

Original Research Article

Occupational accidents among healthcare workers in a tertiary health facility in Enugu state, South-East Nigeria

Hope O. Nwoga^{1*}, Miriam O. Ajuba¹, Malachy M. Nwankwo²

¹Department of Community Medicine, ²Department of Pharmacology and Therapeutics, Enugu State University College of Medicine and Teaching Hospital Parklane, Enugu, Nigeria

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***Correspondence:**

Dr. Hope O. Nwoga,

E-mail: nwogahope@gmail.com

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ABSTRACT

Background: The risk of acquiring blood borne infections by healthcare workers (HCWs) in developing countries is accentuated by the high prevalence of blood borne infections, poor provision of personal protective equipment (PPEs), negative socio-cultural factors and poorly maintained healthcare systems. The objective was to determine the prevalence of occupational accidents among HCWs in a tertiary health facility in Enugu state, South-East Nigeria.

Methods: A descriptive cross-sectional study that used mixed method technique. The quantitative data was collected using a self-administered questionnaire while an in-depth interview (IDI) guide was used for the qualitative data. Manual content analysis was done for the qualitative data while the quantitative data was analysed using SPSS version 22. The significance level placed at $p < 0.05$.

Results: The prevalence of mucous membranes exposure to blood/body fluids were the same in the past 6 and 12 months (22.0%) while the mean number of exposures were 3.93 ± 3.002 and 4.47 ± 4.008 respectively. The prevalence of needle stick or sharps injury in the past 6 and 12 months were 17.0% and 23.0% while the mean numbers of injuries were 2.24 ± 2.001 and 2.48 ± 2.858 respectively. The injuries occurred majorly while recapping needles and breaking injection ampoules. Emergent themes from the IDI were also recapping of needles and breaking of injection ampoules.

Conclusions: There is still high prevalence of occupational accidents among the studied HCWs training and re-training of HCWs on the dangers associated with these occupational accidents.

Keywords: Occupational accidents, Healthcare workers, Enugu metropolis, Tertiary health facility, Nigeria

INTRODUCTION

An occupational accident is an occurrence arising out of or in the course of work which results in a fatal or non-fatal injury.¹ Several accidents can occur in the healthcare settings owing to the numerous activities carried out in health facilities; either to prevent disease or ailment, treatment or rehabilitation. HCWs can be accidentally exposed to the blood or body fluids of patients through percutaneous injury or sharps injury, muco-cutaneous injury (splash of blood or other body fluids into the eyes, nose or mouth) or contact with non-intact skin.^{2,3} These

accidents expose the HCWs to blood borne infections such as human immunodeficiency virus (HIV), hepatitis B (HBV) and hepatitis C (HCV) infections.

A safe injection is defined by the world health organization (WHO) as an injection that does not harm the recipient, does not expose the provider to any avoidable risks and does not result in waste that is dangerous for the community.⁴ A safe injection does not harm but breaks in infection control practices are common causing severe infections which put human lives at risk.^{4,5} Unsafe injection practices are a powerful engine to transmit blood borne pathogens, including HBV, HCV,

and HIV. Because infection with these viruses initially presents no symptoms it is a silent epidemic. However, the consequences of this silent epidemic are increasingly recognized.⁴

The risk associated with a single parenteral exposure to blood from a source patient who has HBV infection ranges from 2 to 40%.⁶ The average incidence of sero-conversion to HCV positive source ranges from 3 to 10%. HCWs particularly in developing countries are at a serious risk of infection from blood borne pathogens because of the high prevalence of these pathogens and the increased risk of occupational injuries.⁶ There is no immunization currently available for HIV and HCV infection, it is therefore important to prevent infection by preventing exposure to infection. The health consequences of these infections are enormous. For instance, 60-85% of HCV infections result in chronic liver disease and a risk for liver cirrhosis and liver cancer.

Injections are one of the most common healthcare procedures and each year about 20 billion injections are administered worldwide.⁵ Its overuse in many countries has caused a substantial proportion of infections with blood borne pathogens. Both the recipients, HCWs and the community are at risk of infection through contaminated sharps. Unsafe injections account for 33% of new HBV infections in developing and transitional countries resulting in a total of 21.7 million people infected each year.⁵ Unsafe injections are the most common cause of HCV infection in developing and transitional countries, causing 2 million new infections each year and accounting for 42% of cases.⁵ Globally nearly 2% of all new HIV infections are caused by unsafe injections with a total of 96,000 people infected annually.⁵

WHO estimates that about 2.5% of HIV cases and 40% of HBV and HCV cases among HCWs worldwide are the result of workplace exposure.⁷ Currently in Nigeria there is inadequate data about occupational exposure in relation to transmission of blood-borne pathogens among healthcare providers.

