

Prevalence of Occupational accidents among healthcare workers in government primary health facilities in Enugu Metropolis, South-East Nigeria

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DOI: 10.29322/IJSRP.10.06.2020.p10278

<http://dx.doi.org/10.29322/IJSRP.10.06.2020.p10278>

Abstract- Background: Occupational safety of Health Care Workers (HCWs) is often neglected in low-income countries in spite of the greater risk of infection due to higher disease prevalence, low level awareness of the risks associated with occupational exposure to blood, inadequate supply of PPE and limited organizational support for safe practices.

Objectives: To determine the prevalence of occupational accidents among HCWs in primary health facilities in Enugu Metropolis, Nigeria.

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

Results: The proportion of HCWs that have had exposure of their mucous membranes to blood/body fluids in the past 6 and 12 months were 17.5% and 27.0% respectively while the mean number of exposures were 2.94 ± 2.388 and 3.19 ± 2.875 respectively. A similar proportion had needle stick and sharps injury in the past 6 (16.5%) and 12 (22.0%) months while the mean number of injuries were 2.73 ± 1.875 and 2.98 ± 2.074 respectively. The major circumstances under which they obtained injury were while giving injection and breaking injection ampoule. Emergent themes from the IDI were recapping of needles and giving injections

Conclusion: The prevalence of occupational accidents is still high considering the dangers associated with these accidents.

Index Terms- Enugu Metropolis, HealthCare Workers, Occupational Accidents, Primary Health Facilities

that is dangerous for the community.³ Yet breaks in infection control practices are common causing severe infections which put human lives at risk. Globally about 3 million out of approximately 35 million healthcare workforce representing 12% of the working population experience percutaneous exposure to blood borne pathogens each year with 2 million of these exposed to HBV, 0.9 million to HCV and 170,000 to HIV.⁴ These injuries may result in 15,000 HCV, 70,000 HBV and 1000 HIV cases with more than 90% of these infections occurring in developing countries.⁵⁻⁷ In developing countries, where the prevalence of HIV infected patients is the highest in the world, the number of NSSI is also high.⁸ The risk of acquiring these infections in these countries is accentuated by the high prevalence of blood borne infections, poor adherence to safety precautionary measures, poorly maintained healthcare system and negative socio-cultural factors.⁹

Unfortunately, some employers assume little responsibility for the protection of their workers' health and safety. This negates the provision of the Convention 155 of the ILO, which mandates occupational health and safety. The convention requires governments and employers to ensure adequate precautions in the work place. However, despite the need for protection of health and safety of workers, occupational hazards and accidents abound in developing countries, including Nigeria.¹⁰ This is due to the fact that many developing countries are yet to domesticate the ILO convention on occupational health and safety, while few that have done so lacked pre requisite infrastructure for its enforcements.¹⁰ The objective of this study was to determine the prevalence of needle sticks and other occupational exposures among HCWs in the primary health facilities in Enugu South-East, Nigeria. The study will also help the HCWs to know the severity and prevalence of occupational exposures and to minimize its impact in order to be safe in their working environment in good health.

I. INTRODUCTION

Injuries from sharp devices are associated with the transmission of more than 40 pathogens including Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), HIV, Lassa fever and other haemorrhagic fevers, thereby increasing the risk and burden of infectious diseases.^{1,2} Safe injection practice is defined by 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

II. SUBJECTS, MATERIALS AND METHODS

The study was a descriptive cross-sectional design involving all the primary health facilities in Enugu Metropolis, Enugu State, Nigeria that provide primary health care within the Metropolis. Enugu Metropolis consists of 3 local government areas (Enugu East, Enugu North and Enugu South) and Enugu State is located in South Eastern part of Nigeria.

The study populations were nurses/CHEWs, laboratory scientists/technicians and ward orderlies that had spent at least 12 months in the hospital practice. HCWs not directly involved in patient care were excluded from the study. All the HCWs in all the primary health facilities were involved in the study. However, 200 eligible HCWs were used for the study.

III. DATA COLLECTION

The study lasted for a period of 6 weeks; from 19th April to 30th May 2018. Data collection was done using two approaches; a pre-tested structured self-administered questionnaire and an IDI guide designed by the principal researcher. The questionnaire contained a section on socio-demographic information and another section on self-report occupational accidents. Four questions were used to assess the prevalence of occupational accidents. The preceding 6 and 12 months' prevalence of NSSIs and exposure of impaired skin or mucous membrane to blood/body fluids of patients was assessed. 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 and 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 HCWs.

