

AWARENESS AND PATTERN OF NEEDLESTICK INJURIES AMONG HEALTH WORKERS AT UNIVERSITY TEACHING HOSPITAL ILORIN, NIGERIA

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Correspondences: Dr G.K. Osagbemi. E mail : gkosagbemi@yahoo.com**ABSTRACT**

Needle stick injuries (NSIs) result from accidental piercing of the skin and/or mucous membranes of the health workers and others that the needles are not intended for. It also includes injuries from suture needles and other sharps. It is an occupational hazard in health care sectors. Needle stick injuries expose health workers to blood and body fluids which may be infected and the infections transmitted to them. More than 20 pathogens have been reportedly transmitted from needlesticks (1). The most serious are Hepatitis B (HBV), Hepatitis C (HBC) and HIV. This descriptive cross-sectional study was designed to look into the level of awareness and patterns of needlestick injuries among 294 randomly selected health care workers at the University of Ilorin Teaching Hospital Ilorin, Nigeria. The study covered workers who either use, carry or dispose needles and sharps. They included doctors, nurses, laboratory workers, attendants, ward aides and porters. It was carried out between January and June 2004 using a structured questionnaire designed by the researchers. There was a high level of awareness of the risks associated with needle stick injuries. Most of the workers (89.1%) in the teaching hospital knew about the risks and that they are also exposed to these risks. The injection safety practice does not measure up to the level of awareness. There was a high incidence of NSI (57.8%) and the workers in the surgical departments were at higher risk.

Key words: Needlestick, Injuries, Health workers

INTRODUCTION

Needle stick injuries (NSIs) result from accidental piercing of the skin and/or mucous membranes of the health workers and others that the needles are not intended for. It also includes injuries from suture needles and other sharps. It is an occupational hazard in health care sectors. Although occupational transmission of Hepatitis B virus (HBV) has long been recognised as a hazard for Health Care Workers (HCW), it was not until the occupational transmission of Human Immunodeficiency Virus (HIV) had been documented that widespread

materials used during patient care procedures. Needlestick injuries (NSI) also occur when HCW, draw blood, handle trash or dirty linen where needles have been inappropriately discarded. More than 20 pathogens have been reportedly transmitted from needlesticks (1). The most serious are Hepatitis B (HBV), Hepatitis C (HBC) and HIV. In fact the risk of acquiring HBV or HBC from contaminated needlesticks is greater than that of HIV worldwide. A health worker's chance of contracting disease after an infected needlestick is 1 in 250 for HIV, 1 in 20 for HBV, and 1 in 40 for Hepatitis C (2). It is estimated that 200,000 needle stick injuries occur each year in the United States (3). In Nigeria, the incidence of needlestick injuries has been reported to be 57.8% among health workers in a teaching hospital (4). Bloodborne viruses and bacteria in hospital settings

most frequently injured. The nature of work, the exposure rate to potentially infected blood and body fluids, and the exposure to contaminated materials at work place makes these groups especially vulnerable. Results of a study on the epidemiology of NSI among Health Care Workers (HCW) in two German hospitals indicate that 500,000 NSIs occur annually in Germany (4). NSI are also preventable sources of infection and stress of HCW in Africa. A study in Uganda found that needlestick injuries are common with an estimate of about 55% of HCW reporting at least one NSI in the previous year (5). In a study carried out in Benin City, Nigeria, amongst nurses, it was found that the nurses had a poor knowledge about universal precautions, as only 34.2% of had heard of universal precautions. There was also a poor observance of universal precautions. Knowledge of measures to be taken after the occurrence of occupational accidents and needlestick injuries was also poor (6). Similarly, 44.6% of surgical residents in Nigeria in a study conducted in 1997, had an idea of CDC guidelines for Universal Precaution against bloodborne infections, 42.2% knew it well, while 13.8% had no idea (7). This descriptive cross-sectional study was designed to look into the level of awareness and patterns of needlestick injuries among health care workers at the University of Ilorin Teaching Hospital Ilorin, Nigeria. The study covered workers who either use, carry or dispose needles and sharps. They include doctors, nurses, laboratory workers, attendants, ward aides and porters. It was carried out between January and June 2004.

