

## Prevalence of needle stick injuries among healthcare workers at the Federal Medical Centre, Owerri, South-East Nigeria

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### Original article

#### ABSTRACT

**Background:** A needle-stick is a sharp-pointed instrument used for puncturing tissues or passing a ligature around or through a vessel, but possibly also it could be a sharp instruments or objects for other purposes. Healthcare workers (HCW) can easily contact infections with blood-borne pathogens such infections are hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV), when health workers are exposed to occupational blood diseases through the use of sharp instruments and needle sticks.

**Objective:** This research investigated the prevalence, causes and prevention of needle stick injury among healthcare workers at the Federal Medical Centre (FMC), Owerri.

**Materials and Methods:** The sample size was fifty respondents while the major instrument for data collection was a well constructed, validated and reliable tested questionnaire, including observations made. Data obtained was analysed using frequency distribution, and chi-square.

**Results:** Results of the a study indicated majority of the injuries occur during injection procedure (34%), recapping (14%), and improper disposal of used syringes and needle (6%), stress had (6%), overfilled disposal boxes also recorded (2%) and lack of experience among workers had (0%). Sex of respondents recorded 86% for female and 14% for male.

**Conclusion:** A standard and understandable programmes to avert NSI should be encouraged.. Examples of such measures are as follows: recapping should be avoided, the use of disposal containers should be encouraged, surgical gloves and other safety devices can also be used to reduce a high cause of developing chronic blood-diseases like hepatitis, cirrhosis and liver cancer.

**Keywords:** Needle- stick injury, hepatitis, healthcare workers, occupational hazard, disposal containers

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## La prévalence des blessures par piqûre de seringue chez les travailleurs de la santé au niveau fédéral centre médical, Owerri, Nigeria du sud-est

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### L'article d'origine

#### RÉSUMÉ

**Contexte:** une aiguille-stick est un pointu instrument utilisé pour percer les tissus ou passant une ligature autour ou par l'intermédiaire d'un navire, mais éventuellement aussi il pourrait être un instrument tranchant ou objets à d'autres fins. Travailleurs de la santé (HCW) peuvent facilement contacter les infections avec les agents pathogènes transmissibles par le sang telles infections virus de l'hépatite B (VHB), virus de l'hépatite C (VHC) et le virus de l'immunodéficience humaine (VIH), lorsque les travailleurs sanitaires sont exposés à des maladies du sang à travers l'utilisation des instruments tranchants et piqûres d'aiguille.

**Objectif:** Cette recherche a enquêté sur la prévalence, les causes et la prévention des blessures par piqûres d'aiguilles chez les travailleurs de la santé au fédéral centre médical (FMC), Owerri.

**Matériels et méthodes:** La taille de l'échantillon était de cinquante répondants tandis que l'instrument majeur pour la collecte de données a été un bien construit, validées et fiables testés questionnaire, y compris les observations faites. Données obtenues a été décised utilisant distribution de fréquence, et chi-carré.

**Résultats:** Les résultats de l' étude ont indiqué majorité des blessures se produisent lors de l'injection procédure (34 %), récapitulatif (14 %), et élimination inappropriée des seringues et aiguilles (6 %), le stress avait (6 %), surchargé disposition cases également enregistré (2%) et le manque d'expérience des travailleurs avaient (0 %). Le sexe des répondants ont enregistré 86% de femmes et 14% pour les hommes.

**Conclusion:** un standard compréhensible et programmes pour éviter l'INS devrait être encouragé.. Exemples de telles mesures sont comme suit : récapitulatif devrait être évitée, l'utilisation de contenants à déchets devrait être encouragé, gants chirurgicaux et autres dispositifs de sécurité peut également être utilisé pour réduire une grande cause de développement sang chroniques de maladies comme l'hépatite, la cirrhose et le cancer du foie.

