



Research Article

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## The Prevalence of Needle-Stick Injuries among Healthcare Workers in Dasht-e-Azadegan, Southern West of Iran

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### ABSTRACT

High incidence of needle-stick and sharps injuries among healthcare workers places them at high risks of infection with blood-borne pathogens. The purpose of this study was to determine the prevalence of needle-stick injuries and the factors associated with them in the healthcare workers in Dasht-e-Azadegan, Iran. In this cross-sectional study, healthcare workers of Dasht-e-Azadegan were studied. Data was collected through a questionnaire consisting of two parts. The first part included the demographic data, including age, gender, occupation, education, and work experience, and the second part included the record and the number of needle-stick injuries in the last 12 months, the mechanism of dealing with the pathogens, the primary actions taken after exposure to pathogens, and the use of prophylactic drug. Data were analyzed using SPSS v18. The mean age of the 377 participants in the study was  $32.67 \pm 7.35$ . Among them, 69 (18.38%) individuals had had needle-stick injury in the last 12 months. Nurses had the highest frequency of reported needle-stick incidents (24.6%). Among the individuals who had experience injury, 46.38% had taken primary actions (washing with soap and water or bleach, etc.) to prevent transmission of infection. Only 38.23% had reported the needle-stick injury and received prophylactic medication. The highest frequency of needle-stick injuries was observed in the medical staff (79.7%) at the night shifts (47.8%) and at the end of the shifts (64.70%). Considering the high incidence of needle-stick injuries in the studied population and the lack of attention to protective measures for healthcare workers, it seems that vaccination, screening, and training of the personnel should be considered the top priority.

**Keywords:** Needle-stick, Blood-borne infections, Healthcare workers

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### INTRODUCTION

Needle-stick and sharps injuries are an occupational hazard for healthcare workers(1). They can expose the healthcare workers at risk of blood-borne infections, such as hepatitis B and C and HIV (2-7). They and are considered one of the major factors in disease transmission (8). Out of 39.5 million healthcare workers worldwide, 3 million experience needle-stick injuries every year. Frothy percent of hepatitis B and C, and 2.5% of HIV/AIDS in

this group is associated with needle-stick injuries (9). Studies show that the incidence of needle-stick injuries in healthcare workers is rising which can be attributed to more invasive services and decreased compliance with safety measures (10). Workplace conditions and activities, including the type and design of the needles, injections, recapping the needles, using a needle, handling waste and dirty fabrics, obtaining blood and bodily fluids or handling culture medium, contact between healthcare personnel and sharp objects when cleaning them, needle manipulation, and the breakage of needles while using them expose all healthcare workers, from physicians and surgeons and nurses through the lab technicians and service personnel, at the risk of needle-stick and sharp injuries (10, 11). Although trainings on occupational hazards and precautions for healthcare workers is essential and not costly in control and prevention of disease and needle stick incidents, unfortunately, actions are rarely taken in this regard (12). The estimated incidence of needle-stick injuries is often higher than the reported cases, and the cases are under-reported (often less than 50%) (13, 14). In the US, 600,000 to 1,000,000 needle-stick incidents, and in England, 100,000 needle-stick incidents occur every year (11). Over 90% of blood-borne infections in healthcare workers occur in developing countries (9, 15), however, the cases are rarely reported (10). In Iran, there are no precise and comprehensive statistics, and the frequency of needle-stick injuries has been reported as 24.1-76% in the literature (16-18). Since the prevention of needle-stick injuries is an essential part of blood-borne infections prevention programs in healthcare centers, the present study aimed at determining the incidence of needle-stick injuries and related factors in the different categories of healthcare workers in Dasht-e-Azadegan.

### MATERIALS AND METHODS

This study was a cross-sectional study conducted in May-July, 2011 in Dasht-e-Azadegan among healthcare workers, including doctors, nurses, technicians, experts on disease prevention and family health, midwives, health workers, operating room technicians, laboratory technicians and experts, practical nurses, assistant practical nurses, and service personnel. The inclusion criteria included the consent of people and being a healthcare worker and the exclusion criteria was the lack of willingness to participate in the study. In this study, 390 individuals were eligible to be enrolled in the study. The study objectives were explained to them, and 377 (96.67%) individuals agreed to participate in the study. Data were collected using a researcher-made questionnaire consisting of two parts. The first part included the demographic data (age, sex, occupation, education, and work experience), and the second part included the record of needle-stick injuries and the related factors (the history and the number of needle-stick injuries in the last 12 months, primary actions, and drug prophylaxis after needle-stick, vaccination against hepatitis B, etc.). In this study, needle-stick and sharps injury were defined as any injury caused by sharps objects, including hypodermic needles, blood collection needles, IVC, and scalp veins, suture needles, blood culture slides, broken test tubes, and scalpels. Questionnaires were completed in a period of 2 months at healthcare centers and hospitals. Data were analyzed using descriptive statistics and  $X^2$  test to assess the relationship between the classified variables in SPSS18.

