


## Occupational risk factors contributing to injury by medical sharps among health workers at Kenyatta National Hospital, Nairobi, Kenya

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### ABSTRACT

**Purpose:** Healthcare workers are at risk of medical sharps injuries, which according to the Kenya national policy on injection safety, 58% of healthcare workers have suffered these injuries. This study was conducted with the aim of establishing occupational risk factors contributing to injury by medical sharps among healthcare workers at Kenyatta National Hospital, Nairobi, Kenya.

**Design/ Methodology/Approach:** This descriptive cross sectional study was conducted between July and December 2010. A self-administered questionnaire was distributed to 320 respondents from different job cadres of healthcare workers at the hospital who were selected proportionate to the sample frame. A checklist was used to observe medical sharps wastes management practices at the hospital.

**Findings:** The study findings suggest that 44% of respondents were involved in medical sharps injury at the hospital. The majority of the injured respondents (91%) experienced medical sharps injuries between 1-2 times, while few of the respondents (5%) experienced medical sharps injuries 3- 4 times within the past one year. Sixty two percent of injured respondents suffered moderate injuries which were characterized by skin puncture and some bleeding, while 33% of respondents suffered superficial injuries which were without any bleeding and 5% of respondents experienced severe injuries which were characterized by profuse bleeding.

**Contribution to policy and practice:** the study is of importance to the management of kenyatta hospital, and the government. It will help the hospital's management in managing its human resources and also aid in addressing the myriad challenges facing the health sector.

**Originality/Value:** The study extends the literature on public health

## **BACKGROUND**

Successful implementation of HR practices need to become institutionalized into the interpretive schemes of organisational actors in order to make such practices gain legitimacy in organizations (J Patterson, J Hultman B Van Mierlo et al 2018). It follows that implementation of human resource practices entails broadly the transition process during which human resource policies and practices develop from an idea or goal, into an institutionalised, functioning organisational instrument (Ostroff& Bowen, 2016; Wright & Nishii, 2013). Thus, implementation of HRM practices is considered to be a rational process with foreseeable and where attendant difficulties can be dealt with or avoided if such practices are designed and managed correctly (J Patterson, J Hultman B Van Mierlo Mierlo et al., 2018).

The epidemiology of medical sharps injuries could be higher considering studies on underreporting of medical sharps injuries. For instance, in the United States of America, an extensive survey documented an underreporting of medical sharps injuries at 58%, while other studies estimate underreporting at 90% (Braun, B., 2011). Globally, 3 million healthcare workers are exposed to blood borne pathogens through the percutaneous route annually, 90% of these cases occur in the developing countries (WHO, 2006)

Different studies have established that healthcare workers are prone to needle stick and medical sharps injuries. In Iran, a descriptive cross-sectional study among hospitals staff found that 75.6% of the 352 healthcare workers experienced at least one needlestick injury in that year (Nasiri et al 2010). In South Africa, a cross-sectional retrospective survey assessing the prevalence of needle-stick and sharps injuries found (21%) of the respondents to have been exposed to sharps injuries despite the high risk of occupational exposure to HIV among health care workers in busy labour wards (Mosweu et al 2005)

In most developing countries, there is a paucity of standard reporting protocols apart from the fact that most exposures among health workers are caused by medical sharps (Tetali and Choudhury 2006). A cross sectional survey in Mauritius found that needlestick injuries were the most common type of injury sustained by nurses ( Subratty and Moussa, 2007) .In Saudi Arabia, for example, a five years surveillance study found that most reported sharps injuries involved the nursing staff, followed by doctors then downstream staff. (El-Hazmi and AlMajid, 2008). A retrospective study conducted in West African hospital wards found an estimated incidence of 0.33 percutaneous injuries per healthcare worker per year in medical or intensive care personnel and 1.8 percutaneous injuries year in surgeons. (Tarantola et al 2005) Hospital workers in Tanzania were observed working in hazardous environments and most of them were not aware of the health and safety issues (Manyele et al, 2008). In Uganda, a cross-sectional study found an annual incidence rate of 3.94 needlestick and medical sharps injuries per healthcare worker (Nsubuga, 2009). The mentioned studies demonstrate that medical sharps injuries occur in different countries and pose serious occupational health risks to healthcare workers.

