

Original Research Article

Assessment of occupational exposure to sharp injuries among health care workers in King Abdulaziz University Hospital

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ABSTRACT

Background: Sharps injuries are accidental infiltrating wounds that are typically the consequences of utilizing hazardous equipment in the usual fast-paced, and stressful health care setting. As a result, exposure to blood-borne pathogens from sharps injury poses a significant risk to health care workers. These injuries predispose the staff to dangerous infections such as hepatitis B, C and HIV. The aim of the study was to assess the occupational exposure to sharps injuries among health care workers in King Abdulaziz University Hospital in Jeddah.

Methods: A cross-sectional descriptive study was conducted. Nurses, residents, dentists, and housekeepers working in the surgical ward, obstetrics and gynaecology ward, emergency department, operation room, labor and delivery room, and dental clinics at King Abdulaziz University Hospital were included. A random sample of 161 subjects was recruited in this study using a self-administered structured questionnaire.

Results: Of 161 participants, 53 (32.90%) had a history of sharps injury. Among them 25 (47.16%) were nurses, both surgical and gynaecological residents had the same result of 11 (20.76%), and 6 (11.32%) of them were dentists. Most of the injuries had occurred during the use of the suture needle; 24 (45.28%) suggested that work overload was the main reason for sharps injury occurrence.

Conclusions: Among health care workers, nurses were especially at risk of exposure to sharps injury. The most important risk factors for injury occurrence include long working hours, continuous rotating shifts, and work overload. Also, not all of the health care workers knew about the hospital's reporting system.

Keywords: Sharp injuries, Healthcare workers, Occupational exposure

INTRODUCTION

Sharp injuries are any wound resulted from a sharp object such as scalpel, needle which result in mixture of blood with other body fluid. They are a result of a dangerous equipment being used in a stressful setting.¹

Many diseases are transmitted via blood borne contact, such as HIV, hepatitis B and hepatitis C. The first HIV needle stick transmitted case played an important role to

increase awareness and concerns about the health care worker (HCW) handling of their environment.²⁻⁴

Exposure prevention network (EPINet) reported that sharp injuries occurred in almost half the time of usage, while the majority happened before using the safety device and rules, where 40% of those injuries were a safety designed tool. However, the report shows that the vast majority of injuries occurred in surgical team members and nurses.⁵

Memish study report of infection control in Saudi Arabia showed that the infection control policies were born from the preventive medicine concern of Hajj pilgrim's to Mecca, which is unrelated to hospital policies of international safety standards. Multiple usage of shaving blades has been reported as a source of blood borne infection among the hajj population, which led to the fast growing awareness program of infection control.⁶

In Saudi Arabia, infection control is a new field that is constantly and rapidly growing. Blood-borne pathogens from sharp injuries continues to pose a significant risk to health care workers. These injuries predispose the staff to dangerous infections such as hepatitis B, C and HIV. Our aim for this study is to further assess the occupational exposure of these injuries in the university's teaching hospital.

Rationale of the study

In this research, it is hypothesized that there is a high incidence of sharp injuries occurs among nurses, increased working hours contributes to sharps injury incidence, and low working experience leads to higher exposure to sharp injuries. Therefore, the main objective of this research was to assess the occupational exposure to sharp injuries among health care workers in KAUH. More specifically, the study aimed at determining the incidence of sharp injuries due to occupational exposure among health care workers in KAUH, determining factors associated with the incidence of sharp injuries in KAUH, and identifying policies and strategies available for blood-borne infections associated with sharp injuries.

METHODS

This study was a descriptive cross-sectional study that was conducted in over four-month duration from February to May 2015. The study took place in King Abdulaziz University Hospital which is a part of the KAU Medical City, alongside the faculty of nursing, faculty of medicine, faculty of pharmacy, faculty of applied medical sciences, faculty of dentistry and King Fahd Medical Research Center. The surgical ward, obstetrics and gynecology ward, emergency department, operation room, labor and delivery room, and dental clinics at King Abdulaziz University Hospital were included. Subjects recruited for the research included nurses, residents, dentists, and housekeepers in the areas aforementioned at KAUH (Male and Female, Saudi and non-Saudi) that are at risk for exposure to sharps injuries were included in this study.

