as the laboratory may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Also, the hazard is described as a property of a substance, i.e., pathological or situation that is capable of inducing undesirable consequences. The occupational danger which has been researched in some different fields refers to activities in the workplace which have the chances to increase the risk of injury or ill health (Ajayi, 2006). These activities that endanger the lives of the workforce can be controlled via the introduction of a process which aims at protecting the health and safety of the staff in the healthcare industry. (Ajayi, 2006). The high rates of mortality and morbidity which is reflected in an estimated 100,000 deaths annually and about 400,00 diagnosis of new cases of occupational diseases resulting from workplace has necessitated the introduction of occupational health and safety (Bell, 2013). The Medical laboratory worker is potentially at risk of different types of hazards that may stem from the environment in which work is carried out to the materials being used in the cause of routine action. For example, chemicals have been associated with numerous health challenges ranging from cancers, male / female infertility disorders and chronic noncommunicable life-threatening public health concerns (Cruz-Morató, 2014, WHO, 2017). An insight in the level of understanding and perception of laboratory workers on occupational hazards may assist in the design of behavior change interventions in various ways by promoting an understanding of environmental and occupational hazards posed by multiple agents such as chemicals, body fluids, and consumables used in the laboratory. (Curtis, 2016).

In Nigeria, the number of hospitals, pharmaceutical, and diagnostic centers has increased dramatically with an increase in the number of medical laboratories also attached to these facilities. However, inadequate human resource management system such as inadequate welfare, two shift work duty with 12 hours working system, inadequate training, lack of information about causes of occupational hazards and preventive measures are the prevailing norm in the majority of the hospitals and diagnostic centers (Aluko, 2016).

The WHO, 2002 classified hazards in Healthcare facilities into six (6) categories namely: physical, biological, mechanical, ergonomic, chemical and psycho-social. According to Aluko, 2016, some of the predominant hazard associated with the Healthcare workers include blood-borne infections [Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV) and Hepatitis C virus (HCV)]. Others include stress, allergic reactions to latex materials, spills from chemicals, exposure to radiation, assault from patients. Research has shown that most work related to occupational hazards have been documented among healthcare providers such as doctors, nurses and ward attendants. However, not much is known about the attitude of laboratory workers regarding occupational hazards (Amosun, 2011).

This work is therefore aimed at understanding the knowledge, perception, and experiences of selected Medical laboratory Scientists in Nigeria regarding occupational hazards. The choice for this group of laboratory staff is based on the premise that they serve as the final authority in matters that relate to the laboratory workplace such as supervision of activities, training of other workers and carrying out different laboratory assays. The primary objectives of the study are:

- ✓ To examine the understanding and perception of Medical laboratory scientists regarding occupational hazard.
- ✓ To evaluate the attitude and practice of medical laboratory scientists towards occupational hazards.
- ✓ To offer suitable suggestions to protect health from the impact of occupational hazards associated with Medical Laboratory Practice.

II. METHODS

This study was conducted among Medical Laboratory Scientists attending the annual Scientific conference organized by the Association of Medical Laboratory Scientists of Nigeria which held in Kaduna state, Nigeria in November 2017. It was a cross-sectional study which was descriptive using quantitative data collection methods. The study was conducted using pretested self-administered questionnaires that were distributed to qualified Medical Laboratory Scientists attending the conference.

The questionnaire consisted of both open and closed-ended questions which assessed the demographic characteristics of the participants such as age, sex, years of practice, educational qualification. Also, information regarding knowledge and perception of occupational hazard was also obtained from the administered questionnaire. It also included questions on the types of hazards respondents was aware in addition to different preventive measures for the different types of dangers and perceptions of respondents regarding the role of employers in the prevention of risks associated with hazards.

A total of one hundred and twenty (120) questionnaires were distributed after Informed consent was obtained from the respondents. All personal identifiers were removed from the data and confidentiality maintained. Collected filled questionnaires were entered in data form and analyzed using SPSS 21 version. The results were presented as descriptive in the way of percentages and frequencies.

III. RESULTS

The socio-demographic characteristics of respondents are presented in Table 1. The study revealed that out of the one hundred and twenty questionnaires administered, only 86 returned their survey with a response rate of 71.6%. Based on the sex distribution, 57(66.3%) were males while 29(33.7%) were females. Participants between the ages of 31-40 years constituted 34.9% while age group >50 years had 17.4% participants. Overall most of the participants were married (74.4%) while 40.7% had a Bachelor's degree as their highest educational qualification and participants with fellows were

the least in number(4%). Based on the years of experience as a Medical Laboratory Scientists, thirty-eight percent(33) had between 6-10years working experience while twenty-six percent had between 1-5years working experience.

