

Awareness of Factors Affecting Needle Stick Injuries Among Health Care Workers in the Operation Theatre of a Private Teaching Hospital of Lahore

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ABSTRACT

Aim: To determine the knowledge, aptitude and practices of health care workers regarding needle stick injuries

Material and methods: In this cross-sectional study, 109 healthcare workers, serving in the Operation Theatre of Shalamar Hospital, Lahore participated. The data was entered and analyzed using SPSS 20. Chi-square test was used for the statistical analyses of the data. P-value of 0.05 or less was considered as significant

Results: Among the healthcare professionals 55% were male and 45% were females. Among the subjects majority were doctors (42.2%). Most of the subjects have awareness (61.5%) regarding needles and sharp injuries. Though 45% had experienced needles and sharp injuries, only 18.3% reported the incident of needles and sharp injuries. 37.6% had strongly agreed that using gloves during the handling of needles and sharp objects can reduce the incidence of needles and sharp injuries while 11% disagreed. Similarly 59.6% strongly agreed that the presence of safety boxes at the workplace can reduce the incidence of needles and sharp injuries.

Conclusion:

By providing knowledge and proper guideline about prevention from needles and sharp injuries by using personal protective equipment, while handling contaminated blood and body fluids needles and sharp objects, can reduce the incidence of needles and sharp injuries.

Keywords: Needle-Stick and Sharp Injuries, Operation Theatre, Health care workers

INTRODUCTION

Globally, penetrating stab wound from sharp objects, needle-stick and sharp injuries (NSSIs), are major health issue in clinical settings¹. These can result in exposure to Foreign/contaminated body fluid or blood² including hepatitis B virus (HBV), hepatitis C virus (HCV) and human immune deficiency virus (HIV).³ Globally three million out of thirty-five million healthcare workers experience NSSIs. Transmission of HBV was found more prevalent in developed countries⁴. In developing countries, factors such as compliance with infection control protocols, knowledge of infectious diseases, needle recapping, are associated with NSSIs⁵. World Health Organization (WHO) reports that prick by sharps objects contributes to 40% of Hepatitis B and C Infection whereas diseases linked to human immune deficiency virus (HIV) contribute up to 2–3% in Healthcare workers.⁶

Prevalence of Needle stick & sharp injuries among health care workers ranges from 29 to 45% however; about 35% of such injuries were reported to respective authorities.⁷⁻¹⁰. There are many contributing factors in needle stick injury. Recapping was the most common causes of NSSI (31.7%), followed by hastiness in work (28.8%).⁷ Assen et al reports that Fingers were reported to be the most frequent (45.2%) body part exposed to needlestick injury. The highest number of injuries occurred during injections (29%), then during operations (27.5%) and collecting needle and sharps after use (17.7%). Healthcare workers who recapped used needles were 2.63 times more likely to get injured compared to their counterparts.³ Similarly according to Pakistani literature NSSIs were frequent during activities such as blood sampling, injections, IV catheter insertion and disposal of contaminated needles, needle recapping and washing contaminated instruments.¹¹ Mostly healthcare workers encounter with needle stick injuries in hospital ward, usually while recapping, and followed by the operating room complex (15.3%). However, Surgeons' most common place of needle-stick injury was the operating room complex (85.4%). Practicing of needle recapping among healthcare workers is very frequent and most of the healthcare workers were found unaware that needles should not be recapped before disposing of them.^{8, 9, 12}

Thus the study has been conducted to determine the knowledge and practices regarding needle stick and sharp injuries

among healthcare workers in the operation theatre of Shalamar Hospital, Lahore

SUBJECTS AND METHODS

This cross-sectional study was carried out in the Operation Theatre of Shalamar Hospital, Lahore from May 1st, 2022 to Aug 31st, 2022. In this study 109 healthcare workers which were present in the operation theatre of Shalamar Hospital were asked to fill the questioner derived from the previous questionnaires^{7, 13}. HCWs whose probation period was less than 1 month were excluded from the study.

Data was collected from the Operation Theatre Department of Shalamar Hospital, Lahore after the approval of Shalamar Medical and Dental College Institutional Review Board (SMDC's IRB). After the approval from IRB, data was collected in the manner described below:

A questionnaire proforma was provided to each employee of the department who agreed to participate in the research including doctors, nurses, technologists, technicians and supporting staff. For those who could not understand the language, verbally questions were asked and questionnaires were filled by the principal investigator himself. A questionnaire included questions of demographics (age, job category, working experience and working hours) awareness, any needlestick injury experience and factors affecting the NSSI. Then all the filled questionnaires were collected and data was entered in SPSS version 20 and analyzed accordingly. Chi-Square test was used for analysis.

The data was collected and analyzed by SPSS 20.0 version. Frequencies were calculated for qualitative data (such as gender) whereas mean and standard deviation was computed for quantitative variables (such as age). Chi-square was used to find an association between categorical variables. 5% level of significance was used for all statistical tests.