METHODOLOGY

The study was conducted in the University of Ilorin Teaching Hospital. It is a tertiary and referral health institution located in the north central part of Nigeria. Majority of the HCWs in the teaching hospital are nurses and medical doctors, 51.1% and 35.4% respectively. Another group that is sizeable is the supporting staff of hospital attendants, aides and porters accounting for 13.5% of respondents. The 320 subjects for the study were selected out the 1180 staff involved with

direct patient care. Proportionate simple random sampling method by balloting was used to select these study subjects based on their respective total numbers in their departments. The tool for data collection was a pre tested structured questionnaire that was completed by the respondents themselves. Epi-info version 6.0 computer software package was used for data analysis.

RESULTS

Three hundred and twenty copies of the questionnaire were distributed out of which 294 were found suitable for analysis after editing. Of the 294 respondents, 274 (93.2%) knew of the existence of needle stick injuries as a health hazard while 262 (89.1%) believed they were exposed to the hazard. The most commonly known methods of disposal of used needles were safety box (63.9%), incineration (60%) and dumping (24.3%). Others were burning 3.4% and recycling (6.8%). Most commonly known infections associated with needle-stick injuries were HIV/AIDS (96.6%), Hepatitis B (85.4%), Hepatitis C (37.1%), Hepatitis A (32.1%), Bacterial infections (27.2%), Hepatitis E (10.5%) and Malaria (4.4%). The commonly known methods of preventing needle-stick injuries were proper disposal (76.5%), recapping of needles (42.5%), gloving/double gloving (26.9%), use of special operating gloves (22.2%), health education of workers (21.3%), stop recapping (13.4%) and better concentration while performing procedures (6.7%). Only 13.4% mentioned no recapping of needles as a way of preventing NSI. Disposal methods employed for used needles and sharps were safety boxes (47.9%), baskets (46.9%), plastic cans (40.8%) and kick-about bowls (4.8%). Eighty-one point three percent (81.3%) of respondents usually recap used needles while (18.7%) did not. One hundred and eighty five (62.9%) of respondents has had at least one NSI before (table 1) with 57.8% of them having had one within the last 12 months preceding the study. All but one (99.5%) of those who had the NSI experience had their hands affected. One respondent had the needle puncture on the foot. Eighty (45.5%) experienced the injury during the day 38.2% during the

afternoon and 13.3% during the night. Fifty-nine point four percent (59.4%) of needle stick injuries occurred during injection procedures with 43.6% of them occurring during recapping of needles after injections, 22.7% occurred during operations, 14.1% during intravenous manipulations while 6.5% was during other procedures such as packaging of linens and wastes. The main actions taken by those affected by NSI include

squeezing the site (63.2%), washing with soap (41.6%), washing with bleach (28.6%) and pressing the sites to stop bleeding (20.5%). Other things done (7.6%) include using antibiotics, cleaning with spirit, bandaging and an individual was given post exposure prophylaxis with antiretroviral drugs. Only 22 people (7.5%) reported and these to their immediate boss, the compound matron or staff clinic.

Table 1: Pattern of needle stick injuries among health care workers in various departments of UPTH Ilorin, Nigeria

Department	Yes	No	Total
Medical	26	17	43
Surgical	37	6	43
Laboratory	10	19	29
Nursing	101	57	158
Others	11	10	21
Total	185	109	294

Chi Square = 21.09 df = 4 P = 0.0003

The department to which a respondent belonged significantly influenced the occurrence of NSI (table 1). Respondents in the surgical departments (surgery, obstetrics and gynaecology, ophthalmology) and nursing were more likely to suffer from needle stick injuries than others. The medical departments constitute community medicine, paediatrics and internal medicine.

DISCUSSION

One of the most important occupational risks among health care workers is exposure to blood-borne pathogens. Needle-stick injuries (NSI) are recognized as posing this great risk to HCWs. The most important of these diseases are Human Immune-deficiency Virus (HIV), Hepatitis B (HBV) and Hepatitis C (HCV). The commonest is HBV, but HIV and HCV are of more

concern because there are no vaccines for them and no satisfactory treatment available yet. In this study, the level of awareness of needle-stick injuries can be described as high for 93.2% knew that it exists, 89.1% of respondents agreed they are exposed to the injury. The awareness of risk of contracting diseases from needle-stick injuries was also high as indicated by the response to the risk associated with the injuries. More than 90% of respondents knew that HIV/AIDS can be transmitted to health workers through needle stick injuries.

