

ORIGINAL ARTICLE

NEEDLE STICK INJURIES IN NURSES AT A TERTIARY HEALTH CARE FACILITY

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Background: Needle-stick injury (NSI) is a major occupational health and safety issue faced by healthcare professionals globally. This study was aimed to assess the frequency and factors associated with NSIs in nurses of a tertiary health care facility in Lahore, Pakistan. It also focuses on safety measures adopted by these nurses after a needle stick injury. **Methods:** This cross-sectional descriptive study was conducted in Ghurki Trust Teaching Hospital, Lahore from October 2009 to January 2010. All nurses have participated in the study with a response rate of 99%. These responses were obtained via a pretested self-administered questionnaire. The data was analysed using SPSS-16. Percentages of the categorical variables were computed and represented in various statistical data presentation forms, for analysis and comparison. Chi-square test was applied as a test of significance with fixing the *p*-value of 0.05 as significant. **Results:** Out of 77 nurses who participated in our study, only 33 (42%) nurses were aware of the occupational hazards of their profession when they joined nursing. Needle stick injury was reported by 40 (71.9%) of the nurses in last one year. About 17 (31.5%) were injured at the time of recapping the syringe. The availability of needle cutters in the hospital was reported by 75 (97.4%) nurses while only 46 (60%) of them had undertaken a sharp management training course. Approximately 50 (64.9%) nurses failed to use gloves while administering injections. After getting stuck by a contaminated needle 71 (92%) of the nurses cleaned the wound with a spirit swab, 67 (87%) washed the area with soap and water and 58 (75%) applied a readily available bandage. Only 38 (49%) went on to inform the higher officials about a needle stick injury. Fifty-seven (74%) of the nurses were vaccinated against HBV, and 56 (72.2%) of needle stick injured nurses proceeded for HBV screening, while 53 (68.6%) for HCV and 37(48.5%) for HIV. **Conclusion:** Needle stick injury is the most important occupational health hazard in nurses with alarmingly high rates. Reporting to the concerned authorities, screening of nurses after needle stick injury and promotion of safety measures against it should be greatly encouraged.

Keywords: Needle stick injuries, Nurses, Pakistan

INTRODUCTION

Needle stick injury means penetrating stab wound, introducing blood or other potentially hazardous material into the body of healthcare worker, during the performance of their duties, by a hollow bore needle or sharp instruments, including, needles, lancets, scalpels, and contaminated broken glass.¹ Needle-stick injury (NSI) is a major occupational health and safety issue faced by healthcare professionals globally.² Globally, more than 35 million Health Care Workers face the risk of sustaining a percutaneous injury with a contaminated sharp object every year.³ Centres for Disease Control and Prevention (CDC) estimates that approximately 385,000 needles and sharps-related injuries occur every year to HCWs in the United States.⁴

Nurses have the highest rate of needle stick injury among health care workers.⁵ It is estimated in USA that the reported incidence of needle stick injury in nurses is currently 16.3%.⁶ In United Kingdom, nearly 48% of the nurses have reported that they have been stuck by a needle or sharp used on a patient at some point in their careers. One in ten respondents (10%) had been stuck by a needle or sharp in the last year.⁷ In

Australia the reported incidence of needle stick injury during the previous 12 months in nurses is 13-9%.⁸ Incidence of needle stick injuries is also alarming in developing countries. In a study of injection safety conducted in Saudi Arabia, it was noted that needle stick injury in the previous one year was reported by 14.9% of physicians and 16.5% of nurses (0.21 and 0.38 injuries/person/year respectively).⁹ In a recent survey of 296 Health Care Workers in India, reporting Needle Stick Injuries (NSIs) in India it was noted that it was 28.4% in nurses, 9.1% in nursing interns, 21.6% in doctors and 15.9% in medical interns.¹⁰

In Pakistan the reported incidence of needle stick injuries is 0.29% in consultants, 24.5% in trainees, 44.7% in house officers and 16.3% in nurses.¹¹ The gravity of situation in Pakistan can be estimated by another study conducted in operation room personnel, 58.8% reported more than four needle-stick injuries per year, 36.8% one to three needle-stick injuries per year, while 4.4% reported no needle-stick injury in the last five years.¹²

Occupational exposures to percutaneous injuries are a substantial source of infections with blood

borne pathogens among healthcare workers. Needle stick injuries have the potential of annual transmission of 66,000 infections with HBV, 16,000 with HCV, and 1,000 with HIV worldwide.³ More than 80% of the needle stick injuries can be prevented through the use of safety devices and effective safety programmes.¹ The objective of this study was to estimate the incidence of needle stick injuries in nurses in last one year and to assess the safety measures taken by them for prevention of disease transmission.