Sampling

A stratified simple random sample was used. By using Steven K. Thompson formula for deciding the sample required for the research to represent 495 participants, the sample is of 363 participants (61 SW nurses, 22 L&D nurses, 35 OB/GYNE nurse, 62 ED nurses, 69 OR + RR nurses, 28 gynaecology residents, 28 surgical residents, 28 dentists, 9 housekeepers in SW, 8 housekeepers in OR, 5 housekeepers in ED, and 8 housekeepers in L&D and OB/GYNE ward).

Data collection was conducted using a self-administered structured questionnaire was previously constructed and pre-tested.

Table 1: Research sample size.

Sample	Actual Number	Formula sample size by using Steven K. Thompson formula	Research sample size
SW nurses	72	61	15
L&D nurses	24	22	13
OB/GYNE nurses	39	35	15
ED nurses	75	62	12
OR + RR nurses	83	69	33
Gynecology residents	30	28	15
Surgical residents	31	28	15
Dentists	30	28	15
Housekeeping (SW)	9	9	7
Housekeeping (OR)	8	8	8
Housekeeping (ED)	5	5	5
Housekeeping (L&D, OB/GYNE)	8	8	8
Total	495	363	161

Data was analyzed using Statistical Package for Social Science (SPSS) software version 22 at ($p=0.05$). Written consent was taken from all participants. The Ethical Research Committee at the Faculty of Nursing & KAU approved the proposal of the study and a written consent from the administration of KAUH was obtained.

RESULTS

The vast majority of participants were females (76.0%). Two-thirds were of non-Saudi nationalities. The details of demographic data are depicted in Table 2.

Table 2: Demographic data of the recruited sample.

Demographic data	Variables	Frequency	Percentage (%)
Gender	Male	38	23.60
	Female	123	76.40
Nationality	Saudi	54	33.50
	Non-Saudi	107	66.50
Profession	Surgical resident	15	9.30
	Gynaecology resident	15	9.30
	Dentist/dental assistant	15	9.30
	Housekeeper	30	18%
	Surgical nurse	15	9.30
	OB/GYNE nurse	15	9.30
	Delivery nurse	13	8.10
	ER nurse	12	7.50
	OR nurse	32	19.9
Academic degree	Diploma	47	29.2
	Bachelor	80	49.7
	Master	3	1.9
	Doctoral	2	1.2
	Other	29	18.0
Work experience	Less than 5 years	54	33.5
	5 to 15 years	85	52.8
	16 to 25 years	18	11.2
	More than 25 years	4	2.5
Working area	Emergency department	18	11.2
	Surgical ward	37	23
	Operation room	43	26.7
	Dental clinic	15	9.3
	Delivery room	29	18
	Obstetrics/gynecology ward	19	11.8
Shift working hours	12 hours	97	60.2
	8 hours	56	34.8
	10 hours	8	5.0
Shift rotation	Continuous day shifts	51	31.7
	Continuous night shifts	3	1.9
	Rotating shifts	107	66.5
Did you receive your doses of hepatitis B vaccine?	Yes, completed	145	9.1
	Yes, incomplete	9	5.6
	No, didn't receive any	5	3.1
	I don't remember	2	1.2

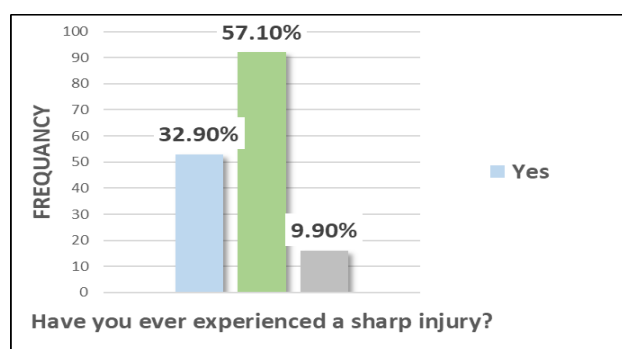


Figure 1: Number of participants who have experienced a sharps injury (n=161).