RESULTS

A total of 109 healthcare workers Aged 32.78 ± 8.884 years. Among them 60(55%) were male and 49(45%) were female. The questionnaire was filled by 46(42.2%) doctors, 15(13.8%) nurses, 23(21.1%) technicians, 11(10.1%) technologists and 14(12.8%)

supporting staff working in the operation theatre of Shalamar Hospital, Lahore. 67 (61.5%) of the individuals knew NSSIs and 49 (45.0%) participants had suffered NSSIs throughout their job.

Table 1: Experience of participants

Experience	Frequency	Percentage
<5 years	49	45.0
5-10 years	33	30.3
11-15 years	11	10.1
16-20 years	9	8.3
>20 years	7	6.4

Table 1 shows the frequency of total experience of HCWs. The HCWs with less than 5 years of experience had the highest frequency while workers with more than 20 years of experience had the least frequency.

Table 2: Knowledge, education and frequencies of NSSIs among HCWs in the operation theatre of Shalamar Hospital, Lahore

Questions	Frequency	
	Yes	No
Do you have knowledge regarding a needlestick injury?	67 (61.5%)	42 (38.5%)
Do you have any formal education/training regarding needlestick injury at your department?	69 (63.3%)	40 (36.7%)
Do you have any training regarding occupational health and safety?	88 (80.7%)	21 (19.3%)
Have you ever experienced needlestick and sharp injury?	49 (45.0%)	60 (55.0%)
If yes, have you reported it to hospital management?	20 (18.3%)	30 (27.5%)
Do you know the types of investigation needed after a needlestick injury?	92 (84.5%)	17 (15.6%)

Table 4.5 and figure 2 shows that a total of 61.5% have knowledge regarding NSSIs, 63.3% HCWs had formal training and education regarding NSSIs, 80.7% had training regarding occupational health and safety, around 49 (45%) HCWs got injured by needlestick and sharp objects, 20 (18.3%) HCWs reported the NSSIs and while 84.5% know the types of investigations needed after NSSIs.

Table 4.1: Characteristics of working environment

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The presence of work guidelines and safety instructions at work can reduce the incidence of needlestick injury	61 (56%)	44 (40.4%)	4 (3.7%)	0 (0%)	0 (0%)
Every healthcare worker should know the immediate precautionary steps after needlestick injury?	89 (81.7%)	18 (16.5%)	2 (1.8%)	0 (0%)	0 (0%)
The presence of safety boxes at the workplace can reduce the incidence of needlestick injury	65 (59.6%)	35 (32.1%)	7 (6.4%)	2 (1.8%)	0 (0%)
The hospital which has a written protocol for reporting injury can stimulate lesser injuries	58 (53.2%)	39 (35.8)	8 (7.3%)	4 (3.7%)	0 (0%)
Using gloves during the handling of sharp objects can reduce the incidence of needlestick injury.	41 (37.6%)	36 (33%)	19 (17.43%)	12 (11%)	1 (0.9%)

Out of 109 HCWs, 61 (56%) strongly agreed and 44 (40.4%) agreed that the presence of work guideline and safety instructions can reduce the incidence of NSSIs. 89 (81.7%) HCWs strongly agreed and 18 (16.5%) agreed that every HCWs should know the immediate precautionary steps after NSSIs and just 2 (1.8%) HCWs response was neutral. 65 (59.6%) HCWs strongly agreed that the presence of safety boxes at the workplace can reduce the incidence of NSSIs, while 2 (1.8%) disagreed. Out of 109 HCWs, 41 (37.6%) strongly agreed and 36 (33%) agreed that handling sharp objects and needles by using gloves can reduce the incidence of NSSIs while 12 (11%) HCWs disagreed whereas 1 (0.9%) respond was strongly disagreed.

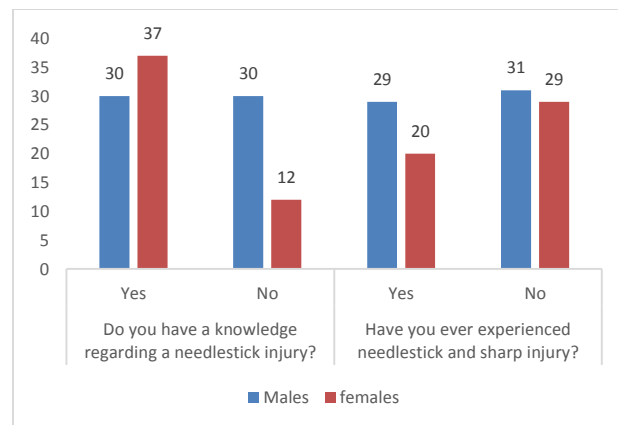


Figure 4.1: Frequency of awareness and incidence among gender

Table 4.2: Frequency of awareness and incidence among gender

		Males	Females	Exact Sig. (2-sided)
Do you have knowledge regarding a needlestick injury?	Yes	30 (27.5%)	37 (33.9%)	0.010
	No	30 (27.5%)	12 (11%)	
Have you ever experienced needlestick and sharp injury?	Yes	29 (26.6%)	20 (18.3%)	0.447
	No	31 (28.4%)	29 (26.6%)	

Table 4.3: Knowledge and experience of healthcare workers regarding their job categories