Demographic variables	Frequency	Percentage (%)
Age group in years		
≤ 30	17	19.8
31-40	30	34.9
41-50	24	27.9
>50	15	17.4
Sex		
Male	57	66.3
Female	29	33.7
Religion		
Christianity	62	72.1
Islam	24	27.9
Marital status		
Single	22	25.6
Married	64	74.4
Highest educational qualification		
Associate	18	20.9
Bachelor's degree	35	40.7
Master's degree	29	33.7
Fellow	4	4.7
Work experience in years		
1-5	23	26.7
6-10	33	38.4
>10	30	34.9

Table 1: Socio-demographic characteristics of study participants

The knowledge of respondents on occupational hazards is shown in table 2, ninety-seven percent (84) of the respondents were knowledgeable regarding occupational dangers while two percent had no response. Respondents knew the difference between professional and nonoccupational hazard as 84.9% identified early arrival at work as a nonoccupational hazard. Also, 44(51.2%) of the respondents stated that the most common source of infection in the laboratory is direct contact with blood and body fluids while 2(2.3%) were of the opinion that body contact was a significant source of infection in the laboratory. Majority of the respondents 75(87.2%) identified recapping of needles as a substantial cause of occupational hazard while 1(1.2%) identified handling of equipment before use as a source of risk in the laboratory. Regarding safety measures to prevent occupational cross infection after procedures, 84(97.7%) were aware that hand washing was an essential measure while 1(1.2%) were not mindful of the importance of hand washing(Table 2).

Questions	Frequency	Percentage (%)
Do you know about occupational hazards?		
Yes	84	97.7
No	-	-
No response	2	2.3
Which of the following is not an occupational hazard?		

Noise	4	4.7
Needle stick injuries	3	3.5
Early arrival at work	73	84.9
Body contamination with patient's body fluids	2	2.3
No response	4	4.7
The most likely source of infections is one of the following:		
Air-borne	34	39.5
Feces and urine	3	3.5
Blood and body fluid	44	51.2
Body contact	2	2.3
No response	3	3.5
During which of the following activities is a needle stick injury most likely to occur?		
Recapping	75	87.2
Transporting to the sharp's disposal safety box	6	7.0
Handling equipment before use	1	1.2
Handling equipment after disposal	4	4.7
Hand washing is proper to prevent occupational cross infection after procedures		
Yes	84	97.7
No	1	1.2
No response	1	1.2

Table 2: Knowledge of occupational hazard among respondents

Table 3 shows the awareness level of occupational hazards and safety practices with a total of 80(93%) respondents being aware of safety precautions against occupational dangers in contrast to 1(1.2%) that were not aware of safety practices to prevent the occupational hazard. The use of gloves and laboratory gowns were the most practiced safety measures against the occupational risk, ie, 76(88.4%) and 71(82.6%) respectively in contrast to the 81(94.2%) that were aware of these measures. On the other hand, 60(69.8%) of the respondents were aware that immunization for tetanus was a critical safety measure for prevention of occupational hazard. However, 39(45.3%) practiced ensuring that they were well immunized against these diseases.

Awareness and practice	Frequency	Percentage (%)		
Are you aware of safety precautions against occupational hazards?				
Yes	80	93.0		
No	1	1.2		
No response	5	5.8		
Which of the following are you aware of and which do you practice				
Precautions	Aware		Practice	
	Yes	No	Yes	No
Hand washing with	79(91)	1(1.2)	6(7.0)	71(82.6)
			5(5.8)	10(11.8)

the bactericidal agent	.9)	2)	2.6)	8)	6)	
Barrier methods	64(74.4)	7(8.1)	15(17.4)	60(69.3)	8(9.3)	18(20.9)
Gloves	81(94.2)	2(1.2)	4(4.7)	76(88.4)	1(1.2)	9(10.5)
Gowns	81(94.2)	-	5(5.8)	71(82.6)	6(7.0)	9(10.5)
Eye goggles	74(86.0)	3(3.5)	9(10.5)	41(47.7)	29(33.7)	16(18.6)
Nose masks	75(87.2)	4(4.7)	7(8.1)	54(62.8)	18(20.9)	14(16.3)
Environment control	78(90.7)	2(2.3)	6(7.0)	63(73.3)	2(11.6)	13(15.1)
Safe disposal of sharps	78(90.7)	1(1.2)	7(8.1)	71(82.6)	6(7.0)	9(10.5)
Complete immunization of Hepatitis B	77(89.5)	2(3.3)	6(7.0)	56(65.1)	17(19.8)	13(15.1)
Complete immunization of Tetanus	60(69.8)	5(5.8)	21(24.4)	39(45.3)	20(23.3)	27(31.4)
Prophylactic treatment and procedures following exposure	72(83.7)	5(5.8)	9(10.5)	48(55.8)	18(20.9)	20(23.3)
Correct body posture during procedures	63(73.3)	14(16.3)	9(10.5)	55(64.0)	18(20.9)	13(15.1)

