

Knowledge and practice of preventive measures for occupational health hazards among nurses working in a teaching hospital in Enugu

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Abstract

Occupational hazard preventive measures are important practices because of the high rates of associated morbidity and mortality of exposed workers and include actions that can be taken to reduce the potential of exposure to the hazard. This study assessed the knowledge and practice of preventive measures of occupational health hazards among nurses working in Enugu State University Teaching Hospital (ESUTH), Parklane Enugu. This study used a descriptive cross-sectional survey design to collect data through a researcher-developed questionnaire. Utilizing the purposeful sampling technique, 214 nurses working in ESUTH, Parklane, completed the survey. A total of 214 questionnaires were filled and returned (response rate=93.9%). A good level of knowledge (91.6%) on occupational hazard preventive measures was most evident among the respondents. There was also an associated good level of implementation of occupational hazard preventive measures among the respondents with a grand mean of 3.08±1.28. The factors found to influence the implementation of occupational hazard preventive measures among the respondents include the inadequate provision of PPE (3.47±0.58), poor attitudes of government towards workers' working conditions (3.44±0.63), and lack of adequate staff training (2.93±0.41). Overall, the findings show that Nurses working in ESUTH showed good knowledge and practice of preventive measures of occupational health hazards. In terms of reducing hazards among Nurses in the wards, and in the hospitals, we recommend that risk assessment should be carried out regularly to identify potential hazards at a safe stage.

Introduction

World Health Organization (WHO)¹ defined a health hazard as "property damage, loss of livelihoods and services, social, environmental or economic disruption caused by any dangerous phenomenon, substances, human activity or condition". Hazards are often inherent in every occupation. Occupational hazards hence refer to short-term and long-term risks and dangers, which emerge from unhealthy work environments.² These hazards may be in form of materials and substances or activities, processes, and conditions present in the work environment that tend to increase the risk of injury or ill-health. In other words, it is a potential risk to the health of an individual arising from an unhealthy work environment in which one works.³

The environment of healthcare organizations is one of the most

harmful environments to work in. Employees working in this sector experience constant exposure to various complex health and safety hazards in the course of their jobs. According to Izadi and Piruznia,⁴ these hazards may be categorized into biological, chemical, physical, ergonomic, and psychosocial hazards. Biological hazards are mainly pathogenic organisms such as bacteria, viruses, fungi, and parasites, which cause diseases such as HIV/AIDS, tuberculosis, hepatitis, and other blood-borne infections. Chemical hazards may arise from toxins such as glutaraldehyde and ethylene dioxide. Common physical hazards that may be found in health facilities include radiation, noise, and exposure to sharps. Exposure to ergonomic risks may emanate from heavy lifting and prolonged standing and long working hours. Workplace violence and shift work are examples of psychosocial hazards that may be found in healthcare settings.⁵

Globally, problems emanating from occupational exposures have gained tremendous attention among healthcare staff and especially among nurses, as they are often the first-line health care provider.⁶ These problems are often underreported and under-researched in Nigeria⁷ probably due to poor motivation and poor demand of research findings by policy makers. Health workers and other support staff in health care institutions are subjected to a variety of occupational health hazards. As the largest group of health workers, Amadhila *et al.*⁸ report that 95% of them are at risk of being exposed to workplace hazards because of the nature of their job, lack of resources, and poor working conditions. Occupational hazards remain an inevitable phenomenon in every health care delivery setting.⁹ According to WHO,¹⁰ all healthcare workers, including healthcare professionals, are at risk of workplace hazards. An estimate by the WHO reported that 59 million people work in healthcare facilities worldwide.⁵ This figure accounts for approximately 12% of the world's working population.¹¹ The International Labour Organization (ILO) further documents that work-related accidents and illnesses impact the lives of millions of healthcare workers, and many health workers are overwhelmed by these occupational hazards.¹²

