

Epidemiology of Needle Stick and Sharp Injuries among Health care Workers and Their Relationships with Selected Demographic Data from 2012-2017, at King Hussein Medical Center, Jordan.

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ABSTRACT

Background: Needle stick and sharps injuries (NSSIs) are one of the major risk factors for blood-borne infections at healthcare facilities.

Objectives: This study examined the prevalence of needle stick sharps injuries among health care providers at King Hussein Medical Center from 2012-2017, and determine their relationships with some demographic data.

Methods : A retrospective chart review analysis of 386 needle stick sharp injuries report of cases from 2012 to 2017 was referred to preventive medicine department at King Hussein Medical Center for prophylactic and management follow up.

Results: In this study, 386 patients with needle stick injuries were referred to preventive medicine department. More than half (54%) were males and about half of the injuries (52.2%) occurred in the hospital wards. The highest needle stick injuries were among house keepers 131 (33.9%), followed by nurses 188 (48.7%). The most common site of injury was the left hand (47.1%). Only 25.1% completed 3 doses of immunization (hepatitis B vaccine). The commonest sites of injuries were in the upper limbs (89.8%).

Conclusions and Recommendations: Needle stick injuries are still important occupational hazards' in hospitals. Health education is one of the major important tools to minimize these hazards. Other future studies are recommended to determine the cause of needle stick injures, to prevent or reduce them.

Key words: Needle stick, Immunization, King Hussein Medical Center, Royal Medical Services, Health Care providers.

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Introduction

The per coetaneous exposures to needle stick injuries secretions i.e. blood and body fluids through contaminated needle sticks and sharps are an important occupational hazard for morbidity and mortality from

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infections with blood-borne pathogens among health care workers.

(1, 2) There are 35 million health care providers worldwide, three million among them experience Needle stick and sharps injuries (NSSIs) every year.

(3) with a high incidence of these injuries being reported from health care facilities in a number of countries that vary in terms of their level of economic development (4- 12).

Those countries have considerable risk for the transmission of more than 20 kinds of blood-borne pathogens such as hepatitis C virus (HCV) hepatitis B virus (HBV), and human immunodeficiency virus (HIV). (2) The exposure to sharps and needle stick injuries by the World Health Organization is very high in the work places, reported by 40% of infections with HBV, and HCV, and 2-3% of HIV infections among health care workers (3).

It is important to have an effective measures and policies for NSSIs, to reduce the risk and incidence of these injuries in our hospitals. Previous studies have revealed that NSSIs are more likely to occur among health care workers who are females, (13), young, white and non-Hispanic, (13) anesthesiology technicians. (4) gynecologists/obstetricians and surgeons, working mixed shifts, long hours in surgical or intensive care units with less working experience. (9) Recapping needles without using protective gloves when handling needles, and are not involved in health and safety issues or not appropriately trained in procedures for risk control (6, 11). The administrators and policy makers need to reflect on these factors for the implementation of health promotion strategies for the prevention of NSSIs.

In our study, the objective was to detect the prevalence of needle stick and sharp injuries (NSSIs) among health-care workers and to refer them to preventive medicine directorate from different departments of King Hussein Medical Center (KHMC)(Royal Medical Services) for prophylactic and management follow up , from 2012-2017, this study also aims to explore the relationship between NSSIs and certain demographic variables , and find out the circumstances and factors surrounding the occurrence to provide effective occupational safety standards and precautions regarding the handling of blood-related products at healthcare facilities in our hospitals.

Methods

We conducted a retrospective chart review analysis of 386 NSSIs cases from different departments during 2012-2017 and referred them to Preventive Medicine Department (by self-reporting) 2012-2017, at KHMC-(Royal Medical Services) for prophylactic management and follow up. This data was obtained from using special sheet present in the department of preventive medicine and public health at KHMC. This sheet contained some demographic data, i.e. Age, gender, site of the injuries, location of incidents, procedures under which sharp injuries occurred, and the immunization status of the patient. The relevant data were collected from the sharp injuries medical sheet, at the preventive medicine and public health department by one of the qualified preventive medicine doctors (epidemiologist), and staff from the same department. The data presented there was collected carefully by the researchers. The authors classified some of these demographic data in subgroups, such as, >20 years, 20-30 years, and greater than 30 years old. The other variables were classified and divided as shown in Tables (II, III, and IV).

A simple descriptive analysis (frequency and percentages) was used to describe some of the demographic data.

JOURNAL OF THE ROYAL MEDICAL SERVICES

The P-values under 0.05 were considered to indicate statistical significance for the different association of these variables.

Results

In this study, 386 NSSIs cases were referred to preventive medicine department from different departments. The highest NSIs were occurred among house keepers 131 (33.9%), followed by nurses 188 (48.7%), and others are shown in *Table I*.

Table (I): Distribution of NSSIs cases among health care workers by Occupation, between the years (2012 - 2016), at King Hussein Medical Center.

