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Effective Factors on Needle Stick Injuries in Health Care Workers

Momen-Heravi M.¹ MD, Vakili Z.* MD, Telkabadi Z.² MD, Soleimani Z.³ MD

*Pathology Department, Medicine Faculty, Kashan University of Medical Sciences, Kashan, Iran

¹“Social Determinants of Health Research Center” and “Infectious Disease Department, Medicine Faculty”, Kashan University of Medical Sciences, Kashan, Iran

²Rajae Hospital, Kashan University of Medical Sciences, Kashan, Iran

³“Infectious Research Center” and “Infectious Disease Department, Medicine Faculty”, Kashan University of Medical Sciences, Kashan, Iran

Abstract

Aims: Needle stick accidents are a serious health risk for blood-borne infections among health care workers. This study was conducted to evaluate the frequency of needle stick injuries in health care workers and its related factors.

Instrument & Methods: This cross-sectional study was carried on HCWs of Shahid Beheshti Hospital of Kashan City, Iran (270 individuals), from September 2013 to March 2014. Due to the low number of samples, all those who had the experience of needle stick injuries and confirmed to participate were entered to the study. A researcher-made questionnaire with 20 questions was used. Data were analyzed by SPSS 16 software using descriptive statistics.

Findings: The most injuries of needle sticks (75.2%) were superficial and the most common device for NSIs was the needle of syringe (51.8%). Blood sampling was the most common activity during NSIs (28.4%). The most common contamination was blood and its products (69.5%). 61 participants (43.3%) used gloves during NSIs. 118 participants (83.7%) were vaccinated completely against hepatitis B, and 19 participants (13.5%) had incomplete HBV vaccination. 4 participants (2.8%) had no history of vaccination against hepatitis B.

Conclusion: Needle stick injuries among health care workers of Kashan Hospital are relatively high.

Keywords

Needlestick Injuries [<https://www.ncbi.nlm.nih.gov/mesh/68016602>];

Health Personnel [<https://www.ncbi.nlm.nih.gov/mesh/68006282>];

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* Corresponding Author

Tel: -

Fax: +98 (31) 55541112

Post Address: Beheshti Hospital, Qotbe Ravandi Boulevard, Kashan, Iran

z_vakili@yahoo.com

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Introduction

Health care workers (HCWs) are at risk because some infections can be transmitted during patients care. Injuries with sharp devices and needle sticks are important conditions of injuries among HCWs [1, 2]. "Needle stick injuries" or NSI is used when a sharp instrument (e.g. cannula, lancet or scalpels) that was contaminated by patients' body fluids cause wounds, cuts or scratches in HCWs [3]. Globally, over 30 million HCWs are handling sharp objects [4] and potentially are at the risk of blood borne infections, e.g. HIV, Hepatitis B and Hepatitis C [5-7].

NSIs have caused 37.6% of hepatitis B, 39% of hepatitis C, and 4.4% of HIV/AIDS in HCWs with a burden of 9, 177, and 679 disability-adjusted life years (DALY), respectively, between 2000 and 2030 all over the world [8].

Among HCWs, nurses, technicians, interns and assistant doctors have the highest incidence of occupational exposure [9]. Safe and correct handling of sharp instruments depends on several factors, e.g. HCW experience, level of education, age, work pressure, the dominant hand used in duties, type of the used device, type of department, type of the tasks of the HCWs and the nature of used protective wear [4]. There are different reports about the frequency of NSIs in various studies in Iran [1-8], but we have no up-to-date information about the rate of NSI among HCWs in Iran hospitals.

This study was conducted to evaluate the frequency of needle stick injuries in health care workers and its related factors.

Instrument & Methods

This cross-sectional study was carried on HCWs of Shahid Beheshti Hospital of Kashan City, Iran (270 individuals), from September 2013 to March 2014. Due to the low number of samples, all those who had the experience of needle stick injuries and confirmed to participate were entered to the study.

A researcher-made questionnaire with 20 questions was prepared in two sections; demographic backgrounds and characteristics of needle stick injury and history of HBV vaccination. The validity of the questionnaire was examined by referring to the textbooks, scientific research reports, and the opinion of the professors serving as the faculty members

of the university. The reliability of the questionnaire was 0.85 by Cronbach's alpha. Data were analyzed by SPSS 16 software using descriptive statistics.