### ***Research Problem***

Exposure to hazardous healthcare waste can result in disease or injury. Occupational infections and injuries leads to economic, physical and psychological damage to the healthcare worker and family (Manyele et., al 2008). An estimated 1,000 HCV infections, 6,000 HBV infections, and approximately 100 HIV infections occur annually in Kenya among HCWs and are attributable to sharps injuries (Taegtmeier, et al, 2008). In Kenya, 58% of health workers are at risk of injuries from injection equipment coupled with improper management of healthcare waste in an estimated 70% of the health facilities (MoH, 2007 a). One of the main causes of

these injuries is inappropriate recapping of the needles which was observed in 30% of health workers (MoH, 2007 b). A cross sectional study of nurses in Nairobi found that 61% of needle stick and 46% of the injuries occurred due to recapping and 12% in the process of disposing (MoH, 2007 a). A study at Kenyatta National Hospital on the perceptions of occupational risk of exposure to blood borne pathogens among registered nurses recommends the need for further research on other risk factors which contribute to occupational exposures (Ngesa, 2008). The mentioned studies show that medical sharps injuries occur especially among nurses and there is a gap on the factors associated with occupational risks of exposure to medical sharps across different cadres of healthcare workers. Further to that, the researcher had conducted several compliance environmental audits in different healthcare settings and through experience observed several challenges associated with managing medical wastes. Therefore, this research aimed at establishing occupational risk factors contributing to injury by medical sharps among healthcare workers at Kenyatta National Hospital in Nairobi, Kenya.

#### Study Objectives

- i. To assess the risks of exposure to healthcare sharps at the hospital among health workers;*
- ii. To determine the frequency and severity of injuries from healthcare sharps among healthcare workers at the hospital;*
- iii. To find out the factors that contributes to occurrence of injury by healthcare sharps among health workers; and*
- iv. To assess the measures in place to report, document, prevent, control, or manage injuries from healthcare sharps among health workers.*

#### LITERATURE

##### ***Healthcare sharps injury in developed nations***

It is estimated that 100,000 needlestick injuries occur annually in the UK alone and 500,000 annually in Germany (Ramphal et al 2010). Each year, 3 million health workers worldwide are exposed through the percutaneous route to blood borne pathogens: 2 million are exposed to hepatitis B, 900 000 to hepatitis C and 170 000 to HIV. These injuries result in 15 000, 70 000 and 1000 infections, respectively. More than 90% of these infections occur in developing countries (WHO, 2006). These blood borne infections have serious consequences, including long-term illness, disability and death. In addition to HBV, HCV and HIV, other pathogens can be transmitted to health-care workers by sharps injury, including those that cause tuberculosis, diphtheria, herpes, malaria, Ebola plague, and Epstein-Barr infection (Pruss-Ustun. A., et al., 2005)

While several studies report that injuries occur frequently to nurses, physicians and technicians, housekeeping and other support staff are also at risk (Hiransuthikul, Tanthitippong & Jiamjarasrangsri, 2006). As a measure of likelihood of injury among hospital workers, it has been estimated that 28 sharps injuries occur annually for every 100 occupied hospital beds (Perry, Parker & Jagger, 2009 b). According to the WHO, 2005, the global burden of disease from sharps injuries to health care workers includes 40% of all hepatitis infections and 4.4 % of all HIV infections among health workers. The risk of health care worker infection following a Needlestick injury from an infected source patient depends on the virus.

Needlestick and other sharps injuries are a serious hazard in any medical care situation. These injuries are caused by different types of needles and sharps, such as scalpels and broken glass

containers. Contaminated needles and sharps may inject healthcare workers with blood that contains pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), all of which pose a grave, potentially lethal, risk. Although immunization is available to prevent hepatitis B illness, no immunization is available to prevent HCV or HIV (CDC, 2010)

### ***Healthcare sharps in developing countries***

The results of a WHO 2004 assessment conducted in 22 developing countries showed that the proportion of health care facilities that do not use proper waste disposal methods range from 18% to 64% (WHO, 2005 b). EPI-net data for 2008 reports a rate of approximately 27 needle stick injuries (NSIs) per 100 beds in teaching hospitals. There are few reports on NSIs from India and with limited data; it is not possible to estimate an annual incidence (Bairy et al., 2009).