**Mots-clés:** Aiguille- stick blessures, de l'hépatite, les travailleurs de la santé, risque professionnel, contenants à déchets

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## INTRODUCTION

Needle-stick Injury is the accidental wound that occurred to the skin of a healthcare worker by the use of a needle during a medical intervention. Needle-stick injury is the most common accidents reported by healthcare workers. It was in a record that every year, hospital workers experience between 600,000 and 800,000 when exposed to blood-borne diseases; United States Department of Labour-Occupational Safety and Health Administration (1). Healthcare workers, like nurses who worked at different hospital bedsides with patients sustain a majority of these needle-stick injuries (2).

The needle stick injury occurs when drawing blood, administering intravenous or intramuscular drugs, or doing other hospital works that involved sharp objects, in which the needle the health worker is working with accidentally slips and injures the worker. These injuries normally occur when a healthcare worker is set to administer treatment to a patient. Such set stage could be a means of virus transmission from the source person to the recipient during needle recapping and due to improper placing of used needles in approved sharps containers for disposal purpose.

In general view, needle-stick injuries can cause some minor bleeding, visible trauma or scalpel injuries on health workers which can ultimately seem larger than a needle-stick injury; however, there is high rate of viral infection even in the absence of bleeding when injured with a needle-stick. Some nosocomial infections associated with needle-stick injury when not properly handled by healthcare workers are as follows Hepatitis-B Virus, Hepatitis-C Virus or Human Immunodeficiency Virus (HIV) (3).

Needle-stick injuries are not only meant for health workers but it can also be encountered in any environment that is predisposed to the risk. Strategies to prevent infections due to sharps injuries are not far from educating Health care workers on the preventive measures, invasive reduction of injection procedures, use of safer devices and protective management of exposed workers.

In the industrialized world, occupational monitoring and surveillance assess the health hazards related to blood borne diseases and preventive measures to reduce the risk of transmission of the hospital infections (4). In the under developed countries like Nigeria, health impacts on health workers when exposed to work environment that predisposes to the risk, if they are not properly monitored, it may lead to accident and for that reason, much needs to be done to protect the workers from such risks that cause infections, illness, and morbidity which may have impact on the health workers (3).

Studies have shown that decrease of 83% and 89% cases of needle sticks after the introduction of safety engineering measure which consist of the use of safer medical devices, like, sharps devices with engineered sharps injury protections and needleless systems. Most devices are built-in safety characteristics that decrease the risk of injury and they are sliding sheath syringes, retracting needles into syringe after use, shielded or retracting catheters, and intra venous systems that use a catheter port with a needle housed in protective form (5). The 74% reduction in the number of accidents/injuries from needles when used for drawing blood after the establishment of safety engineered alternatives measures such as giving medication and fluids through a catheter port using non-needle connections and jet-injection systems that deliver liquid medication via beneath the skin (6).

A research study conducted on hospital workers in Malaysian Hospital reported that, 66.1% had a wrong understanding that needles should be recapped after use and 52.5% know about needleless safety devices (7). Another study conducted among Healthcare workers in Malaysia in 2008 indicated that the cases of needle stick injury were 23.5% (6). Others studies that were carried on among other healthcare workers showed the following prevalence rates; general hospital in Malaysia in 2005 had [24.9%] (8), Saudi Arabia in 2002 [74%] (9), Nepal in 2003 [74%] (10) and Iran in 2009 [39.4%]

respectively (11).

Needle stick injury recorded in African countries is higher when compared to other places in the world and it has a significant public health impact due to the fear of hospital infections faced by workers, ill protected and overworked health workers amongst other factors. Close research studies conducted in Ethiopia showed that 32% of the needle stick injuries were reported in the Sidama zone, an observed 31% was reported in north western Ethiopia and 66% was not observed out of 52 health facilities subjected in for study.

However, the recorded cases of needle stick injuries annually in countries like Nigeria is unknown, and lack of data from some hospitals appear to be the greatest obstacle in arriving at an injury estimate.

