

# Occupational hazard preventive measures among nurses in a Nigerian tertiary health institution

## Abstract

**Introduction:** The health of people in a work place is as important as the work they do and this focuses on public health. Nurses are faced with risk of occupational hazards, hence the need for use of personal protective equipment (PPE). This study examined occupational hazard preventive measures among nurses in a Nigerian tertiary health institution.

**Method:** this study adopted descriptive cross sectional research design using structured questionnaire for data collection. Two hundred and ninety-two (292) questionnaires were distributed but only 264 were retrieved among which 220 were completely filled and therefore included in data analysis. Simple random sampling was used to select study participants. Ethical approval was obtained from UI/UCH ethical committee before data collection. Data software package was used for data analysis.

**Results:** The findings of this study showed that about two third (66%) of nurses working in the facility have good knowledge of occupational hazard. Respondents confirmed the availability of PPE (79.1%) and occupational health services (83.6%) in their work place. However, physical (99%), chemical (97.7%) and biological (95.5%) hazards were identified as the three commonest forms of hazard been exposed. Also, gloves (99%), goggles (99.5%), gown (99.5%) and face-mask (99.5%) were identified as mostly used PPE. Overall, 163(74%) nurses practise good preventive strategies. Negligence and poor accessibility were mentioned as factors affecting use of PPE.

**Conclusion:** The study concluded that despite good knowledge of occupational hazards among nurses, many of them don't use PPE due to lack of organizational policies. It is therefore imperative for health institutions to ensure use of PPE to reduce risk of occupational hazard among nurses.

**Keywords:** nurses, occupation, hazard, risk, protective equipment

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**Abbreviations:** PPE, personal protective equipment; OH, occupational hazards; UI, university of ibadan; UCH, university college hospital

## Introduction

Nursing profession deals with health and most importantly life of the people in the society, hence, it demands a great deal of commitment. Personal fulfilment in nursing practice can be satisfying, yet some health risk associated with the work must be taken into consideration. Due to the nature of their work, nurses are at risk of so many occupational hazards. Nurses are confronted with biological, physical and chemical hazards, during the course of discharging their duties. However, their safety depends on their knowledge of occupational hazards they are exposed to and how they can be prevented.<sup>1</sup>

Nurses continue to report high levels of job-related injury and illness.<sup>2</sup> Working environment, responsibilities, and duties of nurses put them in the frontline of numerous occupational hazards which can be acute or long term. Health outcome includes musculoskeletal injuries/disorders, infections, changes in mental health, cardiovascular, metabolic and neoplastic diseases.<sup>2</sup> Another hazards and work stressors common to nursing practice include the way work is organized in nursing. For example; shift work, long hours and overtime. Irtyah<sup>3</sup> reported that shift work exert adverse effects by disturbing circadian rhythm, sleep, family and social life and may

also have long term outcomes such as obesity, type two diabetics and cardiovascular diseases. Work related musculoskeletal disorders by definition are a subset of musculoskeletal disorders that arise from occupational exposures.<sup>4</sup> The nursing population accounts for 60% of these musculoskeletal disorder. Nurses often conduct patient handling by bending their waist and maintaining an uncomfortable posture towards the opposite side of the bed or chair, increasing the risk of back pain.<sup>4</sup> Shift work may be a demanding situation because it raises problems for restoring work and no work activities. Shift schedules that involve night duties also disturb circadian rhythm and put different workload demands and reduce adequate communication and participation in preventive activities than the other work schedules.<sup>4</sup> Musculoskeletal disorder has a significant impact on the quality of life.<sup>4</sup> They contribute to lost work time or absenteeism and reduced work participation and quality of work output, resulting in a considerable economic burden on the individual, the organization, and the society as a whole.

Occupational hazards are mostly under-reported due to inadequate research. However, literature has revealed a lot of occupational diseases/ injuries in sub-Saharan Africa and Asia with developing countries lacking the necessary expertise and resources to manage it.<sup>5</sup> It has also been argued that the management of medical waste poses a very high risk to healthcare in developing countries. This includes poor handling, collection, sorting, segregation and disposal of medical waste such as sharps, medical devices, and blood and body tissues.<sup>5</sup>

Unsafe disposal of medical wastes is a major challenge in developing countries as it contributes largely to occupational injuries and infections.<sup>5</sup> Additionally, Masum<sup>6</sup> and Owie<sup>5</sup> found that the increase in occupational health hazards in developing countries are largely blamed on Healthcare Workers (HCWs) not practicing universal safety precautions such as hand washing, wearing of gloves and the usage of Protective Personal Equipment (PPE). This unsafe practice increases the risk of injuries as well as transmission of infections to health care workers.

