

Examination of Common Occupational Hazards among Healthcare Workers in a University Healthcare Center in Southeastern Nigeria

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Abstract

Background: Healthcare workers are challenged by an imposing group of occupational hazards. These hazards include exposure to biological and non-biological hazards like ionizing radiation, stress, injury, infectious agents, and chemicals. The aim of this study was to assess common occupational hazards among health workers at the Department of Health Services (DHS), Federal University of Technology, Owerri. **Methods:** A hospital-based cross-sectional study design was employed for the study, and a self-administered questionnaire was used for data collection. The SPSS Version 22.0 software was used for the analysis of the descriptive statistics obtained from the study. This study included both clinical and non-clinical health workers. A purposive sampling technique was used in recruiting a total of 94 respondents who participated in the study from September 2020 to April 2021. **Results:** A total of 94 respondents who participated in the study and among the participants, 33.3% (31) of the respondents were aged 31 - 40 years, and the majority of the health workers, 43.6% (41) had stayed between 1 - 5 years. Also, 92.6% (87) of the health workers have heard of occupational hazards. The study showed that 84.0% (79) of health workers had good knowledge of common occupation-

al hazards. Biological hazards among health workers are 47.9% (45) cuts and wounds, 29.8% (28) direct contact with contaminated specimens/hazardous materials, and 26.6% (26) sharp related injuries, while for non-biological hazards, 44.7% (42) have slipped, tripped or fallen, and 35.1% (33) have been stressed. Common safety measures include 86.2% (81) washing their hands regularly; 78.7% (74) using hand gloves; and 85.1% (80) agreeing they use face masks. **Conclusion:** Despite good knowledge of occupational hazards, participants at DHS were faced with certain hazards. It is recommended that the university, government, and policymakers revise and implement actions to provide health workers at DHS with equipment to encourage safety in work activity.

Keywords

Hazards, Occupational Hazards, Health Workers, Knowledge, Safety, Risk

1. Introduction

Occupational hazards in the health care sector are a major public health concern. Globally, the healthcare workforce accounts for 12% of the labor force [1] [2] [3]. Healthcare workers work in what is regarded as one of the most hazardous occupational settings [2]. Healthcare workers face a formidable set of occupational hazards. Among the dangers are ionizing radiation, stress, injury, pathogenic agents, and toxins. The magnitude and variety of these threats are underappreciated. The acquired immunodeficiency syndrome (AIDS) epidemic has increased occupational hazards and brought attention to the issue of health-care worker occupational hazards [1]. Concerns about human immunodeficiency virus (HIV) nosocomial transmission have fueled efforts to implement universal infection control precautions and reduce needle stick injuries [1]. In addition to the usual workplace hazards, healthcare workers are exposed to a variety of hazards as a result of their work activities [4]. To avoid occupational hazards such as blood and blood-borne pathogens, there are well-established guidelines. These include training healthcare workers in the safe use of devices, procedures, and exposure management [5].

Furthermore, by 2030, the World Health Organization (WHO) has instructed governments to switch to safety injection devices exclusively [3] [6]. While developed countries have acted on this advice, the vast majority of African countries in Sub-Saharan Africa have failed to enact legislation to protect healthcare workers [7]. Apart from provider behaviors that increase occupational hazard exposure, system-level barriers in the healthcare setting also increase the risk of hazard exposure [8]. Unsafe conditions in the healthcare setting, a lack of personal protective equipment (PPE), and a high provider-to-patient ratio raise the risk of bloodborne pathogen exposure and infection [9].

Despite this knowledge, governments and organizations continue to overlook

the healthcare work environment [10]. In comparison to other occupational groups, healthcare workers have a higher annual prevalence of back pain (77%) [1] [2]. Ergonomic injuries are the most common occupational injury in the healthcare industry [9], despite the fact that they pose a significant health risk to workers. Healthcare workers are at risk for blood-borne infections, which can lead to diseases like HIV, tuberculosis, and hepatitis B and C [11]. Significant morbidity and mortality among these workers will inevitably result in the loss of skilled personnel, putting a strain on healthcare services in many low and middle-income countries [12].

Several studies found significant deficiencies in health care providers' knowledge, practice, and policy compliance [1] [2] [8] [13] [14] [15]. According to [16], on average, nurses in the Philippines have been injured on the job once or twice in the previous year, with 6% having been injured at least three times. More than three-quarters (78%) reported back pain, with more than half (53%) continuing to work despite the discomfort. The World Health Organization (WHO) and the Federal Ministry of Health (FMOH) recognized the need to strengthen the nationwide infection control program in order to improve health care workers' preparedness to respond to outbreaks of highly transmissible infectious diseases, as well as to prevent and reduce the occurrence of health care-associated infections among patients [3] [11] [17].

Some Occupational Health and Safety provisions mandate the use of safe practices for handling needles and other sharp objects in order to prevent further outbreaks, particularly of Hepatitis B and C, which are frequently linked to healthcare providers [10] [18]. Infection transmission from patients to healthcare workers, as well as other patients and attendants, is facilitated by a breach in infection-control practices. All health-care workers must follow the Occupational Health and Safety Strategies [2]. Health-care administrators must also ensure that OHS is implemented in their facilities [11].