To further elucidate these claims in the healthcare environment, Ajayi *et al.*¹³ write that occupational injuries and diseases result in high rates of morbidity and mortality among exposed healthcare workers. They reported that every year, roughly 400,000 new cases of occupational injuries are diagnosed among health workers while an estimated number of about 100,000 health workers die from occupational hazards. On the part of the workers, occupational exposure may result in some detrimental effects, which can range in intensity from minor physical injuries, serious physical injuries to death. In between, there may also be temporary and permanent physical disability and psychological trauma. These also present serious implications such as the loss of skilled personnel and poor service delivery for the health care delivery system in developing countries, especially Nigeria.¹⁴

Just like every other category of workers such as miners or construction workers who work in a high-risk environment, a healthcare staff also needs to be protected from these workplace dangers.⁵ Occupational hazard preventive measures refer to safety interventions that shield workers from workplace hazards by helping to minimize or eliminate injuries, illnesses, and accidents. They include actions that can be adopted to decrease the tendency of risk exposure to the hazard, or controls measures to completely remove the hazard from the environment.¹⁵ The practice of occupational hazard preventive measures in the workplace is of utmost relevance because of the resultant increased rates of morbidity and mortality among exposed workers.

Despite the existence of Occupational Health Safety policy in

the Ministry of Health and Social Services and its adoption by ESUTH, Parklane, there has been an increase in the number of reported incidents of occupational health hazards at the hospital. According to the most recent ESUTH Parklane Report, health workers at the hospital experienced occupational health problems during the reporting period of four years (2014-2017) that include needle prick injuries (126), musculoskeletal disorders (50), miscarriage (5), and varicose veins (55). Furthermore, 10 of the health workers resigned as a result of stress and burnout. Nurses in ESUTH, Parklane is primarily involved in organizing the environment, material resources, and coordinating the work of the health staff, as well as providing care to the patients. They are responsible for directing patient care tasks such as hygiene, administering medication, wound dressing, placing and changing bandages, and vaccinating patients. These duties leave them at risk of health hazards such as work-related stress, musculoskeletal disorders, needle-stick injuries, blood-borne diseases, sleep disturbances, and assault from patients and their relatives. The knowledge and practice of occupational safety among nurses in ESUTH, Parklane remains unclear. There has however been no evidence of quantitative research conducted in ESUTH, Parklane investigating the knowledge and practices of occupational hazard preventive measures among registered nurses. Also, there are dearth of studies among hospitals in the southeastern region of Nigeria on this topic. Since the implementation of safety measures among nurses who work in the clinical area requires the nurses' knowledge of such measures and skills to practice them. It is therefore against this background that this study aims to assess the knowledge of nurses working in ESUTH, Parklane on occupational health hazard preventive measures, their practice of these measures, and to highlight the factors that influence the implementation of occupational hazard preventive measures.

Materials and Methods

Study design and sampling

This study used a descriptive, cross-sectional design to assess knowledge and practice of occupational health hazards preventive measures among nurses working in Enugu ESUTH, Parklane. A purposive sampling technique was used to ensure that participants were proportionately drawn from the 18 wards in the hospital. The data was collected in March 2021. At the end of the data collection, the researchers administered 228 copies of the questionnaire and 214 of the total questionnaire were properly filled and returned making a return rate of 93.9%. The eligible sample size was drawn from the target population of 446 nurses registered with ESUTH using the Kejcic and Morgan¹⁶ Power analysis formula. Nurses who did not have direct contact with a patient for the past three months and those who were not willing to participate were excluded from the study.

Study site

The area for this study is Enugu State University Teaching Hospital Parklane, Enugu. It has a total number of 18 wards and several clinics. ESUTH was chosen for the study given its central position and wide care-service catchment in the region.

Instrument and survey form

The instrument for data collection is a researcher-developed questionnaire. It was constructed based on the literature review^{6,17,18} and the stated objectives for this study. The question-

naire was designed to elicit responses on the knowledge of occupational health hazards preventive measures among nurses with four (4) sections. Section A elicited the demographic data. Section B elicited data on the level of knowledge of occupational hazard preventive measures among Nurses. Section C elicited data on the level of implementation of occupational health hazards preventive measures among nurses. Finally, section D elicited data on factors that influence the implementation of occupational health hazards preventive measures among nurses. All the questions were close-ended with some A and B having multiple options while sections C and D have a Likert scale of five close-ended questions.

