Assessment Of Safety Consciousness and Practices of Medical Laboratory Workers in Hospitals and Laboratories In Port Harcourt Metropolis

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ABSTRACT

This study investigated the safety consciousness and practices of medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis. The descriptive survey design was used for the study. The population of the study comprised of four hundred and seventy-five (475) laboratory professionals working in selected medical laboratories in Port Harcourt metropolis, with a sample size of 217 laboratory professionals which was determined using the Taro Yamane formula, and selected using the multistage sampling technique. A structured questionnaire was used for data collection and analysis was done using descriptive statistics such as percentage, mean and ANOVA. The finding of the study showed that there was no significant difference between age and consciousness to general laboratories safety among medical laboratory workers [F (3, 210) = 2.002; p>0.05]; there was significant difference between educational qualification and consciousness to general laboratories safety among medical laboratory workers [F (2, 210) = 1.936; p>0.05]; there was significant difference between years of experience and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis [F (3, 210) = 1.473; p>0.05]; amongst others. The study concluded that medical laboratory workers in Port Harcourt metropolis have good Knowledge, consciousness and practice towards laboratory safety. However continuous training is required. It was recommended that, laboratory technicians should not relent in their effort to get enlightenment on the occupational hazards associated with their job by continuous search for relevant information through different channels, this will enable them get acquainted with emerging hazards and how to control them.

Keywords*: Safety, Consciousness, Medical laboratories, Workers, Hospital, Port Harcourt.*

INTRODUCTION

Background to the study

Medical laboratories are clinical departments that engage in the analysis of clinical specimens or patient samples to derive information about the health of a patient to aid in the diagnosis, treatment and prevention of diseases. Standard medical laboratories accommodate various biomedical equipment, chemical reagents and other devices for performing diagnostic analysis. The clinical specimens employed in such analysis include blood, serum, plasma, urine, stool, etc. (Obeta et al., 2019).

Medical laboratories are essential units of hospitals and other health institutions and they are associated with a variety of occupational hazards to the workers who serve in them and this constitute a significant public health issue. Therefore, laboratory safety is a vital and crucial component to the success of any medical laboratory (Eden, 2018).

Occupational hazards are defined as potential risks to the health of persons due to any activity, situation, processes or materials at the workplace (World Health Organization, WHO, 2010). It is evident that laboratory workers are predominantly faced with many occupational risks and their health and work efficiency are severely affected. Therefore, it is important that they employ adequate safety consciousness and practices (Zaveri & Karia, 2012).

The medical laboratory staff comprise of highly skilled scientists (microbiologists, clinical laboratory technologists, technicians, pathologists, chemists and other specialists) who perform diagnostic testing of several clinical specimens. Their role is to supply accurate laboratory data that help physicians to form proper diagnoses, and determine the appropriate treatment options for their patients (Donna, 2021). These groups of workers are exposed to toxic gases, fumes and chemicals which can cause acute poisoning, suffocation, burns, and other traumas as a result of workers' error, equipment failure, or other accidental reasons.

Medical laboratories have been termed one of the highest risk prone workplaces due to the exposure to multiple occupational hazards. It is therefore very vital that the laboratory workers adopt and implement safety practices to curb these hazards that may impact on their health and work efficiency.

A number of factors which have been identified to contribute to hazards in medical laboratories include mishandling of specimen, limited knowledge regarding the right protocols during an emergency, lack of experience working with harmful substances and reagents, lack of spatial and environmental awareness, carelessness with respect to occupational hazards, failure to use adequate protection (Mehrifar et al., 2016)

Because of the high prevalence of related illness and death among exposed employees, Occupational Safety and Health (OSH) is a critical problem for medical laboratory workers (Aluko et al, 2016). Over 2.3 million people are expected to die each year as a consequence of workplace accidents and diseases (Tait et al, 2018). However, these risks of exposure can be significantly reduced if medical laboratory staff have high level of consciousness and strict adherence to

biosafety practices set out in the professional guidelines by the US Centre for Disease Control called the "standard precautions" (Ayalu et al, 2011). Hand hygiene, the use of Personal Protective Equipment (PPE), sharps safety, cleaning and disinfection, respiratory hygiene/cough etiquette, safe injection techniques, and waste disposal are all examples of preventative measures (CDC, 2018). Medical laboratory workers need to be enlightened about the hazards and risk involved in their job and the consequences it could have on their health and wellbeing so that dangers can be averted and accidents eradicated (Walter et al., 2017). They therefore need to adhere to strict safety standards.

Safety is a strategy for avoiding dangers or minimising the harm to people or property that may occur as a consequence of an accident. Because of the inherent hazards in handling hazardous and infectious clinical samples or specimens, health and safety are key considerations in a medical laboratory. By fostering excellent laboratory techniques and providing appropriate safety equipment, these dangers may be prevented or decreased. Despite the fact that rules control health and safety activities in the workplace, safety workshops and trainings are essential to encourage excellent safety practises, and the situation varies by laboratory (Shnawa, 2017).

All staff and the employer are responsible for laboratory safety. Medical labs provide a number of occupational dangers to laboratory employees, since they are constantly exposed to potentially hazardous biological agents and are at a greater risk of contracting a biological laboratory-related infection. Several published reports have shown that laboratory-associated infections of emerging and re-emerging diseases pose a threat to medical laboratory workers, who are at risk of contracting a wide range of infectious diseases, including the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV), among others (Reddy et al., 2017).

