

## Needlestick Injuries in Healthcare Workers in the North East of Iran

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ARTICLE INFO	ABSTRACT
<p><b>Article type:</b> Original Article</p> <hr/> <p><b>Article history:</b> Received: 14-Dec-2016 Accepted: 04-Jan-2017</p> <hr/> <p><b>Keywords:</b> Blood Healthcare Worker Injury Needle</p>	<p><b>Introduction:</b> Needle-stick injuries are the second most commonly reported adverse incident and constitute a major hazard for the transmission of blood transmitted diseases. The incidence of Needle stick is higher than the reported cases in different countries. Reporting of these exposures is often a challenge for HCWs (health care workers). This article describes the prevalence of occupational injuries caused by contacting patients with needle and sharp objects and fluids of the patients' body fluids in HCWs.</p> <p><b>Materials and Methods:</b> This cross-sectional study has been conducted in 4 hospitals affiliated to Mashhad University of medical sciences, Iran during 2008-2015. We assessed self-reported occupational exposures in HCWs includes nurse, physician, medical student and other.</p> <p><b>Results:</b> Among the HCWs with NSIs, other personnel includes paramedics, assistants, crew, midwife, operation room personnel, and laboratory, radiology and physiotherapy personnel had the highest percentage of needle stick contact, followed by nurses. Self-reporting of needle-stick has been growing in this period. In this study, the hepatitis B immunity in sharps injury recipients was 90-95% in 2015.</p> <p><b>Conclusion:</b> The prevalence of needle stick in HCWs is high. Preventive strategies had to be devised. Use of safety engineering devices, to encourage recording and reporting of incidents, hepatitis B immunity, serological tests, follow-up post exposure, training in precaution standard is necessary for HCWs and medical students.</p>

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### Introduction

Needlestick injuries (NSIs) and mucocutaneous exposure to blood as well as secretion of patients' body fluids (BFs) are some of the most serious threats facing healthcare workers (HCWs) (1, 2).

Due to their [health-sensitive?] work environment, HCWs, laboratory personnel, and people who collect hospital waste are at risk of accidental NSIs and contact with cutting objects (2).

NSIs are the second most commonly reported adverse incident and constitute a major hazard for the transmission of viral disease, HIV, and hepatitis B and C. They are also a potential source of transmission of prion diseases and different pathogens that cause many

diseases via blood including malaria, infectious mononucleosis, diphtheria, herpes, tuberculosis, syphilis, and spotted fever (3).

The occupational injuries caused by needle stick impose direct and indirect costs on the health system (4, 5).

Needle stick injuries reports vary in different countries (6).

Based on a research in America, between 600000 to 1000000 NSI reports (the proportion of health employees in a year) were received from conventional needles and cutting objects, whereas this amount was 100000 in Britain (2).

It is difficult to determine the actual number of NSI cases because even in countries which have a surveillance system to report such cases, approximately 70 percent of them are not reported. The Center for Disease Control and Prevention (CDC) has estimated that half of these injuries have not been reported (7).

Reporting these exposures is often a challenge for HCWs. Many of them believe that they have sufficient knowledge for handling this issue and some of them have personal reasons such as lack of support from managers or losing their job (8, 9).

This article describes the prevalence of occupational injuries caused by needle, sharp objects, and fluids of patients' body in HCWs of four hospitals affiliated to Mashhad University of Medical Sciences, Iran.

## Materials and Methods

This cross-sectional study was conducted in Mashhad, (Iran) during 2008-2015. It was carried out based on the self-reported data of occupational injury caused by an encounter with a sharp object or needle among HCWs of several university hospitals of Mashhad. Hospitals were selected based on convenience sampling and accessible statistics. The hospitals included Imam Reza Hospital (the largest hospital in the province with 1000 beds), Khatam Hospital, (eye hospital), Kamyab Hospital (trauma hospital), Hosheminejhad hospital (one hospital with several general wards).

After the National Nosocomial Infections Surveillance NNIS Guideline was issued by the Ministry of Health in Iran (2007) to all hospitals throughout the country, infection control committees in the hospitals started comprehensive training programs for HCWs. One of the aspects of this guideline was designing health files for personnel and monitoring their occupational injury. The present study has used a self-reported structured form of HCWs based on the above guideline. These reports were given to the infection control supervisor in the morning shift and to the hospital supervisor in the evening and night shifts. The self-reported form included personal information, date of injury, date of the report, type of injury, vaccination, and prior background. According to this guideline, in case of personal encountering, based on the conditions, Vaccination after post-exposure prevention, laboratory tests, and consultation with an infectious diseases specialist will be performed.

In the current study, personnel information was kept secret and ethical considerations were observed. The staff consisted of nurses, physicians, medical students, and other HCWs (including paramedics, assistants, environmental service workers, midwives, operating room personnel, as well as laboratory, radiology and physiotherapy personnel) in different wards of the hospitals.

