BRJ BASIC RESEARCH JOURNALS

Basic Research Journal of Medicine and Clinical Sciences ISSN 2315-6864 Vol. 4(11) pp. 253-257 November 2015
Available online http//www.basicresearchjournals.org

Full Length Research Paper

Needle pricks among health care workers in a tertiary care general hospital, Saudi Arabia: A nine- year survey

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Accepted 24 November, 2015

ABSTRACT

This study investigates the rate of needle pricks in a 1000-bed tertiary care hospital that serves three main cities and a number of small towns of a population of around 4 millions. A total of 112 healthcare workers reported incidents of needle pricks during a study period of 9 years. They were 20-45 (29.7± 5.7) years old and encompassed 32 (28.2%) males plus 80 (70.2%) females. They consisted of 57 (50.9%) staff nurses, 24 (21.4%) housekeepers, 17 (15.2%) doctors 7 (6.3%) technicians and 3 (2.7%) trainees 1 dental student (0.9%) and 3 (2.7%) undetected staff. Majority of injuries were caused by needles 102 (91.1%) involving fingers 87 (77.7%) and hands 14 (12.5%) and occurring mainly during the morning hours of duty 72 (64.0%). Injuries occurred either accidentally 38 (33.9%), during handling medical waste 14 (22.3%) and while recapping of needles 14 (12.5%). Only 58 (51.8%) of the reported injuries had known HBsAg, HIV and HCV serological status of source. High rate of nursing staff, housekeeping staff and doctors received needle pricks. Implementing of standard infection control measures is pressing to control blood borne infections among health care workers.

Keywords: Needle Pricks, Health care workers, Nursing staff, Housekeeping staff, HBV, HCV HIV.

INTRODUCTION

Health care workers are at risk of occupational injuries that may result in serious viral infections including hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV). The World Health Organization reported 35.7 million health care workers who were exposed to the risk of needle prick injury worldwide (Pruss-Ustun *et al*., 2003). Annually 1 million health care workers experience needle pricks (Shevkani *et al*., 2011) with varying rates of exposure ranging from 19 to 74.9% in different part of the world (Nwankwo and Aniebue, 2011; Bhardwaj *et al*., 2007; Mbaisi *et al*., 2013; Ashat *et al*., 2011; Kuruüzüm *et al*., 2008). Globally 38% of total injuries occur during needle use while 42% after use of needle but before disposal (Pruss-Ustun *et al*., 2005). Sharp injuries have been reported to be; in the range of 29 and 38% among doctors (Bhardwaj *et al*., 2007; Rajkumari *et al*., 2014; Cliffe *et al*., 2010), < 50% (Kuruüzüm *et al*., 2008; Health Protection Agency Centre for Infections, 2008; Bhardwaj *et al*., 2007), to up to 74.6% among nurses (Erhabor *et al*., 2007), 57.8% among cleaning staff (Kuruüzüm *et al*., 2008) and 97% among dental health care workers (Shah *et al*., 2006).

High patients load was blamed for most of exposures (Ashat *et al*., 2011) which occur mainly during recapping of needles (Marković-Denić *et al*., 2013; Kuruüzüm *et al*., 2008; Mazi *et al*., 2015), during decontamination/cleaning

Table 1. Characteristics of Health Care Workers who Suffered Needle pricks in a Tertiary Care General Hospital, Saudi Arabia

Age	29.7± 5.7 (20-45 years)	
Gender	Male	32 (28.1%)
	Female	80 (70.2%)
Occupation	Staff nurse	57 (50.9%)
	House keepers	24 (21.4%)
	Doctors	17 (15.2%)
	Technicians	7 (6.3%)
	Trainees	3 (2.7%)
	Dental student	1 (0.9%)
	Undetected	3 (2.7%)