It is expected that the results of this study would serve as a benefit to the Workers, Health Officers, Public Health Practitioners, health related professionals, and the general public in Nigeria. The study will serve as a guide to the prevention and safety measures needed for needle –stick injuries it will enhance correspondence in the dramatic increase in the adherence of safety rules in the use of needle stick. This study will help generate the much needed data on needle-stick injuries, prevalence, risk and prevention. This research is therefore intended to estimate the prevalence cases and predisposing factors for needle stick injuries among hospital workers at the Federal Medical Center (FMC) Owerri Southeast, Nigeria

## METHODOLOGY

This research study was carried out on Healthcare workers working at the Federal Medical Center (FMC), Owerri, eastern part of Nigeria, from January to July, 2013. Federal Medical Center (FMC) is situated at Owerri, Imo State and it is a hospital owned by the Federal Government. It has several male and female healthcare workers and many wards and departments that operate with needle sticks.

As a medical center, the hospital is located at the heart of Owerri along

Amakohia – Orlu road. It is bounded on the north by Douglas road, on the south by Amakohia road, on the west by Okigwe road and on the east by Onitsha road.

The researchers employed the descriptive cross-sectional method to enhance the achievement of the study objectives. The design of this study was to enable the researchers collect and analyse relevant data, in order to find out the prevalence, risk factors, and control of needle stick injuries among hospital workers. Ethical committee of the Federal Medical centre, Owerri gave an approval to this research study after which an advocacy visits were paid to the various departments and units.

This study was carried out among 50 healthcare workers (HCW) in federal medical centre in Owerri Southeast, Nigeria Pre-tested and well designed questionnaire was used to conduct self administered interview among the selected Healthcare workers. Data was collected through self administered questionnaire. Verbal consent was obtained from each study participants. Participation was informed through the questionnaire about the interview. Participation was based on willingness, the right to withdraw at any time and confidentiality of any findings were ensured by keeping questionnaires closed to non members of the research team.

Orientation was given on the aim of the study and on the procedures to follow in filling out the questionnaire. Likewise, data in this study was collected on the socio-demographic characteristics of the respondents, work environment determinant factors and prevention of Health care workers at Federal Medical Centre, exposed to needle stick injuries. Pre testing was done on 10% of the sample size who are working in health institution (General hospital Umuguma, near Owerri town); this was not included in the study and modifications of the questionnaire were under taken. The collected data was checked for completeness on a daily basis by the researchers and supervisors.

The sampling technique used was stratified simple random sampling techniques. Ten (10) departments that handle needle stick in the institution in which five (5) respondents from each department were selected by simple randomization process. In each department, respondents were selected until the required sample size was obtained. The workers whose jobs were not directly related to handling of needle stick were excluded from this study such as hospital engineers and those who were involved in handling needle stick or those who assist in handling needle-stick were included.

The data collected were edited and analysed after being coded into the computer software called Statistical Package for Social Sciences (SPSS) Version 20.0 and descriptive statistics. The results were tested using Chi-square at 95% confidence interval (CI) to identify predictors of needle-stick injury with p-value less than 0.05 as significant. It was calculated to see the presence of the association with the outcome variable and to observe the interaction effects of variables respectively.

## RESULTS

### Socio demographic characteristics

The findings of this research showed prevalence of needle stick injuries on healthcare workers and the assessment of safety measures taken by these health workers. Out of 100 target population, 50 respondents during the period of the research were interviewed and their age ranges between 20-30 years 13 (26%), 31-40 years 25 (50%), 41-50 years 11 (22%), 51-60 years 1 (2%).

The response rate for age in this study was higher between people of 31-40 years was 25 (50%). Sex of respondents recorded 14% for male and 86% for female. The maximum percentage was found in female health workers in the hospital. Marital status of the respondents; married (84%) had the highest percentage followed by single (14%) and divorced (0%). Level of education; non-formal had (0%), primary had 0%, secondary had (4%), tertiary had (96%). Table 1 indicates the socio-demographic characteristics of the respondents.