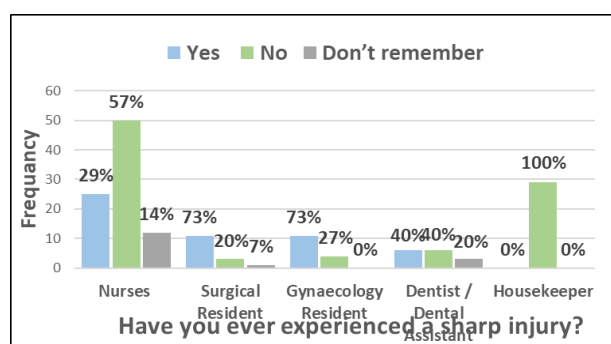


Figure 2: Number of participants who have experienced a sharps injury according to their profession (n=161).

As regards exposure to sharp injuries, only one third of the participants could recall that they had been exposed to sharp injuries (Figure 1). In relation to the occupation, surgical residents and residents of obstetrics and gynecology were the highest group to report exposure to sharp injuries (73%). Dentists and nurses came next with 40 and 29% reporting exposure to injury, respectively (Figure 2).

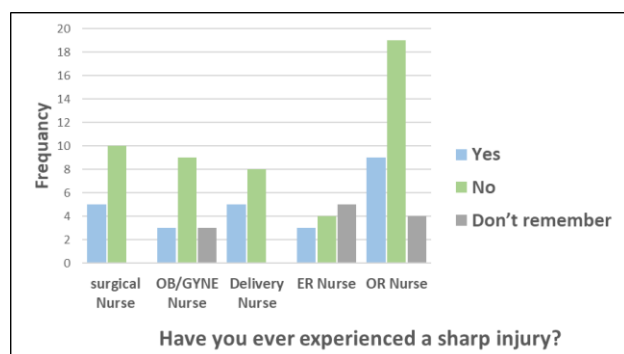


Figure 3: Number of nurses who have experienced a sharps injury according to their specialty (n=87).

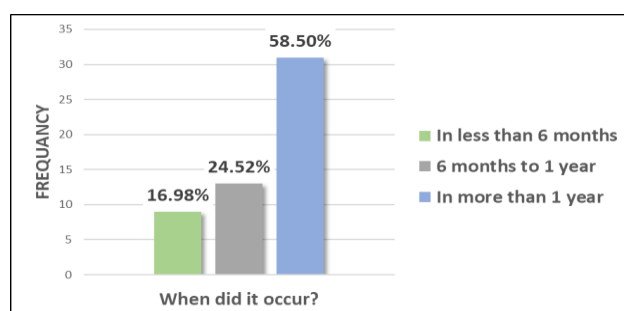


Figure 4: Incidence occurrence time (n=53).

When nurses were analyzed more specifically, it was found that OR nurses had the highest exposure to sharp injuries followed by nurses working in surgical, obstetrics, and gynecology departments (Figure 3). Over one half of those nurses reported that the injury occurred more than one year before the time of the study, whilst only 16% could recall that they experienced a sharp injury during the past 6 months (Figure 4).

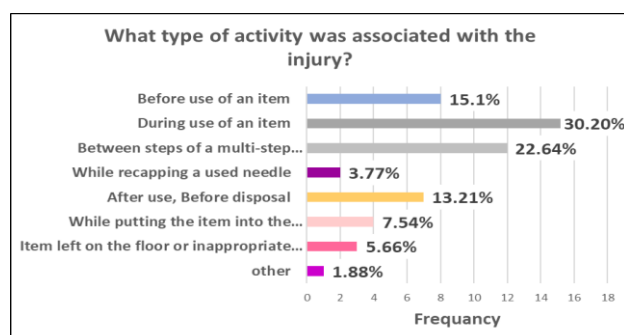


Figure 5: Type of activity that was associated with the injury (n=53).

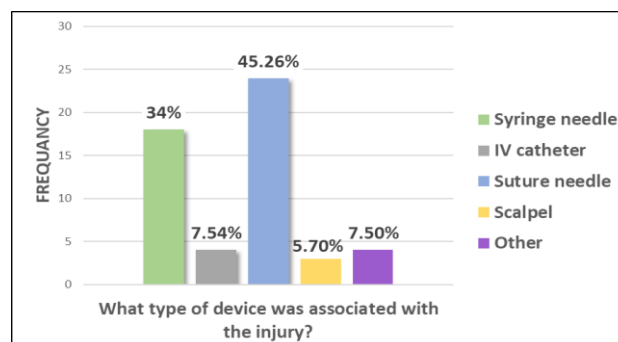


Figure 6: Type of device associated with the injury (n=53).