Qualitative data was obtained with the use of In-depth Interviews.

Ethical approval for the study was obtained from the Enugu State University Teaching Hospital Research and Ethics Committee and from Enugu State Ministry of Health Ethics Committee. Informed consent was also obtained from respondents. There was no form of coercion and anonymity was assured.

IV. DATA ANALYSIS

Cleaning and editing of data were done manually to detect omission and ensure uniform coding. Quantitative data was analysed using Statistical Package for Social Sciences (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. Information's from the IDI were written into transcripts on the same day after interview to identify primary themes. These were coded into different themes and reviewed line-by-line to isolate nodes which would summarize the important underlying idea.

Idea codes related to characteristics from the example question "What are the circumstances under which injury occurred?" Are there specific factors that predispose HCWs to exposure? were reviewed and the various contents were counted and grouped into categories such as 'recapping of needles', 'bending of needles', 'breaking of needles' etc. The results from the categories and the results across groups of HCWs were summarized and used to guide the achievement of the objectives by drawing conclusions from the interviews.

V. RESULTS

Table 1 shows the socio-demographic characteristics of the HCWs. The mean age in years of the respondents was 37.19 ± 8.9 . Most of the HCWs were in the age group 30-39 years. Majority of them were females 183 (91.5%), married 137 (68.5%) and had tertiary education 180 (90.0%). Most of the HCWs have worked for 1-5 years and majority were nurse/CHEWs 183 (91.5%).

Table 1: Socio-demographic characteristics of the HCWs in primary government health facilities in Enugu Metropolis, Nigeria

Variable	Frequency	Percentage
Age of respondents		
Mean \pm SD (years)	37.19 \pm 8.9	
Age in groups		
<30 years	48	24.0
30 – 39 years	70	35.0
40 – 49 years	60	30.0
>49 years	22	11.0
Gender		
Male	17	8.5
Female	183	91.5
Religion		
Christianity	200	100
Islam	0	0.0
Ethnicity		
Igbo	200	100
Others	0	0.0
Marital Status		
Single	63	31.5
Married	137	68.5
Educational Level		
Primary/secondary completed	20	10.0

Tertiary	180	90.0
Years of service		
Mean ±SD	11.08±7.8	
Years of service in groups		
1 – 5	65	32.5
6 – 10	39	19.5
11 – 15	41	20.5
≥16	55	27.5
Occupation		
Nurse/CHEW	183	91.5
Laboratory Scientist/technician	13	6.5
Orderly	4	2.0

Table 2; Prevalence of occupational accidents among HCWs in primary government health facilities in Enugu Metropolis, Nigeria

Variable	Frequency	Percentage
Had exposure of mucous membrane to BBF in the past 6 months		
Yes	35	17.5
No	165	82.5
If yes, how many times	n=35	
Mean ±SD	2.94±2.388	
1-4times	30	85.7
>4times	5	14.3
Had exposure of mucous membrane to BBF in the past one year		
Yes	54	27.0
No	146	73.0
If yes, how many times	n=54	
Mean ±SD	3.19±2.875	
1-4times	43	79.6
>4times	11	20.4
Had NSSI in the past six months		
Yes	33	16.5
No	167	83.5
If yes, how many times	N=33	
Mean ±SD	2.73±1.875	
1-4times	28	84.8
>4times	5	15.2
Had NSSI in the past one year		
Yes	44	22.0
No	156	78.0
If yes, how many times	N=44	
Mean ±SD	2.98±2.074	
1-4times	34	77.3
>4times	10	22.7
Circumstance under which injury occurred*		
Recapping of needle	40	20.0
Bending of needle	30	15.0
Breaking of needle	28	14.0
Giving injection	43	21.5
Breaking injection ampoule	41	20.5
Surgical procedures	20	10.0
Setting intravenous line	24	12.0
Cleaning patient's bedside	31	15.5
Collecting blood sample	27	13.5
Checking of patients' 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/body fluids in the past 6 and 12 months were 17.5% and 27.0% respectively while the mean number of exposures were 2.94 ± 2.388 and 3.19 ± 2.875 respectively.

Similar proportion had Needle Stick and Sharps Injury (NSSI) in the past 6 (16.5%) and 12 (22.0%) months while the mean number of injuries were 2.73 ± 1.875 and 2.98 ± 2.074 respectively.

The major circumstances under which they got injured were giving injection, breaking injection ampoule and recapping of needles. Emergent themes from the IDIs showed yet again that recapping of needles and giving injections were the major circumstances under which the occupational accidents occurred. Other circumstances mentioned were while suturing episiotomy, setting intravenous lines and improper discarding of used sharps.