SUBJECTS AND METHODS

Between October 2009 and January 2010, a cross sectional survey was conducted in female nurses working at Ghurki Trust Teaching Hospital, Lahore. A total of 77 female nurses participated in this study using a non-probability convenience sampling technique. Informed consent was taken and only female nurses were included in the study, excluding the rest of the paramedical staff. A pre-tested self administered questionnaire was administered, which requested information on age, education, serving grade, frequency of needle stick injuries and measures adopted after this injury. The data was entered to SPSS-16. Results were given in the form of descriptive statistics and charts. Chi-square test was applied as the test of significance and *p*-value was fixed at 0.05 to be statistically significant.

RESULTS

Ghurki Trust Teaching Hospital has a total strength of 80 nurses out of which 77 nurses have participated in this study with a response rate of 99%. This survey was based on a self administered questionnaire which was filled anonymously. The results of this study showed the incidence of needle stick injuries in nurses and the assessment of safety measures taken by these nurses after this injury. Maximum nurses, (49, 63.6%) belonged to age group 20–30 years, followed by 40–50 years age group which had 16 (20.8%), and 11 nurses (14.3%) were in age group 30–40 years. Only one Matron (1.3%) belonged to age group of more than 50 years. There were only 26 (33.8%) nurses who had done B. Sc. Nursing and only one (1.3%) had done Masters in nursing. Out of 77 participants, 59 (76.6%) were working in grade 16 and 18 (23.4%) in grade 17 respectively. It was found that 72 nurses (93.5%) have monthly income greater than Rs. 10,000, and 29 (37.7%) were married. Majority of them (48, 62.3%) were unmarried. Fifty-three (69%) nurses admitted that they had got needle stick injury in last one year. Out of these, 11 (20.4%) had NSI once a week, 16 (29.6%) had it once a month and 27 (50%) had it once in six months. Seventeen (32%) reported it at time of recapping the syringe (Figure-1).

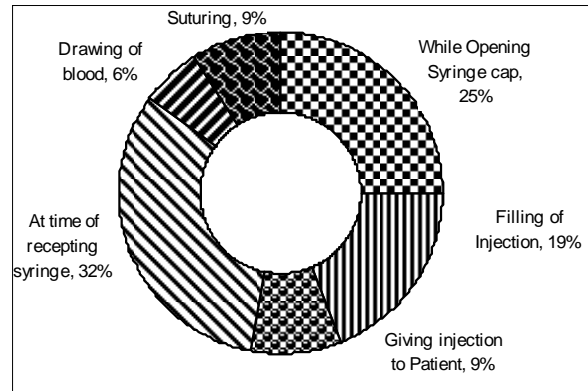


Figure-1: Needle stick injuries in nurses at work

Out of 77 nurses, 38 (49.4%) reported needle stick injury to the higher officials whereas 39 (50.6%) never reported it. Approximately 59.7% of the nurses (46 out of 77) had received sharp management course and the other 40.3% (31) did not. Seventy-five (97.2%) of the nurses reported that they had needle cutter available at their work place and 2 (2.6%) reported that needle cutter was not available at their workplace. Only 25 (32.4%) named Hepatitis B alone, 18 (23.4%) named Hepatitis B and C, and 34 (44.2%) knew about HIV inclusion to the list. Only 27 (35.1%) of the participants used to wear gloves and 50 (64.9%) did not wear gloves while injecting the patient. It was asked from the nurses that have they ever got screening for the infectious diseases which can be transmitted by needle stick injuries and it was noted that 56 (72.7%) have screened themselves for Hepatitis B, 53 (68.8%) for Hepatitis C and only 37 (48%) have got screening for HIV.