A researcher-developed questionnaire was deemed necessary for this study to enable eliciting culturally adapted and setting specific data. Two Nurses and a Biostatistician reviewed the questionnaire for face and content validity. They made recommendations and corrections to ensure that the items in the questionnaire are suitable for the objectives proposed for the study. The corrections were implemented by the researcher before proceeding to pilot test the instrument.

A pilot study was conducted at ESUTH, Parklane Enugu using 20 separate nurses with a focus on the good understanding of the question and to remove any ambiguity and ensure the instrument measures what is set to measure. To establish the reliability of the instrument, the reliability coefficient of the instrument was calculated using Cronbach alpha to gauge its feasibility. The result showed a reliability coefficient of 0.87, which confirmed that the questionnaire is reliable.

Data collection

The questionnaires were distributed to the respondents by hand, and afterward, they were collected and crosschecked to ensure they are properly filled. After getting administrative permission from each ward, the researcher addressed the nurses in each ward during their break period, during which the researchers explained the essence of the study, why they were chosen and the process on how to answer the questions appropriately. The questionnaires were subsequently administered by the researchers, to those who consented to participate in the study. The questionnaire could be filled in a 20 minutes duration. At the end of the distribution, a 100 percent response rate was obtained as the respondent was told to fill the questionnaires and return them the same day.

Statistical analysis

Data were collected, coded, and entered into a computer, where they were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Data was presented in frequencies, percentages, means, and standard deviations using descriptive statistics.

Results

Socio-demographic profile of the participants

The sociodemographic profile of the participants is shown in Table 1. The table above shows that the age distribution of the respondents slightly varied with a mean age of 35.61 ± 6.05 with respondents aged between 26-35 years being comparatively higher

Table 1. Socio-demographic profile of the participants (n =214).

Category	Options	Frequency	Percentage (%)	Mean \pm SD
Age (years)	26 – 35	135	63.1	35.61 \pm 6.05
	36 – 45	50	23.4	
	46 – 55	21	9.8	
	56 and above	8	3.7	
Gender	Male	21	9.8	
	Female	193	90.2	
Marital status	Single	65	30.4	
	Married	134	62.6	
	Divorced/separated	-	-	
	Widow/widower	15	7.0	
Number of years in service	1-10 years	115	53.7	
	11-20 years	61	28.5	
	21-30 years	26	12.2	
	31 and above	12	5.6	
Religion	Christianity	214	100.0	
	Islam	-	-	
	African Traditional/Pagan	-	-	
	Atheist	-	-	
Position in the Hospital	Nursing officer	95	44.4	
	Senior Nursing officer	39	18.2	
	Principal Nursing Officer	35	16.3	
	Chief Nursing Officer	29	13.6	
	ADN and above	16	7.5	
Educational Qualifications	RN	27	12.6	
	RN/RM	110	51.4	
	BNSc	71	33.2	
	MSc	6	0.28	
	PhD	-	-	

(63.1%). The majority of 193 (90.2%) of the respondents were females and were married 134(62.6%). Based on their years of service, 115(53.7%) of the respondents have spent 1-10 years in service. All 214(100.0%) respondents were Christians and the highest numbers held the position of Nursing Officers 95(44.4%). Lastly, findings under educational qualification revealed that a little above half of the respondents were doubly qualified, possessing both registered nursing (RN) and registered mid-wifery (RM) qualifications (51.4).

The Knowledge of Occupational Hazard Preventive Measures

From Table 2, all the respondents (100.0%) have heard about occupational hazard. The respondents identified the various types of occupational hazards to include: chemical hazards 214 (100.0%), radiation 211 (98.6%) physical hazards 208 (98.6%), biological hazards 206 (96.3%), psychosocial hazards 161 (75.2%), and ergonomics hazards 103 (48.1%). Also, all respondents 214 (100.0%) have heard about occupational hazard preven-

tive measures with the various measures identified to mainly include: Maintaining hand hygiene 214 (100.0%), Use of personal protective barriers such as gloves, gowns, aprons, footwear, eye goggle 214 (100.0%), use of new single disposable needle 214 (100.0%) and Making use of safety box for sharp objects 212 (99.1%). Only a few respondents avoid recapping of used needles and syringes 75 (35.1%).

