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Risk of Sharps and Needle Stick Injuries among health care workers in a Teaching Hospital, southwest of Iran.

Sahar Geravandi[1,2], Farid Yousefi[3], Seyed Mohammad Alavi [3], Sasan Moogahi[3], Mohammad Mahboubi[4], Zohreh Dehkordi[1], Bayram Hashemzadeh[5], Ahmad Reza Yari[6], Yusef Omidi Khaniabadi[7], Masoud Torabpour[4], Mohammad Javad Mohammadih[4,8] *

[1]Razi Teaching Hospital, Clinical Research Development Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[2]M.S student of Nursing, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran
[3]Institute of Health, Infectious and Tropical Diseases Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[4]Abadan school of Medical Sciences, Abadan, Iran
[5]Department of Environmental Health, Khoy School of Nursing, Urmia University of Medical Sciences, Urmia, Iran
[6]Research Center for Environmental Pollutants, Qom University of Medical Sciences, Qom, Iran.
[7] Health Care System of Karoon, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[8]Student Research Committee, Department of Environmental Health Engineering, School of Public Health AND Environmental Technologies Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

ABSTRACT

Needle stick injuries (NSIs) are one of the most important threats for the health care workers (HCWs) in teaching hospitals. Our aim was to estimate the Prevalence of Needle Sticks Injuries (NSIs) among Health Care Workers (HCWs) in a teaching hospital of Ahvaz, southwest of Iran, during 2014. This study was a descriptive incidence one conducted on 600 HCWs at the Razi hospital of Ahvaz, Iran. Data about health care workers, type of NSIs, wards and their activities were collected. Data were summarized, using descriptive statistical methods which were processed with SPSS version 16. Based on the results, nurses were at highest risk of NSIs among other HCW groups. In this hospital, 41 cases of NSIs were found. Based on the findings, recapping needles was found in 36.58%, handling needle on a tray in 21.95%, suturing in 17.07%, passing needle in 12.19%, transit of disposal needle devices in 4.87% and dissembling needle devices in 7.31% of cases. The most NSIs were reported in the wards of general surgery, ICU, emergency, obstetrics and gynecological (OBGYN), orthopedic, operating room, and infectious diseases during 2014. The results indicated that recapping the needles was the most risk factor for NSIs. According to the findings of our study, Number of NSIs among nurses was higher compared to other health care workers The finding of this study showed that training programs related to the prevention of NSIs would be one of the priorities in the Razi teaching hospital.
Keywords: Prevalence, Needlestick Injuries, health workers, Hospital.

Corresponding author

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INTRODUCTION

Needle sticks injuries (NSIs) are a kind of wounds caused by needles which are used in health-care that one of the common injuries in the teaching hospitals [1, 2]. NSIs commonly occur during recapping needles, passing needle, suturing, drawing blood, handling needle on tray, administering an intravenous drug, needles penetrate of the during surgery, overfilled or poorly located safety box, transit disposal needle devices, dissembling needle devices and failure to use appropriate personal protective equipment [3, 4]. one of the most important threats between health care workers (HCWs) is NSIs [5, 6]. Based on the report of World Health Organization (WHO), in 2002, among 35 million HCWs, 2 million experience percutaneous exposure to NSIs and infectious diseases each year [7]. NSIs in during processing treatment patents may occur with freshly contaminated sharps and needles that carry dry blood [8]. Blood borne infections (BBIs) such as hepatitis B virus (HBV), hepatitis C virus (HCV) and the human immunodeficiency virus (HIV) are a major concern about NSIs [5, 7]. Center Disease Control (CDC) reported that, among the HCWs of the United States, 600000 to 800000 cases of NSIs occur each year [9]. The most of NSIs between healthcare professionals were occurred during surgery with rate of incidence 23% [10]. Also, in Europe, according to the European Biosafety Network's (EBN) report, one million NSIs occurred annually [11]. Within the HCWs, regards to the risk of NSIs, nurses, specialties surgery and anesthesia, residents, midwives, operating room technicians, nurse aid and workers tend to show relatively high and doctors, radiology and pediatrics relatively low rates of NSIs [12]. Based on the results of several studies, nurses are the most common groups among HCWs who face NSIs injuries [13, 14]. Greatest concern among nurses are performing invasive procedures because of dangerous they may transferring Blood borne infections [10]. Other major factors to enhance the risk of NSIs can be mentioned to long working hours and not having enough sleep during the night shift [15, 16]. The NSIs can lead to the significant stress and anxiety for HCWs and their families [5]. Cases of NSIs may cure in any environment where sharps are encountered poses a risk [17]. According to published report by WHO, NSIs were responsible for the incidence of 66,000 hepatitis B, 16,000 hepatitis C and 1,000 HIV infections [10, 18]. Deep penetration, high-risk patients and visible blood on the needle are the main factors which affect the risk of NSIs [19]. The most important complications of NSIs can be mentioned to the costs of treating, blood testing and lost time at work [20]. Treatment of a NSIs is costly, estimated to be between $376-$2,456 in the United States [10, 21]. Different studies showed that, by spending lower costs for hospital hygiene and education of HCWs, can be largely avoided the incidence of NSIs [22]. Training of appropriate resources, using instruments to grasp needles, reduction of the use of sharps device, avoiding hand-to-hand passing of sharp instruments, load scalpels, decrease direct contact with needles, an appropriate disposal and using useful safety box can decrease the risk of NSIs [6, 10, 23]. In the study conducted by Galougahi in 2010 at Khanevadeh hospital of Tehran, Iran, evidence showing that most of the common actions resulted to the exposure of NSIs were Injections and recapping of needles [15]. The results of this study can have a major impact on the management and control of NSIs, preparation of educational bulletins and the knowledge of authorities about this health care problem.