Protective barriers such as gloves, gowns, aprons, masks, or protective eyewear are used in medical labs as part of worldwide safety measures and good laboratory practises to decrease the risk of infection (Manyele et al., 2008). For aerosol-generating operations, biological safety cabinets with biosafety level 2 procedures and fit-tested respirators with an N-95 rating should be used and examined on a regular basis (Khasawne, 2014).

Due to the importance of medical laboratory in health care delivery, as well as the health and safety of the workers, this study was aimed at assessing and understanding the safety consciousness and workplace practices of medical laboratory workers in selected hospitals in Port Harcourt metropolis. This study also sought to understand the varieties of hazards that are prevalent in the medical laboratory. It also emphasizes Occupational Health and Safety among the medical laboratory practitioners; as well as to aid the development of more policies and Occupational Health initiatives.

Statement of the Problem

The burdens associated with occupational hazards in the medical laboratory practice prompted the need for this study. In a developing country such as Nigeria, there is deficient consideration for safety consciousness and practice among medical laboratory workers. There is also the need for more empirical data for Occupational Health and Safety Initiatives as well as Public Health

initiatives which will help in the development of national policies which will revolve around the health, well-being and work place efficiency of medical laboratory workers. Therefore, the need to take into cognizance the safety consciousness and practice among medical laboratory workers in Nigeria becomes of utmost importance. Presently there is paucity of published studies on occupational hazards affecting medical laboratory workers in Port Harcourt metropolis. This study intends to contribute towards filling this knowledge gap amongst workers in this vital healthcare sector.

Aim and Objectives

The aim of this study was to assess the safety consciousness and practices of medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis

The objectives were to;

1. Determine the level of knowledge of biosafety practices among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis.
2. Ascertain the consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis.
3. Determine the occupational safety measures among medical laboratory workers in hospitals and laboratories in Port Harcourt.

Research Questions

The following questions guided the study:

1. What is the level of knowledge of biosafety practices among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis?
2. What is the consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis?
3. What are the occupational safety measures among medical laboratory workers in hospitals and laboratories in Port Harcourt?

Research Hypotheses

The following hypotheses were tested at 0.05 alpha levels.

HO_1: There is no significant difference between age and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis.

HO_2: There is no significant difference between educational qualification and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis.

HO_3: There is no significant difference between years of experience and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis.

Conceptual Review

Occupational Hazard

A hazard is any substance, process or situation that predisposes to or itself causes accident or diseases (Asuzu, 1994). People in different professions are faced with conditions and situations that are associated with their line of work which are hazardous to their wellbeing. Occupational hazards are things that pose danger to life, health and property while at work (Onumbu, 2018). Occupational hazards are hazards encountered in the work environment. Hazards in the workplace can take the form of objects, equipment, materials, conditions, settings and practices. According to Oppong (2011) they are aspects of the workplace (human and nonhuman) that have the potential to cause gradual deterioration in a worker's health and/or have the potential to cause injuries, health, and/or damage to property.

Physical Hazards

A physical hazard is defined as "A factor within the environment that can harm the body without necessarily touching it". Physical hazards in the work environment are experienced in the physical way (Onyia, 2011). These include noise, vibration, temperature, illumination and radiation (Prashar & Bansal, 2015). Others are electricity, pressure and heights. The resultant effects according to Gupta (2010) of exposure to physical hazards could be hearing or visual loss, heat exhaustion or stroke. Slips, trips and falls could also occur due to the amount of items and equipment stored in the laboratory. Cuts can occur from sharp or broken work glass materials. Hot and sharp apparatus can also cause injuries in the laboratory. Lifting of heavy equipment can lead to musculoskeletal injuries like back pain and sprains. Electrical shock and fires can occur from faulty equipment, electrical points positioned close to liquid, and use of incorrect or exposed cords and plugs.

Chemical Hazards

A chemical can be considered a hazard if by the virtue of its intrinsic properties it can cause harm or danger to humans, property or environment. Hazards associated with chemicals are also dependent on the dose or amount of the chemical that the worker is exposed to. The resultant effects of these chemicals hazards are detrimental to health. Some of these chemicals can be harmful if accidentally swallowed, or if they come in contact with bare skin or the eyes. These chemicals can also become dangerous to persons when inhaled or absorbed through the skin. Among these are the corrosives, flammables, reactive and toxins. Many organic and inorganic chemicals are corrosive to the skin and to eyes, and they could be toxic also. Chemical reactions which generate heat or vapors can cause thermal burns to the skin, and` inhalational injuries and burns to the respiratory airway mucosa. Similarly, inhalation of certain chemicals that are toxic

can be dangerous, with immediate or slow manifestation of the effect over time. Ingesting chemicals due to contamination on hands, food and drinks is another huge problem in laboratories. Chemical reactions can also lead to fires and explosions.

Biological Hazard

Biological hazards are living things or substances produced by living things that can cause harm or illness in humans (Gupta, 2010). These are bacteria, viruses, fungi, parasites and protozoa or their products. These can come as micro-organisms, cell culture or human endo-parasites whether or not genetically modified. These can cause acute or chronic infections, parasitism, toxic and allergic reactions. These organisms or their substances can enter the body through inhalation, ingestion and absorption (Amanze & Agu, 2014). Biological hazards can also be considered to include biological vectors or transmitters of disease.

Exposure to biological hazards in the work environment can also occur when people are in contact with laboratory cell cultures, soil, clay and plant materials, organic dusts, food, as well as rubbish, wastewater and sewerage. Also the handling of human bodily matter, such as blood, tissues, saliva, mucous, urine and faeces, can lead to infections.