African health care workers suffer on average two to four needle stick injuries per year and over half of the hospitalized patients in South Africa are HIV positive (Nemutandani et al., 2005). In some regions of Africa and Asia close to half of all hepatitis B and C infections among health care workers are attributable to contaminated sharps. In some areas of the Eastern Mediterranean region over two-thirds of hepatitis B and C infections in health care workers are attributable to contaminated sharps. Over two-thirds of all hepatitis B in Central and South America are the result of occupational exposure (Prüss-Ustün et al., 2005). Preventable needle stick injuries, while still common in the United States, occurs most commonly in Africa and Southeast Asia. These are the settings where health care workers are at greatest risk for infection. Factors associated with an increased risk of occupational exposure to sharps injuries can differ from place to place while developed countries are busy designing new protective devices and improving their policies, the developing world still struggles with the lack of basic equipment, inadequate policies and poor adherence to them.

Sub-Saharan countries in Africa have a heavy burden of HIV/AIDS and other blood borne infectious diseases and high usage of injections. Lack of safe devices in hospitals because of the low expenditure on health care, occupational safety and health services and a high ratio of patients to health care worker contribute to a work environment predisposing the health care workers to a great risk of needle stick injuries, and consequently, to blood borne infections. Only a few studies have been published on sharps injuries from developing countries in general although 90% of needle sticks injuries occur in developing countries (Nsubuga and Jaakkola, 2005).

Unreported needle stick and sharps injuries are a serious problem and prevent injured health care workers from receiving post-HIV exposure prophylaxis shown to be 80% effective against HIV infection. Without documentation of the injury, the worker is unlikely to receive worker's compensation benefits if later becoming infected with the human immunodeficiency virus (HIV) or hepatitis. Needle stick and sharps injuries (NSSIs) remain a source of infection for health care workers (HCWs) worldwide. Active surveillance and periodic review of interventions are important aspects to reduce NSSIs in targeted high-risk occupational groups (Jahan, 2005).

## **MATERIALS AND METHODS**

This was a descriptive cross sectional study design conducted by means of pretested, structured, self-administered questionnaires, focus group discussions, key informant interviews and observation checklist. In this study, Kenyatta National Hospital was purposely sampled as the study site and the healthcare workers at the hospital, being the study population, were

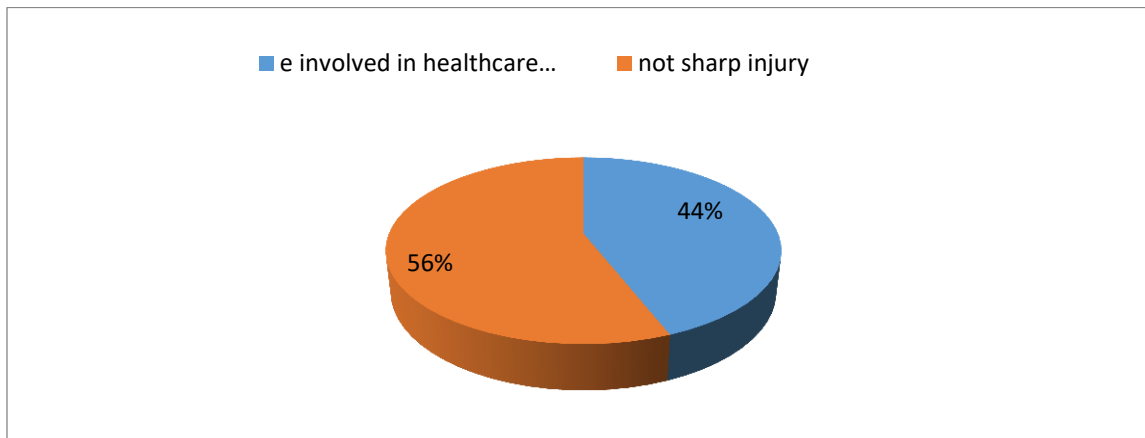
randomly selected using computer generated table of random numbers. The study focused on the occupational risks of exposure to medical sharps, the frequency and severity of the medical sharps injuries, the factors that contribute to the occurrence of the medical sharps injuries and the measures the hospital has put in place to control and manage the sharps injuries. This study was conducted between July 2010 and December 2010.