Study aim

Our aims were to determine the prevalence of Needle Sticks Injuries among health workers of Teaching Hospital of Ahvaz, Iran, during 2014.

METHODS

Design and setting

This cross-sectional and descriptive analytical study was performed on a population composed of HCWs of Ahvaz Razi Teaching Hospital to investigate the prevalence of NSIs in 2014. In this study was used to estimation the prevalence and causes of sharps and cutting objects injuries and performance of the HCWs in Razi hospital, with 220 beds approximately from March 2014 up to September 2014. All of HCWs in Razi teaching hospital included in the study. Data were taken by infection control supervisor; according to reported cases of NSIs and observation. Finlay, data were collected and confirmed by infectious diseases specialists. Data collection forms consisted of the category of HCWs information such as nurses, residents, midwives, operating room technicians, nurse aid and workers and activities information including sources, recapping

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needle, passing needle, suturing, handling needle on tray, transit disposal needle devices and dissembling needle devices.

Description of study area

Ahvaz city, the capital of Khuzestan province of Iran, with a population of 1 million approximately and an area of 140 square kilometers, is located between 48° and 49°29′ east of the Greenwich meridian and, 31°and 45′ minutes north of the equator [24-28]. Razi hospital is a tertiary-care hospital with 220 beds, located in the center of Ahvaz [2]. The location of the study area is shown in Figure 1.

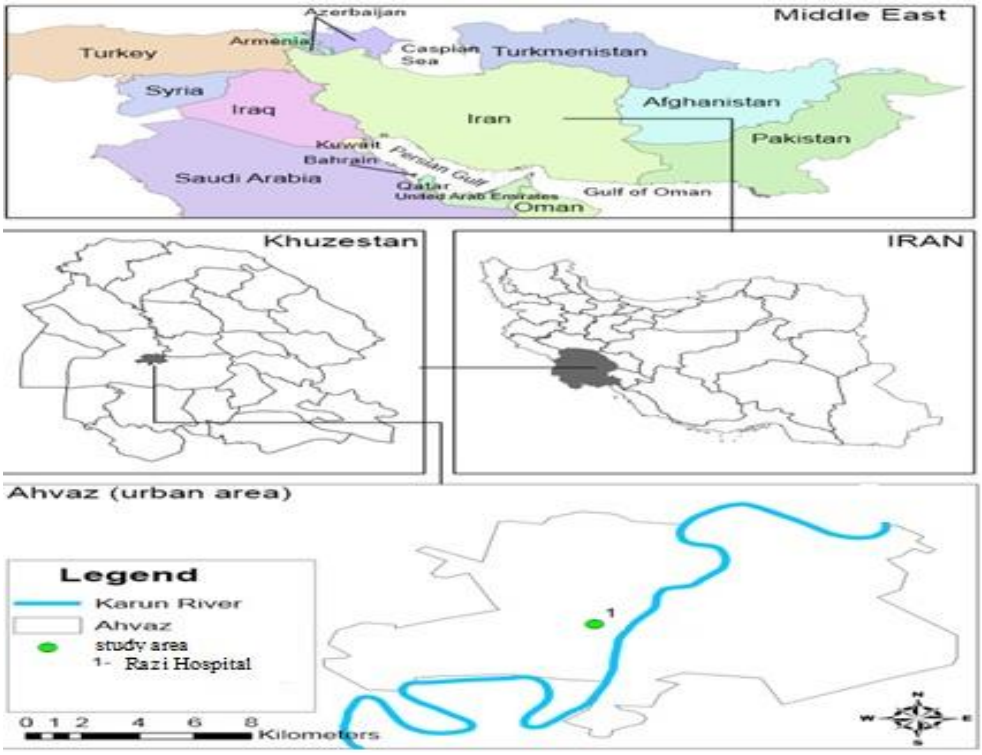

Figure 1: Location of the study, Razi teaching hospital, in the south west of Ahvaz, Iran