An officer in charge of one of the primary health facilities had this to say;

"I have had many needle stick injuries mainly while setting intravenous line or giving injection to children. Sudden movement of the children was the major reason for the injury".

Lack of knowledge and carelessness was also pointed out as associated factor. A nurse had this to say,

"I had a needle prick while recapping needle. I was not well equipped with knowledge because I was not supposed to recap a needle"

VI. DISCUSSION

This study collected data about membrane exposure of HCWs to blood/body fluids and NSSIs in the past 6 and 12 months in primary health facilities in Enugu State, Nigeria. The final response rate attained the standard for this type of research.¹¹ Majority of the HCWs were in the 30-39 year age group and were females as seen in related studies.^{12,13} This is not surprising as nursing has been a profession dominated by females as seen in similar studies.^{14,15} The findings in this study is lower than what was reported in a similar Nigerian study where exposure of mucous membrane to blood/body fluids within 12 months were reported by 53.3% of the HCWs.¹⁶ In the later study, majority of the HCWs were doctors and nurses and these group of HCWs are known to be involved in procedures that may lead to splashes of blood/body fluids. However, another study reported a similar lower finding.¹⁷

Even though the rate of mucous membrane exposure is low among the studied HCWs, about 79.6% had 1-4 injuries with mean injury of 3.19 ± 2.875 within one year. This repeated exposure will obviously increase the risk of infections. For instance, a range of about 5-45% has been noted by a study as the risk of acquiring hepatitis B infection from percutaneous exposures.¹⁸ These increased percutaneous exposures may be due to non-availability of PPEs as a study in Nigeria have reported lack of PPEs in primary health facilities.¹⁹ This submission is also supported by a study of infection control practices in three tertiary hospitals in Nigeria where high risk of occupational exposures were attributed to inadequate supplies for infection apart from low infection

control practice.²⁰ It is necessary for HCWs to have access to PPEs and be taught the risks associated with handling blood/body fluids without PPEs since HCWs compliance with universal precautions is influenced by the availability of protective equipment.²¹

There was noted an increasing trend in Needle Stick and Sharps Injury (NSSIs) from 16.5% in 6 months to 22.0% in one year. This is similar to an observed rising trend involving 83% of HCWs in training.²² The finding in the study is similar to what was reported in other studies in Nigeria,¹⁷ Ethiopia²³ and China.²⁴ The studies have similar cadre of HCWs and this can explain the similar findings. However other studies reported higher findings.^{16,25} These data underscore the importance of increased efforts toward improved education, prevention, and availability of protective equipment.

The rate of needle stick injuries was up to 4 times per year which is lower than the findings of another Nigerian study.²⁵ A multivariate regression analysis has shown that injury due to sharp instruments in university graduates was <60% when compared to those with high school or less, and the injury risk increases 5% in each year of increase in working experience.²⁶ In this our study 90% of the studied HCWs had tertiary education and this can explain the lower rate of NSSIs

Emergent themes from the In-depth Interview (IDI) attributed NSSIs to two reasons; giving injections and recapping needles. This is supported by a study which included recapping of needles (among other factors) as a predictor of NSSIs from logistic regression. Other studies with similar findings has also shown recapping of needles as circumstance under which exposure occurred.^{15,27,28} Occurrence of NSSIs while giving injections (or related injection procedures e.g. phlebotomy) was seen also in some studies.^{12,13} NSSIs are very common occurrences among HCWs.^{25,29,30} Our IDI also found that sudden movement of patient was the major reason for NSSIs and this is corroborated by a similar study³¹ or even from a restless patient.²⁷ There is still an urgent need to train HCWs on the safe handling of tools and equipment as well as how to use them while making them available. All patients should be treated as potentially infectious according to the CDC guidelines.^{32,33} The need for training is heightened by some studies which showed that poor knowledge and practice of standard precautions by HCW is associated with occupational exposure to blood/body fluids.^{34,35}

Furthermore, the personal and professional consequences of NSSIs can be profound even if they do not lead to infections.³⁶ NSSIs remain a huge occupational health concern for all HCWs. Most literatures and agency guidelines reiterate that the transmission of blood/body fluid pathogens from patients to HCWs is avoidable by adhering to the minimum standards of universal precautions

VII. CONCLUSION

Though the prevalence of mucous membrane exposure to blood/body fluids and NSSIs among the HCWs in this study is not high, the dangers associated with even a single exposure makes it a high risk exposure.