Psychosocial Hazard

Psychosocial hazards are hazards that have effect on the mental state of a worker. Psychosocial hazard is a combination of psychological and social factors emanating from the work environment that can result in risk to psychological health. These may arise from organizational or personal factors. According to Gupta (2010) workplace stressors can lead to stress or distress, and have been identified as illness inducing factors. Psychosocial stressors in the workplace may include violence within and outside the organization, sexual harassment, burnout, mobbing, emotional and verbal abuse (Amanze and Agu, 2014). Others are job insecurity, lack of job satisfaction and poor human relations in the organization (Onumbu, 2018).

Ergonomic Hazard

Ergonomics is defined by Jain and Rao (2007) as the scientific study of the relationship between man and his working environment including his tools, materials, methods and organization of work. Ergonomics deals with the 'fit' between people and their work. Thus, ergonomics takes into consideration the workers capabilities and limitations, and ensures that equipment and the environment suits the worker. By this, productivity is maximized and fatigue reduced (Labyrinth, 2003).

Ergonomic hazards as defined by Onumbu (2018) as actual approaches to work expositions and designs that may be harmful to the worker or properties in a work or work – related area. In ergonomics, the following is taken into consideration. These would include the task assigned to the worker and its' demands on the worker, the equipment used (its size, shape and how appropriate it is for the task) and the physical and social environment (temperature, humidity, lighting, noise, vibration as well as teamwork and supportive management).

Occupational Diseases Associated with Laboratory Workers

An "occupational disease" is any disease contracted primarily as a result of an exposure to risk factors arising from work activity. Work-related diseases have multiple causes, where factors in the work environment may play a role, together with other risk factors, in the development of such diseases (World Health Organisation, 2019).

Laboratory-acquired infections can occur from exposure to a wide variety of bacteria, viruses, fungi, and parasites especially those in microbiology laboratory. Exposures may occur inadvertently or from lapses in technique leading to accidental inoculation (Robert and Kamaljit, 2009). Bacterial infections account for the largest proportion of infections (43%) in diagnostic laboratories, with over 37 different species reported (Pike, 1976). Common among them are Salmonellosis, shigellosis, Brucellosis, tuberculosis, and meningococcal diseases.

Burnouts, mental fatigue and anxiety disorders can occur from excess workloads, workplace violence and harassment.

Substance use disorders and drug abuse result from use of substances like alcohol, caffeine, sedatives and Opioids to cope with workplace stress.

Poor posturing, lifting of heavy objects, and standing and sitting for long periods of time can lead to musculoskeletal disorders like back injuries and pain, spinal disc injuries and osteo-degenerative diseases.

Hypersensitivity reactions to work reagents and materials like latex gloves can lead to diseases like occupational asthma, dermatitis and conjunctivitis.

Blurred vision, excessive tearing, and in some cases refractory errors has arisen from use of defective or obsolete microscopes and poor lighting.

Theoretical Framework

Social Learning Theory (SLT)

The Social Learning Theory was proposed in the 1960's by Albert Bandura. It then evolved into the Social Cognitive Theory (SCT) in 1986 (McLeod, 2016). It states that, learning takes place in a social scenario through a mix of different interaction between a person, environment and behaviour. The theory examined the influence of a person's past experience on their future action and interactions. It studied how previous experiences influence and justify expectations and perceptions which culminate in shaping how a person will engage in a certain behaviour. The SLT specified reciprocal determinism, attitudinal capacity, observational learning, re-enforcement, expectation and self-efficacy as parameters that influence attitudinal changes.

It is expected that the medical laboratory workers must have the satisfactory knowledge of carrying out their duties so as to avoid the health accidents due to insufficient knowledge. The technical knowledge they have in performing the job will enable them to overcome some hazardous predicaments. Therefore, the medical laboratory workers should be engaged through training and re-training as more workers are employed or recruited to have the knowledge for desired attitudinal change.

In the long run, the implication of this theory is that when medical laboratory personnel have knowledge and understanding of inherent health hazards in their work place and their susceptibility to such hazards in their work place, they will recourse to an effect-benefit analysis and take possible precautions to control hazards that exist in the workplace.

Empirical Review

Mukhtad, Aminese, Mansor, Mansour and Elmesmary (2018) carried out a study on ergonomic risk assessment among Healthcare Laboratory Technicians in Benghazi Medical Centre, Libya. Findings showed that 67 (65%) were suffering pain, 14 (13.6 %) stiffness and 22 (21.4 %) fatigue. Furthermore, results showed the areas of pain as 46.3% suffer from low back pain, 14.9% suffer shoulder pain, 13.4% suffer arm pain and 1.5% suffer from leg pain. On the other hand, data outcome presented that 94% of medical laboratory technicians do not conduct any safety training program.

El-Helaly, Balkhy, and Vallenius (2018) carried out a study on carpal tunnel syndrome among laboratory technicians in relation to personal and ergonomic factors at work. Results showed that the prevalence of CTS among the laboratory technicians was 9.7% (27/279). The following were the statistically significant risk factors for CTS among them: gender (all cases of CTS were female, P=0.00), arm/hand exertion (OR: 7.96; 95% CI: 1.84-34.33), pipetting (OR: 7.27; 95% CI: 3.15-16.78), repetitive tasks (OR: 4.60; 95% CI: 1.39-15.70), using unadjustable chairs or desks (OR: 3.35; 95% CI: 1.23-9.15), and working with a biosafety cabinet (OR: 2.49; 95% CI: 1.11-5.59). CTS cases had significant longer work duration (17.9 ± 5.6 years) than CTS non-case (11.5 ± 7.4 yeas) with low OR (1.108). . The mean age of all participants was 37.22 ± 9.5 years and most of them were female (67.9%), non-smokers (91.8%), with bachelor's degrees (80.3%) and a mean BMI of 26.71 ± 4.63.