The objective of this study was to determine the prevalence of needle sticks/sharps and other injuries among HCWs in a tertiary government health facility in Enugu State Nigeria and also ascertain the availability of some infection control measures.

METHODS

The study was a descriptive cross-sectional design conducted in one of the tertiary health facilities in Enugu state Nigeria. Enugu state is in South-East Nigeria.

Study population and sampling

The study populations were all HCWs (doctors, nurses, laboratory scientists/technicians, ward orderlies). All

HCWs that are directly involved in patient care and had spent at least 12 months in hospital practice were included while HCWs that have not been directly involved in patient care for 6 consecutive months and those not directly involved in patient care were excluded. The calculated minimum sample size using the formulae for studying proportions with population less than 10,000 was 168.⁸ However 200 HCWs were used for the study.

The HCWs have been naturally stratified based on cadre i.e. doctors, nurses, laboratory scientists, laboratory technicians, ward orderlies. Proportionate allocation was used to get the number of HCWs for each stratum while systematic sampling technique was used to select the respondents for the study in each stratum.

Data collection

Data collection lasted for 4 weeks; March to April 2018. The quantitative data was collected with a structured pre tested self-administered questionnaire while the qualitative data was collected with an in-depth interview (IDI) guide formulated by the principal researcher. The first section of the questionnaire was the socio-demographic information while the second section was on self-report occupational accidents. Four questions were used to assess the preceding 6 to 12 months prevalence of NSI and exposure of impaired skin or mucous membrane to blood/body fluids of patients. Each question had 3 responses (yes, no, uncertain). A 'yes' indicated exposure or injury while a 'no' or 'uncertain' indicated non-exposure or no injury. This was used to calculate the 6 to 12 months prevalence of occupational accidents.

The number of injuries or exposures was also elicited and the mean injuries with their standard deviations calculated. The cause (s) of the injury was used to determine the major cause of occupational accidents among the studied HCWs.

In the third part of the questionnaire 6 questions were used to assess the availability of some infection control measures. Each question had 3 responses (yes, no, don't know). Each correct response was scored 1, while a wrong or non-response was scored 0. The minimum score was 0 while the maximum score was 6. The score was graded as poor, fair and good. A score of 0-2 (<50%) was graded as poor; 3-4 (50% to <90%) was graded as fair while 5-6 (90% to 100%) was graded as good.

Ethical clearance for the study was obtained from the Enugu State University Teaching Hospital Research and Ethics Committee. Written informed consent was also obtained from respondents. Anonymity was assured and there was no form of coercion.

Data analysis

Data cleaning and editing were done manually to detect omission and ensure uniform coding. Quantitative data

was analysed using SPSS version 22. The categorical variables were displayed as frequencies and percentages while the continuous variables were displayed as means and standard deviations. The significance level was based on $p < 0.05$. Manual content analysis was done for the qualitative data.

RESULTS

Table 1: Socio-demographic characteristics of HCWs in a government tertiary health facility in Enugu state, Nigeria.

Variable	Frequency	%
Age of respondents		
Mean±SD (years)	34.59±7.7	
Age in groups (in years)		
<30	48	24.0
30-39	103	51.5
40-49	42	21.0
>49	7	3.5
Gender		
Male	64	32.0
Female	136	68.0
Religion		
Christianity	199	99.5
Islam	1	0.5
Ethnicity		
Igbo	197	98.5
Others	3	1.5
Marital status		
Single	65	32.5
Married	135	67.5
Educational level		
Primary/secondary completed	27	13.5
Tertiary	173	86.5
Years of service		
Mean±SD	7.68±5.8	
Years of service in groups		
1-5	85	42.5
6-10	75	37.5
11-15	23	11.5
≥16	17	8.5
Occupation		
Medical doctor	62	31.0
Nurse	92	46.0
Laboratory scientist/technician	15	7.5
Orderly	31	15.5

In Table 1, above shows the socio-demographic characteristics of the HCWs. The mean age in years of the respondents was 34.59±7.7. About half of the studied HCWs were in the age-group 30-39 years 103 (51.5%). Most of them were females 136 (68.0%), married 135 (67.5%) and had tertiary education 173 (86.5%). Also, a higher proportion of the HCWs had worked between 1-5 years 85 (42.5%) and were nurses 92 (46.0%).