### RESULTS

The average age of the 377 healthcare personnel participating in the study was  $32.67 \pm 7.35$ , among which, 50.1% were male, and 49.9% were female. Among them, 58.4% worked in the medical department, and 41.6% worked in health department. Regarding the occupation, 4.5% were doctors, 11.4% were nurses, 4% were disease prevention experts and technicians, 6.4% were family health experts and technicians, 18% were nurse-aids, 6.9% were practical nurses, 2.9% were OR personnel, 3.2% were laboratory personnel, 8.8% were service personnel. Most of the participants in the study (30%) held high school diploma and had more than 5 years of work experience (60.47%). Data are shown in Table 1.

Among the 377 healthcare workers who participated in the study, 69 (18.37%) had at least once been injured the last 12 months. Among them, 43.47% had once, 26.09 had twice, and 30.43% had three times or more had a needle-stick incident. Type of injuries was superficial in 89.85% and deep in 10.14%. In most cases, the injuries had happened at the night shift (47.80%) and at the end of the shift (64.70%). After the needle-stick injury, 46.38% had done primary measures such as washing the wound with soap and water or bleach, and 38.23% had reported the incident. Among the 69 individuals who had had needle-stick injury, 38.23% had received prophylaxis drugs after the incident, and 20% had evaluated had been tested for viral infection.

The frequency of needle-stick incidents was 8.7% in the operating room personnel, 24.6% in nurses, 10.1% in family health personnel, 1.4% in medical emergency personnel, 5.8% in doctors, 21.7% in workers, 2.9% in

practical nurses, 7.2% in assistant practical nurses, 8.7% in midwives, 4.3% in the service personnel, 1.4% in disease prevention personnel, and 1.4% in laboratory personnel.

Results show that 227 individuals (60.2%) had not been tested for viral infection. Complete vaccination coverage (three times) in this population was reported as 50.9%, and 32.9% had undergone HBsAb tests to check the immunity after hepatitis B vaccination.

**Table 1. The characteristics of the studied healthcare workers (n=377)**

Variable	
Quantitative Variable	Mean±SD
Age	32.67±7.35
Qualitative Variable	Number (%)
Gender	
Male	189 (50.1%)
Female	188 (49.9%)
Education	
Below Diploma	75 (19.9%)
Diploma	133 (30%)
Associate Degree	84 (22.3%)
Bachelor's Degree	88 (23.3%)
M.D., Ph.D.	17 (4.5%)
Type of Service	
Medical	220 (58.4%)
Health	157 (41.6%)
Work Experience	
Less than a year	35 (9.3%)
1-2 years	47 (12.5%)
2-5 years	67 (17.8%)
More than 5 years	228 (60.47%)

**Table 2. The characteristics of the healthcare workers who had had needle-stick incident (n=69)**

Variable	Number (%)
Gender	
Male	16 (23.20%)
Female	53 (72.81%)
Education	
Below Diploma	8 (11.6%)
Diploma	23 (33.33%)
Associate Degree	14 (20.29%)
Bachelor's Degree	20 (28.98%)
M.D., Ph.D.	4 (5.79%)
Type of Service	
Medical	55 (79.71%)
Health	14 (20.29%)
Work Experience	
Less than a year	8 (11.59%)
1-2 years	13 (18.84%)
2-5 years	10 (14.49%)
More than 5 years	35 (55.07%)
Occupation	
Doctor	4 (5.8%)
Nurse	17 (24.6%)
Disease prevention	1 (1.4%)
Midwife	6 (8.7%)
Family health	7 (10.1%)
Laboratory	1 (1.4%)
Practical nurse	2 (2.9%)
Assistant practical nurse	5 (7.2%)
Service	3 (4.3%)
Worker	15 (21.7%)
Emergency	1 (1.4%)
OR	6 (8.7%)
Miscellaneous	1 (1.4%)