Tait, Mburu, and Gikunju (2018) conducted a study on occupational safety and health status of medical laboratories in Kajiado County, Kenya. Findings revealed that the commonest type of hazards in medical laboratories include; bacteria (80%) for Biological hazards; handling un-labeled and un-marked chemicals (38.2%) for chemical hazards; and laboratory equipment's dangerously placed (49.5%) for Physical hazards. According to Pearson's Product Moment Correlation analysis, not-wearing personal protective equipment's was statistically associated with exposure to hazards. Individual control measures were statistically significant at 0.01 significance level. Only 65.1% of the factors influencing implementation of OSH in medical laboratories were identified. The Social demographic data showed that most (51.5%) of the respondents were females and the majority (60.3%) of respondents were aged 19-30 years with a combined mean age of 30.1 years ± 7.1 SD. The respondents were mostly of Diploma level of education (78.43%) and close to one-half of them had 2-5 years of experience. The study identified biological hazards in Phlebotomy, specimen processing area, waiting bay and at the Slide preparation areas, 80% of the respondents reported exposure to Bacteria, 47% exposure to Parasites, 17% exposure to fungi, while only 8% reported exposure to viral vectors.

Andreassi, et al., (2016) carried out a study on occupational health risks in cardiac catheterization laboratory workers. Two types of statistical models were used. First, differences Exposed

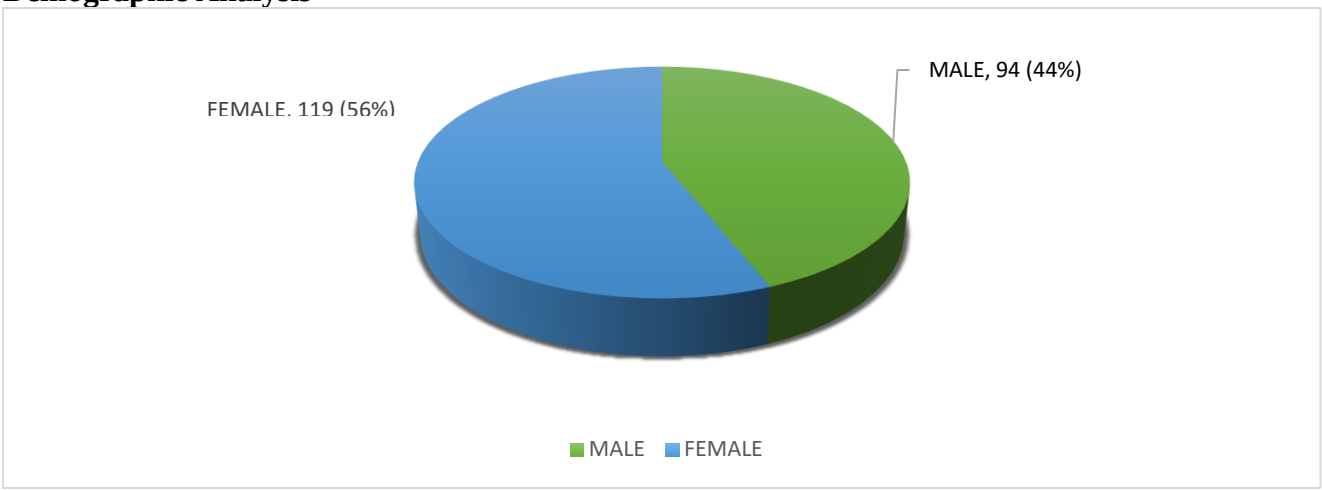
personnel included 218 interventional cardiologists and electrophysiologists (168 males; 46±9years); 191 nurses (76 males; 42±7 years), and 57 technicians (37 males; 40±12 years) working for a median of 10 years (quartiles: 5–24 years). Skin lesions (P=0.002), orthopedic illness (P<0.001), cataract (P=0.003), hypertension (P=0.02), and hypercholesterolemia (P<0.001) were all significantly higher in exposed versus non exposed group, with a clear gradient unfavorable for physicians over technicians and nurses and for longer history of work (>16 years). In highly exposed physicians, adjusted odds ratio ranged from 1.7 for hypertension (95% confidence interval: 1–3; P=0.05), 2.9 for hypercholesterolemia (95% confidence interval: 1–5; P=0.004), 4.5 for cancer (95% confidence interval: 0.9–25; P=0.06), to 9 for cataract (95% confidence interval: 2–41; P=0.004).

Methodology

This study employed the descriptive survey research design. The population for this study comprised of four hundred and seventy-five (475) laboratory professionals working in selected medical laboratories in Port Harcourt metropolis. The sample of this study was 217 medical laboratory professionals. This was determined at 5% level of significance using Taro-Yamen's formula. The multistage sampling procedure was utilized to select the samples for this study. Data collection for the study was collected through the use of structured questionnaires. The questionnaire was titled: 'Safety Consciousness and Practices of Medical Laboratory Workers in Hospitals and Laboratories Questionnaire (SCPMLWHLQ). The structured questionnaire underwent face and content validity testing so as to ensure that the items on the instruments actually measure the constructs they were intended to measure. Validation was done by OHS professionals including the project supervisors. Data analysis for this study was done using the statistical package for social sciences (SPSS) 23.0 version. Mean and standard deviation were used to describe the set of data used for the study and to answer the research questions, while a one-way ANOVA was used to test the hypothesis at 0.05 alpha level of significance.