Due to significant emigration of trained professionals, difficult working conditions, low salaries, low motivation, and a high burden of infectious diseases, particularly HIV/AIDS, the scarcity of human resources for health is described as a humanitarian resource crisis in Sub-Saharan Africa [4] [19]. According to evidence [1] [20], chemical, biological, physical, and psychosocial occupational hazards are common among healthcare workers in Sub-Saharan Africa, according to evidence [1]. They are constantly in contact with patients who may infect them, necessitating the use of proper protective equipment to reduce their risk of disease or injury [2]. Data on occupational hazards among healthcare workers and their mitigation measures remain scarce in most of sub-Saharan Africa and Nigeria in particular [2] [21]. Understanding the predisposing factors for occupational hazards among healthcare workers is needed to inform occupational health and safety policy and programs for healthcare workers [17]. For the most part, injuries and occupational health hazards are not well studied and recorded for communication with other healthcare workers.

Healthcare workers provide patient care in one of the most dangerous occupational settings [12] [22]. Biological, chemical, physical, ergonomic, psychosocial, fire and explosion, and electrical hazards all threaten the lives, safety, and well-being of healthcare workers [18] [23]. Every year, it is estimated that one out of every ten healthcare workers suffers a sharp injury [19] [24]. Sharps injuries to healthcare workers resulted in 16,000 cases of hepatitis C virus (HCV), 66,000 cases of hepatitis B virus (HBV), and 1000 cases of human immunodeficiency virus (HIV) infection in 2010 [25]. These infections are thought to have a significant impact. Between 2010 and 2030, these infections are expected to result in 145 HCV-related deaths, 261 HBV-related deaths, and 736 HIV-related deaths [24] [26]. The few studies that have been conducted in Sub-Saharan Africa have shown that healthcare workers are frequently exposed to biological, chemical, and physical occupational hazards [11] [22]. Despite the efforts of a number of health-care organizations and ministries, occupational hazards continue to be a threat to workers' public health. The dangers associated with the healthcare setting are sometimes overlooked by health-care organizations and providers who have prompted public health and safety campaigns. Data on the safety of healthcare workers is limited, and possible exposure to a variety of occupational hazards and challenges remains a major concern that prompted the researcher to conduct this research. It is through this that the researchers examined the common occupational hazards associated with health care workers at the Department of Health Services, Federal University of Technology, Owerri.

2. Methods

This study was conducted from September 2020 to April 2021.

2.1. Study Design and Setting

A Hospital Based Cross Sectional Study Design was used for the study on common occupational hazards among healthcare workers at the Department of Health Services, Federal University of Technology, Owerri from September 2020 to April 2021.

The study included both clinical and non-clinical healthcare workers at the Department of Health Services, Federal University of Technology, Owerri.

This study excluded clinical and non-clinical health workers at the Department of Health Services, Federal University of Technology, Owerri, who had less than six (6) months of experience in the healthcare workforce. This study also excluded interns at the facility during the time of the study.

2.2. Sampling and Sampling Techniques

A purposive sampling technique was used for this study in recruiting a total of 94 health workers who participated in the study. All the categories of health workers (clinical and non-clinical) were sampled without omitting any cadre of workforce at the facility. The particular type of purposive sampling used was the

Purposive Sampling Method.

2.3. Data Collection

A self-administered questionnaire was used to gather the data for this study. The questionnaire consisted of information for the socio-demographics of the respondents, questions about the knowledge of the health workers regarding common occupational hazards, questions on biological hazards and non-biological hazards, and questions on the commonly adopted safety measures for occupational hazards among health workers. The questionnaire was designed in such a way that every question in the questionnaire was related to the research questions.

The reliability of the instrument was determined using the test retest method. The researcher gave 15 copies of the questionnaire to some health care workers at the Federal Medical Center Owerri, which is outside the area of study by the researcher. This area shared similar organizational characteristics with the Department of Health Services, Federal University of Technology, Owerri that were used for this study. The Chrombach alpha test was used to test for the reliability of the questionnaire, and a reliability coefficient of 0.8 was obtained.

The researcher and the research assistants visited the hospital until all the questionnaires were administered face-to-face to the health workers and retrieved.

2.4. Data Analysis

Descriptive statistics were used to analyze the data obtained from questionnaires. Data entry and analysis were done using the Statistical Package for Social Science (SPSS) 20.0. Descriptive statistics from this study were presented with information on the mean data of various variables and presented in pie charts, tables, and percentages.

2.5. Ethics

A letter of introduction and ethical clearance were obtained from the Department of Public Health Ethical Clearance Committee before the research was conducted. The purpose of the research was explained to each respondent and verbal informed consent was obtained from them before inclusion in the study. Also, the anonymity of the respondents was assured and ensured. The confidentiality of the information they gave was also maintained.

3. Results

A total of 94 health workers were sampled for this study.

3.1. Socio Demographic Characteristics of Respondents

Table 1 revealed that 33.3% (31) of the respondents were aged 31 - 40 years, 29.8% (28) between ages 41 - 50, 26.6% (25) were 50 years and above, and the

lowest, 10.6% (10), were aged 21 - 30 years. None of the respondents were less than 21 years of age. A majority of the respondents showed that 74.5% (70) were female and 25.5% (24) were male. 78.7% (74) were married, 13.8% (13) single, 6.4% (6) widowed, and a low 1.1% (1) separated. The majority of the respondents, 94.1% (89), were Christians, 1.1% (1 each for Muslims and Traditionalists) and 3.2% (3) opted for others. 96.3% (88) were of Igbo origin, 5.3% chose "others", 1.1% (1) was of Yoruba ethnic group, while none of the respondents was either Hausa or Fulani. On the cadre of health workers, 36.2% (34) of the respondents were nurses, 19.1% (18) chose medical lab scientists, 13.8% (13) health assistants, 12.8% (12) pharmacists, 9.6% (9) were under the cadre not listed but labeled "others" and 8.5% (8) doctors. When asked about duration of healthcare service, 43.6% (41) had stayed between 1 - 5 years, 34.0% (32) stayed 5 - 10 years, 11.7% (11) stayed 6 - 12 months, and 10.6% (10) said they had stayed above 10 years.