Table 2: Prevalence of occupational accidents among HCWs in tertiary government health facility in Enugu state, Nigeria.

Variable	Frequency	%
Exposure of mucous membrane to BBF in the past 6 months		
Yes	44	22.0
No	156	78.0
If yes, how many times	44	
Mean±SD	3.93±3.022	
1-4 times	30	68.2
>4 times	14	31.8
Exposure of mucous membrane to BBF in the past one year		
Yes	44	22.0
No	156	78.0
If yes, how many times	44	
Mean±SD	4.47±4.008	
1-4 times	28	62.8
>4 times	16	37.2
Had NSSI in the past six months		
Yes	34	17.0
No	166	83.0
If yes, how many times	34	
Mean±SD	2.24±2.001	
1-4 times	31	91.2
>4 times	3	8.8
Had NSSI in the past one year		
Yes	46	23.0
No	154	77.0
If yes, how many times	46	
Mean±SD	2.48±2.858	
1-4 times	39	84.8
>4 times	7	15.2
Circumstance under which injury occurred*		
Recapping of needle	35	17.5
Bending of needle	15	7.5
Breaking of needle	19	9.5
Giving injection	23	11.5
Breaking injection ampoule	33	16.5
Surgical procedures	20	10.0
Setting intravenous line	18	9.0
Cleaning patient's bedside	25	12.5
Collecting blood sample	18	9.0
Checking of patient's blood glucose level	3	1.5

BBF - blood and body fluids, *multiple response, NSSI - needle stick and sharps injury.

Table 2, shows the prevalence of occupational accidents among the HCWs. The proportion of HCWs that have had exposure of their mucous membranes to blood or body fluids (BBF) in the past 6 and 12 months were the

same 22.0% while the mean number of exposures were 3.93 ± 3.022 and 4.47 ± 4.008 respectively.

The proportion of HCWs that had NSSI in the past 6 (17.0%) and 12 (23.0%) months were similar while the mean number of injuries was 2.24 ± 2.001 and 2.48 ± 2.858 respectively.

Most of the injuries occurred while recapping needles or breaking injection ampoules. Recapping of needles was also the most common emergent theme from the IDIs.

A nurse had this to say, “I have had needle prick 2 times. One was while giving injection to a patient in the ward, though I have not used the needle on the patient. Another was the needle I used to puncture intravenous fluid” carelessness was also pointed out as associated factor. “I had needle prick while discarding needle used to puncture intravenous fluid. I think I wasn’t too careful”.

Table 3: Availability of infection prevention measures in a government tertiary health facility in Enugu state, Nigeria.

Variable	Frequency	%
Sharp disposable boxes available in clinics and wards		
Yes	145	72.5
No	55	27.5
Have clear SP guidelines		
Yes	70	35.0
No	130	65.0
Have functional occupational health clinic		
Yes	69	34.5
No	131	65.5
Have functional infectious disease control committee		
Yes	68	34.0
No	132	66.0
Have reporting system for occupational exposure to BBF		
Yes	72	36.0
No	128	64.0
Have post exposure prophylaxis protocol		
Yes	101	50.5
No	99	49.5
Availability of infection prevention measures categorized		
Poor	167	83.5
Good	33	16.5

SP - standard precautions; BBF - blood/body fluids.

Table 3, shows the availability of infection prevention measures in the health facility. Majority of the respondents 145 (72.5%) reported that sharp disposable boxes are available in their clinics and wards. However, most of the HCWs reported that they do not have clear SP guidelines 130 (65.0%), no functional occupational health

clinic 131 (65.5%), no functional infectious disease control committee 132 (66.0%) and no reporting system for occupational accidents 128 (64.0%). About half of the respondents 101 (50.5%) reported having post exposure prophylaxis protocol.

On categorization of available infection prevention measures into poor and good, majority of the HCWs 167 (83.5%) reported poor availability, while only 33 (16.5%) reported good availability of such measures.