Data Presentation, Analysis, Results and Discussion of Findings

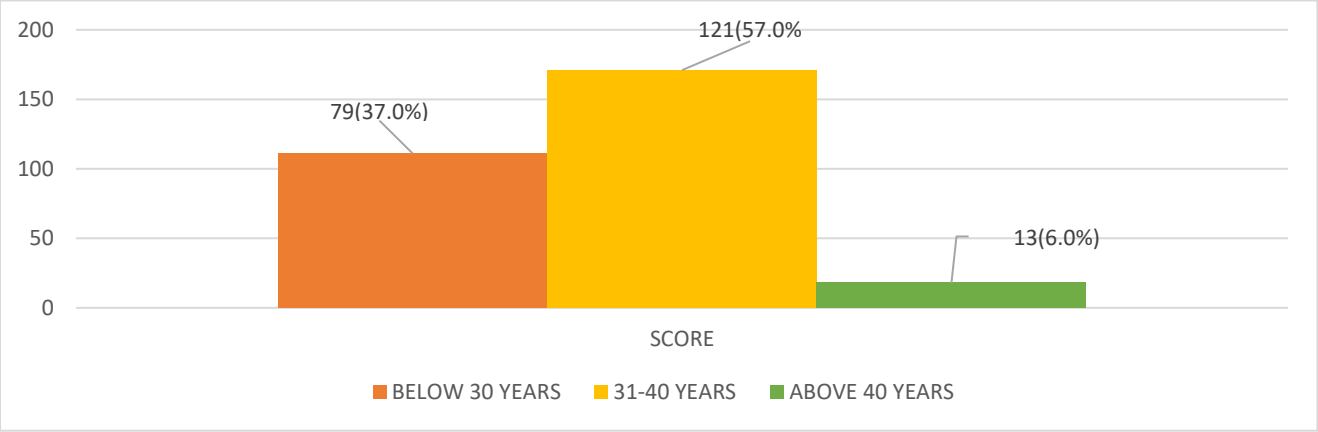
Demographic Analysis



Source: Field Survey (2021)

Figure 1: Gender of Respondents

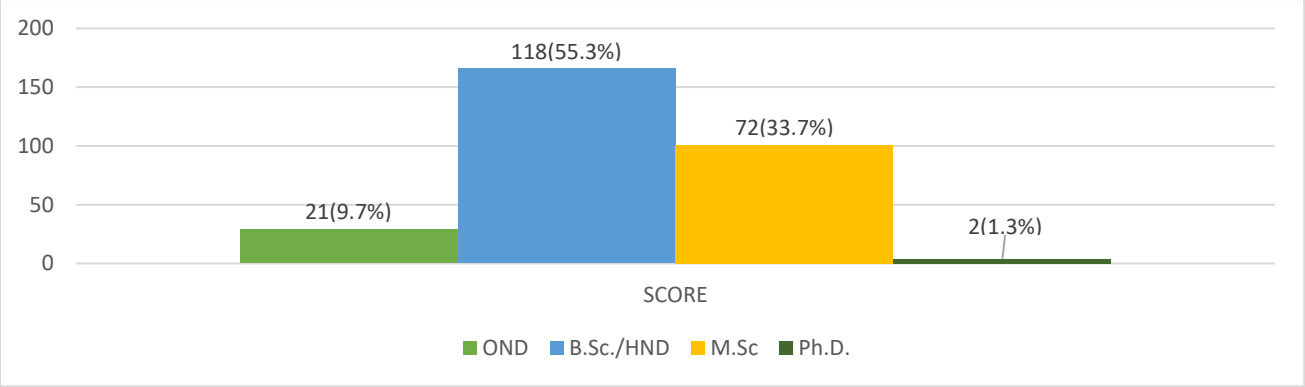
Figure 1 shows the gender distribution of the respondents. The pie chart shows that more than half 119(56.0%) of the respondents were females while 94(44.0%) were males



Source: Field Survey (2021)

Figure 2: Age of Respondents

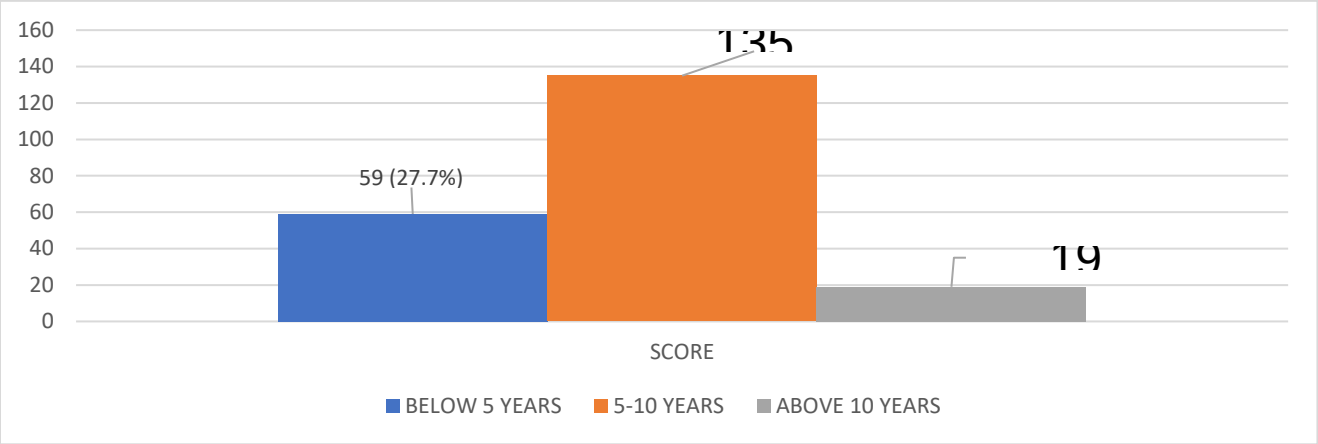
Figure 2 shows the age of the respondents. The bar shows that 79(37.0%) of the respondents were below 30 years, 121(57.0%) were within 31-40 years, and 13(6.0%) were within 40 years and above