Table 1. Socio demographic characteristics of respondents.

Characteristics	Frequency (n = 94)	Percentage (%)
Age		
>21 yrs	0	0.0
21 - 30	10	10.6
31 - 40	31	33.3
41 - 50	28	29.8
Above 50	25	26.6
Total	94	100
Gender		
Male	24	25.5
Female	70	74.5
Total	94	100
Marital Status		
Single	13	13.8
Married	74	78.7
Separated	1	1.1
Widowed	6	6.4
Total	94	100
Religion		
Christianity	89	94.7
Islam	1	1.1
Traditional	1	1.1
Others	3	3.2
Total	94	100

Continued

Ethnicity		
Igbo	88	93.6
Hausa	0	0.0
Yoruba	1	1.1
Fulani	0	0.0
Others	5	5.3
Total	94	100
Cadre of Health Worker		
Doctor	8	8.5
Nurse	34	36.2
Med Lab Scientist	18	19.1
Pharmacist	12	12.8
Health Assistant	13	13.8
Others	9	9.6
Total	94	100
Duration in Healthcare Service		
6 - 12 months	11	11.7
1 - 5 years	41	43.6
5 - 10 years	32	34.0
Above 10 years	10	10.6
Total	94	100

3.2. Knowledge of Common Occupational Hazards among Respondents

Table 2 below shows the distribution based on knowledge of common occupational hazards among informants. 92.6% (87) had heard of occupational hazards, while 7.4% (7) declined. 58.5% (55) reported they heard about it during training, 16.0% (15) from the media, 13.8% (13) heard about occupational hazards from pre-employment orientation, and 4.3% (4) each for respondents who chose sources not listed but “others” and through posters and hand bills at the hospital. 85.1% (80) were aware of the chemical hazards, 80.9% (76) of the biological hazards, 79.8% (75) of the physical hazards, 66.0% (62) of the ergonomic hazards, 57.4% (54) said they knew of the mechanical hazards, and 21.3% (20) of the respondents chose options not mentioned but labeled “others”. When presented with a set of options, a majority, with 75.6% (71) concurred that early arrival at work was not an occupational hazard, 19.1% (18) chose noise, 5.3% (5) said needle stick injuries are not a part of occupational hazards, and none of the respondents opted for “Body contamination with patent body fluids”. When asked about occupational infections, 84.0% (79) said malaria was not an occupa-

tional infection, 9.6% (9) chose HBV, 4.3% (4) went with HIV, and the least, with 2.1% (2), said chicken pox was not an occupational infection. 85.1% (80) said blood and bodily fluids were surely the source of occupational infection. 6.4% (6) chose body contact, 4.3% (4) said faces and urine, and the lowest, with 3.2% (3), decided on air-borne. Responses on activities in which needle stick injury is most likely to occur came in as a majority of 86.2% (81) said “recapping”, 10.6% (10) chose transporting to the sharp disposal safety box, 2.1% (2) said while handling equipment after disposal, and 1.1% (1) said while handling equipment before use. When asked which of them violated the standard precautions, 37.2% (35) said “leaving needles attached to syringes after use”, 29.8% (28) decided on “aspirating for blood before intramuscular injections”, 24.5% (23) did not take any of the options, and the lowest, with 8.5% (8), chose “recapping needles after use”. 96.8% (91) of the informants affirmed hand washing being good to prevent occupational cross infection after procedures, while 3.2% (3) said “No.”

Table 2. Knowledge of common occupational hazards among Respondents.

Variables	Frequency (n = 94)	Percentage (%)
Heard of occupational hazards		
Yes	87	92.6
No	7	7.4
Total	94	100
Source of Information of Occupational Hazards		
During my training	55	58.5
Post employment professional workshop	3	3.2
Ward rounds/clinics	0	0
Pre-employment orientation	13	13.8
Through posters and hand bills at the hospital	4	4.3
Media	15	16.0
Others	4	4.3
Total	94	100
Type (s) of Occupational hazards aware of		
Physical Hazards	75	79.8
Chemical Hazards	80	85.1
Biological Hazards	76	80.9
Ergonomic Hazards	62	66.0
Mechanical Hazards	54	57.4
Others	20	21.3
Total	94	100

Continued

NOT an occupational hazard		
Noise	18	19.1
Needle stick injuries	5	5.3
Early arrival at work	71	75.6
Body Contamination with Patients body fluids	0	0
Total	94	100
NOT an occupational infection		
HBV	9	9.6
HIV	4	4.3
Chicken pox	2	2.1
Malaria	79	84.0
Total	94	100
MOST likely source of occupational infection		
Air-borne	3	3.2
Faces and urine	4	4.3
Blood and bodily fluids	80	85.1
Body contact	6	6.4
Total	94	100
Activities in which needle stick injury is MOST likely to occur		
Recapping	81	86.2
Transporting to the sharps disposal safety box	10	10.6
Handling equipment before use	1	1.1
Handling equipment after disposal	2	2.1
Total	94	100
Which violates the standard precautions		
Aspirating for blood before intramuscular injections	28	29.8
Recapping needles after use	8	8.5
Leaving needles attached to syringes after use	35	37.2
None	23	24.5
Total	94	100
Hand washing is good to prevent occupational cross infection after procedures		
Yes	91	96.8
No	3	3.2
Don't Know	0	0.0
Total	94	100

3.3. Biological Hazards among Respondents

Table 3 below in regards to biological hazards among respondents concerning biological hazards experienced, 47.9% (45) had cuts and wounds, and the next frequency, with 29.8% (28) was direct contact with contaminated specimens or hazardous materials. 26.6% (26) of the respondents have had sharp related injuries; 18.1% (17) have had injuries not mentioned but labeled “others”. 17.0% (16) have encountered airborne diseases; 11.7% (11) bloodborne pathogens; and the lowest, with 8.5% (8) infectious diseases/infections.