During our research when we asked about the safety measures taken by these nurses after needle stick injury, it was noted that 67 (87.1%) of the nurses washed the specific area after needle stick injury and 92.2% nurses cleaned the area with a spirit swab. Plaster was put on the wound by 75.3% nurses. It is important to note that 46.8% of the nurses went for screening after a needle stick injury and 53.2% did not go for further investigation as shown in Table-1.

When these nurses were inquired about their vaccination status, it was noted that only 57 (74.1%) of the nurses were vaccinated against HBV and 20 (25.9%) were not vaccinated against HBV. When the incidence of Needle stick injury was cross tabulated with socio demographic profile, it was interesting to note that age and education of the nurses were not significantly associated with needle stick injury. Serving grade, years of service and place of work were significantly associated with needle stick injury with a *p* value of 0.036, 0.012 and 0.039 respectively (Table-2).

Table-1: safety measures taken after a needle stick injury by the respondent nurses

Safety Measures taken after needle stick injury	Frequency of respondents who took them	% of respondents who took them	Frequency of respondents who never took this safety measure	% of respondents who never took this safety measure
Washing of area with soap & water	67	87.1%	10	12.9%
Cleaning of area with spirit swab	71	92.2%	6	7.8%
Putting plaster on wound	58	75.3%	19	24.7%
Screening of blood	36	46.8%	41	53.2%

Table-2: Cross-tabulation of needle stick injury with socio-demographic profile

Socio-demographic profile	Needle stick injury			χ^2 and p value
	Yes	No	Total	
Age group				$\chi^2=5.950$ df=3 p=0.114
20-30	37	12	49	
30-40	8	3	11	
40-50	8	8	16	
>50	0	1	1	
Total	53	24	77	
Education				$\chi^2=6.986$ df=4 p=0.137
Matric	17	4	21	
F.A/Fsc	9	1	10	
B.A/Bsc	12	7	19	
Bsc Nursing	14	12	26	
Msc Nursing	1	0	1	
Total	53	24	77	
Serving Grade				$\chi^2=4.405$ df=1 p=0.036
16	37	22	59	
17	16	2	18	
Total	53	24	77	
Years of service				$\chi^2=12.962$ df=4 p=0.012
<1	11	3	14	
1-5	18	2	20	
5-10	14	14	28	
10-15	3	4	7	
>15	7	1	8	
Total	53	24	77	
Place of work				$\chi^2= 17.703$ df= 9 p=0.039
Emergency	12	4	16	
Medicine	10	1	11	
Surgery	13	3	16	
Gynae	5	1	6	
Ortho	5	3	8	
Paeds	6	6	12	
Eye	0	2	2	
ENT	1	2	3	
ICU	0	2	2	
Supervisor	1	0	1	
Total	53	24	77	

DISCUSSION

Needle stick injuries indeed are among the most important occupational injuries for nurses.¹³ The reported incidence of NSIs in USA is 49% in nurses

10% in physicians.¹⁴ In developing countries the incidence of needle stick injury is much more than developed countries, in Iran alone the reported incidence of NSIs in nurses is 63.3%.¹³ The results of our study have shown that 53 out of 77 nurses (69%) have admitted that they have got needle stick injury in last one year. When the frequency of these injuries were inquired, it was observed that 11 (20.4%) had NSI once a week, 16 (29.6%) had it once a month and 27 (50%) had it once in six months. In USA, the annual rates of occupational blood exposure were highest for nurses and midwives (6.5 per 100 compared to 3.5 of overall, and nurses tend to be exposed 4.27 times more often than physicians.¹⁵

The activities associated with the majority of needle stick injuries (NSIs) are injections, blood sampling, recapping and disposing needles and also handling trash. According to a study conducted in Mulago, national referral hospital in Kampula, Uganda, the most important risk factors were recapping needles and handling needles without using gloves.¹⁶ Our study has shown that the maximum number of Needle stick injuries 32.1% occur at the time of recapping the syringe; followed by 24.5% while opening syringe cap; 18.9% during filling the injection; 9.4% while giving injection to the patient; 5.7% while drawing of blood; and 9.4% due to suturing. These results are in contrast to a study carried out at Aga Khan Hospital, Pakistan which reported that more than half of the injuries (52.8%) occurred while drawing the blood samples or injecting the medicine.¹⁷ According to the USA OSHA's blood-borne pathogen standards (1996), in order to reduce the risk of transmission of blood-borne pathogens recapping a needle is prohibited. Poor compliance of the prohibition by the nurses is one of the reasons for high rate of NSIs.¹⁸