In Nigeria, the Federal Ministry of Health in 2003 postulated that PPE should be made available to healthcare workers to reduce occupational hazards in the work place. These PPE include; hand hygiene materials, disposable long sleeved gown, goggles or face shield and disposable glove.<sup>7</sup> Various national and international health organizations also provided some interventions to reduce occupational hazards among nurses. These interventions include; assessment of policy gap. Implementation of standard precautions, education of healthcare workers and health system manager, development of surveillance system, immunization against Hepatitis B and implementation of appropriate post-exposure follow up including prophylactic medications. In spite of all these measures, many nurses still face the challenges of work place hazards.

It is on this background that this study assessed the knowledge of nurses on occupational hazard associated with their work and use of preventive strategies to reduce exposure to hazard in their work place.

## Material and methods

This study adopted descriptive cross-sectional design using quantitative approach. It was carried out in University College Hospital (UCH) Ibadan, a federal health institution which serves as referral centre for other hospitals in and outside Oyo state of Nigeria. The study population were nurses and the sample size was determined using the formula:

$$n = \frac{N}{1 + \left(\frac{e}{N}\right)^2}$$

Where:

n=required sample size

N=the total population size (770 for this study)

e=error of tolerance which is 0.05

$$\text{Hence, } n = \frac{770}{1 + 770(0.05)^2}$$

n = 263.6

Adjusting the sample size for 10% non response

$$n = \frac{n}{1 - f}$$

$$n = \frac{263.6}{1 - 0.1}$$

n=292

Simple random sampling technique will be used for this research study to select two hundred and ninety-two nurses. The instrument

used for this study will be a self-developed questionnaire. The questionnaire was developed by the researcher. Face and content validity of the instrument was ensured through a thorough literature review and contributions from experts. The questionnaire was subjected to split-half technique reliability method and a correlation coefficient of 0.8 was considered to be reliable. Ethical approval was obtained from University of Ibadan/University College Hospital ethical review committee before commencement of data collection. The respondents were met at their duty post, informed consent was obtained and questionnaire was administered face to face and same was retrieved immediately.

## Results

### Socio-Demographic Characteristics

The mean age of the respondents was 34.8±9.5years. Majority 130(54.1%) of the nurses were below age 35years. More than two-thirds 191(80.0%) of the nurses were female while almost half 104(49.5%) of them were Nursing Officers. More than half of them have one to ten years post qualification experience (Table 1).

**Table 1** Distribution of socio-demographic variables

Variables	Frequency (N)	Percentage(%)
<b>Age-group</b>		
<35years	130	54.1
≥35years	110	45.8
<b>Sex</b>		
Male	49	20.4
Female	191	80
<b>Religion</b>		
Christianity	185	77
Islam	55	22.9
<b>Marital status</b>		
Married	126	63
Single	70	35
Divorced	4	2
<b>Educational status</b>		
RN	28	13.3
RN and post basic diploma	64	30.4
BNSc	96	45.7
Postgraduate	22	10.4
<b>Present Position</b>		
nursing officer	104	49.5
Senior nursing officer	42	20
ACNO	30	14.2
CNO	30	14.2

Table continue

Variables	Frequency (N)	Percentage(%)
AND	4	1.9
<b>Ward/Unit</b>		
Maternity and O&G ward	38	17.1
medical ward	75	33.7
surgical ward	82	26.9
Accident & emergency ward	27	12.1
<b>Years of experience</b>		
(1-5)years	88	42.1
(5-10)years	52	24.8
(11-15)years	34	16.2
≥15years	35	18.5

### Knowledge of respondents on occupational hazard

The mean knowledge score of the respondents was  $93.5 \pm 6.8$ . In this study, the level of knowledge of the nurses about OH varies significantly (Table 2). Findings from the study show that more than two-thirds 127(66.1%) of the nurses working in the facility had good knowledge (Table 1).

### Classification of occupational hazard

Majority (96.3%) of the study participants classified cut from scalpel as physical hazard while a high percentage (84.1%) of them classified infection as biological hazard. Also, poison was classified by majority (81.5%) as chemical hazard (Table 4).

### Preventive Strategies of Occupational Hazards

The study revealed that almost one-quarter 49(25.5%) of the nurses had poor preventive strategies for OH (Table 6). However, more than two-thirds 150(78.9%) of the nurses had protective device in their respective wards as nurses. More than two-thirds 180(93.8%) had gone for pre-employment check-up before employed into the facility (Table 5).

