

Injection safety practices among resident doctors in a tertiary health facility in Benin City

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Abstract

Introduction: Unsafe injections are a major source of infection with blood borne pathogens including hepatitis B virus, hepatitis C virus and human immunodeficiency virus. World Health Organization estimates the burden of disease associated with unsafe injection practices to be about 1.3 million early deaths, loss of about 26 million years of life and an annual burden of 535 million US dollars in direct medical costs. The present study was aimed at determining the prevalence of needle stick injury and the level of reporting among resident doctors in University of Benin Teaching Hospital, Benin.

Methodology: A descriptive cross-sectional study was carried out from September 2009 to March 2010 among 152 resident doctors in a tertiary health facility in Benin City. The study population was stratified based on their specialty of training. Proportional allocation was applied to obtain the number of participants to be selected from each stratum. Self-administered questionnaire was used to collect data and analysis was by Statistical Package for Scientific Solution (SPSS) version 16.0. (IBM SPSS solution for Education)

Result: The prevalence of needle stick injury among the respondents was 61.8%. The most frequent reason for non-reporting was; the injury was due to a clean needle 68.9%. Awareness of reporting was 92.1% but the level of reporting was 14.9%.

Conclusion: The prevalence of needle stick injury was high, awareness of reporting was high but the level of reporting was low. Behavior change communication models are required to bring about a positive change in the practice of reporting.

Key words: Injection safety, resident doctors, University of Benin Teaching Hospital

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Introduction

Injection is one of the most common health care procedures and each year at least 12 billion injections are administered world-wide.^[1] The more injections are given, the more people are exposed to needle and syringe accidents as well as tendency for reuse without sterilization especially when demand exceeds availability of injection equipment.^[2,3] Unsafe injection practices includes; reuse of syringes and needles in the absence of sterilization, poor collection and poor disposal of dirty injection equipment, improper administration of vaccines etc.^[4] In developing countries, the estimated proportion of injection administered with injection

equipment reuse in the absence of sterilization ranges from 15 to 60% respectively.^[5] Unsafe injections are a major source of infection with blood borne pathogens including hepatitis B virus, hepatitis C virus and human immune deficiency virus.

World-wide, injections cause an estimated 8-16 million cases of hepatitis B virus infection, 2.4-4.5 million cases of hepatitis C virus infection and 80,000-160,000 cases of human immunodeficiency virus (HIV) infection.^[5,6] Infection with these viruses initially present no symptoms, it is a silent

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epidemic, however the consequences are increasingly being recognized.^[7,8] World Health Organization (WHO) estimates the burden of diseases associated with unsafe injection practices to be about 1.3 million early deaths, loss of about 26 million of life and an annual burden of 535 million US dollars in direct medical costs.^[11] In Nigeria, a national cross sectional survey of injection safety practices in health facilities between July and August 2004 showed over prescription of injections, inadequate supply of injection materials, inadequate facilities for sterilization as well as an average of 4.9 injections per person per year.^[9]

Health-care workers are at risk of occupational hazards as they perform their clinical activities in the hospital. They are exposed to blood borne infections from sharp injuries and contact with deep body fluids. Needle stick injuries were the most common occupational health hazards reported from a Nigerian teaching Hospital.^[10] The study was aimed at determining the prevalence of needle stick injury among resident doctors in University of Benin Teaching Hospital (UBTH) and to assess their level of reporting.

Methodology

The study was carried out in UBTH, Benin. A tertiary health facility located on a 150 acre site along Benin – Lagos express way, about 8 km from the city center. A descriptive cross-sectional study design was utilized for the study, which was conducted over a 6 month period (September 2009 to March 2010). A final sample size of 152 was arrived at after substituting the statistical formula of fisher $n = Z^2pq/d^2$ and adding 10% of the calculated sample size in order to make room for non-response cases.^[11] All doctors undergoing residency training at UBTH during the period of the study and who wish to participate in the study were included in the study, while those who do not wish to participate were excluded from the study, also house officers, medical officers, consultants and other paramedical and non-medical personnel were excluded from the study. The calculated sample size for the study is 152, whereas the total number of resident doctors in UBTH as at the time of the study is 330, in the different specialty training categories being offered in the hospital.^[12] Stratified sampling technique was utilized to select respondents from the different strata (various specialty units). Sampling ratio was calculated and respondents proportionally selected from the different strata to make up the calculated sample size. Data was collected using semi-structured, self-administered questionnaire. Data analysis was carried out with statistical package for scientific solutions (SPSS) version 16.0. Appropriate tests of association such as Z-test, *t*-test and OSHA recapping Chi-squared test were carried out where applicable. The level of significance was

set at $P < 0.05$. Ethical clearance was obtained from the UBTH ethical committee before the commencement of the study, also informed consent was obtained from the participants before administering the questionnaire. The major limitation to the study being that data was obtained by self-report and this carries a potential for recall bias, hence prevalence of needle stick injury may have been over or under estimated.