Data analysis

The coded data were entered in SPSS version 16. Data analysis were performed, using descriptive statistics (frequency, mean and standard deviation for each variable).

RESULTS

This study was conducted of the disease on more than 600 HCWs who worked in different wards of hospital during 2014. According to the result of this study 99.1% of the studied HCWs had received hepatitis B vaccine. The prevalence of NSIs was in general surgery more than other wards, respectively. The number of NSIs and the incidence rates of NSIs in the hospital wards during 2014 are presented in table 1.

Table 1: The frequency and prevalence of NSIs according to the hospital wards during 2014

Hospital ward	Frequency	
	Number	percent
General surgery	10	24.39
ICU	8	19.51
Infectious diseases	2	4.87
Operating room	3	7.31

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Emergency	8	19.51
Orthopedic	3	7.31
OBGYN	7	17.07
Total	41	100
Abbreviations: ICU: Intensive care unit		

The prevalence of causing NSIs based on the different wards is shown in Figure 2 during 2014. As figure 1 indicates, General surgery was the most frequent of NSIs.

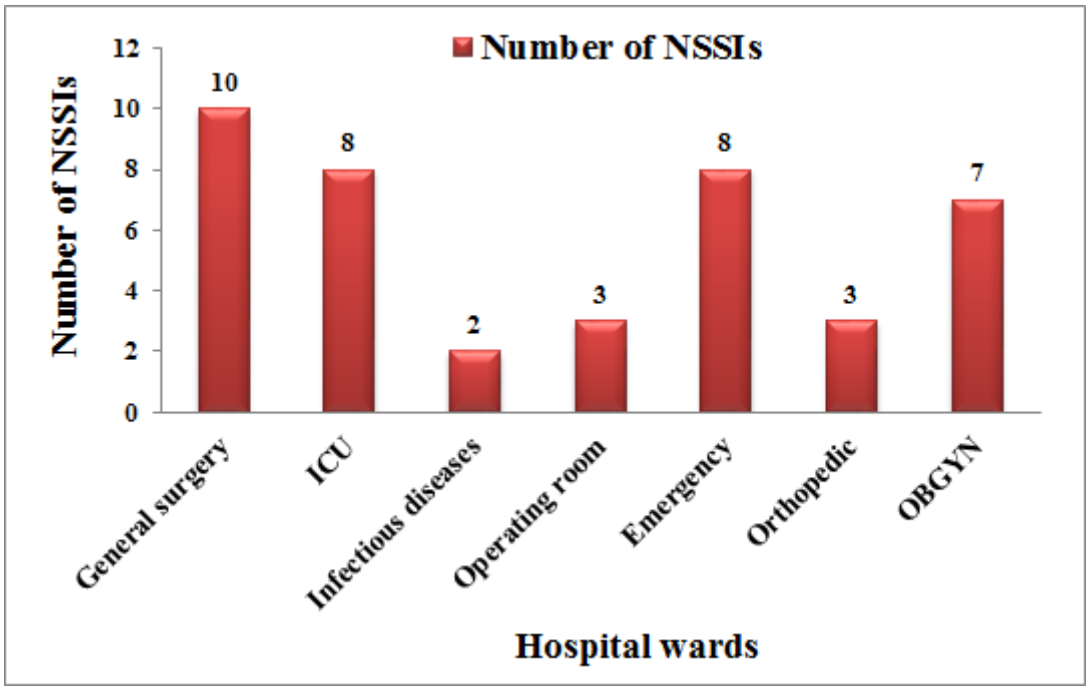

Figure 2: Numbers of NSSIs versus different wards during 2014

The frequency of the type of HCWs with needle stick is shown in table 2. Based on the results, nurses were identified to be at the highest risk of NSI among all HCW groups (n=15, 36.58%). Totally, the number of NSIs was 41 cases in this center during 2014 (Table 2).