## **Results**

### ***Frequency and severity of healthcare sharps injuries***

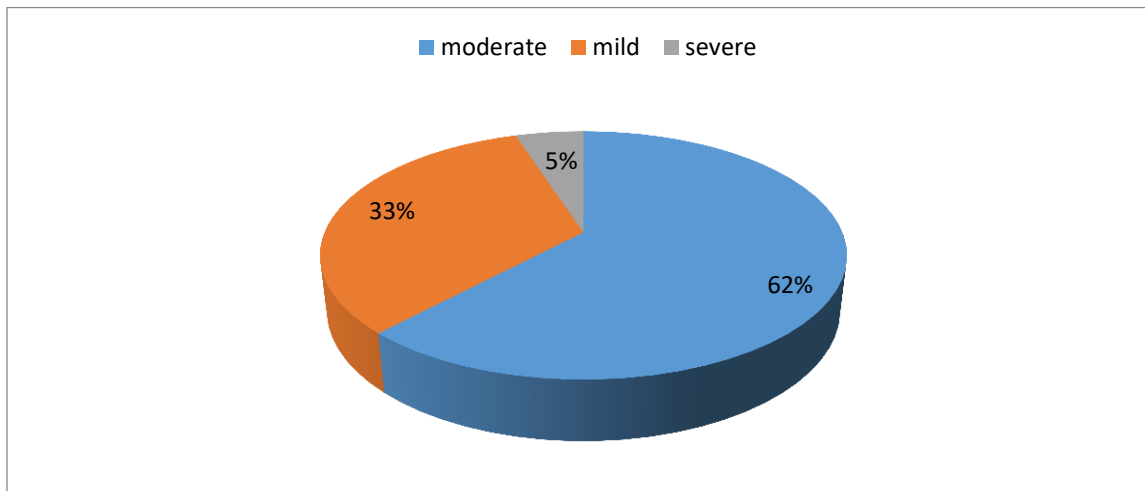
The results of this study show that 140(44%) of respondents were involved in healthcare sharps injury at the hospital, while (180)56% of respondents indicated that they were not injured. Figure 1 shows the percentage of respondents involved in healthcare sharps injury.

**Figure 1 Percentage of respondents involved in sharps injury**



In this study, (86) 62% of injured respondents suffered moderate injuries, which were characterized with skin puncture and some bleeding. Some respondents (45) 33% suffered superficial/ mild injuries which were characterized by no bleeding and few (7)5% respondents experienced severe injuries, which were characterized with profuse bleeding.

**Figure 2 Severity of sharps injuries among health-workers**



### ***Frequency and severity of healthcare sharps injuries***

This study found that most respondents experienced sharps injuries between 1-2 times, which compares favorably with other studies reported in East African countries (le Pont et al., 2003; Newson and Kiwanuka, 2002), although they evaluated the injury in one year. Most respondents suffered moderate injuries which were characterized with skin puncture and some bleeding. This compares well with a study in Ethiopia (Gebriel, 2004) in which deep and penetrating injuries constituted 64% of all the reported accidental injury by needle or other medical sharps. This study also found that some respondents suffered superficial/ mild injuries which were without any bleeding.