Data were obtained from personnel reporting in different occupational ranks and were analyzed subsequently. This research was confirmed by the

Research Deputy of Mashhad University of Medical Sciences.

## Results

During this 8-year period, 1589 self-reported occupational exposures occurred in the aforementioned hospitals. Among the HCWs, paramedics, assistants, environmental service workers, midwives, operating room personnel, and laboratory, radiology and physiotherapy personnel had the highest NSI percentage, followed by nurses. It was noted that NSI had a rising trend in this period. (Table-1)

The hepatitis B immunity was 90-95% in 2015 in sharps injury recipients, while its range was 40-85% in

**Table1:Occupation of sharps injury recipients in 2008-2015**

Occupation	2008-2009	2010-2011	2012-2013	2015-2016
	N (%)	N (%)	N (%)	N (%)
Nurse	74 (32)	136 (37)	139 (33)	173 (30)
Physician	19 (8)	25 (7)	59 (14)	109 (19)
Medical Student	16 (7)	33 (9)	63 (15)	34 (6)
Others	122 (53)	173 (47)	158 (38)	256 (45)
Total	231 (100)	367 (100)	419 (100)	572 (100)

2008-2014.

## Discussion

In this study, among the HCWs, the greatest rate of exposure to blood and body fluids belonged to paramedics, assistants, crew, midwives, operating room personnel, and laboratory, radiology, and physiotherapy personnel.

The risk of occupational exposure to HIV infection from a single HIV-contaminated needlestick is around 0.3%(10). The risk of HBV infection in HCWs who sustain needlestick injuries from HBsAg-positive patients is approximately 30% in the absence of post exposure prophylaxis. This risk is higher if the source-patient is HBeAg-positive (10).

Studies carried out in countries with different health systems and health sources have reported contrasting results: 27 to 31 % in Nigeria (11), 32.6 % in Egypt (12), 63 % in North of India (8), 87 to 93.2 % in Taiwan (9), and 82 % in China (10). Moreover, the results of NSI reports in the case of students were 48.1% in India (13), 61.9% in Taiwan (11), and 71.1% in Iran (12).

The results of the present study demonstrated that the highest rate of NSIs existed among paramedics, assistants, crew, midwives, operation room personnel, and laboratory, radiology, and physiotherapy personnel, followed by nurses. Schwager and Drexler concluded that the risk of needlestick is higher for medical students than for other employees (14).

Most of HCWs and medical students downplay the importance of reporting mucocutaneous exposure to blood and body fluids and serological follow-up (14).

Sharps injury refers to an injury in which a needle or some other sharp object which is contaminated with blood or high-risk body fluids penetrates the skin (15).

Reda found that the incidence of needlestick injury or across professions. The current study does not support this finding, however.

Approximately 90% of HCWs in this study had a history of hepatitis B vaccination.

Hospital records in another study showed that 84% of nurses, 75% of physicians, and less than 50% of medical and nursing students were anti-HBs-positive at the time of accidental exposure(10). The observed higher prevalence of exposure to blood and body fluids in nurses, compared to physicians and medical students, could be attributed to better reporting among nurses when an incident happened. Several other studies had also implied high rates of exposure to blood and body fluids in nurses (1, 16, 17).

In Shiraz (Iran), 82% of the medical students did not report any needlestick injury (18).

In Nepal, 70% of nursing students, 20% of medical interns and 10% of dental interns reported NSIs (19). In another research in Canada, 57% of medical students and 27% of nursing students reported the incident (20).

In still another study, it was revealed that physicians under-report needlestick injuries (21, 22).

Studies suggest that the most common reasons for underreporting NSI in employees and medical students were stress, fatigue, lack of knowledge, workload, hepatitis B vaccination, fear of reporting, fear of a positive serological test, and not motivating to follow up (14).

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exposure to body fluids was not significantly different

Hepatitis B vaccination is recommended for all HCWs. This study observed that hepatitis B immunity in sharps injury recipients was 90-95% in 2015, compared with 40-85% in 2008-2014. HBV vaccination coverage was 86.2% in Shiraz, 86.5% in Nepal, where uptake rates vary from 18-85% (23-25).

A limitation of this study was that the data were self-reported; therefore, there is the possibility of bias in reporting. Another is the low sample size and the small number of assessed characteristics.

## Conclusion

The prevalence of needlestick injuries is high among healthcare workers. Hence, preventive strategies need to be undertaken. It is imperative to use safe engineering devices so as to encourage the recording and reporting of incidents, hepatitis B immunity, serological tests, and post exposure follow-up. In this regard, precaution standards have to be taught to HCWs and medical students.

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