Results

A total of 152 participants were recruited for the study. Almost half of the respondents 62 (48.0) were between the ages of 30 and 34 years.

Three quarters of the resident doctors 114 (75.0%) were males and over half 96 (63.2) were married.

The prevalence (occurrence) of needle stick injury was 61.8%. Most of the participants 92.1% were aware of the needle stick injury reporting procedure, but only 14.9% reported their needle stick injuries.

Activities being carried out when the respondents sustained the needle stick injuries included; recapping of needle after administration of injection 32 (34.0%); surgical procedure cannulation 26 (27.7%); disposal of used sharps 16 (17.0%); restraining of patients 12 (12.8%); others 8 (5.5%) includes; setting up of intravenous line, collection of blood samples, episiotomy etc., [Table 1].

Reasons for not reporting needle stick injury were; the injury was from a clean needle 63 (67.0%); I did not have time 12 (12.7%); afraid a HIV positive result would affect my career 7 (7.5%); I was concerned about confidentiality 6 (6.5%); I thought I would get into trouble 4 (4.3%); Others 2 (2.0%) included; it was just a tiny prick, fear of being blamed etc., [Table 2].^[12]

Respondents who are males and had sustained a needle stick injury were 73 (64.0%) compared to 41 (36.0%) who had not. Respondents who are females and had sustained a needle stick injury were 21 (55.3%) compared with 17 (44.7%) who had not. The difference between sex and occurrence of needle stick injuries was not statistically significant ($P = 0.34$). Respondents who are males and had reported their needle stick injury were 12 (18.2%) compared with 54 (81.8%) who had not. Respondents who are females and had reported their needle stick injury were 2 (14.9%) compared with 26 (92.9%) who had not. The observed difference was not statistically significant ($P = 0.17$) [Table 3].

Respondents who have sustained a needle stick injury and had reported it were 13 (20.6%) compared to 50 (79.4%) who

Table 1: Activity being performed when needle stick injury occurred

Activity	Frequency (%)
Recapping	32 (34.0)
Surgical procedure	26 (27.7)
Disposal of used sharps	16 (17.0)
Restraining of patients	12 (12.8)
Others	8 (8.5)
Total	94 (100.0)

Table 2: Reasons for not reporting needle stick injury

Activity	Frequency (%)
Injury was due to clean needle	63 (67.0)
I did not have time	12 (12.7)
Afraid positive results would affect my career	7 (7.5)
I was concerned about confidentiality	6 (6.5)
I thought i would get into trouble	4 (4.3)
Others	2 (2.0)
Total	94 (100.0)

had sustained needle stick injury, but failed to report. This difference was statistically significant ($P = 0.03$) [Table 4].

Discussion

Out of the 152 resident doctors who participated in the study, 62 (48.0%) were within the ages of 30-34 years. The mean age was 32.9 ± 4.94 years, and they were mostly males 114 (75.0%). This finding reflects the male dominated nature of the profession. Almost all the respondents were Christians, which is the religion that is predominant in the south-south geo-political zone of the country. From the study, the prevalence of needle stick injury was 61.8%, though high, it was however lower than that found among medical and dental practitioners in Benin City, Nigeria. A study that had a prevalence of (77.9%).^[13] The study on medical and dental practitioners in Benin City was carried out in 2002, hence there is a significant reduction in the prevalence of needle stick injuries between the time of that study and the present. This reduction could be attributed to the various training programs on infection control organized in health facilities across Benin City, as well as the enabling environment such as presence of adequate personal protective equipment (PPE), safety boxes at strategic locations in the hospital etc., that has been provided in these health facilities. In another study in Singapore the prevalence of needle stick injury among house officers was 86.4%^[14] whereas in the study among junior doctors practicing in South Africa, it was 91.0%.^[15] In a study among resident doctors in Egypt the prevalence of needle stick injury was 70.8%,^[16] whereas among surgical residents in the U.S it was 74% and 15% among the internal medicine residents. It is not surprising that surgical residents recorded higher prevalence of needle stick as more often the surgical