### Factors affecting the use of PPE

The study (Table 7) provides information on factors affecting the use of PPE as; inadequate knowledge of PPE (95.8%); non-availability of the PPE (98.4%); negligence (94.2%); poor accessibility (94.2%); urgent patients need (68.1%); lack of training and retraining (96.8%) and inadequate organizational policies (91.6%).

### Hypotheses testing

**Hypothesis one:** There is no significant relationship between years of experience and level of knowledge about occupational hazard (Table 8).

Result shows that relationship between years of experience and level of knowledge about occupational hazard is not statistically significant at  $p=0.160$ . This means that year of experience does not significantly influence the level of knowledge about OH.

**Hypothesis two:** There is no significant relationship between knowledge about occupational hazard and level of preventive strategies

The relationship between knowledge about occupational hazard and level of preventive strategies is statistically significant at  $p=0.001$ . This implies that knowledge about OH significantly influences its level of preventive strategies (Table 9).

**Table 2** Knowledge on occupational hazards

Statement	YES	NO	% score
Occupational hazard is a potential risk of a health of a person	191(99.5)	0(0.00)	99.47917
Occupational hazard emerges from an unhealthy environment	175(92.1)	15(7.9)	91.14583
Does Occupational hazard affect the mental, physical well-being of the nurses	189(98.4)	1(0.5)	98.4375
Are nurses at high risk of occupational hazard	163(84.9)	0(0.00)	84.89583
Mean Score %			93.48958

**Table 3** Cumulative knowledge score

Level of knowledge of OH	Frequency	Percentage	Mean±SD
Poor	65	33.9	93.5±6.8
Good	127	66.1	

**Table 4** Distribution of classifications of occupational hazards

	Classification of hazards				
	physical hazards	Biological hazards	Chemical hazards	Psychological hazards	Sociological hazards
Back pain	152(76.0)	44(22.0)	1(0.5)	3(1.5)	0.(0.00)
Varicose vein	94(47.0)	99(49.5)	7(2.5)	0.(0.00)	0.(0.00)
Poison	10(5.1)	25(12.8)	159(81.5)	1(0.5)	0.(0.00)
Infection	19(9.9)	159(84.1)	10(5.2)	1(0.5)	0.(0.00)
Skin disorder	47(25.1)	123(65.8)	12(6.4)	2(1.1)	3(1.6)
Fatigue	80(42.1)	24(12.6)	2(1.0)	76(40.0)	8(4.2)
Assault	150(77.3)	6(3.0)	2(1.0)	26(13.4)	10(4.1)
Stress	41(20.5)	12(10.0)	0(0.00)	130(65.0)	17(8.5)
Fall	182(93.8)	0(0.00)	0(0.00)	12(6.1)	0(0.00)
Cut from scalpel	183(96.3)	2(1.1)	0(0.00)	5(2.6)	0(0.00)

**Table 5** Distribution of preventive strategies of occupational hazards

Preventive Strategies	Yes(%)	No(%)	
Are there protective devices for nurses in your ward	150(78.9)	40(21.1)	78.12500
Did you go for pre-employment medical checkup before you were employed	180(93.8)	12(6.3)	93.7500
Does individual has a role in preventing occupational hazards	189(99.0)	2(1.0)	98.43750
Is wearing of gloves a means of preventing occupational hazards	187(98.9)	2(1.1)	97.39583
Is wearing of gown, goggle and face mask a means of preventing occupational hazards	191(99.5)	1(0.5)	99.47917
Practicing proper hand washing before and after each procedure prevent occupational hazards	189(99.0)	2(1.0)	98.43750
Immunization against hepatitis B can help prevent occupational hazards	186(98.9)	2(1.1)	96.87500
Do you know about aseptic technique	187(99.5)	1(0.5)	97.39583
Safe and proper disposal of needle prevent occupational hazards	186(98.9)	2(1.1)	96.87500
Does proper waste disposal help in preventing occupational hazards	184(98.4)	3(1.6)	95.83333
Can increase in the number of break time reduce the risk of occupational hazards	116(62.7)	69(37.3)	60.41667
Not recapping needle after use can prevent occupational hazards	164(88.6)	21(11.4)	85.41667
Do you have functional fire bridge service	90(48.9)	94(51.1)	46.87500
Is fire bridge service relevant to your practice	160(86.5)	25(13.5)	83.33333
Is occupational health service department available in your hospital	156(83.9)	30(16.1)	81.25000
Does the organization have a role in the prevention of occupational hazards	177(94.1)	11(5.9)	92.18750
<b>Mean Score %</b>			<b>87.63021</b>