Occupation	Number	Percentage
Physicians	33	8.5
Nurses	188	48.7
Laboratory -technicians	20	5.1
House keepers	131	33.9
Others	14	3.6
Total	386	99.8

*The sum dose note add up to 100% due to rounding

More than half of NSIs occurred in hospital wards 203(52%), but the next place found to be in the outpatients clinics 102 (26.4%). The association of demographic data such as (age, gender, and occupation) with the place of injuries was statistically significant and other information data is shown in table II.

Table II: The relationship between age, gender, occupation and place of injury.

Variables	Operation room	Laboratory	Hospital ward	Outpatient clinics	Other places	Total %	P-value
Age	20>	13	0	0	0	13(0.033)	0.000
	20-30	42	25	201	0	268 (69)	
	>30	0	0	2	102	105 (27)	
gender	55	25	132	0	0	212 (54)	0.000
Male							

JOURNAL OF THE ROYAL MEDICAL SERVICES

Female	0	0	71	102	1	174 (45)	
Occupation	33	0	0	0	0	33 (0.085)	0.000
Physicians							
Nurses	22	25	141	0	0	188 (48)	
Laboratory technician	0	0	20	0	0	20 (0.05)	
House keepers	0	0	42	88	1	131 (33)	
Others	0	0	0	14	0	14 (0.036)	
Total	55 (14.2%)	25 (6.4%)	203 (52.5%)	102 (26.4%)	1 (0.0025%)	386(100)	

The commonest site of NSI was left-hand 182(47.1%), followed by the right-hand 156 (42.7%) and 69% occurred among 20-30 years old with 188(48%) among nurses. There was a significant association between age, gender, and occupation with the site of injury, as shown in table III.

Table III: Association between age, gender, occupation and site of injury.

Variables		Rt. hand	Lt.hand	Lower limb	Chest & abdomen	Head & neck	Total %	P-value
Age	20>	13	0	0	0	0	13(0.03)	0.000
	20-30	152	116	0	0	0	268 (69)	
	>30	0	66	30	1	8	105 (27)	
gender		165	47	0	0	0	212 (54)	0.000
Male								
Female		0	135	30	1	8	174 (46)	
Occupation		33	0	0	0	0	33 (0.085)	0.000
Physician								
Nurse		132	56	0	0	0	188 (48)	
Laboratory technician		0	20	0	0	0	20 (0.05)	
House keepers		0	106	25	0	0	131 (33)	
Others		0	0	5	1	8	14 (0.036)	
Total		165 (42.7%)	182 (6.4%)	30 (7.7%)	1 (0.0025%)	8 (0.02%)	386 (100)	

The most common procedure under which NSIs occurred was medical waste collection 127(32.9%). More than half i.e. (54%) were males and (48%) were nurses. The association between age, gender, and occupation with the procedure under which the NSIs occurred was statistically significant, as shown in Table IV.

Table IV: Association between age, gender and occupation, with procedure under which injury occurred.

Variables	Medical waste collection	Given medication	Blood sample withdrawal	Surgical intervention	Blood analysis	Unusual occurrence	Total %	P-value
Age								
20>	13(.10)	0	0	0	0	0	13(0.03)	0.000
20- 30	114(.89)	32(100)	77(100)	45(.88)	0	0	268 (69)	
>30	0	0	0	6(.12)	19(100)	80(100)	105 (27)	
gender								
Male	127(100)	32(100)	53(.68)	0	0	0	212 (54)	0.000
Female	0	0	24(.32)	51(100)	19(100)	80(100)	174 (46)	
occupation								
physician	33(.25)	0	0	0	0	0	33 (0.085)	0.000
Nurses	94(.74)	32(100)	62(.8)	0	0	0	188 (48)	
Laboratory technicians	0	0	15(.19)	5(.098)	0	0	20 (0.05)	
House keepers	0	0	0	46(.9)	19(100)	66(.82)	131 (33)	
Others	0	0	0	0	0	14(.18)	14 (0.036)	
Total	127 (32.9%)	32(8.2%)	77(19.9%)	51 (13.2%)	19(4.9%)	80 (21.2%)	386 (100)	

More than half 205 (53%) of NSIs occurred among patients who received 3 doses of Hepatitis B vaccine, followed by those with (0) zero vaccinations 97 (25%). The majority of them 286 (69%) were between 20-30 years old. All NSIs with zero dose vaccine were females and where less than half i.e. 188 (48%) were nurses. The association between age, gender, and occupation with the immunization status was statistically significant (0.000), as shown in table V.

Table V: Association between age, gender and occupation with immunization status.