Reducing the frequency with which HCWs recap needles, increasing precautions they take by training are necessary steps towards lowering the odds of HCWs exposure.

VIII. STUDY LIMITATIONS.

This study was carried out in primary health facilities which may limit its generalizability to large health facilities. The results could have been affected by recall bias as respondents were needed to recall past experience. Limiting the responses on frequency of exposures to two categories (1-4 and >4 times might have reduced the magnitude of recall bias. This being a cross sectional study, the causal effect could not be established, however, this study provides useful information on occupational health hazards in primary health facilities located in low income community settings.

IX. RECOMMENDATIONS

- There should be training and re-training of HCWs on the dangers associated with occupational accidents/injuries in the healthcare setting to improve their knowledge, practice and adherence to standard precautions.
- More research should explore the organizational factors that may contribute to occurrence of occupational exposures and NSSIs and strengthen policies to promote health and safety.

REFERENCES

- [1] 1. Injection Safety in the Context of Infection Prevention and Control Trainer's Guide FMOH and JSI. MMIS, Niger. 2007;1-126
- [2] 2. Training handout on injection safety in the context of infection prevention and control for health care personnel. FMOH and JSI/MMIS, Nigeria, 2006: 3-29
- [3] 3. World Health Organizations/Safe Injection Global Network (WHO/SIGN) Alliance. Available at www.who.int/injection_safety/sign/en. [Accessed 28/ 5/ 18]
- [4] 4. Amira CO, Awobusuyi JO. Needle-stick injury among health care workers in hemodialysis units in Nigeria: A multi-center study. *Int J Occup Environ Med*.2014; 5(1):1-8
- [5] 5. Sadoh WE, Fawole AO, Sadoh AE, Oladimeji AO, Sotiloye OS. Practice of universal precautions among healthcare workers. *J Natl Med Assoc*. 2006;98(5):722-726
- [6] 6. Rampal L, Zakaria R, Sook LW, Zain AM. Needle stick and sharps injuries and associated factors among health care workers in a Malaysian hospital. *Eur J Soc Sci*. 2010;13(3):354-362
- [7] 7. Sreedharan J, Muttappillymyalil J, Venkotramana M. Knowledge about standard precautions among university hospital nurses in the United Arab Emirates. *EMHJ - Eastern Mediterranean Health Journal*. 2011;17 (4): 331-334
- [8] 8. Rapiti E, Prüss-üstün A, Hutlin Y, Campbell-lendrum D, Corvalán C, Woodward A. Sharps injuries: Assessing the burden of disease from sharps injuries to health-care workers at national and local levels. *World Heal Organ Environ Burd Dis Ser No* 11. 2005;(11):1-50
- [9] 9. Isah H, Sabitu K, Ibrahim M. Profile Of Institutional Infrastructure For Implementing Universal Precautions In Primary Health Care Facilities In Sokoto State, Nigeria: Implication For Occupational Safety. *African J Clin Exp Microbiol*.2009; 10(3):164-174
- [10] 10. Akinwale A, Olusanya O. Implications of Occupational Health and Safety Intelligence in Nigeria. *J Glob Heal Care Syst*. 2015;6(1):1-13
- [11] 11. Locker D. Response and Non-response Bias in Oral Health Surveys. *J Public Health Dent*. 2000; 60(2):72-81
- [12] 12. Rakhshani F, Heidari MT, Barati S. Prevalence of Needlestick Injuries among the Healthcare Professionals in Zahedan Medical Sciences University. *IRJE*. 2009;4(3):87-91
- [13] 13. Hashemi SH, Torabian S, Mamani M, Moazen Dehkordi S. The Prevalence of Needlestick and Sharps Injuries among Health Care Workers in Hamadan, Iran. *UMSHA*. 2012;18(4):41-46
- [14] 14. Musa OI. Injection Safety Practice among Health Workers in Static Immunisation Centres in an Urban Community of Nigeria. *Niger Postgrad Med J*. 2005;12(3):162-167
- [15] 15. Djeriri K, Charof R, Laurichesse H, Fontana L, El Aouad R, Merle JL, et al. Occupational risk for blood exposure and staff behaviour: a cross-sectional study in 3 Moroccan healthcare centers. *Med Mal Infect*. 2005;35(7-8):396-401