Ninety-six point six (96.6%) of respondents indicated HIV/AIDS which agrees with the study in Ilorin, Nigeria in which 97% of the health workers knew that HIV can be transmitted by needle-stick injuries (8). Injection safety involves not exposing the patients, the health workers and

the community to dangers. The disposal of used needles safely is a very important aspect of prevention of needle stick injuries as advocated by the World Health Organisation (9). In the literature, recapping of used needles is a popular culprit in the cause of needle stick injuries. A significant 24.3% of respondents still picked dumping as an option. This is worrisome since dumping is not safe and it may be an indication that dumping is a major method of disposal system of most things in the study area 21. This common practice of waste disposal in the tropics, exposes scavengers in the community to the danger needle stick injuries (10&11). While almost all (94.6%) of respondents believed that NSI can be prevented, the methods suggested are not completely in agreement with international standards. Universal precaution recommends non-recapping of used needles and sharps. In this study 42.5% of respondents recommended recapping as a method of preventing NSI, while 13.4% suggested non-recapping. This showed a low level of knowledge concerning the issue of recapping as a cause of NSI. This evident in the practice of recapping by the majority (81.3%) of the health workers. In this study, majority of respondents, 81.3% usually recap needles after use. This was not unexpected because 42.5% mentioned recapping as a way of preventing NSI. Universal precaution standards prohibit recapping, but it continues to be an identified cause of NSI (12). The proportion of respondents (62.9%) that had experienced NSI is high. This shows a high exposure level to blood from patient and 36.4% of the respondents had experienced NSI in the preceding 12 months. This proportion is similar to rates found in studies in other teaching hospitals in Nigeria and Uganda (5&7). In the study in Ile-Ife, Nigeria, it was found to be 34% in the previous year (13). These figures are much less than 88.4% of reported NSI among surgical residents in Nigeria (7). This finding is in support of the higher risk to which surgeons were exposed when it involves exposure to blood and body fluids (14&15).

The main sites involved were the fingers for all but one (99.5%) respondent. It is the hand that is involved in the handling of needles and syringes, in packing linen, in suturing, in setting intravenous lines and in recapping of the needles. It is thus the most vulnerable and affected part of the body by needle stick injuries. Most actions taken by victims to manage the NSI were palliative. An individual who had NSI from a known HIV positive patient had to take post exposure prophylactic (PEP) antiretroviral drugs. This might be an indication that the action taken could be affected by the knowledge of the danger to which the health care worker is exposed. In environments of high prevalence of HIV positive individuals, PEP has been recommended (13&14). There was poor reporting of NSI in this study as only 11.9% of those who had the injuries reported. This observation had been made by other workers in other parts of the world (4 &16). The actions taken by those who reported were not different from those by the individuals who did not report. This might be an indication of the absence of a standardized protocol of managing such injuries as NSI in the hospital. Table 1 shows the effect that the department to which an individual belongs had on NSI experience. The health workers in the surgical departments (surgery, ophthalmology, obstetrics and gynaecology) had higher incidence of NSI. The nurses are also more likely to have NSI. Surgeons operate and use needles in suturing, sometimes doing blind suturing and thereby exposing themselves to the danger of NSI (15&17). It was also found in other surveys that suturing account for a significant proportion of NSI amongst surgical staff who were also relatively more injured than other groups (17).