The type of activity during which the injury occurred was also assessed (Figure 5). Most participants experienced the injury during performing a procedure using the sharp item (30.2%). Suture needles were the most common type causing sharp injuries (45%) followed by syringe needles (34%). IV catheters, scalpels, and other devices constituted lower percentages (Figure 6).

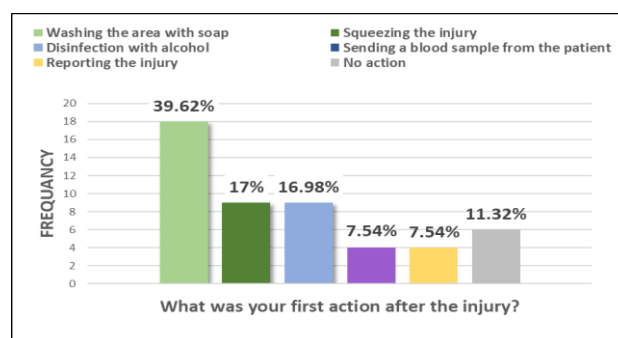


Figure 7: Participants first action after the injury (n=53).

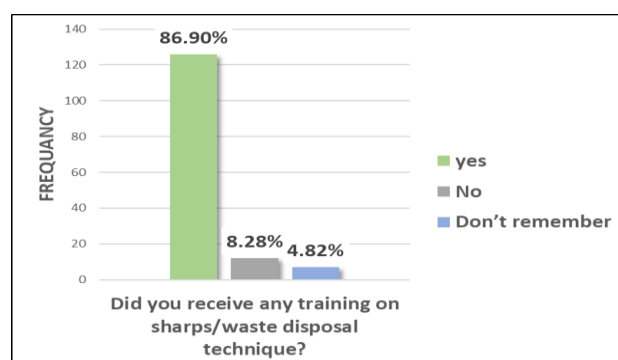


Figure 8: Number of participants who have received training on sharps/waste disposal technique (n=145).

The response or action after injury was also evaluated, and around one half of patients reported that they washed the area of injury with soap and water. Squeezing the injured area and disinfection with alcohol were less common. The different actions adopted by participants after injury (Figure 7). The participants were asked

whether they have received any prior training about dealing with sharp injuries, and more than 85% denied any (Figure 8). Most of the participants thought that work overload was the most common factor responsible for sharp injuries. Putting used needles in waste particles were thought by about one fifth of participants to be a risk factor, and low experience came next (Figure 9). Over 85% of participants did not have a reporting system for needle stick injury (Figure 10).

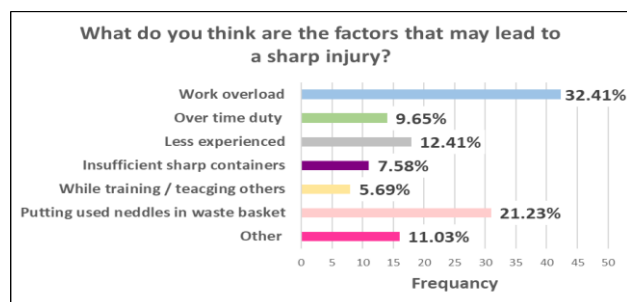


Figure 9: Opinions of participants on the factors that may lead to a sharps injury (n=145).

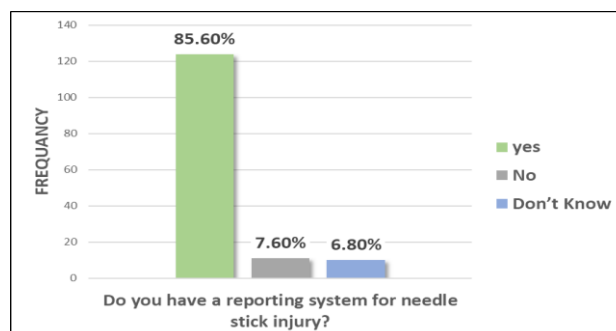


Figure 10: Awareness of participants about reporting system for needle stick injury (n=145).

The relationship between exposure to sharp injuries and many factors were studied in this research, namely the profession, the work experience, and shift working hours. Only profession had a significant correlation with the incidence of sharp injury exposure with a $p < 0.0001$ (Table 3). While no significance was found between injury and work experience nor working hours.