- [16] 16. Isara AR, Ofili AN. Prevalence of occupational accidents/Injuries among health care workers in a federal medical centre in southern Nigeria. *West Afr J Med*. 2012;31(1):47-51
- [17] 17. Nwoga HO, Ajuba MO, Nwankwo MM. Occupational accidents among healthcare workers in a tertiary health facility in Enugu State, South-East Nigeria. *Int J Community Med Public Health*.2020; 7(6):1-6
- [18] 18. Stewardson DA, Palenik CJ, McHugh ES, Burke FJT. Occupational exposures occurring in students in a UK dental school. *Eur J Dent Educ*. 2002;6(3):104-113
- [19] 19. Nwoga HO, Ajuba MO, Onwasigwe CN. Availability Of Infection Control Supplies In Primary And Tertiary Government Health Facilities In Enugu Metropolis , Nigeria. *Nig Research J Clin Sci*. 2019;9(1 and 2):43-52
- [20] 20. Ansa VO, Udoma EJ, Umoh MS, Anah MU. Occupational risk of infection by human immunodeficiency and hepatitis B viruses among health workers in south-eastern Nigeria. *East African Medical Journal*. 2002;79:254-256
- [21] 21. Clarke SP, Sloane DM, Aiken LH. Effects of Hospital Staffing and Organizational Climate on Needlestick Injuries to Nurses. *Am J Public Health*. 2002;92(7):1115-1119
- [22] 22. Holzmüller CG, Sexton JB, Syin D, Gilson MM. Needlestick Injuries among Surgeons in Training. 2007; (356):2693-2699
- [23] 23. Gebresilassie A, Kumei A, Yemane D. Standard precautions practice among health care workers in public health facilities of Mekelle special zone, Northern Ethiopia. *J Community Med Heal Educ*. 2014;4(3):286
- [24] 24. Zhang M, Wang H, Miao J, Du X, Li T, Wu Z. Occupational exposure to blood and body fluids among health care workers in a general hospital, China. *Am J Ind Med*. 2009;52(2):89-98
- [25] 25. Nsubuga FM, Jaakkola MS. Needle stick injuries among nurses in sub-Saharan Africa. *Trop Med Int Heal*. 2005;10(8):773-781
- [26] 26. O'Neill TM, Abbott AV, Radecki SE. Risk of Needlesticks and Occupational Exposures Among Residents and Medical Students. *Arch Intern Med*. 1992;152(7):1451-1456
- [27] 27. Adib-Hajbaghery M, Lotfi MS. Behavior of healthcare workers after injuries from sharp instruments. *Trauma*. 2013;18(2):75-80
- [28] 28. Jayanth S, Kirupakaran H, Brahmadathan K, Gnanaraj L, Kang G. Needle stick injuries in a tertiary care hospital. *Indian J Med Microbiol*. 2009;27(1):44-47
- [29] 29. Zhang M, Wang H, Miao J, Du X, Li T, Wu Z. Occupational exposure to blood and body fluids among health care workers in a general hospital, China. *Am J Ind Med*.2009; 52(2):89-98
- [30] 30. Efetie ER, Salami HA. (2009). Prevalence of, and attitude towards, needle-stick injuries by nigerian gynaecological surgeons. *Niger J Clin Pract*. 2009; 12(1):34-36
- [31] 31. Adegboye AA, Moss GB, Soyinka F, Kreiss JK. The Epidemiology of Needlestick and Sharp Instrument Accidents in a Nigerian Hospital. *Infect Control Hosp Epidemiol*. 1994;15(1):27-31
- [32] 32. C.D.C. Guidelines for prevention of transmission of human immunodeficiency virus and hepatitis B virus to health-care and public-safety workers. *MMWR Suppl*. 1989;38(6):1-6
- [33] 33. Guidelines for the management of occupational exposures to hepatitis B, hepatitis C, and HIV and recommendations for postexposure prophylaxis. Atlanta: Centers for Disease Control and Prevention; 2001. 2005
- [34] 34. Stein AD, Makarawo TP, Ahmad MFR. A survey of doctors' and nurses' knowledge, attitudes and compliance with infection control guidelines in Birmingham teaching hospitals. *J Hosp Infect*. 2003;54(1):68-73
- [35] 35. Nwoga HO, Ajuba MO, Ogugua I. Assessment of the knowledge, attitude and practice of standard precautions among healthcare workers in

primary government health facilities in Enugu, South East Nigeria. Nig
Research J Clin Sci. 2019;9(1 and 2): 16-30

[36] 36. Alert N. Preventing needlestick injuries in health care settings. DHHS
Publ. 1999;1999:2000–2108

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