Table 3: Awareness of occupational hazards and safety practices among study participants

In this study, as shown in table four, 78(90.7%) of the respondents were of the opinion that occupational hazard is a health issue that should be taken seriously and necessitated prompt attention. Regarding the prevention of occupational hazard as a joint responsibility of the laboratory management and medical laboratory staff, 75(87.2%) agreed to this. Also, 40(46.5%) of respondents felt the extra attention paid to occupational hazard was not an unnecessary burden. The training of staff and provision of personal protective equipment (PPE) were identified as essential for reducing the risk of exposure to occupational hazard as reflected in the study which had 74(86%) respondents in support. Aprons and face masks were also recognized by most of the participants (91.9%) as necessary personal protective wears that should be used in procedures where splash/spill of blood is likely. A total of 66(76.7%) of participants agreed that washing of hands after contact with each patient and placing disposal boxes within a few feet from the place of laboratory tests were essential considerations for the prevention of health hazards associated with medical laboratories. On issues regarding recapping of needles after use, 57(66.3%) believed that used needles should never be recapped. A total of 66(76.7%) of the participants strongly agreed that all laboratory staff should be immunized against HBV, measles, mumps, rubella, and influenza while 48(55.8%) felt that prolonged standing should be avoided by all laboratory workers. Also, 41(47.7%) respondents were firmly in agreement that punitive sanctions

should be applied on defaulting staff members as they believed that it would deter other staff from defaulting. Regarding the need for a review of exposure and control policies, 64(74.4%) acclaimed the need for this action as an intervention for prevention of occupational hazard.

Directions	SA	A	UD	D	SD
The occupational hazard is an issue that should be taken seriously and given prompt attention in the hospital	78(90.7)	1(1.2)	2(2.3)	1(1.2)	4(4.7)
Prevention of occupational hazards is a joint responsibility of the hospital management and the staff	75(87.2)	7(8.1)	3(3.5)	-	-
Paying extra attention to occupational hazard is an unnecessary burden on me	7(8.1)	6(7.0)	4(4.6)	29(33.7)	40(46.5)
Training of staff and provision of personal protective equipment is necessary to reduce the risk of exposure to occupational hazard	74(86.0)	10(11.6)	2(2.3)	-	-
Aprons and face masks should be worn in procedures where splash/spill of blood is likely	79(91.9)	4(4.7)	2(2.3)	-	1(1.2)
Gloves should always be worn when drawing blood	76(88.4)	5(5.8)	2(2.3)	1(1.2)	2(2.3)
Hands should be adequately washed after each contact with a patient.	66(76.7)	11(12.8)	4(4.7)	5(5.8)	-
Used needles should never be recapped	57(66.3)	7(8.1)	8(9.3)	6(9.3)	8(9.3)
Sharps should be disposed in sharp's boxes	77(89.5)	4(4.7)	4(4.7)	-	1(1.2)
Disposal boxes should be located within a few feet of where you practice	66(76.7)	13(15.1)	4(4.5)	1(1.2)	2(2.3)
HBV, measles, mumps, rubella and influenza vaccines should be received by all laboratory	66(76.7)	10(11.6)	7(8.2)	2(2.3)	1(1.2)