Source: Field Survey (2021)

Figure 3: Educational Qualification of Respondents

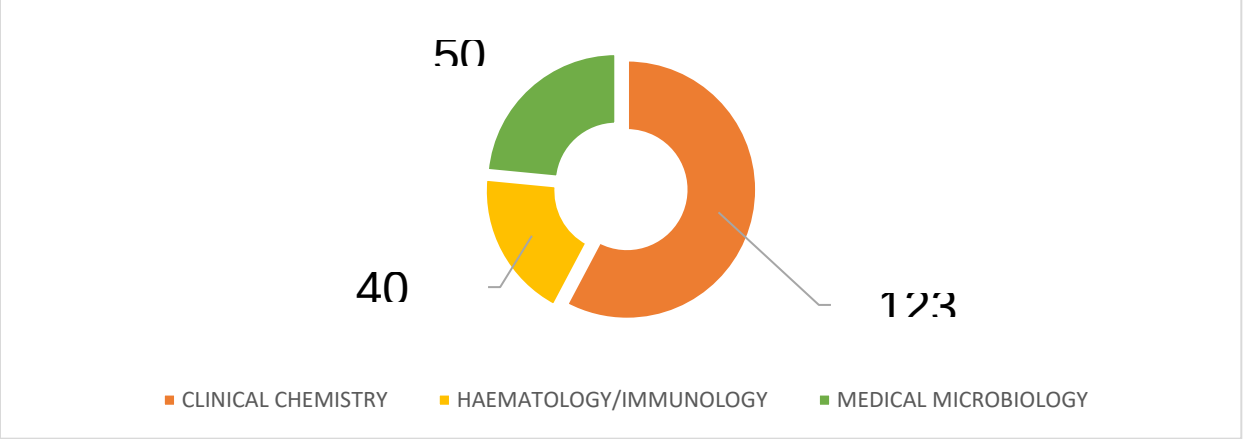
Figure 3 shows the educational qualification distribution of the respondents. The bar chart shows that 21(9.7%) had OND degree, 118(55.3%) had B.Sc/HND degree, 72(33.7%) had Master's degree, and 2(1.3%) had Ph.D. degree.



Source: Field Survey (2021)

Figure 4: Years of Experience of Respondents

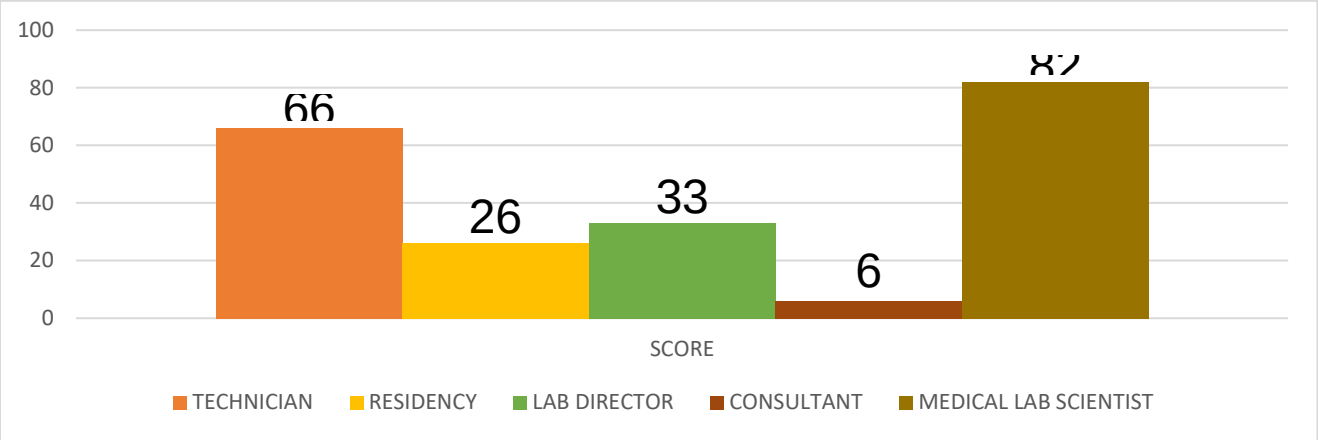
Figure 4 shows the years of experience of the respondents. The bar chart shows that 59(27.7%) had below 5 years of experience, 135(63.3%) had 5-10 years of experience, and 19(9.0%) had 10 years and above years of experience



Source: Field Survey (2021)

Figure 5: Assigned Work of Respondents

Figure 5 shows the assigned work of the respondents. The pie chart shows that 123(57.7%) were assigned to clinical chemistry, 40(19.0%) were assigned to haematology/immunology, and 50(23.3%) were assigned to medical microbiology.