Findings

116 of 141 persons who had the experience of NSIs (82.3%) were female and the mean age of all participants was 29.7±6.6 years. 79 participants were between 20-29, 42 between 30-39 and 20 between 40-49. 106 participants (75.2%) were nurses, 9 (6.4%) were midwives, 17 (12.1%) were co-nurses and 9 (6.4%) were practical nurses. 22 participants (15.6%) had practiced more than 10 years, 18 (12.8%) between 5 to 10 years and 70 (49.6%) less than 5 years. The average of person's practice was 7.6±6.9 years. The most of NSIs was occurred in internal ward by 33 cases (23.4%) and the least of it in pediatrics wards and CCU that each one had 7 cases (5%).

The most injuries of needle sticks (75.2%) were superficial and the most common device for NSIs was the needle of syringe (51.8%). Blood sampling was the most common activity during NSIs (28.4%; Figure 1).

Figure 1) Distribution of participants according to NSI characteristics

Parameters	Number	Percentage
Depth of injury		
Superficial	106	75.2
Deep	7	5
Unknown	28	19.9
Blood oozing		
Yes	120	85.1
No	15	10.6
Unknown	6	4.3
Time of NSI		
Morning	46	46.9
Evening	25	25.5
Night	27	27.5
Activity leading to NSI		
IVline	40	28.4
Sampling	33	23.4
Injection	32	22.7
Surgery	3	2.1
Others	29	20.6
NSI device		
Angiocat	30	21.3
Needle cap	73	51.8
Bistory blade	5	3.5
Suture needle	10	7.1
Others	19	13.5
Number of NSI		
1	104	84
2-4	28	19.6
≥5	9	6.4

The most common contamination was blood and its products (69.5%). 61 participants (43.3%) used gloves during NSIs.

Right hands (79 cases) involved more than left hands (62 cases) in NSIs. The most frequent involved organ of the body was the second finger of right hands (17.73%) and the least frequent was the palm of left hands (0.83%).

118 participants (83.7%) were vaccinated completely against hepatitis B, and 19 participants (13.5%) had incomplete HBV vaccination. 4 participants (2.8%) had no history of vaccination against hepatitis B. In none of the cases, the HCV infection was identified.

Discussion

52.2% of HCWs of the Shahid Beheshti Hospital of Kashan City, Iran, had the experience of NSIs. The frequencies of NSIs have been reported from 24 to 94% by other studies in Iran [1-8]. In other countries, also, different results were reported; 56.9% in Nigeria [9], 64% in Pakistan [10], 35.6% in Egypt [11], 20% in the USA [12] and 23.1% in India [13].

Differences between results could be due to the contribution of physicians in some studies, different degrees of educational programs in the field of NSI and its prevention, and different levels of awareness, attitude and behavior of the personnel.

82.3% of the needle stick injured samples were females that this finding was similar to some studies [14, 15]. Generally, nursing is more attractive for women so, the number of female nurses is more than males and NSI is more frequent in females.

Most cases of NSIs had occurred in ages between 20 to 39 years and it had the least frequency in ages between 40 to 49, which is approved by other studies [16, 17]. It seems that high frequency of NSIs within ages from 20 to 29 years is because of that majority of studied persons were young and beginner.

The most frequent NSIs cases were in internal wards of the hospital and the least were in pediatrics wards and CCU, which is similar to other studies [2, 4, 5]. In another study, surgical wards had the most frequent and internal wards had the next level of frequency [16]. This could be caused by high turnover rate of patients, high request laboratory test and frequent blood sampling that results in tiredness of personnel.

The most frequent device that caused NSIs was needle syringe that is similar to other studies [2, 5, 7, 18]. It seems that the most frequent sharp device that is used by nurses and health care staffs is needle; so it is the most frequent cause of NSIs.

The most frequent activity during which NSIs occurred, were taking intravenous line and blood sampling. The most frequent organ of the body, which was damaged by sharp devices, was hands. Right hands were damaged more than left hands, which was similar to other countries' studies [19-21]. Since most people are right-handed, so there is a significant difference between the dominant hand and other hand in most NSIs.

In our analysis, we refer only to NSIs occurred in nursing personnel and interns and physicians did not participate in our study. Education of HCWs about risk of occupational exposure should be considered as a main goal of hospital managers.

Conclusion

Needle stick injuries among health care workers of Kashan Hospital are relatively high.

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Ethical Permission: Ethics committee of the Research Deputy of Kashan University of Medical Sciences has approved the study proposal (Ethic Committee Code; 87061) and consent forms were taken from all HCWs enrolled in the study.

Conflicts of Interests: None declared.

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