CONCLUSION AND RECOMMENDATIONS

Needle stick injuries are an important occupational risk to which health workers are exposed. There was a high level of awareness of the risks associated with needle stick injuries. Most of the workers in the teaching hospital knew about the risks and that they are also exposed to these risks. The level of awareness may be very high (as indicated by the knowledge of the risks and the known

method of disposal), but the injection safety practice does not measure up to the level of awareness. There the practice of unsatisfactory disposal system of used sharps as a sizeable proportion still use methods that can expose the population to the risk of injuries from used needles (dumping, burning, etc). There was a high incidence of NSI and the workers in the surgical departments were at higher risk. The hand was the most commonly affected by NSI in this study. Injection administration, recapping of needles and surgical operations were the main procedures associated with NSI. The health care workers in the teaching hospital should have training and workshops on injection safety. The management of the teaching hospital should have a policy on injection safety, which should include needle stick injuries, their prevention and management. Specially designed needles for surgical procedures, especially the blunt needles should be provided for use in the operating theatres and emergency units.

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this has failed to bring relief that other differential diagnosis is considered. The next stage of the disease results in the development of the usual telltale signs and symptoms of a viral haemorrhagic fever such as reddish conjunctiva, bullneck, sorethroat, and later bleeding from the orifices (mouth, GI tract, urinary tract and into other internal organs).

Whole blood clotting time in 20 minutes (WBCT20mins) is an indirect crude test used to evaluate bleeding tendency. It was originally used in snakebite patients bitten by viperidae species that are prone to development of haemorrhagic systemic envenomation symptoms (5) In this situation, it was found very useful in initiating antsnake venom therapy once a value beyond 20minutes is obtained. This was found to reduce mortality significantly.

The high mortality associated with lassa fever in which the ultimate cause of death is bleeding can be reduced if there is an early diagnostic tool that can be used to detect bleeding tendency early enough while awaiting serological diagnosis. This laboratory confirmation often comes late to alter the course of the disease favourably if prompt treatment is not instituted before bleeding commences.

This small pilot observational study was therefore done to see if this simple test will be beneficial in improving the diagnosis of lassa fever.

METHODOLOGY

All febrile adult patients presenting in Irrua Specialist Teaching Hospital, Irrua (ISTH), to the medical team both during clinic sessions and at the accident and emergency (A&E) units were examined. Patients were assessed clinically and routine investigation such as blood film examination and full blood count were done.

Patients were then stratified into various groups according to their clinical diagnosis.

A sample of blood was taken from each patient for WBCT-20minutes.

Whole blood clotting time in 20 minutes (WBCT20minutes) was done by modifying the original method of Lee and white to the bedside. 2mls of venous blood is collected from the antecubital vein into a 5ml syringe. A free space is left above the blood column so that the entire blood in the syringe is visible before clotting commences. The syringe containing the blood is left standing and tilted slowly to the horizontal after four minutes and every minute subsequently. The time taken for clotting to occur is then noted. A normal WBCT is between 5 – 12 minutes (less than 20 minutes). Values beyond 20 minutes are considered abnormal and this forms a basis for prompt commencement of intravenous therapy, which is the only treatment available so far for lassa fever in these environment (6)

Samples were also taken from an equal number of non-febrile age and sex matches medical students and hospital workers as controls.

All patients were then stratified according to their WBCT- 20minutes.

All patients were followed up and re evaluated clinical at one week to evaluate those who developed classical symptoms and were then treated for lassa fever.

Patients were compared with controls. Chi Square was used to analyse discrete variables and ANOVA for continuous variables.

RESULTS.

A total of thirty eight febrile patients were examined- male twenty (52.6%) females eighteen (47.4%) Clinical diagnosis of Lassa fever were made in five patients (13%), others were malaria twenty two (58%), meningitis five (13%), Enteric fever four (11%), lobar pneumonia Two (5%).

Table 1 Frequency of clinical diagnosis

Diagnosis	Frequency	Percentage (%)
Lassa fever	5	13
Malaria	22	58
Meningitis	5	13
Enteric Fever	4	11
Lobar pneumonia	2	5
Total	38	100

Table 2. Age/Sex distribution of patients

Age (years)	Male	Female	Total
10 – 19	3	4	7
20 – 29	9	5	14
30 – 39	6	4	10
40 – 49	2	3	5
50 – 59	0	2	5
Total	20	18	2

WBCT was prolonged in all the five cases of clinically diagnosed lassa fever. (32%) of the patients diagnosed as malaria had highly elevated WBCT – 20minutes. Only one of those with meningitis had elevated WBCT>20minutes and none of those with pneumonia had elevated values. On evaluation of patients 1week later, All seven patients diagnosed as malaria but with prolonged WBCT 20minutes developed classical features of lassa fever such conjunctiva suffusion, swollen neck, blood stained sputum and had to commence on ribavirin.