Table 3: The relationship between sharps injuries and profession.

	Profession					Total
	Nurse	Surgical resident	Gynaecology resident	Dentist/dental assistant	Housekeeper	
Yes	25	11	11	6	0	53
No	50	3	4	6	29	92
Don't remember	12	1	0	3	0	16
Total	87	15	15	15	29	161

Chi-Square, (P value=0.000).

DISCUSSION

In this research, females constituted a higher percentage of participants in comparison to males, with nationalities of Non-Saudi over Saudis. As nursing students, nurses were our concern. Therefore, most of the samples were nurses as it showed in the findings. Work experience of 5 to 15 years had the highest result, and it showed that there is no correlation between work experience and the occurrence of sharps injury, which disagree with the result of Mohammed in Iran. Of note, OR nurses represented the highest percentage of HCWs being injured, and this also matches Mohammed's study, which says that sharp injuries occur mostly among nurses in the OR. Regarding to shift working hours and shift rotation 12 hours and rotating shift were more frequent ones. The vast majority of the participants have received and completed their hepatitis B vaccine doses, as a protective strategy provided by the hospital for their HCWs.

Factors associated with sharp injuries

According to the results, most of the participants who answered "yes" to the question "have you ever

experienced a sharp injury?" were nurses, followed by surgical residents and gynecologists evenly with the

housekeepers being the lowest, which matches Memish's⁶ and other studies findings; nurses were more exposed to sharp injuries than physicians and house keepers. Those researchers stated that three job categories that had high incidences of sharp injuries among wide; nurses were more exposed to sharps injury incidence than physicians and housekeepers.⁶⁻⁸ The study also explored the type of activity and type of device that was associated with injury and it showed that the majority of the incidents occurred during the use of an item and while using suture needle followed by syringe needle, it also agrees with Memish's research which showed that most of the incidents occurred during the use of a needle item. In agreement with our results, the poor working condition was shown as one of other factors that increase the incidences of sharp injuries such as, stress, staff shortage; exhaustion decreases the nurses' focus and lead to errors. Adequate personnel in the ward decreased (20.6%) of sharp injuries incidences¹.

The first action after being injured was washing the area with soap being the most frequent one, squeezing the injury, disinfection with alcohol, no action, while sending a blood sample from the patient and reporting the injury had even occurred as the least common. Work overload was the most common factor leading to sharp injuries as shown in the results followed by putting used needles in waste basket, with while training/teaching others being the least common, a study by Choa shows that poor working conditions such as stress, staff shortage and exhaustion is one of the factors that increase the incidence of sharp injuries and another study by Shriyan showed that most of the injuries occurred in nurses in relation to the number of cases admitted per day which correlates with the finding of our study.¹ According to the findings very high percentage of the participants received training programs about sharps disposal and know about the reporting system in the hospital, on the contrary Memish mentioned in a study that KSA's hospitals had a low level of education about sharps injury incidence report, and they should increase the awareness of their HCWs towards sharp injuries incidence.

To test the hypothesis of the study, there was a significant relationship between the nursing profession and sharps injury events with ($p=0.000$), while there were no statistical significant between sharps injury events and working experiences ($p=0.241$) or shift working hours ($p=0.690$).

Strengths

The sample included different groups of participants from different professions, academic degrees, nationalities, genders, ages, and cultures. This is the first study for sharps injury exposure assessment to be done among dental personnel in dental clinics.

Limitations

This study was conducted only in KAUH and the dental clinics, so we might not be able to generalize the results. KAUH is an educational hospital; which is why the working conditions might differ from those in MOH hospitals.

CONCLUSION

This study was conducted at King Abdul-Aziz University Teaching Hospital in Jeddah. The main findings of the study were that 33% of participants were injured during their work and the most common type of activity was during the use of an item, with suture needle being the most common type of device associated with the injury followed by the and syringe needle. There was highly significant relationship between occupation and sharp injuries events, while there were no statistical significant

between sharp injuries events and working experiences or shift working hours. Also, the study showed that there were enough training programs for staff regarding to hazards associated with sharp injuries, and most of the staff were aware of the reporting system in the hospital. At last, further studies are needed before generalizing these study findings.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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