### Departments in the studied hospital

Table 2 below shows the department /units that are more predisposed to needle stick injuries in the studied hospitals, These are; theatre department (16%), Paediatric department (18%), General Out Patient Department (G.O.P.D) (10%), Non theatre department (N.T.D) such as consulting room(22%), conference hall (8%) while medical male wards and medical female wards and laboratory recorded (4%), (10%), (12%), respectively as indicated in table 1 below,

### Knowledge of respondents on Prevalence, risk factors and preventive measures of needle-stick injury

Years of experience of the respondents in the hospital; 0-5years had (26%), 6-11years had (64%) which was the highest among all the staff, more than 12years recorded (10%). Prevalence of needle sticks injury among healthcare workers at Federal Medical Centre Owerri. Respondents that gave a positive response to this ranked 62% while those who responded negatively to this claim ranked 38% as presented in table 3. Risk factors of needle-stick injury among the health workers recorded as followed; recapping was (14%), nature of injection procedure had (34%), lack of experience among workers had (0%), improper disposal of syringes and needles was (6%), stress had (6%), while over filled disposal boxes recorded (2%) as shown in table 3. Establishment of knowledge of respondents on preventive measures in the hospital to comply by the healthcare workers were as follows; those said yes that preventive measure were in place had (98%) while those said "no" were (2%) indicated no preventive measure in table 3.

## DISCUSSION

The reported prevalence of Needle Stick Injuries at federal medical centre Owerri is 62% among the health workers. The result corresponded to 59% that was earlier got by Pugliese, bartley and Mecornick (11). This finding is higher with a study done in Malaysia hospital in 2010



(23.5%) (6), 2005 (24.9%) (7). and Iran in 2009 (39.4%) (10). However this result is lower than studies in Saudi Arabia in 2002 (74%) (8) and Nepal in 2003 (74%) (9), these differences are due to the fact that there are interventional efforts in infection prevention and safety activities. The statistical analysis in this study indicates that female workers (86%) are more victims when compared with their male counterparts (14%).

This may be due to the fact that males are better off in safety precautions compared to females. Another study in Malaysia indicated that there is a significant association between sex of the worker and the occurrence of sharp and needle stick injury among health care workers [7]. This difference may be disparities in safety consciousness and socioeconomic development of workers. In this study age of the worker did not indicate a significant association with the prevalence for sharp objects or needle stick injury. However, a study in Malaysia indicated that there is a statistical difference based on sex of worker which was in contrary to this study [7].

This study revealed that ninety eight percent of health care workers believe that needle stick and sharp injury is a preventable public health problem but only 2% disagreed to this, stating no preventive measures like Personal Protective Equipment during their work period.

In regards to the risk factors of needle stick injury, the hospital activities lead to majority of needle stick injuries (NSIs) are nature of injections procedure and recapping when compared to other risk factors. The highest percentages of (34%) found in the nature of injections procedure and (14%) meant for recapping the syringe were attributed to lack of understanding of safety measures. Improper disposal of blood sampling and improper disposal of syringes and needles as well as the method of handling hospital waste are challenging issues in most health facilities in developing countries like Nigeria. This is because most of these developing countries like Nigeria lack hospital waste officers who can properly play significant role on safety precautions.

The results in this study reflected a study carried out at Aga Khan Hospital, Pakistan which reported that more than half of the injuries (52.8%) occurred while drawing the blood samples or injecting the medicine. According to Hofranipour et al., (12), the blood-borne diseases has a standard, set out to reduce the predisposing factors for the transmission of blood-borne pathogens through recapping of a needle is to be prohibited in health care sector.

Based on the result analysis, there is a significant relationship between needle stick injury and marital status among healthcare workers in the study area. This is because the rate of occurrence of needle stick injury is greater among married healthcare workers (84%) than single healthcare workers (16%) while divorced workers did not have any record due to their full time concentration on safety measures. High compliance to the prohibition by the health workers is one of the reasons for the reduction rate of needle stick injury NSIs. As years of experiences of the respondents were (26%) for 0-5years and 6-11years 64% for 6-11years respectively, where  $\chi^2$  is  $2.705 < 3.84$ ,  $p=0.015$ . There is a significant association between years of working experience and needle stick injury among Healthcare workers at the FMC, Owerri

Different studies indicated that job satisfaction and stress had a great role on the prevalence of sharp and needle stick injury. This study revealed that 3(6%) of workers had been stressed in relation to their job. Job stress showed statistical significant association with the prevalence of sharp and needle stick injury.