Table 2: Distribution of occupational NSSIs exposure among HCWs

Category of HCWs	Frequency	
	Number	percent
Nurses	15	36.58
Residents	4	9.75
Midwives	2	4.87
Operating room Technicians	4	9.75
Nurse aid	9	21.95
Workers	7	17.07

The number of NSIs among nurses, residents, midwives, operating room technicians, nurse aides and workers were 15, 4, 2(4.87%), 4, 9 and 7, respectively, as shown in figure 3.

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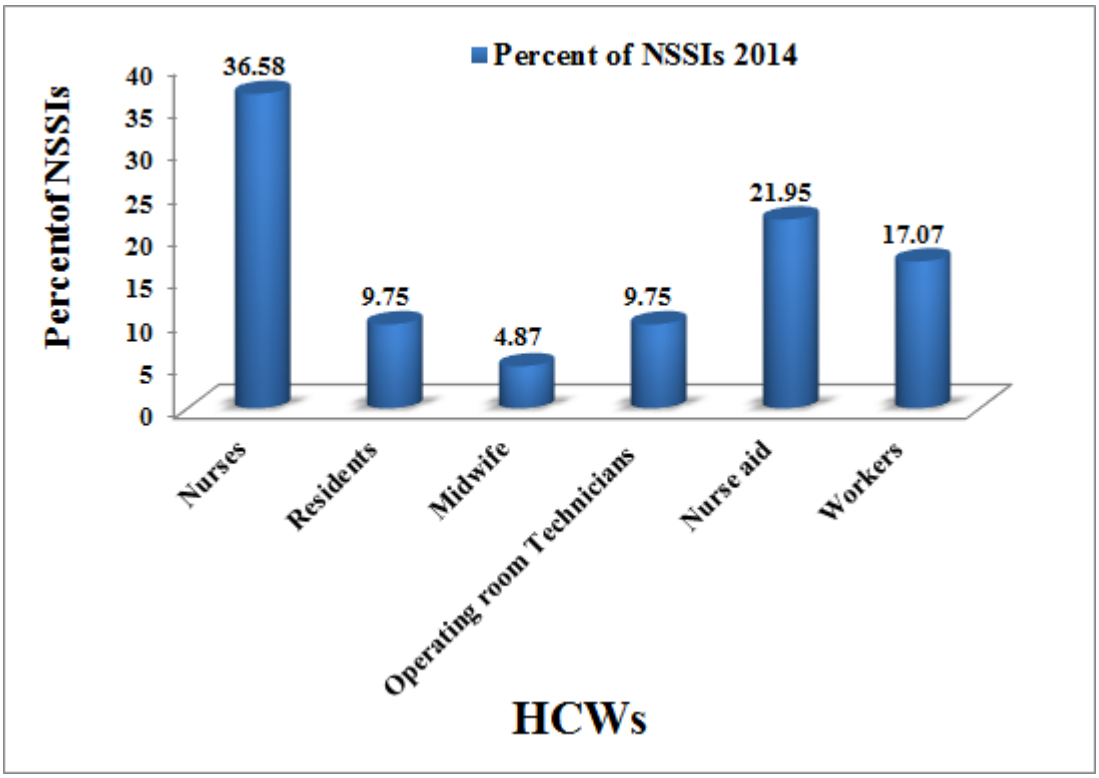

Figure 3: Numbers of NSSIs versus different HCWs during 2014

The predominant activities at the time of NSIs are presented in table 3. Totally, the 41 respondents who had experienced NSSIs in this center by recapping needle (n=15), passing needle (n=5), suturing (n=7), handling needle on tray (n=9), transit disposal needle devices (n=2) and dissembling needle devices (n=3), respectively.

Table 3: Distribution of type of activities at the time of NSIs

Activity	Frequency	
	Number	percent
Recapping needle	15	36.58
Passing needle	5	12.19
Suturing	7	17.07
Handling needle on a tray	9	21.95
Disassembling needle device	3	7.31
Transit of disposal needle device	2	4.87

DISCUSSION

In recent years, NSIs is considered to be a serious threat to the quality of life and health of HCWs. Razi Hospital is a civil activity one in the south west of Iran with 220 beds. In this study, we calculated the cases of NSIs among HCWs groups.

Based on the results of our study, in Razi Hospital, the most case of NSIs were General surgery (n=10, 24.39%) followed by ICU (n=8, 19.51%), Infectious diseases wards (n=2, 4.87%), operating room (n=3, 7.31%), Emergency (n=8, 19.51%), Orthopedic (n=3, 7.31%), and OBGYN (n=7, 17.07%) during 2014. Pili et al conducted a survey about the factors which were associated with the needle stick and sharp devices in 2013. They showed that the needle stick injuries in most cases occurred in the ICU and CCU wards, 24.7% and 12.4%, respectively [7]. According to the result of the study of Afrasiabi, operating room ward with 39.3% had the highest rate of NSIs [8].