### ***Risks of exposure to healthcare sharps***

The risk of exposure to healthcare sharps in this study were needle pricks, cuts, glove tear, bloods splash, abrasion, bruise, urine splash and occupational infections. The finding that most respondents in this study suffered a needle prick compares favorably with a study at a Karachi Hospital (Ahmad et al., 2008) which found that needle stick was the commonest (78%) type of exposure to blood and fluids compared to other forms of exposure such as injury by other sharps. In this study, 76% of the injuries were caused by needles; similarly injection needles caused most 76% of sharps injuries at Witbank hospital in South Africa (Lachowicz et al., 2009). In this study, (24) 18% of the respondents reported to contract upper respiratory tract infection (URTI) at the hospital while (3) 2% of respondents reported to have contracted pulmonary tuberculosis at the hospital. It is therefore critical that healthcare workers should be protected from needle stick injuries that are a risk for infection, illness, disability and death from acute hepatitis, chronic hepatitis, hepatocellular carcinoma and AIDS. It is estimated that about 4.4% (0.8%–18.5%) of HIV infections among HCWs may be attributable to occupational sharps injuries worldwide (Pruss-Ustun et al., 2005). In this study, 0.3% of the respondents reported to be infected with HIV/AIDS. This was observed that it could be higher due to low reporting of medical sharps injury and the stigma associated with infections such as HIV/AIDS. It is therefore vital to improve on the reporting of medical sharps injuries at the hospital and improve on the uptake of postexposure prophylaxis. Focus group discussions with nurses revealed that they were aware of the dangers faced by exposure to contaminated medical sharps. Some of the nurses were not comfortable discussing the subject of HIV/AIDS infection due to the possibility of stigmatization. It was however agreed that the reporting of such injuries should be improved especially on the reporting format and procedure. The participants wanted a simple and comprehensive format and content for the injury reporting logs which is recommended in this study

### ***Reporting of healthcare sharps injuries***

In this study, the finding that 64% respondents did not report the occurrence of healthcare sharps injury is consistent with other studies from Africa and other developing countries, which found that between 60%-70% of injuries, were not reported (Nsubuga and Kosgerugin, 2004). This picture was similar in the developed countries where findings of other studies (Cutter and Jordan, 2004; Haiduven et al., 1999) on underreporting indicate that up to 80% of injuries were not reported. Focus group discussions with nurses revealed that the reason why they did not report the injury included; cumbersome reporting procedure, not aware of the procedure, and some indicated that it was time consuming. The most common reason cited for not reporting was that the respondents did not consider the patient to be of high risk, followed by the needle was sterile, and that the reporting mechanism was too long. All occupational exposure should be reported so that accurate risks assessment, appropriate preventive measures and post

exposure prophylaxis can be undertaken. Failure to report sharps injuries according to institutional and national protocol indicates a disregard to personal safety, management policy and guidelines (Ngesa, 2008).

## **CONCLUSION**

This study concludes that; there was a high occurrence of medical sharps injuries among healthcare workers at the hospital. Furthermore there are several risks associated with handling healthcare sharps among healthcare workers at the hospital, which include; needle pricks that could result to cases of occupational infections such as HIV/AIDS. The factors that contribute to occupational injury by healthcare sharps at the hospital include; unsafe practices such as recapping of needles, working in the critical care section and the medical department, working in the job cadre of a nurse or nursing student, healthcare workers with an education level of secondary education and below, lack of reporting of sharps incidents or near misses. The hospital has partly adopted the use of safety engineered devices; however there is low reporting of sharps injuries, low utilization of post exposure prophylaxis and inadequate supply of safety boxes.

## **Areas for Further Research and recommendations**

Several recommendations to be implemented at the hospital were identified as discussed below. Special attention should be given to the nurses, cleaners, the critical care section and the department of medicine at the hospital when addressing the mentioned issues. There is need for health workers in sections such as the critical care section and department of medicine to be fully trained on the use of safety engineered devices such as auto retractable needles or blunt tipped suture needles to reduce incidents of sharps injuries. The infection control nurses should evaluate the effectiveness and efficiency of the continuous medical education program and consider using a new approach to change the attitude of handling medical sharps among health workers from engaging in unsafe practices to that of taking personal responsibility and accountability. The public health department should ensure adequate supply of safety boxes, proper use, timely collection of used medial sharps in puncture proof containers such as safety boxes that should be  $\frac{3}{4}$  full when emptying and safe transportation in a covered vehicle for incineration. This study identified the following areas for further research; Factors leading to non-reporting of occupational injuries among health workers at the hospital. The extent of occupational risks among healthcare waste handlers at the hospital. The level of compliance by the hospital to the national healthcare waste management standards, regulations and policies.

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