

Needle-stick and Sharp Injuries Incidents among Healthcare Workers: An Updated Survey in Iran

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Abstract

Background and Objectives: Needle-stick and Sharp Injuries (NSIs) have remained a persisting occupational hazard among the healthcare workers. This study aimed to provide updated information on the intensity and potential causes of their problem in Iran by surveying a sample from the major hospitals affiliated with Tehran University of Medical Sciences (Tehran, Iran).

Methods: Of 3312 healthcare workers with the potential risk of exposure to the NSIs, 295 who had experienced NSIs during the study period (June 2012 to June 2013) were included to the study. The participants were asked to complete a specific form developed by the Infection Control Committee of the university with their data of age, gender, level of education, marital status, occupation, work experience, work shift, and description of NSIs experience. Data were summarized and analyzed using descriptive statistical methods.

Findings: The reported incidence rate of NSIs was determined to be 11.2%. The majority (39%) of incidents were found to occur in nurses, followed by housekeeping workers (18.3%) and doctors (11.27%). While more than half of injuries have occurred in the individuals below 30 years old, the majority of cases (70.5%) had the work experience of less than five years. In addition, most incidents occurred in the morning work shift (53%). Phlebotomy was found to be the practice most frequently leading to injury incidents.

Conclusions: The low rate of NSIs suggests under-reporting calling exploration of the causative factors. The fact that the majority of incidents have occurred in young and low-work-experience individuals requires specific focus on educating and improving the awareness of this group of people about safety issues.

Keywords: Needle-stick and Sharp Injuries (NSIs) incidents, Healthcare workers, Occupational safety, Infection control.

Background and Objectives

NSIs (NSIs) remain as one of the most important occupational hazards among the hospital staffs [1,2]. These incidents threaten the safety of healthcare workers (HCWs) by inducing transmission of infectious agents like Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV) due to exposure to the patients' blood and/or other body fluids [3-5].

Transmission of blood-borne pathogens to HCWs can occur during the medical or sanitation procedures such as non-sterile injections, accidental injuries by

needle-sticks, and improper recycling of needles and syringes [6,7]. Many studies have focused on highlighting the hazards of NSIs among HCWs, especially in the developed countries [8,9]. These research efforts have led to the development of health and safety strategies and regulations aimed at reducing or preventing the occupational risks due to NSIs [10,11]. However, NSIs have remained a significant risk factor for HCWs so that more than 50% of nurses have at least one NSIs experience during their work life [12]. For setting the safety strategies, we need a good establishment of a surveillance system in which any case is reported without fail because detailed analysis allows the examination and preparation of counter-actions. Currently, some kinds of sharp injuries surveillance are used in the clinical settings, such as

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the Exposure Prevention Information Network (EPI-Net) developed by Virginia University [13,14]. In contrast to the developed countries, data on the prevalence and type of NSI incidents from the developing countries, where more than 90% of occupational hazards occur, is scanty that limits the development of relevant effective surveillance systems [15].

On the other hand, the Centre for Management of Transmittable Infectious Diseases affiliated with the Iranian Ministry of Health and Medical Education has recently declared that the rate of diseases related to blood-borne viruses has got a growing trend [16]. This situation highlights the importance of research on the prevalence of NSIs in the health settings, as a significant risk factor of blood-borne disease transmission among the HCWs.

Accordingly, in this study, we aimed to identify the incident rate of NSIs in the HCWs in five major general hospitals of Tehran University of Medical Sciences (TUMS).

Methods

This cross-sectional study was conducted in five major general hospitals affiliated with TUMS. All 295 HCWs with the experience of NSIs during the study period (June 2012 to June 2013) were enrolled in the study. The survey tool was a questionnaire designed and validated by the Infection Control Committee of TUMS by using the viewpoints of experts in infection control, as part of a project, entitled "Nosocomial Infection Surveillance System". The infection control experts in each hospital were trained on assisting the HCWs to correctly completing the questionnaires. The respondents were asked to record their age, gender, level of education, marital status, occupation, work experience, work shift, and the details of NSI incident(s). The data were analyzed using the SPSS software (version 16).