The overall level of knowledge on occupational hazard preventive measures possessed by respondents showed that almost all respondents 196 (91.1%) had good knowledge while 16 (7.5%) and 2 (0.9%) had moderate and poor knowledge respectively.

The level of implementation of occupational hazard preventive measures

Table 3 displays the level of implementation of occupational hazard preventive measures among the respondents. The most common preventive measures always/frequently performed by the respondents were performing frequent hand washing with soap before and after the procedure (3.44±1.5), frequent use of correct

Table 2. The knowledge of occupational hazard preventive measures (n =214).

Variables	Options	Frequency	Percentage(%)
Have you heard about occupational hazard?	Yes	214	100.0
	No	-	-
What are the various types of occupational hazards? (Multiple responses)	Biological hazards	206	96.3
	Chemical hazards	214	100.0
	Ergonomics hazards	103	48.1
	Radiation	211	98.6
	Physical hazards	208	98.6
	Psychosocial hazards	161	75.2
*Have you heard about occupational hazard preventive measures?	Yes	214	100.0
	No	-	-
If Yes to *, identify various occupational hazard preventive measures (multiple responses)	Making use of safety box for sharp objects	212	99.1
	Maintaining hand hygiene	214	100.0
	Use of personal protective barriers such as gloves, gowns, aprons, foot wear, eye goggle	214	100.0
	Use of new single disposable needle	214	100.0
	Avoid recapping of used needles and syringes	75	35.1
	Proper labeling of chemicals and other hazardous drugs	173	80.8
	Overall knowledge of occupational hazard preventive measures among Nurses	Good Knowledge	196
	Moderate Knowledge	16	7.5
	Poor Knowledge	2	0.9

Table 3. The level of implementation of occupational hazard preventive measures (n=184).

Variable	Always (%)	Often (%)	Rarely (%)	Not at all (%)	Mean±SD
Receive appropriate vaccine to prevent hazardous diseases	52(24.3)	101(47.2)	61(28.5)	-	2.96±1.46*
Frequent hand washing with soap before and after procedure.	94(43.9)	120(56.1)	-	-	3.44±1.58*
Frequent using of correct personal protective equipment or other barriers	87(40.7)	127(59.3)	-	-	3.41±1.57*
Being careful at work and conscious of health hazards that may occur	45(21.0)	150(70.1)	19(8.9)	-	3.12±1.49*
Use of Post Exposure Prophylaxis	-	34(15.9)	145(67.7)	35(16.4)	1.99±1.08
Practice of high level disinfection of used instruments	59(27.6)	123(57.5)	32(15.0)	-	3.13±0.64*
Safe injection practices	45(21.0)	169(79.0)	-	-	3.21±1.50*
Promoting and maintaining cross ventilation in the ward	42(19.6)	140(65.4)	32(15.0)	-	3.05±1.47*
Treatment of blood and fluids from patient as infectious	66(30.8)	148(69.2)	-	-	3.31±1.54*
Use of hand sanitizer	45(21.0)	160(74.8)	9(4.2)	-	3.17±0.47*
Grand /overall mean					3.08±1.28

* indicates good level of implementation of occupational hazard preventive measures.

personal protective equipment or other barriers (3.41±1.57), treatment of blood and fluids from the patient as infectious (3.31±1.54) and safe injection practices (3.21±1.50). Only a few respondents practice the use of Post Exposure Prophylaxis (1.99±1.08).