3.4. Non Biological Hazards among Respondents

When asked about non-biological hazards experienced by 44.7% (42) (42) have slipped, tripped or fallen, 35.1% (33) have been stressed, 22.3% (21) reported that they have had physical trauma due to noise or verbal abuse, 10.6% (10) have had hazards not mentioned but labeled “others”, 6.4% (6) have had fractures, 5.4% (5) said they have experienced chemical spills, burns, or radiation, and the lowest, 2.1% (2), chose the option “sexual abuse” (**Table 4**).

3.5. Safety Measures of Occupational Hazards among Respondents

Disclosed in **Table 5** are the responses from the respondents on safety measures for occupational hazards. 84.0% (79) affirmed they do not use safety eye goggles, while a minor 16.0% (15) of the respondents replied “Yes.” 86.2% (81) wash their hands regularly while 13.8% (13) do not. 85.1% (80) concurred that they use face masks while 14.9% (14) said “No”. 78.7% (74) use hand gloves and the remaining 21.3% (20) are denied. A majority, with 94.7% (89) of the informants, do not use helmets, while a small 5.3% (5) affirmed. A small frequency used ear plugs (3.2%), while a large 96.8% (91) did not use safety plugs. The table also shows 81.9% (77) of the respondents denied using aprons, while 18.1% (17) said “Yes”. The bulk of the respondents, 94.7% (89), said “No” when they were asked if they used boots, and the rest, 5.3% (5), concurred.

4. Discussion

Considering the socio-demographic characteristics of the respondents at the department of Health Services FUTO, findings from the study revealed that a majority of 33.3% (31) of the respondents were aged 31 - 40 years. This finding is in accordance with a study by [27] among health care workers in Bida, North Central Nigeria. The mean age in the study was found to be 36 years. Socio demographic findings from the study demonstrated that 78.7% (74) were married. This could be due to a cultural sensitivity to divorce. According to the study, 94.1% (89) of the informants were Christians, and 96.3% (88) were of Igbo origin. This is due to the fact that the study was conducted in the Southern part of Nigeria where the facility, Department of Health Services, FUTO, is located in the Eastern part of the federation.

Table 3. Biological Hazards among Respondents.

Variables	Frequency (n = 94)	Percentage (100%)
Biological Hazards Experienced		
Sharp related Injuries (Such as needle sticks)	26	26.6
Cuts and wounds	45	47.9
Direct Contact with contaminated specimens/hazardous materials	28	29.8
Airborne Diseases	16	17.0
Infectious Disease/infections	8	8.5
Blood borne pathogens	11	11.7
Others	17	18.1
Total	94	100

Multiple selection*.

Table 4. Non biological Hazards among Respondents.

Variables	Frequency (n = 94)	Percentage (%)
Non Biological Hazards Experienced		
Stress	33	35.1
Physical trauma due to noise or verbal abuse	21	22.3
Sexual abuse	2	2.1
Musculoskeletal injuries	12	12.8
Slip, trips or falls	42	44.7
Fractures	6	6.4
Chemical spills, Burns and radiations	5	5.4
Others	10	10.6
Total	94	100

Multiple selection*.

Table 5. Safety measures of occupational hazards among respondents.

Variables	Frequency (n = 94)	Percentage (%)
Eye goggle		
Yes	15	16.0
No	79	84.0
Total	94	100
Regular Hand washing		
Yes	81	86.2
No	13	13.8
Total	94	100

Continued

Face Mask		
Yes	80	85.1
No	14	14.9
Total	94	100
Hand glove		
Yes	74	78.7
No	20	21.3
Total	94	100
Helmets		
Yes	5	5.3
No	89	94.7
Total	94	100
Ear plug		
Yes	3	3.2
No	91	96.8
Total	94	100
Apron		
Yes	17	18.1
No	77	81.9
Total	94	100
Boots		
Yes	5	5.3
No	89	94.7
Total	94	100

The study revealed a high level of knowledge of common occupational hazards; 92.6% (87) of the health workers at the Department of Health Services, FUTO had heard of occupational hazards. This finding corroborates with a study conducted by [28] assessing the workplace hazards and safety practices by selected HCWs in a typical health care facility (HCF) in Nigeria that found 90.5% of the health workers have heard of occupational hazards. This is due to the fact that health workers in DHS are tasked with various training sessions and educational programs. This study also revealed that 58.5% (55) reported they heard about occupational hazards during training, which falls in line with a finding by [29] that 56.7% of health care workers at District Council, Tanzania heard about occupational hazards through training. This finding goes against a study by [28] that indicated 34.7% of health workers heard about occupational hazards from pre-employment orientation. The study revealed that 85.1% (80) of the health workers at Department of Health services were aware of the chem-