Based on the results of this study, the incidence of NSIs was 41 cases in this center. Distribution of the occupational exposure among HCWs nurses with the frequency of 15(36.58%) were the most involved HCWs, followed by 9(21.95%) nurse aid, 7(17.07%) workers, 4(9.75%) residents, 4(9.75%) operating room technicians and 2(4.87%) midwives during 2014.

In another study by Jaybhaye et al. the relation between the needle stick injuries among health care workers and tertiary care hospital of India were considered in 2014. The results of this study shows that, nurses had the highest rate of NSIs as compared to other HCWs groups [6]. Prevalence and response to NSIs among health care workers in a tertiary care hospital of Delhi, India, has been performed. It had shown the relationship between accrued NSIs among nurses. It was also shown the most occurrence of NSIs among nurses [12]. Based on the result of the study of Ilhan et al, long working hours increase the risk of NSSIs in nurses [15].

Result of this study identified all nurses were the maximum cases NSIs between HCWs (n=15, 36.58%). This observation is in agreement with the findings of Gholami et al [18] and Martins et al [20]. In a similar work, Smith's study in a Japanese teaching hospital during 2006 showed, nurses with a population of 46% were the most frequent cases of NSIs [4]. In a similar work, Askarian et al estimate the needlestick injuries among the nurses of Fars province of Iran. Result of our study was considerably lower than those in Askarian's study with the incidence of 49.6% [29], Prakash and his associates who are investigated to evaluate the epidemiology of needle-stick injuries in Mangalore, India, during 2012 [30]. Based on the results of this study, doctors were the most frequent NSIs (64.7%), followed by waste workers (25.5%) and Nurses (7.8%) [16]. Another study reported that, nurses (28.4%) and doctors (21.6%) were the most frequent cases of NSIs [30]. Also, based on the results of a study conducted in Tehran, the most rate of NSIs had among nurses groups [29], which is similar to the results of the present study. This can be explained by the fact that, nurses administer most of the injections and are responsible for the major procedures which require the use of needles.

Based on the results of this study, total number of NSSIs that had experienced in this center, (n=15, 36.58%) were recapping needle, passing needle (n=5, 12.19%), suturing (n=7, 17.07%), handling needle on tray (n=9, 21.95%), transit disposal needle devices (n=2, 4.87%) and dissembling needle devices (n=3, 7.31%), respectively. Similar findings were reported, recapping was the majority of the respondents a cured NSSIs[31, 32]. Also Cheng et al exploited the factors which affect the occupational exposure to NSSIs among dentists in Taiwan during 2012. Their result showed that, recapping of used syringes is responsible for 28% of NSSIs [33]. According to the result of study of Saleh et al in Saudi Arabia, needle recapping (26.4%) was the most responsible subjects of NSIs [34]. In another similar work, Laishram et al evaluated the prevalence of needle stick injuries among nurses in a tertiary care hospital and their immediate response in 2013. They were conducted a work to find the recapping of the needle was the most important risk factor for NSSIs [7].

Implications for practice

During the restructuring of General surgery and ICU, the management should pay attention to changes in the safety culture, particularly on manager expectations and actions promoting safety, teamwork within hospital units and staffing.

CONCLUSION

In this study, data showed that, the incidence of NSIs has a correlation with the type of HCWs. Overall, the frequency of NSIs among health care workers was the maximum among nurses and recapping was the most common procedure during the most of injuries which were occurred. It should be noted that although the vaccination rate was at a high level, vaccination alone cannot fully guarantee immunity against infectious diseases. So, there is a need for development of effective surveillance systems, control their antibody levels and the use of devices that decrease the risk of NSIs and the number of affected HCWs.

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Authors Contributions

Study concept, design and critical revision of the manuscript for important intellectual content: Sahar Geravandi, Farid Youesfi, Seyed Mohammad Alavi, Sasan Moogahi, Mohammad Mahboubi, Zohreh Dehkordi, Bayram Hashemzadeh, Ahmad Reza Yari, Yusef Omidi Khaniabadi, Masoud Torabpour and Mohammad Javad Mohammadi; drafting of the manuscript and advisor: Mohammad Javad Mohammadi; performing the experiments Sahar Geravandi.

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