The factors that influence the implementation of occupational hazard preventive measures

The information presented in Table 4 shows that the respondents identified the following factors to influence the implementation of occupational hazard preventive measures: inadequate provision of PPE (3.47±0.58), poor attitudes of government towards workers working conditions (3.44±0.63), and lack of adequate staff training (2.93±0.41). Other factors not found to significantly influence the implementation of occupational hazard preventive measures include poor usage due to emergencies (1.82±0.60), poor usage due to time limitation (1.80±0.64), poor usage due to inappropriate size of PPE (2.02±0.64), poor knowledge of the use of PPE (2.23±0.97) and patient discomfort associated with PPE use by nurses (1.90±0.47).

Discussion

This study recruited Nurses in Enugu State University Teaching Hospital (ESUTH), Parklane to assess their knowledge and use of preventive measures of occupational health hazards. The finding shows that nurses in ESUTH, Parklane demonstrated adequate knowledge of occupational hazards and their preventive measures. Overall, 91.1% met the study's criteria for a good level of knowledge. This was reflected in the participants' responses as all respondents have heard about occupational hazards and preventive measures. This finding indicates that a good number of the respondents equally correctly identified various types of occupational hazards except for ergonomic hazards. Ergonomic hazard does not appear to be well recognized as a hazard in the health facility among this study participant. However, the notable adequate knowledge is commendable as the knowledge of workplace hazards and its preventive measures is germane to promoting positive behavior, which will inform their practice of safety precautions. ESUTH, Parklane is the only state government-owned teaching hospital in Enugu state, with qualified professional nurses and one would expect that relevant areas like occupational hazards should be given adequate attention. This goes in line with the result of Aluko *et al.*¹⁷ who documented that most respondents (89 %) were knowledgeable about hazards. The level of knowledge found in the current study was, however, slightly higher than that of Sabita *et al.*⁶ who reported that the level of knowledge of occupa-

tional health hazards among the nurses was adequate knowledge (61.8%). In contrast, Erah *et al.*¹⁸ submitted that a little above half (50.92%) of the study participants had poor knowledge of the occupational hazard. These differences seen across previous work could be attributed to the differences in the assessment instrument employed and the year that the work was carried out as studies carried out within and in the post-COVID-19 pandemic must have been influenced by the high hygiene measure campaigned towards controlling the pandemic.

Besides, while Ogunnaike and Akinwaare⁷ have argued that nurses safety is dependent on their knowledge and measures of how to prevent these occupational hazards, some studies have documented that even though the knowledge of occupational hazard preventive measures have been consistently high among nurses, this knowledge does not translate into practice as compliance with precautions among nurses to avoid exposure hazards is low.^{6,7,17} The findings of this study rather aligned with Ogunnaike and Akinwaare⁷ as the result gotten regarding implementation of occupational hazard preventive measures among Nurses showed that Nurses had a good practice of environmental safety though they are obliged to care for their patients and themselves in the safest environment. Especially, nurses in this study showed adequate implementation level in all the variables used to measure preventive measures apart from post-exposure prophylaxis where the majority (1.99±1.08) of them responded they rarely took it. Rather, they gave more attention to frequent handwashing with soap before and after a procedure (3.44±1.5). This is not surprising, as hand hygiene remains one of the most important ways to reduce the transmission of infections in healthcare settings.¹⁹ Other commonly reported implemented measures include frequent use of correct personal protective equipment or other barriers and treatment of blood and fluids from the patient as infectious. This finding is in congruence with the results of other related studies conducted in Nigeria. Ogunnaike and Akinwaare⁷ reported that 74% of nurses practice good preventive strategies. In Aluko *et al.*¹⁷ it was discovered that 52.1% "always" complied with standard procedures and most (93.8 %) practice safe disposal of sharps. Contradictory results however have been documented in some studies such as Ajayi²⁰ revealed poor practices in terms of inadequate hand hygiene practices, use of gloves, eye protection, masks, wearing a gown when the risk of body fluid exposure is anticipated, avoiding needle recap after use, and carefully considering all patients as potentially infectious. Similarly, Sabita *et al.*⁶ in Nepal, Mutifasari *et al.*²¹ in Indonesia, and Osungbemiro *et al.*²² in Nigeria were less than an average number of the respondents demonstrated poor practice of occupational safety measures. However, the differences in findings from these studies might have been influenced by the

Table 4. The factors that influence the implementation of occupational hazard preventive (n=214).