ical hazards, and the study also showed that 80.9% (76) of the biological hazards and 79.8% (75) of the healthcare physical hazards, 66.0% (62) of the ergonomic hazards, and 57.4% (54) said they knew of the mechanical hazards. This finding on the awareness of various types of hazards at the facility corroborates with a finding [30] carried out at a tertiary care center in central Nepal which showed awareness of various occupational hazards among health workers to be 76.9% biological hazards, 81.6% physical hazards, and 73.7% ergonomic hazards. Findings from the study showed that a majority of 75.6% (71) correctly concurred that early arrival at work was not an occupational hazard. When asked about occupational infections, the study revealed that 84.0% (79) said malaria was not an occupational infection. This finding goes in alliance with a publication by [31] that showed that a majority of 79.5% of health workers at Kumasi Health Facility agreed that malaria is not an occupational infection. Furthermore, findings from this study showed that a good majority, 85.1% (80) of health workers, had good knowledge that blood and bodily fluids were surely the likeliest source of occupational infection. This goes in contrast with a finding by [29] that showed that 54.7% of healthcare workers in Singida District Council, Tanzania have knowledge of blood and bodily fluids, which is surely the likeliest source of occupational infection. The study also revealed that 86.2% (81) of health workers at the Department of health care services FUTO on activities in which needle stick injury is most likely to occur came in as a said “recapping”. This agrees with a previous study among health workers in Warsaw teaching hospitals by Borges and Fischer that found 89.8% of hospital workers have good knowledge of recapping as a likely source of occupational infection and hazards. As regards to knowledge of the range of options that violate standard precautions, 37.2% (35) said “leaving needles attached to syringes after use” [32]. This goes against a similar study by Ziraba *et al.* that demonstrated a proportion of 74.1% of health workers who identified leaving needles attached to syringes after use as a violation of standard precautions [33]. A good number of 96.8% (91) of the informants affirmed hand washing as being good to prevent occupational cross infection after procedures, in line with a study by Kirkcaldy *et al.* that demonstrated 88.3% of health workers had good knowledge of hand washing as a method of preventing occupational cross infection [28]. Considering the finding of this study in regards to biological hazards experienced, 47.9% (45) have had cuts and wounds, which go in line with a study by Beyene *et al.* that found 51.7% of health workers at Trigay Ethiopia have had cuts and wounds [34]. This study showed 29.8% (28) of the health workers had direct contact with contaminated specimens or hazardous materials. This finding goes in contrast with a finding by Rai and colleagues, which showed that 67.4% of health workers had direct contact with contaminated specimens [35]. The findings of this study showed that 26.6% (26) of health workers at DHS have had sharp-related injuries. This goes in contrast with a publication by Orji *et al.* [15] on health workers at the obstetrics and gynecology unit of OAU Teaching Hospital that shows (75.6%) of

health workers have had needle and sharp related injuries. 17.0% of health workers at the Department of Health Services have encountered airborne diseases, which goes in contrast with a recent publication by Sepkowitz (2016) that showed that 48.5% of health workers had airborne diseases as an occupational hazard [36].

In terms of non-biological hazards, this study found that 44.7% of DHS health workers had slipped, tripped, or fallen, which is similar to a previous study by Orji and colleagues. Slips were reported as an occupational hazard by 37.4% of health workers at the Obafemi Awolowo University Teaching Hospitals Complex in Ile-Ife, Nigeria [15]. The study demonstrated that 35.1% had been stressed, in contrast with a study by Senthil and colleagues [37]. demonstrated work-related stress (83.3%) among health workers in Ife, Osun State. This study among health workers at DHS revealed that 22.3% (21) of health workers reported having experienced physical trauma due to noise or verbal abuse, and also 12.8% of the workers said they experienced “musculoskeletal injuries.” This finding goes in alliance with a study by Jones and colleagues [38], who found that 14.7% of health workers experienced physical trauma due to abuse and 19.4% musculoskeletal injuries. The study also revealed that 5.4% (5) said they have experienced chemical spills, burns, and radiation, in line with a study by Rai *et al.* [35] that showed that 2.2% of health workers in Bhutan experienced chemical spills, burns, and radiation.

The study revealed that based on safety measures of occupational hazards, 84.0% (79) affirmed they do not use safety eye goggles. The majority of 86.2% (81) of health workers at the Department of Health Services wash their hands regularly. This goes in accordance with a study that found that 90.2% of health workers at Kampala Teaching Hospital wash their hands regularly [38]. The study revealed that 85.1% (80) concurred they use face masks in corroboration with multiple studies [6] [38] [39]. The study also showed that 78.7% (74) of the health workers at DHS, FUTO use hand gloves, which is corroborated by a similar study by Al-Otaibi and colleagues [40] who found that 83.2% of health workers at a governmental hospital in the Kingdom of Saudi Arabia use hand gloves. Findings from this study also revealed that a majority, 94.7% (89) of the health workers do not use helmets. This is because of the nature of the study. A large 96.8% (91) do not use safety plugs as noted by the health workers, in line with a study by [38] showing 87.6% of health workers in Kampala do not use safety plugs. The study also showed that a bulk of 94.7% (89) of the health workers at DHS, FUTO said “No” when they were asked if they used boots. This could be due to the nature of clinical activity by health workers at the facility.

5. Limitations

The idea of getting the attention of the health staff at the facility was one of the challenges confronted by researchers in this study. Health professionals could constantly be seen working in clinical or non-clinical settings. Another draw-

back of the study was its failure to provide proof of a statistical relationship between various hazards faced by health workers and their cadre of employees. Future research is urged to assess the relationship between these risks and the cadre of health personnel.

6. Conclusion

This study revealed that the majority of healthcare workers, both clinical and non-clinical, experienced one type of occupational hazard or the other, ranging from biological and non-biological hazards. The results could have been affected by recall bias as respondents were required to recall past experiences. This being a cross-sectional study, cause and effect could not be established. Nevertheless, this study provides useful information on occupational health hazards in this facility.