workers						patients, equipment						
Prolonged standing should be avoided by all labs. workers	48(55.8)	21(24.4)	14(16.3)	3(3.5)	-	Chemical spill	21(24.4)	5(5.8)	3(3.5)	8(9.3)	39(45.3)	10(11.6)
All exposures to occupational hazards should be reported to and appropriately documented by appropriate authorities	71(82.6)	12(14.0)	-	-	-	Assaults from patients	11(12.8)	1(1.2)	3(3.5)	9(10.5)	52(60.5)	10(11.6)
Adequate staffing of hospitals is a way of reducing occupational hazards	47(54.7)	19(22.1)	7(8.2)	10(11.6)	3(3.5)	Assaults from co-workers	8(9.3)	7(8.1)	1(1.2)	5(5.8)	55(64.0)	10(11.6)
There should be provision of incentives for adherence to universal safety precautions	35(40.7)	24(27.9)	14(16.3)	12(14.0)	1(1.2)	Assaults from patient's relative	12(14.0)	3(3.5)	-	6(7.0)	53(51.6)	12(14.0)
Punitive actions should be taken against violators of safety practices	41(47.7)	21(24.4)	3(3.5)	6(7.0)	-	Work overload	12(14.0)	1(1.2)	10(11.6)	39(45.3)	15(17.4)	9(10.5)
Exposures and control policies should be regularly reviewed by the hospital management	64(74.4)	19(22.1)	3(3.5)	-	-	Sleepless nights	13(15.1)	5(5.8)	2(2.3)	23(26.7)	34(39.5)	9(10.5)
						Poorly ventilated working environment	7(8.1)	5(5.8)	2(2.3)	12(14.0)	49(57.0)	11(12.8)
						Anesthetic gases	3(3.5)	-	1(1.2)	1(1.2)	69(80.2)	12(14.0)
						Fire outbreak	8(9.3)	-	-	-	69(80.2)	9(10.5)

Table 5: Occupational hazard conditions in the last two months

A look at the predisposing factors for occupational hazards as noted by the respondents indicates that negligence and carelessness on the part of the workers were the primary agreed cause of occupational hazard 61(70.1%). This was also the finding of Aluko,2016 who observed that among doctors, nurses and ward attendants, the primary factor that contributes to occupational illness is negligence. Furthermore, previous work by Aluko, 2016 showed that occupational hazards among Hospital care Providers ranked among the highest of any industry though could be reduced or eliminated. Some of the other noted predisposing factors of occupational dangers by the respondents were lack of protective aids, equipment (65.1%) and lack of commitment on the part of management to invest in infection control programs (61.6%).A fewer percentage of the respondents,34.9%, agreed that lack of awareness about safety practices in health settings was a predisposing factor for occupational hazard associated with the medical laboratories.

Factors	Agree	Disagree	Not sure	Don't know
Inadequate hand washing facility	38(44.2)	26(30.2)	-	22(25.6)
Lack of awareness about safety practices in health settings	30(34.9)	32(37.2)	2(2.3)	22(25.6)
Lack of commitment on the part management to invest in infection control programs	53(61.6)	18(20.9)	5(5.8)	10(11.6)
Individuals negligence and carelessness	61(70.9)	15(17.4)	1(1.2)	9(10.5)
Lack of adequate	56(65.1)	20(23.3)	1(1.2)	9(10.5)

SA-Strongly agree, A- Agree, UD-Undecided, D-Disagree, SD-Strongly disagree

Table 4: Attitude towards hazards/safety practices

This study shows that occupational hazards associated with anesthetic gases, fire outbreak, needle pricks, latex allergies, constant exposure to radiation had never been encountered by the majority of the respondents in the last two months (80.2%, 77.9%, 75.6% and 74.4% respectively). On the other hand, the most commonly encountered occupational hazard, i.e., more than three times in two months was work overload 39(45.3%).

Hazard	Once	Twice	Thrice	>thrice	Never	No response
Needle pricks	7(8.1)	1(1.2)	-	2(2.3)	67(77.9)	9(10.5)
Latex allergies	4(4.7)	2(2.3)	11(12.8)	4(4.7)	65(75.6)	11(12.8)
Constant exposure to radiation	6(7.0)	1(1.2)	11(12.8)	4(4.7)	64(74.4)	11(12.8)
Direct contact with body fluids	15(17.4)	6(7.0)	3(3.5)	4(16.3)	38(44.4)	10(11.6)
Trips, slips and falls	12(14.0)	5(5.8)	-	2(2.3)	56(65.1)	11(12.8)
Heavy lifting, e.g.,	10(11.6)	2(8.1)	2(2.3)	5(5.8)	52(60.5)	10(11.6)

protective aids and equipment				
Shortage of staff	43(50.0)	25(29.1)	7(8.1)	11(12.8)
Prolonged standing	40(46.5)	25(29.1)	10(11.6)	11(12.8)
Inadequate knowledge of the usage of modern facilities	41(47.7)	25(29.1)	9(10.5)	11(12.8)

Table 6: Predisposing factors for occupational hazards in workplace

IV. DISCUSSION

Medical Laboratories are workplaces where infections are likely to dominate, and disease pathogens are harbored by body fluids. This condition could be aggravated by specific factors such as unavailability of necessary protective measures, excessive workload, insufficient training for laboratory workers on safety practices in the laboratories, lack of policy on the standard requirement for training and retraining of laboratory workers among others, especially in developing countries. As a result of the nature of work carried out by most medical laboratories, there is a high risk of health issues such as injuries and diseases which could be described as occupational hazards. Gustavsson, 2017 reported cancer-related diseases among laboratory workers in Sweden which is currently on the increase. Medical Laboratory scientists as the overall heads in all Medical laboratories are saddled with the responsibility of both diagnosis and administrative role, and this will require adequate knowledge of occupational hazard and safety measures.