**Table 6** Cumulative preventive strategies score

Preventive Strategies of OH	N	%	Mean±SD
Poor	49	25.5	87.6±16.1
Good	143	74.5	

**Table 7** Distribution of Factors affecting the use of personal protective equipment

Factors	Yes(%)	No(%)	p-value
Does inadequate knowledge about PPE affect the use of the device	183(95.8)	8(4.2)	0.002
Non-availability of the PPE can also affect the use of PPE	188(98.4)	3(1.6)	0.001
Can negligence affect the use of PPE	180(94.2)	11(5.8)	0.121
Time factor place a role in the use of PPE	116(61.7)	72(38.3)	0.001
Does PPE slows down work	57(30.3)	131(69.7)	0.599
Reaction to the use of latex gloves can also affect the use of PPE	151(79.9)	38(20.1)	0.128
Poor accessibility to the use of PPE can affect its utilization	179(94.2)	11(5.8)	0.874
Urgent patients' needs can affect the use of PPE	126(68.1)	59(31.9)	0.03
Inadequate organizational policies about the use of PPE can also affect its utilization	174(91.6)	16(8.4)	0.067
Lack of storage of PPE can also affect its utilization	181(95.3)	9(4.7)	0.568
Lack of training and retraining on safety measures and the use of PPE can also affect its utilization	184(96.8)	6(3.2)	0.622

**Table 8** Cross tabulation of years of experience and level of knowledge about occupational hazard

Years of experience	Knowledge		Chi-square statistic	p-value
	Poor	good	$\chi^2$	
(1-5)years	28(44.4%)	50(39.7%)	5.166	0.16
(5-10)years	17(27.0%)	27(21.4%)		
(11-15)years	12(19.0%)	20(15.9%)		
>15years	6(9.6%)	29(23.0%)		

**Table 9** Cross tabulation of knowledge about occupational hazard and preventive strategies

Knowledge	Preventive strategies		Chi-square statistic	p-value
	Poor	good	$\chi^2$	
Poor	3(6.1%)	62(43.4%)	22.594	0.001
Good	46(93.9%)	81(56.6%)		

## Discussion

The notable adequate knowledge of occupational hazard among the respondents is actually commendable. However, the level of poor knowledge (39.9%) is also unacceptably high especially because the respondents are nurses who are supposed to be involved in providing information on occupational hazards to members of the society. This could be responsible for high level of work-related injury and illness among nurses as reported by Caruso.<sup>2</sup> Similarly, Apexa<sup>4</sup> reported that nurses account for 60% of work-related musculo-skeletal disorders among hospital healthcare workers. Therefore, training and re-training of nurses on safety measures and the use of PPE is highly essential to improve their knowledge and safety.

Furthermore, previous studies<sup>8,9</sup> identified factors influencing use of PPE. Such as; lack of training, non-availability of PPE and poor accessibility. This study in addition to these factors also identifies

factors such as; inadequate knowledge, negligence, inadequate organizational policies about the use of PPE. Hence, management and policy issues around the use of PPE become important factors that need intervention to ensure the safety of nurses in their workplace.

In addition, the relationship between years of experience and level of knowledge about OH is not statistically significant meaning that years of working experience among nurses do not significantly influence the level of knowledge about OH.

## Conclusion

The major OH encountered by nurses was biological, physical, chemical and psychological hazards during the course of discharging their duties. The safety of nurses in their workplace depends on availability and accessibility to PPE. Good knowledge of OH is needed to understand occupational health and safety. Majority of the

nurses had good knowledge about OH. Insufficient knowledge about OH may be due to inadequate training on occupational health and safety. Knowledge about OH may be positively influenced through training and retraining occupational health and safety, hence the need for training and retraining of nurses on how to prevent themselves from exposure to OH. Occupational health and safety is a focus of public health.

## Recommendations

Based on the conclusion in line with our discussion, the following recommendation should be put into consideration:

1. Regular training on occupational health and safety should be organized for nurses in different cadres to improve the knowledge about OH.
2. Hospital policies which may affect utilization of PPE should be amended.
3. PPE should be made available in all wards, laboratories and office in order to prevent occurrence of OH.
4. Risk assessment should be carried out regularly to identify potential risks among Nurses and in the wards in the hospital.

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## Conflicts of interest

The authors declare that there are no conflicts of interest.

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