Based on the study findings, it is recommended that health workers in the department should ensure that they put on their necessary personal protective equipment to forestall the occurrence of future occupational hazards. And also, the university, government, and policymakers should revise and implement actions to provide health workers at DHS with equipment to encourage safety in work activity.

Availability of Data and Materials

The Data set from the study are available to the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Salvage, R., Rogers, D. and Cowell, R. (2015) Nurses at Risk. *Nursing Times*, **94**, 34-35.
- [2] Nsubuga, M.S. and Jaakkola, F.M. (2005) Needle Sticks Injuries among Nurses in Sub-Saharan Africa. *Tropical Medicine and International Health*, **10**, 773-781. <https://doi.org/10.1111/j.1365-3156.2005.01453.x>
- [3] World Health Organization (2016) The World Health Report Working Together for Health. World Health Organization, Geneva.
- [4] Goniewicz, A., Włoszczak-Szubzda, M., Niemcewicz, M., Witt, A., Marciniak-Niemcewicz, M.J. and Jarosz, M. (2012) Injuries Caused by Sharp Instruments among Healthcare Workers—International and Polish Perspectives. *Annals of Agricultural and Environmental Medicine*, **19**, 523-527.
- [5] Gershon, J.M., Pearson, M.F., Sherman, S.M., Samar, A.N., Canton, P.W. and Stone, R.R.M. (2009) The Prevalence and Risk Factors for Percutaneous Injuries in Registered Nurses in the Home Health Care Sector. *The American Journal of Infection Control*, **37**, 525-533. <https://doi.org/10.1016/j.ajic.2008.10.022>
- [6] Triolo, P.K. (1989) Occupational Health Hazards of Hospital Staff Nurses. Part II:

Physical, Chemical, and Biological Stressors. *AAOHN Journal*, **37**, 274-279.

<https://doi.org/10.1177/216507998903700704>

- [7] Dovlo, D.Y. (2004) Using Mid-Level Cadres as Substitutes for Internationally mobile Health Professionals in Africa. A Desk Review. *Human Resources for Health*, **2**, Article No. 7. <https://doi.org/10.1186/1478-4491-2-7>
- [8] Manyele, S., Ngonyani, H. and Eliakimu, E. (2008) The Status of Occupational Safety among Health Service Providers in Hospitals in Tanzania. *Tanzania Journal of Health Research*, **10**, 159-165. <https://doi.org/10.4314/thrb.v10i3.14356>
- [9] Dovlo, D. (2005) Taking More than a Fair Share? The Migration of Health Professionals from Poor to Rich Countries. *PLOS Medicine*, **2**, Article No. e109. <https://doi.org/10.1371/journal.pmed.0020109>
- [10] Andersen, L.L., Clausen, T., Mortensen, O.S., Burr, H. and Holtermann, A. (2012) A Prospective Cohort Study on Musculoskeletal Risk Factors for Long-Term Sickness Absence among Healthcare Workers in Eldercare. *International Archives of Occupational and Environmental Health*, **85**, 615-622. <https://doi.org/10.1007/s00420-011-0709-5>
- [11] Hayden, D.W., Blom, E.A., Lyle, C.G., Moore, R.A. and Weinstein, M.K. (2008) Risk of Hand or Glove Contamination after Contact with Patients Colonized with Vancomycin-Resistant *Enterococcus* or the Colonized Patients' Environment. *Infection Control & Hospital Epidemiology*, **29**, 149-154. <https://doi.org/10.1086/524331>
- [12] Tinubu, C.E., Mbada, A.L., Oyeyemi, A.A. and Fabunmi, B.M. (2010) Work-Related musculoskeletal Disorders among Nurses in Ibadan, South-West Nigeria: A Cross-Sectional Survey. *BMC Musculoskeletal Disorders*, **11**, Article No. 12. <https://doi.org/10.1186/1471-2474-11-12>
- [13] Bolyard, O.C., Tablan, W.W., Williams, M.L., Pearson, C.N., Shapiro, S.D., Deitchmann, E.A. and Hospital Infection Control Practices advisory Committee (1998) Guideline for Infection Control in Healthcare Personnel, 1998. *Infection Control and Hospital Epidemiology*, **19**, 407-463. <https://doi.org/10.2307/30142429>
- [14] Siegel, E., Rhinehart, M., Jackson, L. and Chiarello, J.D. (2017) Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings. *American Journal of Infection Control*, **35**, 65-164. <https://doi.org/10.1016/j.ajic.2007.10.007>
- [15] Orji, E.O., Fasubaa, O.B., Onwudiegwu, U., Dare, F.O. and Ogunniyi, S.O. (2002) Occupational Health Hazards among Health Care Workers in an Obstetrics and Gynecology Unit of a Nigerian Teaching Hospital. *Journal of obstetrics and gynaecology*, **22**, 75-78. <https://doi.org/10.1080/01443610120101781>
- [16] De Castro, S.L., Cabrera, G.C., Gee, K., Fujishiro, A.B. and Tagalog, E.A. (2009) Occupational Health and Safety Issues among Nurses in the Philippines. *AAOHN Journal*, **57**, 149-157. <https://doi.org/10.1177/216507990905700405>
- [17] Federal Ministry of Health of Nigeria [FMOH] (2017) Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings in Nigeria. Federal Ministry of Health of Nigeria, Abuja.
- [18] Lockley, L.K., Barger, N.T., Ayas, J.M., Rothschild, C.A., Czeisler, C.P. and Landrigan, S.W. (2007) Effects of Health Care Provider Work Hours and Sleep Deprivation on Safety and Performance. *Joint Commission Journal on Quality and Patient Safety*, **33**, 7-18. [https://doi.org/10.1016/S1553-7250\(07\)33109-7](https://doi.org/10.1016/S1553-7250(07)33109-7)
- [19] Moore, N. and Kaczmarek, R.M. (1990) Occupational Hazards to Health Care Workers: Diverse, Ill-Defined, and Not Fully Appreciated. *American Journal of Infection*