instruments by nurses after surgery and during use of a needles prior to intervention by doctors (Marković-Denić *et al*., 2013) and while suturing or handling of garbage bags by housekeeping staff (Kuruüzüm *et al*., 2008). The main risk associated with needle prick is exposure to percutaneous infections with HBV, HCV and HIV (Cliffe *et al*., 2010; Erhabor *et al*., 2007; Fisker *et al*., 2004). The risk of percutaneous transmission after exposure has been reported to be 30% for HBV if the source is HBeAg positive, but < 6% if the source is HBeAg-negative, 1.8% if the source is anti-HCV positive and 0.3% if the source is HIV positive (American Association of Orthopaedic Surgeons, 2001). Injections contaminated with blood borne viruses were reported to have caused an estimate of 21 million HBV infections, two million HCV infections and 260,000 HIV infections globally (Pruss-Ustun *et al*., 2003). To best of our knowledge only two studies reported sharp injuries in Saudi Arabia one showed a rate of exposure of 82% among nursing staff (Mazi *et al*., 2015) while another reported a rate of needle stick injury of 14% with no significant difference between nurses and physicians (Ismail *et al*., 2014).To contribute further towards understanding the magnitude of sharp injuries in Saudi Arabia this study looks into the rate of exposure in a major, 1000-bed tertiary care hospital in Saudi Arabia.

METHODOLOGY

This study was carried out in a 1000-bed tertiary care hospital that serves three main cities and a number of small towns in Saudi Arabia with a population of 4 million people. The hospital admits around 14 thousands patients annually. It has two large adult intensive care units: medical/surgical and cardiology, endoscopy unit, large burn unit and a dialysis unit. It covers most of the important medical/surgical specialties for patients either from the community or referred from other ministry of health hospitals for; trauma management, major general surgery, neurosurgery, orthopedic surgery, rhino otolaryngology surgery, respiratory failure or multi-organ failure. The hospital also performs kidney transplant operations and provides internship to medical students from different medical schools and also provides clinical attachment to doctors. The hospital has an infection control services run by a dedicated full time team supported with all the required resources.

In this retrospective study records were reviewed for all needle pricks reported by the hospital staff between 1998-2007.All statistical analyses of data were conducted using the statistical package SPSS® 20 for Windows.

RESULTS

A total of 112 healthcare workers reported incidents of needle pricks and other sharp injuries during the study period. They were 20-45 (29.7± 5.7) years old encompassing 32 (28.2%) males and 80 (70.2%) females and consisted of 57 (50.9%) staff nurses, 24 (21.4%) house keepers, 17 (15.2%) doctors 7 (6.3%) technicians 3 (2.7%) trainees Table 1. Of all injuries 102 (91.1%) were needle pricks involving the fingers 87 (77.7%) and hands 14 (12.5%) and occurring during the morning hours of duty 72 (64.0%) either accidentally 38 (33.9%), during handling medical waste 25 (22.3%) or while recapping of needles 14 (12.5%) Table 2. Only 58 (51.8%) of the reported injuries had known serological status with HBsAg, HIV and HCV markers of the source Table 3.

DISCUSSION

This is one of few reports on needle pricks reported in Saudi Arabia. Over 70% of the subjects with needle pricks presented in this study were females health care workers. This is because most of these needle pricks occurred among nursing and housekeeping staff who mainly consisted of females (84.0%). Nursing and housekeeping staff regardless of the gender along with doctors received the highest rate of needle pricks. This reflects the heavy engagement of these groups of health care workers in needle-related activities in addition to the possibility that these activities might have been performed in an unsafe environment where practices including improper disposal, lack of proper work stations while performing procedures using sharps, rush during

Table 2. Types of Needles and Other Sharps Causing Injuries and Sites, Time and Circumstances of Injuries Among Health Care Workers in a Tertiary Care General Hospital, Saudi Arabia

Variable		No. (%)
Sharp type	Needles	102 (91.1%)
	Suture needle	4 (3.6%)
	Blade	2 (1.8%)
	Broken terisoldispenser	2 (1.8%)
	Arteriovenous fistula needle	1 (0.9)
	Not mentioned	1 (0.9)
Injury time	Morning	72 (64.3%)
	Evening	28 (25%)
	Night	12 (10.7%)
Circumstances of incidents	Accidental	38 (33.9%)
	Exposure to medical waste	25 (22.3%)
	Recapping	14 (12.5%)
	Unexpected movement of patient	10 (9.8%)
	Inexperience	8 (7.1%)
	No close sharp container	2 (1.8%)
	Laziness	2 (1.8%)
	Shortage of staff & overcrowdings	1 (0.9%)
	Rush in duty	1 (0.9%)
	Not mentioned	11 (9.8%)