Source: Field Survey (2021)

Figure 6: Position of Respondents

Figure 6 shows the position of the respondents. The bar chart shows that 66(31.0%) were technicians, 26(12.0%) were resident laboratory professionals, 33 (15.7%) were laboratory directors, 6(2.7%) were consultants, and 82(38.7%) were medical laboratory scientist.

Research Questions

Research Question 1: What is the level of knowledge of biosafety practices among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis?

Table 2: Level of Knowledge of biosafety practices among medical laboratory workers

S/N	Items	$\bar{X}$	SD	Decision
1	I know what to do in the event of any medical emergencies	2.83	.955	High
2	I know how to use water and exhaust system in emergencies	2.71	.772	High
3	I know how to use a first aid kit in case of emergency	2.66	.738	High
4	I use protective gloves and a lab coat always to avoid coming in contact with hazardous chemicals	2.79	.795	High
5	I know the location of emergency equipment	2.89	.825	High
	Grand mean	**2.78**	**.817**	**High**

Table 2 shows the level of knowledge of biosafety practices among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis. The result shows that knowledge of biosafety practices was high among laboratory professionals as the overall average = 2.78±.817 was greater than the criterion mean = 2.5. The highest response derived showed that the respondents agreed to that, I know the location of emergency equipment ($\bar{X}$ = 2.89±.825), followed byI know what to do in the event of any medical emergencies ($\bar{X}$ = 2.83±.955), I use protective

gloves and a lab coat always to avoid coming in contact with hazardous chemicals ($\bar{X}$ = 2.79±.795), I know how to use water and exhaust system in emergencies ($\bar{X}$ = 2.71±.772), and I know how to use a first aid kit in case of emergency ($\bar{X}$ = 2.66±.738).

Research Question 2: What is the consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis?

Table 3: Level of consciousness to general laboratories safety among medical laboratory workers

S/N	Items	$\bar{X}$	SD	Decision
1	I know the standard procedures to deal with specimen receiving and leaking containers	3.65	.778	High
2	Glass bottles are stored where they cannot be knocked or kicked over	3.58	.669	High
3	Bio-materials are clearly labelled using appropriate hazard symbols	3.41	.615	High
4	I ensure that all surfaces in the laboratory are regularly cleaned and disinfected	3.59	.791	High
5	I am sufficiently trained in lab documentation	3.39	.599	High
	Grand mean	**3.52**	**0.69**	**High**

Table 3 shows the consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis. The result shows that consciousness to general laboratories safety was high among laboratory professionals as the overall average = 3.52±.69 was greater than the criterion mean = 2.5. The highest response derived showed that the respondents agreed to that, I know the standard procedures to deal with specimen receiving and leaking containers ($\bar{X}$ = 3.65±.778), followed by I ensure that all surfaces in the laboratory are regularly cleaned and disinfected ($\bar{X}$ = 3.59±.791), Glass bottles are stored where they cannot be knocked or kicked over ($\bar{X}$ = 3.58±.669), Bio-materials are clearly labelled using appropriate hazard symbols ($\bar{X}$ = 3.41±.615), and I am sufficiently trained in lab documentation ($\bar{X}$ = 3.39 ±.599).

Research Question 3: What are the occupational safety measures among medical laboratory workers in hospitals and laboratories in Port Harcourt?

Table 4: Occupational safety measures among medical laboratory workers

S/N	Items	$\bar{X}$	SD	Decision
1	Everyone receives the necessary workplace health and safety training when starting a job, changing jobs or using new techniques	2.84	.779	High
2	Pre- employment medical examination is done	2.91	.823	High
3	There is an active and effective health and safety committee	2.45	.840	Low

4	Incidents and accidents are investigated to improve workplace health and safety.	2.40	.909	Low
5	Systems are in place to identify, prevent and deal with hazards.	2.94	.848	High
6	Personal protective equipment such as gloves, face masks, etc. are provided by management and it is adequate and appropriate.	3.64	.818	High
7	There is a proper waste disposal system in my workplace	2.70	.832	High
8	Communication about workplace health and safety procedures is clear to all workers	2.78	.805	High
9	Employer periodically sends employees for trainings to update and upgrade their efficiency and effectiveness	2.36	.913	Low
10	There is an HSE policy that is duly signed by the supervisor in my workstation	2.38	.994	Low
11	There is adequate training on hazard control measures in the workplace	2.31	.942	Low
12	Periodic medical examinations are carried out	2.25	1.00	Low
	Grand mean	**2.66**	**.875**	**High**

Table 4 shows the occupational safety measures among medical laboratory workers in hospitals and laboratories in Port Harcourt. The result showed that the grand mean = ($\bar{X}$ = 2.66±.875) is greater than the criterion mean = 2.5, indicating that there was a high level of compliance to safety measures by laboratory professionals in hospitals and laboratories in Port Harcourt metropolis

Testing of Hypotheses

Hypothesis 1: There is no significant difference between age and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis

Table 7: Analysis of Variance (ANOVA) showing significant difference between age and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis

Sources of variance	Sum of squares	Df	Mean sum of squares	F-value	p-value	Decision
Between group	12.769	3	1.277	2.002	.030	H_o
Within group	605.889	210	.638			Retained
Total	**618.658**	**213**				

***Not Significant, p>0.05**

Table 7 shows the One-Way ANOVA of significant difference between age and consciousness to general laboratory safety among medical laboratory workers in hospitals and laboratories in Port

Harcourt metropolis. The findings of this study shows that there was no significant difference between age and age and consciousness to general laboratories safety among medical laboratory workers [F (3, 210) = 2.002; p>0.05]. Therefore, the null hypothesis which stated that there is no significant difference between age and age and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis was accepted and the alternate hypothesis rejected.