Our study showed that most respondents were males which is different from the work done by Aluko, 2016 in the southern states of Nigeria where he observed that females were more because of the nurse's involvement in the research. The findings of more participants being married and between the ages of 30-41 years is similar to the work of Aluko, 2016 and Manyele, 2008 who carried out research in different countries and found that the mean age for health workers in their study was 33 years. This further shows that majority of workers involved with laboratory work are young and still at their peak reproductive age. The finding of a higher number of participants with a bachelor's degree with between 5-10 years working experience shows that laboratory workers have the first degree to practice as professionals having acquired both knowledge and experience which are necessary for carrying out various diagnostic tests.

According to the Concise Oxford dictionary, knowledge is information and skills, acquired through experience and education. Based on this definition, awareness of potential occupational hazards and safety in medical laboratories is the basis for a positive attitude which will translate to behavior. In line with this, most respondents were aware of the different types of hazard in addition to the differences between occupational and nonoccupational hazards. The identification of recapping of needles and contact with body fluids as the most common cause of occupational risk is a significant finding in this study. This was also the findings of Aluko, 2016

who carried out a similar work among Healthcare providers in southern Nigeria. The importance of hand washing was reiterated by respondents who noted that this is an important safety measure in the prevention of hazards associated with working in the Medical Laboratory.

The current study brought out the level of awareness of respondents on occupational hazards and safety practices which was high as most respondents knew the methods that will prevent the occupational hazard. The most practiced safety measure by these respondents is the use of gloves and laboratory gowns. On the other hand, our work revealed that although a high percentage of laboratory scientists were aware that immunization for tetanus was an critical safety measure for prevention of occupational hazard, only a few indeed ensured they were immunized from common infectious agents.

This study has helped in gaining a better insight regarding the attitude of respondents regarding occupational hazards which is a significant public health issue requiring urgent intervention. Also, most of the respondents viewed the prevention of occupational hazard as a joint responsibility of the laboratory Management and medical laboratory staff. The training of staff and provision of personal protective equipment (PPE) identified as essential for reducing the risk of exposure to the occupational hazard agrees with the work of Aluko, 2016. Findings of this study regarding the need to avoid recapping of needles are in line with various studies by different researchers, it is surprising, however, that a few participants advocated for the recapping of used needles. More work will be required in the area of providing more education on the proper disposal procedure for used needles in addition to the production of syringes and needles that can be destroyed soon after use. Immunization of laboratory workers against infectious diseases like HBV, measles, mumps, rubella, and influenza was seen as necessary for the prevention of occupational hazards. However, our study shows that only a few participants engaged this preventive measure. Bearing in mind that prevention of occupational hazard is a joint effort of both workers and staff, it might be worthwhile for all Medical laboratories to ensure that all incoming staff are well educated and immunized based on the recommendations of the World Health Organization. The issue of punitive sanctions for staff members who do not comply with the safety measures may be an option that will help in reducing occupational hazards in the Medical laboratories. With the rising number of different diseases associated with the workplace, it might be necessary to review the safety policies on the ground for Medical laboratories in developing countries.

V. LIMITATION

The cross-sectional nature of the study design is a major limitation as findings cannot be generalized to other environments since the participants were attending a scientific conference in a different climate from their place of work. A study carried out in the setting of the workers will provide a better view of work-related hazards. Also the use of questionnaires is also a source of respondent's bias which is also a source of limitation for this present study.

In Conclusion, this work that set out to understand the awareness and perception of Medical Laboratory Scientists in Nigeria regarding work hazard has revealed that in general, the level of knowledge is high. However, negligence and carelessness on the part of workers have hindered the utilization of safety measures that could reduce the effects of this public health issue. The need for involvement of the government in the provision of the safe environment for the practice of laboratory medicine also of timely monitoring and public health promotion programs on occupational hazards will also go a long way in prevention of occupational risks associated with the medical laboratories.

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