DISCUSSION

The finding in this study is comparable to a similar study among primary HCWs in Ethiopia where 20.2% of the studied HCWs had exposure of their mucous membrane to blood/body fluid of patients in the past one year.⁹ The two studies have similar cadre of HCWs and this can explain the similarity. However, a multi-centre study involving primary and tertiary HCWs in Ethiopia reported a higher prevalence (60.2%).¹⁰ In this study only nurses, laboratory technicians and doctors were involved and these groups of HCWs are more involved in procedures that might expose their mucous membrane to blood/body fluids of patients like surgical procedures and deliveries.

About 23.0% of the HCWs had NSSIs in the past one year. Similar finding was reported in a Nigerian study where 24.5% of the HCWs had NSI in the past one year.¹¹ Other studies also reported similar findings.^{9,10,12,13} This finding was however lower than the report of Nigerian cross country survey where NSI was placed at 45.0%.¹⁴ Higher prevalence was also reported in other studies in China, Afghanistan, Turkey and Nigeria.^{13,15-17} The greater awareness of safe injection practices among the HCWs may have led to the improvement evidenced by lower incidences of NSSIs.

Higher proportion of the HCWs 72.5% reported that they had sharp disposable boxes available in their clinics and wards. The sharp disposable boxes should be available at all times in the sharp applicable areas for proper disposal of sharps. This has been shown to reduce NSIs and recapping of needles in the health care settings.¹⁸ The finding in this study is comparable to a similar study in Nigeria where 80.7% of the studied health facilities always had sharp disposable boxes.¹⁹ Also a multinational survey conducted in low and medium income countries (LMIC) including Nigeria reported a similar finding.²⁰

Only about 35.0% of the studied HCWs reported that they have clear standard precautions (SP) guidelines in their health facility. This poor display of SP guidelines can be due to the false assumption that by virtue of the more educated HCWs (doctors, nurses and laboratory scientists), that they can remember and apply infection control measures without looking at charts or schematic drawings. This false assumption has negative impact on infection control in health facilities. The finding from this study was similar to the report of a multi-national study

involving LMIC where only 26.2% of the health facilities had guidelines for SP.²⁰

Functional occupational health clinic was reported by a minor proportion of the HCWs (34.5%). This poor availability of functional occupational health clinic will lead to poor reporting of occupational accidents. The finding in this study is similar to what was reported in a comparable study in Nigeria (42.6%).¹⁹ Only minority of the HCWs reported having a functional infectious disease control committee (34.0%). Infectious disease control committees are known to bring out recommendations for the management of infections in the hospital and also dialogue with the hospital management to make sure that infection control supplies are always provided to enhance SP. Therefore, in the absence of this important committee, these important functions cannot be performed creating a loop hole for poor infection control and monitoring of occupational accidents. The finding in this study is comparable to a similar study in Nigeria in which 33.5% of the respondents reported having infectious disease control committee.¹⁹ However, a multi-centre study in Southern Nigeria reported a higher finding of 61.1%.²¹ This higher finding may be due to better awareness to the HCWs about the presence of this committee giving a better report because even in facilities with infectious disease committee, some of the HCWs may still be ignorant of their presence.

Also, minor proportion of the respondents (36.5%) agree that their health facility have reporting system for occupational exposure to BBFs. Lack of this reporting system hampers the reporting of occupational exposures to BBFs and institution of the recommended centre for disease control and prevention (CDC) PEP protocol.^{22,23} Lack of awareness of existing reporting system may be a contributing factor to the poor reporting in this study, as many of them may not know that there is a reporting system even when one exists. A study in West Indies showed that only 62.3% of the HCWs knew the reporting system for occupational accidents in their health facility even when it exists.²⁴ A Nigerian study also reported that 36.0% of the studied HCWs are unaware of the reporting system in their health facility.²⁵ This problem can be abated by proper dissemination of information. About half of the HCWs (50.5%) reported that they have PEP in their health facility. A study conducted in Northern Nigeria among doctors and nurses in a secondary health facility showed that only 32.53% of the doctors and 27.84% of the nurses are aware of the availability of HIV PEP in their health facility and only 15.52% are aware of the HIV focal person in their facility.²⁶ This simply shows that it is not enough to have a PEP protocol but proper awareness about the presence of the protocol should be created among the HCWs for proper utilization.

CONCLUSION

Occupational accidents among the HCWs are still high considering the dangers associated with these injuries. SP

should be strictly applied in all healthcare procedures to reduce exposure to BBF.

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