- Control*, **18**, 316-327. [https://doi.org/10.1016/0196-6553\(90\)90231-G](https://doi.org/10.1016/0196-6553(90)90231-G)
- [20] Triolo, P.K. (1989) Occupational Health Hazards of Hospital Staff Nurses. Part II: Physical, Chemical, and Biological Stressors. *AAOHN Journal*, **37**, 274-279. <https://doi.org/10.1177/216507998903700704>
- [21] Ilhan, E., Durukan, E., Aras, S. and Aygun, M.N. (2006) Long Working Hours Increase the Risk of Sharp and Needlestick Injury in Nurses: The Need for New Policy Implication. *Journal of Advanced Nursing*, **56**, 563-568. <https://doi.org/10.1111/j.1365-2648.2006.04041.x>
- [22] Adib-Hajbaghery, M.S. and Lotfi, M. (2013) Behavior of Healthcare Workers after Injuries from Sharp Instruments, *Trauma Monthly*, **18**, 75-80.
- [23] Vegso, L., Cantley, M. and Slade, J. (2007) Extended Work Hours and Risk of Acute Occupational Injury: A Case-Crossover Study of Workers in Manufacturing. *American Journal of Industrial Medicine*, **50**, 597-603. <https://doi.org/10.1002/ajim.20486>
- [24] Lipscomb, J. and Rosenstock, L. (1997) Healthcare Workers: Protecting Those Who Protect Our Health. *Infection Control and Hospital Epidemiology*, **18**, 397-399. <https://doi.org/10.2307/30141245>
- [25] Dembe, J.B., Erickson, R.G., Delbos, S.M. and Banks, A.E. (2005) The Impact of Overtime and Long Work Hours on Occupational Injuries and Illnesses: New Evidence from the United States. *Occupational and Environmental Medicine*, **62**, 588-597. <https://doi.org/10.1136/oem.2004.016667>
- [26] Trinkoff, J., Geiger-Brown, B., Brady, J., Lipscomb, C. and Muntaner, A. (2006) How Long and How Much Are Nurses Now Working? *The American Journal of Nursing*, **106**, 60-72. <https://doi.org/10.1097/00000446-200604000-00030>
- [27] Umar, I.P. (2014) Prevalence of Occupational Hazards Bida, Northcentral Nigeria. *The Journal of the Royal Society for the Promotion of Health*, **115**, 235-243.
- [28] Kirkcaldy, B.D., Trimpop, R. and Cooper, C.L. (1997) Workplace Hazards and Safety Practices by Selected HCWs in a Typical Health Care Facility (HCF) in Nigeria *International Journal of Stress Management*, **4**, 79-87. <https://doi.org/10.1007/BF02765302>
- [29] Lipscomb, A.M., Trinkoff, J., Geiger-Brown, B. and Brady, J.A. (2018) Prevalence of Occupational Exposure, Knowledge, Availability and Utilization of Post Exposure Prophylaxis among Health Care Workers in Singida District Council, Tanzania. *PLOS ONE*, **13**, Article ID: e0201695. <https://doi.org/10.1371/journal.pone.0201695>
- [30] Singh, B., Paudel, B. and KC, S. (2017) Knowledge and Practice of Health Care Workers regarding Needle Stick Injuries in a Tertiary Care Center of Nepal. *Kathmandu University Medical Journal*, **13**, 230-233. <https://doi.org/10.3126/kumj.v13i3.16813>
- [31] Johansson, J.A. (1995) Psychosocial Work Factors, Physical Work Load and Associated Musculoskeletal Symptoms among Home Care Workers. *Scandinavian Journal of Psychology*, **36**, 113-129. <https://doi.org/10.1111/j.1467-9450.1995.tb00973.x>
- [32] Borges, F.N. and Fischer, F.M. (2013) Analysis behavior of Health Care Workers (HCWs) in the Field of Needlestick Injuries (NSIs). *Chronobiology International*, **20**, 351-360.
- [33] iraba, A.K., Bwogi, J., Namale, A., Wainaina, C.W. and Mayanja-Kizza, H. (2010) Workplace Hazards and Factors for Hepatitis B Virus Infection among Health Care Workers in a Tertiary Hospital in Uganda. *BMC Infectious Diseases*, **10**, Article No. 191. <https://doi.org/10.1186/1471-2334-10-191>
- [34] Gebrezgiabher, B.B., Tetemke, D. and Yetum, T. (2019) Awareness of Occupational