	1st dose	2nd doses	3rd doses	zero dose	Total %	P-value
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Variables							
Age	20>	13	0	0	0	13 (0.033)	0.000
	20-30	25	46	197	0	268 (69)	
	>30	0	0	8	97	105 (27)	
gender	Male	38	46	128	0	212 (54)	0.000
	Female	0	0	77	97	174 (46)	
Occupation	physician	33	0	0	0	33 (0.085)	0.000
	Nurses	5	46	137	0	188 (48)	
	Laboratory technician	0	0	20	0	20 (0.05)	
	House keepers	0	0	48	83	131 (33)	
	Others	0	0	0	14	14 (0.036)	
Total		38 (0.098)	46 (0.11%)	205(0.53)	97 (0.25%)	386 (100)	

Discussion

The prevention of NSIs is an important public health issues in Jordan.

A retrospective chart review analysis revealed that a total of 193 sharp injuries was reported at King Hussein Medical Center from January 2006 to December 2011. The highest number of sharp injuries 44% occurred among house keepers, followed by nurses (38%), and the lowest (6.7%) among physicians. (15)

In this study, the highest NSIs occurred among nurses (48.7%), followed by housekeepers (33.9%)

In another 3- year study conducted in Jordan, the Jordan University Hospital from 1993-1995 the highest - needle stick and sharp injuries among staff nurses 34.6% and 19%, environmental workers (house-keepers).(16) which is in agreement with our study. It is important to detect that these two types of occupation remain the most important ones that need more attention for precautions to prevent NSIs. We found that NSIs were less common among physicians and Laboratory technicians (8.5 %- 5.1%) respectively because nurses were more in contact daily with using needles, and sharp instruments than others. A cross-sectional and analytical-descriptive study was conducted in one of the teaching hospitals in Tehran, Iran, in 2013 where the highest NSIs were also found among nurses 135 (43.4%) and more than half of NSIs 58.8% were females.

(17) In another cross-sectional study assessing NSIs among HCW at three public hospitals in Tanzania the highest percentage was among nurses (52%). (18) All of these studies agree with our study.

The incident number of NSIs, i.e. 193 of reported in a study conducted at King Hussein Medical Center from 2006-2011. (15) was much lower than in our study conducted in the same place which could be explained by the duration of studies lack of self reporting from health care workers for these hazards, and their better encouragement and health education. As shown in Table II, more than half of NSIs occurred among HCWs at hospital ward 203(52%), of which the majority were males 132(65%). The same study conducted in Jordan from January 2006 to December 2011 showed that the highest prevalence of NSIs occurred during the medical waste management 21(28%), followed by blood sample withdrawal, and administration of medications (24%, 23.4%) respectively, which could be explained because nurses and housekeepers had the highest percentage of NSIs (42.7%, 31%) since nurses were more involved for administering medications. (15)

In our study, the commonest site of injuries occurred at the upper limbs, mainly left hand 182 (42.7%), followed by right hand 165 (42.7%), which could be explained because the majority of them used the right hand for holding the syringe or needles than the left hand.

The finding that more females in the study attributed to the higher proportion of the HCWs as nurses, could have been due to nursing is a female dominant profession. A study conducted in Saudi Arabia.(19) showed that wards were the commonest place for injury to occur (39%), because of the difficult practical procedures, and more use of NSs procedures performed there, which agrees with our study TableII. In the same study in Saudi Arabia, the commonest injury area (64%) was also at the palmer surface of the distal forefinger of the non- dominant hand. (19) In 2013, another study conducted in Tehran, Iran showed that most of NSIs 33.5% occurred in the emergency department emergency department, and inpatient wards (22.2%), whereas in some other studies, most of the injuries were in the inpatient wards and during the intravenous sampling. (20,21) It seems that the employees of the ED were at higher risk because of the need to act quickly. In our study the highest NSIs occurred during medical waste collection (32.9%). All demographic data (age, gender, and occupation), was statistically significant in relation to the site of injury, and the procedures as shown in Table III,IV.

More than half of the study group 205 (53%) had 3 doses of vaccine (Hepatitis A vaccine, which was consistent with a study conducted in a general hospital in China, where two-thirds (68.3%) of respondents were immunized with Hepatitis B vaccine. A study conducted in Jordan from 2006-2011, showed that 33 (44%) of NSIs patients were given 3 doses of Hepatitis B vaccine which is similar to our study i.e. to those who were given 2 doses of this vaccine. (16) The association of age, gender, occupation with the immunization status was statistically significant as shown in Table V.

Conclusions

The NSIs have a high prevalence among HCWs in Jordan hospitals. We need to pay better attention, especially for those groups more exposed, such as nurses, housekeepers, and others to reinforce and encourage them to self-report to minimize these hazards.

Recommendations

A health education for HCWs is important to increase the standard of safety management and prevention of NSIs. Future studies are recommended to determine the main causes of these occupational hazards and encouraging HCWs to receive the vaccinations recommended in our program at the Directorate of Preventive Medicine and Public health at Royal Medical Services to prevent possible pathogens transmission.

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