Table 3: Association between sex, occurrence and reporting of needle stick injury

Sex	n (%)		
	Yes	No	Total
Occurrence of needle stick injury			
Male	73 (64.0)	41 (36.0)	114 (100.0)
Female	21 (55.3)	17 (44.7)	38 (100.0)
Total	94 (61.8)	58 (38.2)	152 (100.0)
$P=0.34$			
Reporting of needle stick injury			
Male	12 (18.2)	54 (81.8)	66 (100.0)
Female	2 (7.1)	26 (92.9)	28 (100.0)
Total	14 (14.9)	80 (85.1)	94 (100.0)
$P=0.17$			

Table 4: Occurrence of needle stick injury and level of reporting

Occurrence of needle stick injury	Level of reporting n (%)		
	Yes	No	Total
Yes	13 (20.6)	50 (79.4)	63 (100.0)
No	1 (3.2)	30 (96.8)	31 (100.0)
Total	14 (14.9)	80 (85.1)	94 (100.0)
$P=0.03$			

residents handle needles and other sharp instruments more than the internal medicine residents during the course of carrying out their duties.^[17] Studies across the world have reported various prevalence rates for needle stick injury. The difference in the prevalence rates could be attributed to the difference in study population, individual differences and attitude toward work and own welfare. It can also be attributed to the level of awareness and degree of training on infection control practices and utilization of standard precaution in the care of patients. The prevalence of needle stick injury among house officers and junior doctors in South Africa was very high. This could be attributed to the fact that house officers and junior doctors who do not have much experience in the practice are likely to make more mistakes hence the likelihood of sustaining more needle stick and sharp injuries compared with older ones who are more experienced on the job. Surgical procedures, recapping of needles (although not recommended by WHO), disposal of used sharps, restraining of patients, are some of the activities being carried out when needle stick injury was sustained. According to OSHA recapping of needle is prohibited in order to reduce the risk of transmission of blood borne pathogens, yet in the study among the activity being performed when needle stick injury was sustained had the activity "recapping" being 34.0%. Among resident doctors in the Egypt the frequency of recapping of needle was 46.7%.^[16] These needle stick injuries could have been prevented if standard precautions had been appropriately followed. Non-compliance with standard precaution places these health-care workers at a significant health risk,

hence training and re-training programs and other relevant measures such as placement of Information Education and Communication materials at strategic locations at work places, provision of PPE and enforcement of their use, ensuring that safety boxes are provided and are emptied at the right time and so on will likely improve compliance with standard precaution, hence reducing the risk of occupational exposure. Furthermore since the above activities were the main contributors to the occurrence of needle stick injury, it implies that the frequency with which health care workers engage in them is quite high. There is therefore need to increase manpower in the health sector as this will in turn reduce the frequency with which these health care workers engage in these activities. Awareness of needle stick injury reporting procedure from the study was 92.1%. This was high compared to that found in a study conducted among medical students in Bloemfontein, South Africa where the awareness of reporting of needle stick injury in the South African study was low despite the awareness of needle stick injury reporting procedure was 44.4%.^[18] It is quite surprising that high prevalence of HIV in that country, (the prevalence of HIV in South Africa as at 2009 was 18% compared with 4% in Nigeria) hence the need to equip health care workers with relevant information on the event of a needle stick injury or other situations that exposes them to blood borne pathogens. The level of reporting of 14.9% found in the study, though poor was similar to that found in a study carried out in USA among surgeons, with a level of reporting of 17.0%.^[19] The level of reporting was however better among medical students in a study conducted in Virginia USA (43.0%),^[20] Nice France (39.0%),^[21] Bloemfontein South Africa (47.6%)^[18] and among health care workers in Cambridge, England (61.0%).^[22] Since the awareness of needle stick injury reporting procedure is high, but the practice of reporting is low. There is a need for the committee in this health facility that is in charge of infection control to have regular interactions with the staff, also any department that promptly reports their needle stick injury should be motivated. During the regular residents seminar meetings there is need to also emphasize exposure prevention by promptly reporting needle stick and sharp injury. Needle stick injuries are common among medical and surgical residents. Efforts should be made to prevent needle stick injury and to report those that occur. Since a high proportion of the residents neglect the preventive measures such as avoidance of recapping, wearing a PPE etc., that are designed to avoid exposures, more education is therefore needed in this regard to re-emphasize it.

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