Table 3. Serological Status of the Source Subjects Involved in Contamination of Needles that Caused Injuries Among Health Care Workers in a Tertiary Care General Hospital, Saudi Arabia

Serological status of source	Markers	No. (%)
	Anti-HCV	32 (28.6)
	HBsAg	11 (9.8)
	HIV	5 (4.5)
	HBsAg + Anti-HCV	2 (1.8)
	HBsAg+ Anti-HCV + HIV	1(0.9)
	Not mentioned	1(0.9)
	Negative	6 (5.4)
	Unknown serology	54 (48.2)
	Total	112 (100%)

work and recapping of needles. Supports this is that 12.5% of sharp injuries in the current study reported recapping as a cause of needle pricks and 64.0% of pricks occurred during the morning hours of duty where patients load is usually high. In addition majority of pricks reported among doctors occurred accidentally as a result of other stuff performing needle-related activities. Furthermore, junior staff such as medical students who attended the hospital from different medical schools for their residency program lacked knowledge on infection control practices and were found to dispose sharps improperly. Recapping and patients load has been reported by others as reasons for exposure (Marković-Denić *et al*., 2013; Kuruüzüm *et al*., 2008; Fisker *et al*., 2004; Ashat *et al*., 2011).

In the current study nursing staff in particular received around half of the hollow-bore needle pricks and most of the accidental needle pricks. This is mainly due to the fact that nurses are usually the most heavily engaged in needle use activities which inevitably result in injuries. Also it could be that nurses tend to report their needle pricks more than other health care workers, a practice that has been reported by others (Falagas *et al.,* 2007) or it could be a reflection of their large proportion among health care workers. Other studies showed high rates of needle pricks among nursing stuff (74.6%) (Kuruüzüm *et al*., 2008), (46.4%) (Cliffe *et al.,* 2010).

The high rate of exposure among house keeping staff in the current study seems to be due to exposure to medical waste. This further demonstrates the lack of safe disposal of waste. Despite the fact that all housekeeping staff in the current study underwent waste disposal training in the hospital, lack of communication due to language barrier hindered their ability to acquire the necessary skills. Other studies reported rates of exposures of > 60% among housekeeping staff (Toraman *et al.,* 2011; Ream *et al.,* 2014).

The main consequences of sharp injuries among health

care workers is blood-borne viral infections including HBV, HCV and HIV. In the present study none of the index health care workers developed infection despite the fact that considerable proportion (44.6%) of the source subjects were positive for HBV, HCV or HIV. The likely reason is that the low risk of infection that has been reported to be 1.8% if the source is anti-HCV positive and 0.3% if the source is HIV positive while < 6% if the source is HBeAg-negative HBV positive (American Association of Orthopaedic Surgeons *et al.,* 2001) in addition to the possibility that the index health care workers could be immune to HBV as vaccination against HBV is mandatory among clinical staff. Another reason could be the small sample size of health care workers included in this study. Thus to better reflect the role of needle prick in spread of blood borne viral infections in hospital setting a higher sample size is required. In Saudi Arabia one study involving 300 health care workers reported 0.3% had HBsAg and 0.3% had anti- HCV (Alqahtani *et al.,* 2014). However, it is not clear that these infections were occupationally- acquired or community- acquired.

The current study may not accurately reflect the magnitude of the problem of needle pricks and the consequences in term of blood-borne infections. One reason for that is the small sample size in this study. Another reason could be the underreporting due to; lack of awareness among health care workers of the risk of the needle pricks for infection of blood borne viruses, absence of strictly implemented health and safety policy that impose reporting of needle prick or fear among staff of reporting their injuries because of misperception that reporting their injuries might lead to more troublesome situations.

CONCLUSION

A high rate of nursing staff, housekeeping staff and doctors received needle pricks. Implementing of standard infection control measures is pressing to control blood borne infections among health care workers.

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