Results

Overall, 56.3% of the respondents were single, and 64.7% were female, 58% were under 30 years old, and 70.5% had a work experience of less than five years. While 47.5% of the participants held BS degree, 21.7% held MD degree, 19.3% had a diploma, and 11.5% had no university degree.

Table 1 presents the frequency distribution of NSI incidents. The highest rate of NSI incidents (39%) was related to the nurses, followed by housekeeping workers (18.3%) and doctors (11.27%). The operation room technicians reported the lower rate of NSI

incidents. The majority of NSI incidents (58%) were found to occur in the morning work shift (53%). In addition, most NSI events were reported to during phlebotomy (52.5%), followed by collection (11.6%) and surgery (11.5%).

Discussion

More than one tenth of our target population (who were the HCWs of five major general hospitals affiliated with TUMS) experienced at least one NSI incident in the 12-month period of the study, which is comparable to the rate of NSI incidents observed in the study of Trinkoff *et al.* (15.6%) [23]. However, this rate is lower relative to many other domestic or international studies conducted among HCWs [15-17,25], which can be due to underreporting [17,24,25].

In the present research, most of the NSIs happened to nurses (39.3%), which is consistent with another domestic study where the nurses were found to face the majority of NSI events [17]. According to these studies, female HCWs are more vulnerable to NSI incidents compared with their male counterparts; this conclusion is consistent with a number of studies in other countries [18,19,24]. At the same time, a study in Japan found that doctors are at higher risk of NSI incidents than nurses [9]. Also a survey in Nigeria showed that nurses' NSI risk came after dentists and surgeons [20]. This discrepancy of results in the different contexts highlights the importance of conducting local studies in this area for informed strategy development.

In our survey, 57.97% of HCWs who had experienced NSI incident(s) at least once during a 12-month period were in the age group of less than 30 years, which is similar to the results of Yoshikawa *et al.* (51.6%) [9]. In addition, we found that 70.5% of NSI-experiencing HCWs to have a work experience of less than five years. This observation is in agreement with the results from the study of Rezaeian *et al.* who identified a higher rate of NSI incidents among the employees with lower working experience [21].

Our study showed that NSIs mostly occur in the morning work shift (53%). This might be due to a typically heavy workload during the morning shift. Studies have emphasized the impact of workload and long work shifts on the probability of NSI incidents [12,22,23].

In our survey, phlebotomy was identified as the most (52.5%) hazardous clinical practices in terms of NSI incident. The same observation was also reported in the study of Afridi *et al.*, in which injecting medicine and drawing blood were found to induce most NSI incidents (42%) [26].

Conclusions

Among the different groups of HCWs, nurses are more prone to NSI incidents. Most NSI events occur during the morning work shift, presumably due to heavy workload on this shift. Phlebotomy is responsible for the highest rate of NSI incidents. The fact that the majority of NSI incidents have occurred in young and low-work-experience individuals requires specific focus on educating and improving the awareness of this group of HCWs about safety issues. The low rate of NSIs suggests underreporting, calling exploration of the causative factors.

Abbreviations

(NSIs): Needle stick and sharp injuries

Competing interests

The authors declare no competing interests.

Authors' contributions

MG conceived and design the study. FR made the major contribution in collecting and refining the data, analysis and interpretation of the data, and drafting and revising the manuscript. EK and AB were involved in coordination of the study procedure, interpretation of the results, and revising the manuscript. SPN participated in analysis of the data and drafting the manuscript. All authors read and approved the final manuscript.

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Table 1 Frequency distribution of NSIs among the surveyed health care staff based on their occupation, work shift, and clinical practices

Variables	N	%
Occupation		
Nurse	116	39.3
Housekeeping worker	54	18.3
doctor	33	11.3
Medical student	31	10.5
Assistant	21	7
Laboratory staff	11	3.7
Nursing student	11	3.7
Midwife	11	3.7
Technician	7	2.4
Work shift		
Morning	158	53.8
Night	84	28.2
Evening	53	18
Clinical practice		
Phlebotomy	155	52.5
Waste collection	36	11.6
Surgery	34	11.5
Injection	21	7.1
Tap	10	3.4
Others	40	13.6

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