The frequency of these injuries were inquired in this research from January to July, 2013, it was observed that (38%) had no needle stick injury NSI during the study period against 63% that affirmed positively to this claim. This could be caused by the inability of the healthcare workers to adhere to the preventive measures or lack of proper education among them. However, ninety six percent (96%) of the respondents had got formal educational trainings on infection prevention and safety. Getting training

experience on health and safety has a statistically significant association with the prevalence of sharp and needle stick injury because they knew that only hepatitis viruses and HIV could be transmitted via contaminated needles when stuck on health workers while working.

In summary, NSIs were observed in all categories of HCWs at Federal Medical Centre Owerri. There is a scope for improvement in safety protocols. Preventive strategies have to be devised and made mandatory for healthcare workers in hospital sectors and primary health care centres. Issues requiring attention include nature of injection procedure, recapping, recording and reporting of incidents, training of all HCWs in handling and disposal of sharps objects after use and inculcating a responsive attitude among HCWs towards safety measures.

## CONCLUSION

There was a high occurrence of needle stick injury among HCWs in Federal Medical Centre in Owerri, Nigeria which was characterized by high rate of needle recapping, poor sharp waste disposal and inadequate health educational training on occupational hazard and safety.

## Conflict of interest

All authors of this article did not report any conflicts of interest for period of the study.

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**Table 1: Demographic characteristics of subjects and knowledge of respondents.**

<b>Variables</b>	<b>Frequency (N)= 50</b>	<b>Percentage (%)</b>
<b>Age of respondents</b>		
20-30 years	13	26
31-40	25	50
41-50	11	22
51-60	1	2
Total	50	100
<b>Sex of respondents</b>		
Male	7	14
Female	43	86
Total	50	100
<b>Marital status of respondents</b>		
Married	42	84
Single	8	16
Divorced	0	0
Total	50	100
<b>Level of education of respondents</b>		
Non-formal	0	0
Primary	0	0
Secondary	2	4
Tertiary	48	96
Total	50	100

**Table 2: Departments in the hospital that predispose the prevalence of needle stick injury**

<b>Variables</b>	<b>Frequency (N)= 50</b>	<b>Percentage (%)</b>
<b>Departments/uits in the hospital</b>		
Surgical unit	7	14
Theatre dept	4	8
Paediatrics dept	9	18
G.O.P.D	5	10
(Non surgical unit) consulting room	11	22
Medical male wards	3	6
Medical female wards	5	10
Laboratory	6	12
Conference hall	4	8
Total	50	100

**Table 3: Knowledge of respondents on prevalence, risk factors and preventive measures of needle stick injury**

<b>Variables</b>	<b>Frequency (N)= 50</b>	<b>Percentage (%)</b>
<b>Prevalence of needle stick injury</b>		
Yes	31	62
No	19	34
Total	50	100
<b>Risk factors of needle stick injury among healthcare workers</b>		
Recapping	7	14
Nature of injection procedure	17	34
Lack of experience	0	0
Improper disposed of syringe and needle	3	6
Stress	3	6
Over filled disposal box	1	2
Total	50	100
<b>Years of experience of respondents</b>		
0-5 years	13	26
6-11 years	32	64
More than 12 years	5	10
Total	50	100
<b>Preventive measures in needle stick injury for healthcare workers</b>		
Yes	49	98
No	1	2
Total	50	100

**Table 4: Association between variables of interest and NSI (Chi square [ $\chi^2$ ] and p-values)**

Variables	$\chi^2$ values	p-values
Prevalence of NSI and healthcare workers	92.160	.000*
Association b/w education & NSI	125.360	.000*
Association b/w work experience & NSI	2.705	.015*
Marital status & NSI	18.981	.066
Sex & NSI	20.198	.966
Age & NSI	6.798	.065
Work stress & NSI	19.338	.013*
Health profession & NSI	2.777	.876

\*significant,  $p < 0.05$

NSI= Needle Stick Injury

## ERRATUM

1. Tanimowo MO and Abiona OO. Effect of global warming on respiratory diseases. Res. J. of Health Sci. 2014;2(2):108-114.

*Should read as:*

2. Tanimowo MO and Odeyemi AO. Effect of global warming on respiratory diseases. Res. J. of Health Sci. 2014;2(2):108-114.