Variable	SA (%)	A (%)	D (%)	SD (%)	Mean±SD
Poor usage of PPE due to emergency situation.	5(2.3)	8(3.7)	145(67.8)	56(26.2)	1.82±0.60
Inadequate provision of PPE	110(51.4)	95(44.4)	9(4.2)	-	3.47±0.58*
Lack of adequate staff training	12(5.6)	177(82.7)	25(11.7)	-	2.93±0.41*
Poor usage due to inappropriate size of PPE	9(4.2)	18(8.4)	155(72.4)	32(15.0)	2.02±0.64
It makes patient uncomfortable with nursing care	1(0.5)	8(3.7)	173(80.8)	32(15.0)	1.90±0.47
Poor knowledge on the use of personal protective equipment (PPE).	28(13.1)	46(21.5)	87(40.7)	53(24.8)	2.23±0.97
Time limitations in implementing preventive measures	3(1.4)	17(7.9)	128(59.8)	66(30.8)	1.80±0.64
Poor attitudes of government towards workers working condition	110(51.4)	88(41.1)	16(7.5)	-	3.44±0.63*

*indicates a factor influencing the implementation of occupational hazard preventive measures.

COVID-19 demands for heightened precautionary practices of safety measures.

Furthermore, regarding factors that influence the implementation of occupational hazard preventive measures among nurses, the results of this study reveal that the commonest identified factor that influences the implementation of occupational hazard preventive measures was the inadequate provision of Personal Protective Equipment (PPE) 110 (51.4). Indeed, the availability of PPE has for long been recognized as an important infection control measure in the health care industry.²³ When nurses are provided with the best possible protective equipment, there is reduced exposure to hazards.²⁴ Secondly, is the poor attitudes of government towards workers' working conditions 110 (51.4). As a state government hospital, this finding is not uncommon because generally very little attention is given by the government to the health care system in Nigeria. Ogunnaikem and Akinwaare⁷ similarly identified that negligence and poor accessibility influenced the implementation of occupational safety measures. Meanwhile, this study findings did not corroborate the findings of Elewa and Banan²⁵ that identified a perceived lack of educational programs, lack of regular medical examination, policies and procedures for occupational safety, and ineffective supervision were the most contributing factors to the poor implementation of occupational safety measures among nurses. Again, a review by Bailey²⁶ that showed that lack of knowledge, lack of time, forgetfulness, the negative influence of the equipment on nursing skills, uncomfortable equipment, skin irritation, lack of training, the conflict between the need to provide care and self-protection, and distance to necessary equipment or facility were most commonly reported.

Nursing is a profession that is overwhelmingly concerned with the care of others and it tends to neglect itself. To this end, nurses should be encouraged to strive to promote and maintain the highest degree of physical, mental, and well-being by controlling risks. This may be accomplished by periodically organizing and attending seminars and in-service training, mass gatherings, and refresher courses that provide knowledge on workplace risks and safety registered nurses. This material should be changed and updated on a regular basis. Second, appropriate resource materials must be available at all times. These include disinfectants, soaps, and water basins in patients' rooms, as well as gloves, aprons, face masks, goggles, and other products that can be utilized to guarantee nurses' professional safety. Lastly, future research is needed to assess the knowledge and preventive practice of occupational health hazards among nurses working in rural and primary health clinics.

Limitation

This study should be reviewed with its limitations in mind. Firstly the inherent limitations of cross-sectional studies apply here. Also, this is a Unicenter study utilizing only the state teaching hospitals. A multicenter research design involving federal, state, private, and locally owned institutions, as well as a more statistically advanced methodology, may yield results that are more generalizable.

Conclusions

Overall, the findings show that Nurses working in ESUTH showed good knowledge and practice of preventive measures of occupational health hazards. In order to reduce risks among nurses on the wards and in hospitals, risk assessments should be performed on a regular basis in order to detect possible hazards at an

early stage.

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