- Hazards and Utilization of Safety Measures among Health Workers in Aksum and Adwa Towns, Tigray Region, Ethiopia. *Journal of Environmental and Public Health*, **2019**, Article ID: 4174085. <https://doi.org/10.1155/2019/4174085>
- [35] Rai, R., El-Zaemey, S., Dorji, N. and Fritschi, L. (2020) Occupational Exposures to Hazardous Chemicals and Agents among Healthcare Workers in Bhutan. *American Journal of Industrial Medicine*, **63**, 1109-1115. <https://doi.org/10.1002/ajim.23192>
- [36] Sepkowitz, K.A. (1996) Occupationally Acquired Infections in Health Care Workers. Part I. *Annals of Internal Medicine*, **125**, 826-834. <https://doi.org/10.7326/0003-4819-125-10-199611150-00007>
- [37] Senthil, A., Anandh, B., Jayachandran, P., Thangavel, G., Josephin, D., Yamini, R. and Kalpana, B. (2015) Perception and Prevalence of Work-Related Health Hazards among Health Care Workers in Public Health Facilities in Southern India. *International Journal of Occupational and Environmental Health*, **21**, 74-81. <https://doi.org/10.1179/2049396714Y.00000000096>
- [38] Jones, E. and Mathieson, K. (2016) Health Safety among Workers in Kampala Teaching Health Services. *Health physics*, **110**, S52-S58. <https://doi.org/10.1097/HP.0000000000000485>
- [39] Rogers, A.E., Hwang, W.T., Scott, L.D., Aiken, L.H. and Dinges, D.F. (2004) The Working Hours of Hospital Staff Nurses and Patient Safety. *Health Affairs*, **23**, 202-212. <https://doi.org/10.1377/hlthaff.23.4.202>
- [40] Al-Otaibi, Y.K., Al-Nowaiser, N. and Rahman, A. (2019) Reducing Hospital-Acquired Pressure Injuries. *BMJ Open Quality*, **8**, Article ID: e000464. <https://doi.org/10.1136/bmjoc-2018-000464>

Appendix 1

QUESTIONNAIRE ON THE ASSESSMENT OF COMMON OCCUPATIONAL HAZARDS AMONG HEALTHCARE WORKERS AT DEPARTMENT OF HEALTH SERVICES, FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI

SECTION A: SOCIO DEMOGRAPHIC CHARACTERISTICS

INSTRUCTION: Please tick (✓) the correct options besides each question and also fill in the spaces provided where appropriate with the correct options.

- 1) What is your age..... (As at last Birthday)
- 2) What is your Gender? a) Male b) Female
- 3) Marital status a) Single b) Married c) Separated d) Widowed
- 4) Religion: a) Christianity b) Islam c) Traditional d) Others (**Please Specify**).....
- 5) Ethnicity a) Igbo b) Hausa c) Yoruba d) Fulani e) Others (**please specify**).....
- 6) Cadre of Heath Worker a) Doctor b) Nurse c) Med Lab Scientist d) Pharmacist e) Health assistants g) others (specify).....
- 7) How long have you been in healthcare service? a) 6 - 12 months b) 1- 5 yrs c) 5 - 10 yrs d) above 10years

SECTION B: LEVEL OF KNOWLEDGE OF COMMON OCCUPATIONAL HAZARDS AMONG HEALTHCARE WORKERS AT DEPARTMENT OF HEALTH SERVICES, FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI

Please tick (✓) the correct options besides each question and also fill in the spaces provided where appropriate with the correct options.

- 1) Are you aware of occupational hazards? a) Yes b) No
- 2) Where did you get your information on occupational hazards a) During my training b) post employment professional workshop c) ward rounds/clinics d) pre-employment orientation e) through posters and hand bills at the hospital f) Media g) Others (please specify).....
- 3) What type (s) of Occupational hazards are you aware of? (*you can tick more than one*)

s/n	Occupational Hazard	Yes	No
1.	Physical Hazards		
2.	Chemical Hazards		
3.	Biological Hazards		
4.	Ergonomic Hazards		
5.	Mechanical Hazards		

- 4) Which of the following is **NOT** an occupational hazard in this Health center? a) Noise b) Needle stick injuries c) Early arrival at work d) Body Contamination with Patients body fluids

- 5) Which of the following is **NOT** an occupational infection in this health

center? a) HBV [] b) HIV [] c) Chicken pox [] d) Malaria []

6) The **MOST** likely source of occupational infection is one of the following:
 a) Air-borne [] b) Faces and urine [] c) Blood and bodily fluids [] d) Body contact []

7) During which of the following activities is needle stick injury **MOST** likely to occur? a) Recapping [] b) Transporting to the sharps disposal safety box [] c) Handling equipment before use [] d) Handling equipment after disposal []

8) Which of the following violates the standard precautions? a) Aspirating for blood before intramuscular injections [] b) Recapping needles after use [] c) Leaving needles attached to syringes after use [] d) None []

9) Hand washing is good to prevent occupational cross infection after procedures a) Yes [] b) No [] c) Don't know []

SECTION C: BIOLOGICAL HAZARDS AMONG HEALTHCARE WORKERS AT DEPARTMENT OF HEALTH SERVICES, FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI.

1) Please which of the Following Biological Hazards Have you experienced a) Sharp related Injuries (Such as needle sticks) [] b) Cuts and wounds [] c) Direct Contact with contaminated specimens/hazardous materials [] d) Airborne Diseases [] e) Infectious Disease/infections [] f) Blood borne pathogens [] g) others (please specify).....

SECTION D: NON BIOLOGICAL HAZARDS AMONG HEALTHCARE WORKERS AT DEPARTMENT OF HEALTH SERVICES, FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI

1) Please which of the Following Non Biological Hazards Have you experienced a) Stress [] b) physical trauma due to noise or verbal abuse [] c) sexual abuse [] d) Musculoskeletal injuries [] e) slip, trips or falls [] f) Fractures [] g) Chemical spills, Burns and radiations [] h) others (please specify).....

SECTION Es: SAFETY MEASURES OF OCCUPATIONAL HAZARDS AMONG HEALTHCARE WORKERS AT DEPARTMENT OF HEALTH SERVICES, FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI.

Please tick in the box (✓) the correct options of the safety measures associated with you.

S/N	SAFETY MEASURES	Yes	No
1.	Eye goggle		
2.	Regular Hand washing		
3.	Face Mask		
4.	Hand glove		
5.	Helmets		
6.	Ear plug		
7.	Apron		
8.	Boots		