Under reporting of NSI is also a major problem. In our study 49.4% of the needle stuck nurses reported it to higher officials which has improved as compared to documented rate of 7% in other reports published earlier by Alam.¹⁹

Approximately 59.7% of the nurses (46 out of 77) had received sharp management course while in another private setting of Pakistan, 88% of Aga Khan University nursing school graduates have received sharp management course.¹⁷ The availability of needle cutters in our study was 97.4% which was encouraging in the hospital settings of a developing country like ours and allowed proper disposal of used needles which is superior to the results of a Canadian online study which reported inappropriate disposal of needles 87% at all times.²⁰

Regarding awareness towards NSIs, 32.5% knew that only HBV could be transmitted via contaminated needles while 23% knew about both HBV and HCV and 44.2% were aware that HBV, HCV and

HIV all could be transmitted through infected needles. These results are considerably less than those reported in the KAP study at Aga Khan Hospital, Karachi in which overall knowledge regarding the potential transmission of Hepatitis B, C and HIV was high among the participants.¹⁷ In our study, 64.9% nurses failed to use gloves while injecting which is comparably high to Canadian rates where failure to wear gloves by nurses constituted only 17%.²⁰ It is important to note that the chances of getting punctured while handling trash is decreased considerably with the use of needle cutter, as our study showed the availability of needle cutters at working place was 97%.

The results of our study has revealed that after getting stuck by a contaminated needle 92% of the nurses cleaned the wound with a spirit swab, 87% washed the area with soap and water and 75% applied a readily available bandage. In another study it is reported that needle stick injuries occurred during all work shifts and all the nurses self-treat and self-medicated their wounds while a small minority consulted the physicians.²¹

According to our study 72.2% of the needle stuck nurses went for HBV screening, while 68.6% for HCV and 48.5% for HIV. Following an injury 53.2% of the nurses did not go for screening at all. The risk of pathogen transmission from infected persons to non-immune persons through an injury with a sharp instrument has been estimated to be between 6% and 30% for HBV, between 5% and 10% for HCV, and 0.3% for HIV.²²

In our subjects 74% had been vaccinated against HBV while 26% were still un-vaccinated and prone to get infected. Estimated prevalence of Hepatitis B in our population is 3–4% and Hepatitis C is 6%. This information suggests that a sizeable number of Health Care Workers are at potential risk of infections with blood borne pathogens after a needle stick injury.^{23,24} Needle stick injuries and their associated biological hazards therefore, are one of the most important hidden problems in the health care workers. Limitation of this study is, its conveniently selected small sample size and only one setting of a hospital, but the information revealed is alarming as the frequency of NSIs is highest amongst nurses. Therefore, more studies are required to assess the frequency of exposure and to identify the risk factors in some other local hospital setting.

Given the serious, and even fatal, consequences of sharps injuries and the limited effectiveness of post exposure therapies, it is crucial that measures to prevent sharps injuries from occurring be adopted. Therefore, it is high time to introduce disposable syringes and other safety devices as their use in the developed world has reduced the number of Needle Stick Injuries significantly.

CONCLUSION

Needle stick injury is the most important occupational health hazard in nurses with alarmingly high rates. It is important to plan and implement strategies for spreading awareness regarding risks associated, proper handling techniques and effective preventive measures against incidences of needle stick injuries. Infection control centres should be established where absent and their working should be enhanced in terms of training of nurses for sharp management. Reporting to the concerned authorities must be encouraged for accurate estimation of the situation. Screening of nurses after needle stick injury should be promoted and safety measures against it should be enhanced by encouraging the nursing staff to wear gloves while dealing with sharps.

RECOMMENDATIONS

It is highly recommended that the nurses should be aware of their occupational health hazards through career counselling. Regular courses and seminars should be conducted for sharp management training. Reporting of needle stick injuries should be mandatory to higher officials of infection control committee. Nurses should be encouraged to use gloves and needle cutters in their work settings. The regular screening of nurses for infections transmitted through contaminated needles should be done on regular intervals. It should be mandatory for all nurses to get immunoprophylaxis against Hepatitis B before entering into clinical setting.

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