Hypothesis 2: There is no significant difference between educational qualification and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis

Table 8: Analysis of Variance (ANOVA) showing significant difference between educational qualification and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis

Sources of variance	Sum of squares	Df	Mean sum of squares	F-value	p-value	Decision
Between group	3.596	3	.360	1.936	.037	H_o
Within group	176.466	210	.186			Retained
Total	**180.062**	**213**				

*** Significant, p>0.05**

Table 8 shows the One-Way ANOVA of significant difference between educational qualification and consciousness to general laboratory safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis. The findings of this study shows that there was significant difference between educational qualification and consciousness to general laboratories safety among medical laboratory workers [F (2, 210) = 1.936; p>0.05]. Therefore, the null hypothesis states that there is no significant difference between educational qualification and consciousness to general laboratory safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis.

Hypothesis 3: There is no significant difference between years of experience and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis

Table 9: Analysis of Variance (ANOVA) showing significant difference between years of experience and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis

Sources of variance	Sum of squares	Df	Mean sum of squares	F-value	p-value	Decision
Between group	8.508	3	.945	1.473	.013	Not Retained
Within group	610.151	210	.642			
Total	**618.658**	**213**				

***Not Significant, p>0.05**

Table 9 shows the One-Way ANOVA of significant difference between years of experience and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis. The findings of this study shows that there was significant difference between years of experience and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis [F (3, 210) = 1.473; p>0.05]. Therefore, the null hypothesis which states that there is no significant difference between years of experience and consciousness to general laboratories safety among medical laboratory workers in hospitals and laboratories in Port Harcourt metropolis was rejected and the alternate hypothesis accepted.

Discussion of Findings

The result from the study showed that knowledge of biosafety practices was high among laboratory professionals (2.78±.817). The finding of this study is not surprising because the study was conducted among laboratory professionals who are enlightened about vast health issues to a large extent hence, they were found to be knowledgeable about occupational hazards. The finding of this study is similar to that of Mukhtad, et al., (2018) who conducted a study on ergonomic risk assessment among healthcare laboratory technicians in Benghazi Medical Centre, Libya. The findings showed that 67(65%) had very good knowledge of ergonomic risk associated with medical laboratory, 14(13.6 %) had moderate knowledge and 22(21.4 %) had poor knowledge. The finding of this study also corresponds with the study of Oladeinde et al., (2015) who carried out a study on awareness and knowledge of ergonomics among medical laboratory scientists in Nigeria and discovered that majority of the medical laboratory professionals had good awareness and knowledge of ergonomic hazards associated with their job.

The result of this study showed that consciousness to general laboratories safety was high among laboratory professionals as the overall average = 3.52±.69 was greater than the criterion mean = 2.5. This finding is encouraging because it shows that the good knowledge, they have on occupational hazards was not in vain as they took action to adopt safety measures which can help in averting the effect of the hazards on the health of the laboratory professionals. The finding of this study is in line with that of Shobowale et al., (2015) who conducted a survey of biosafety practices of clinical laboratory personnel in four selected clinical laboratories, and discovered that laboratory professionals had a high level of awareness to hazard prevention strategies and general laboratories safety practices.

The finding of this study revealed that the prevalence of occupational risks in hospitals and laboratories in Port Harcourt metropolis was high as the overall average = 2.85±.98 was greater than the criterion mean = 2.5. The result of the findings corroborates with the study of Andreassi, et al., (2016) who conducted a study on occupational health risks in cardiac catheterization laboratory workers, and discovered that there was a high prevalence of skin lesions, orthopedic illness, cataract, hypertension, and hypercholesterolemia amongst medical laboratory workers. The finding is in line with studies of Maulik et al., (2014) who conducted an evaluation of the working posture and prevalence of musculoskeletal symptoms among medical laboratory

Technicians. The findings showed that the overall prevalence of musculoskeletal problems experienced by the technicians was 73.3% and the major affected areas were trunk, knees, neck and ankles/feet. Statistical analysis shows significant associations between musculoskeletal symptoms and VAS scores.

Conclusion

Conclusively, good knowledge, consciousness and practice towards laboratory safety were discovered among the medical laboratory workers in Port Harcourt metropolis. The laboratory professionals were found to be enlightened about the ergonomic hazards and risks endemic in their profession and how they could be managed. There was also, high level of compliance to safety measures by laboratory professionals in hospitals and laboratories in Port Harcourt metropolis. The study irrefutably summarized that age, educational qualification, years of experience of the medical laboratory workers, all had an effect on their consciousness to general laboratories safety in hospitals and laboratories in Port Harcourt.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. The ministry of health should design and implement safety training and retraining programs for laboratory professionals to sustain the high level of safety compliance found among them.
2. The laboratory technicians should also not relent in their effort to get enlightenment on the occupational hazards associated with their job by continuous search for relevant information through different channels, this will make them get acquainted with emerging hazards and how to control them.
2. Safety engineers should be employed by the government to take charge of safety issues in the different laboratories.

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