Table 3. The relationship between factors related to needle-stick incidents in the studied healthcare workers

Variable	Needle-stick N(%)	Not Needle-stick N(%)	OR(95%CI for OR)	
Age				
<30	37 (22.3%)	129 (77.7%)	0.08	0.62 (0.37-1.05)
>30	32 (15.2%)	179 (84.8%)		
Type of service				
Health	14 (8.9%)	143 (91.1%)	<0.001	3.40 (1.82-6.38)
Medical	55 (25%)	165 (75%)		
Education				
Below diploma	31 (16.5%)	157 (83.5%)	0.36	1.27 (0.75-2.15)
Above diploma	38 (20.1%)	151 (79.9%)		
Work experience				
<5 years	31 (20.8%)	118 (79.2%)	0.31	0.76 (0.45-1.29)
>5 years	38 (16.7%)	190 (83.3%)		
Gender				
Male	16 (8.5%)	173 (91.5%)	<0.001	4.25 (2.32-7.76)
Female	53 (28.2%)	135 (71.8%)		

## DISCUSSION

Results showed that 18.37% of the healthcare workers had experienced at least one needle-stick injury in the past 12 months which was lower than the incidence reported by Sumathi 55% (11), Khan Afridi 64% (19), Nasiri 76% (17), Haidari, 45.45% (16) and Hanafi 67.9% (20), Wicker 31.4% (21), Qasemi 55% (18), and Rampal 80.1% (1). The high incidence of needle-stick injuries puts the healthcare workers at high risk for blood-borne infections. The incidence of needle-stick injuries must be reduced through appropriate preventive plans.

The incidence of needle-stick injuries was significantly higher in females than males ( $p < 0.001$ ) which is consistent with the results reported by Shah and Khan Afridi (19, 22). This can be due to the high percentage of women in the nursing and practical nursing occupation that are at high risk of injuries. However, Hadadi (20), Heidari (16), and Rampal (1) reported no statistically significant relationship between gender and the incidence of needle-stick injuries.

In this study, nurses had the highest reported needle-stick incidents (24.6%). This is consistent with the studies by Sumathi (11), Nili (23), Nagao (24), Smith (25), Khan Afridi (19), and Alamgir H (26). This may be due to the excessive workload and exposure to sharp objects. In this regard, the standard nurse-to-patient ratio has to be considered, and regular training sessions regarding necessary precautions must be held. Also, a peaceful and safe working environment has to be created for nurses. The primary actions after needle-stick incident involved washing the area with soap and water, cleaning the area with a suitable disinfectant such as alcohol and Dettol, reporting to the infection control nurse, and health center doctor, and getting tested for HBV, HCV, and HIV. In the present study, the primary actions include washing (46.38%), reporting (38.23%), getting tested for viral infection (20%), receiving prophylactic medication (38.23%) after the needle-stick incident, while in the study by Sumathi (11), these actions had been performed in 60% of staff with needle-stick injuries. Reporting was 28.7% in the study by Wicker (21) and 25% in the study by Hanafi (20). In this regard, trainings on standard precautions and regulations and emphasis on reporting of needle-stick incidents should be priorities in prevention plans. Vaccination is the best way to protect healthcare workers from blood-borne infections. However, only HBV vaccine was available to the healthcare workers studied here. Based on the guidelines, hepatitis B vaccination is free for healthcare workers who are considered the high-risk group. Unfortunately, in our study, only 50.9% of the healthcare workers had received the complete vaccination (three times). This was 78.2% in the study by Wicker (21), 83.6% in the study by Hashemi (27), and 64% in the study by Sabouri Ghannad (28). In Pakistan, due to the high cost of the hepatitis B vaccination, the hepatitis B vaccination percentage was 33.2% which was lower than the present study (19). A limitation of this study was collecting the data based on self-reporting, which can lead to wrong classification. Another limitation was not examining the consequences of needle-stick injuries including Hepatitis B, Hepatitis C, and HIV. According to the results, designing studies that evaluate staff knowledge regarding needle-stick incidents, their preventive methods, and their consequences must be considered.

## CONCLUSION

Considering the low hepatitis B vaccination coverage, not complying with standard precautions, and the lack of proper attention to the primary actions, reporting, and prophylaxis after a needle-stick incident, holding in-service training classes about standard precautions, enabling hospital infection control teams and prevention units, screening, and hepatitis B vaccination must be the high priority of the blood-borne disease prevention plans.

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