The five patients whose WBCT were elevated were promptly commenced on I.V ribavirin and there was both clinical improvement and later reduction of the initial WBCT value to less than 20mins after one week of therapy. No fatalities were recorded in this group. However seven patients previously diagnosed with malaria and meningitis that had initial normal WBCT (less than 20 minutes) and who did not respond to

adequate doses of antimalarial and antibiotics were later found to have elevated WBCT on repeat one week later. two resulted in fatalities because of delay in initial of ribavirin therapy.

The WBCT in 20 minutes for all the control subjects were less than 20 minutes.

DISCUSSION

Lassa fever is a deadly disease (1). It is grouped among the viral haemorrhagic fevers and incidentally was discovered in Lassa near Jos in Nigeria (2) It is endemic in some parts of West Africa namely Sierra Leone, Guinea, and Nigeria (1) The Northern part of Edo state of Nigeria, especially the Esan speaking area is one of such endemic zones and epidemics occur annually during the dry season when bush burning displaces the rodents harbouring the virus from their normal habitat in the wild into the neighbouring villages where the disease is now spread by the ingestion of foodstuff contaminated by the rat body fluids such

as urine, saliva, and feces (2) Others also get infected when they ingest the meat of the rats considered a delicacy by some people.

There is a yearly epidemic because no effective preventive measure has been found to reduce the annual increased incidence rate during the dry season. Rats and other rodents (2) that spread the virus are highly sought out source of protein because of the harsh economic climate and local hunters will spare no effort to trap them. Burning is a way of forcing them into the open to do this but unfortunately it also serves to drive them into human houses where they urinate and stool on drying foodstuffs such as fermenting cassava and garri left outside the house to dry.

Lassa fever is a dreaded illness in these parts of the tropics because of the high mortality rate once bleeding commences. Disturbance of hemostasis is a sine qua non in all viral hemorrhagic fevers including lassa fever (6) and bleeding is ultimately a prelude to early mortality in most cases. Other effects of illness include lymphocytopenia and a moderate thrombocytopenia (7) The thrombocytopenia is associated with a serum inhibitor and with the occurrence of hemorrhage, depression of platelet aggregation thereby increasing the severity of lassa fever (8)

Until fairly recently, the prognosis was poor (3) and there was no effective therapy until the introduction of ribavirin (4) The use of ribavirin in a patient therefore depended on diagnosing lassa fever. The diagnosis of lassa fever in our environment is totally clinical since serological tests for it are unavailable and viral identification tests are absent. Prompt and early diagnosis is essential since there are a myriad of common diseases causing febrile illnesses, chief among them in this environment being malaria, pneumonia, enteric fever, meningitis among others (1,2,3)

Patients in this area with febrile illnesses present late, most having presented to a chemist, a traditional healer, a nursing home or a private clinic before presenting in this hospital usually on account of poor response to initial therapy taken or due to worsening symptoms and signs.

Ability to stratify presumed lassa fever patients into a group to enable immediate therapy with Ribavirin and also to avoid antiviral therapy for patients with other causes of febrile illnesses is absolutely important.

There is no lassa vaccination programme yet to protect the population of endemic regions.

The result of initial study indicates that this simple test can be quite invaluable in improving the diagnosis and institution of therapy for patients with suspected lassa fever. This has led to a drastic reduction in the mortality rate compared to when treatment was delayed while awaiting the late coming serological and other investigations that have to be done in far away centers equipped for this

WBCT, though non-specific test (in literature reviewed) was nonetheless sensitive in increasing diagnostic suspicion in lassa fever. This increased sensitivity may be because patients with illnesses generally present late to the hospital in this environment and prolongation of WBCT is also a late sign.

CONCLUSION.

It is recommended that even if WBCT-20minutes is non-specific, because of the sensitivity noted in this study, its use in the investigation of all febrile patients should be encouraged especially patients who are listed as resistant malaria and for fever presenting for more than a few days.

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