Questions		Job Category					Total	P-value
		Doctor	Nurse	Technician	Technologist	Supporting staff		
Do you have a knowledge regarding needlestick injury?	Yes	33 (30.3%)	13 (11.9%)	10 (9.2%)	7 (6.4%)	4 (3.6%)	67 (61.46%)	0.004
	No	13 (11.9%)	2 (1.8%)	13 (11.9%)	4 (3.6%)	10 (9.2%)	42 (38.5%)	
Have you ever experienced needlestick and sharp injury?	Yes	19 (17.4%)	4 (3.6%)	11 (10.1%)	4 (3.6%)	11 (10.1%)	54 (49.5%)	0.059
	No	27 (24.8%)	11 (10.1%)	12 (10.1%)	7 (6.4%)	3 (2.75%)	55 (50.5%)	

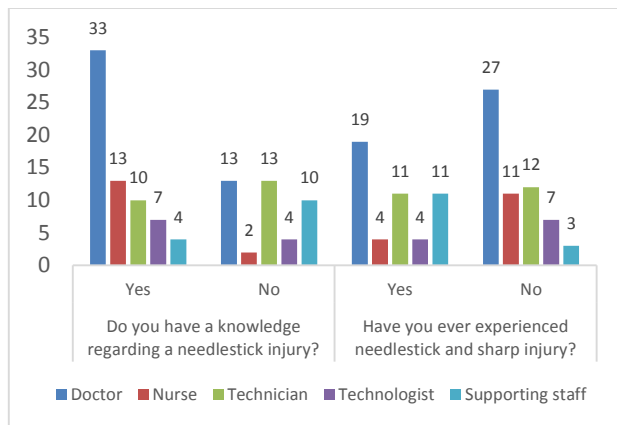


Figure 4.2: Knowledge and experience of healthcare workers regarding their job categories

Table 4.7 and Figure 4.4 represents the knowledge and experience of health care workers regarding needle stick and sharp injuries. 37 females and 30 males were reported to have knowledge regarding needle stick and sharp injuries whereas 29 males and 20 females experienced it. Knowledge regarding needle stick and sharp injuries were significant when observed in both genders whereas it was insignificant regarding the gender which experienced it the most.

Table 4.8 and Figure 4.5 shows that 33 doctors, 13 nurses, 7 technologists had knowledge regarding NSSIs whereas 13 technicians and 10 supporting staff did not have knowledge regarding NSSIs. These results were statistically significant ($p < 0.05$). 11 technicians and 11 supporting staff had the previous history of NSSI whereas 27 doctors, 11 nurses and 7 technologists had no previous history of NSSIs. These results were statistically insignificant ($p > 0.05$).

Table 4.4: Frequency of risk factors among gender

		Gender		Total	P - value
		Male	Female		
The presence of safety boxes at the workplace can reduce the incidence of needlestick injury.	Strongly Agree	44 (40.36)	21 (19.3%)	65 (59.6%)	0.005
	Agree	12 (11%)	23 (21.1%)	35 (32.1%)	
	Neutral	4 (3.7%)	3 (2.75%)	7 (6.4%)	
	Disagree	0 (0%)	2 (1.8%)	2 (1.8%)	
	Strongly Disagree	0 (0%)	0 (0%)	0 (0%)	
Using gloves during the handling of sharp objects can reduce the incidence of needlestick injury.	Strongly Agree	22 (20.1%)	19 (17.43%)	41 (37.6%)	0.327
	Agree	21 (19.3%)	15 (13.7%)	36 (33%)	
	Neutral	8 (7.34%)	11 (10.1%)	19 (17.43%)	
	Disagree	9 (8.26%)	3 (2.75%)	12 (11%)	
	Strongly Disagree	0 (0%)	1 (0.92%)	1 (0.92%)	

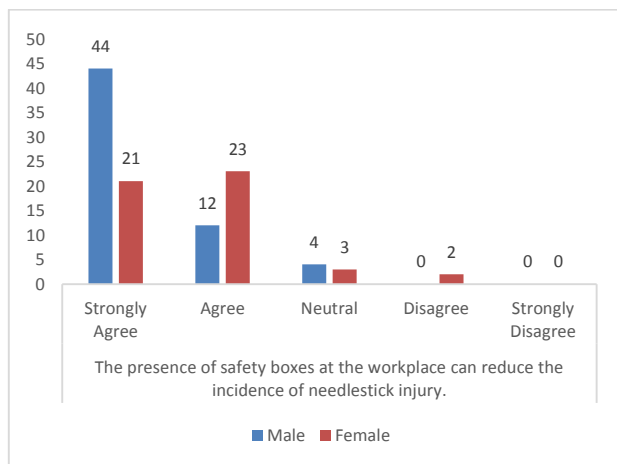


Figure 4.3: Frequency of risk factors among gender

Table 4.9 and figure 4.6 show that 44 males and 21 females strongly agreed that the presence of safety boxes at the workplace can reduce the incidence of NSSIs whereas 12 males and 23 females agreed while 4 males and 3 females remained neutral. Only 2 females disagreed that the presence of safety boxes at the workplace cannot reduce the incidence of NSSIs. These results were statistically significant ($p < 0.05$).

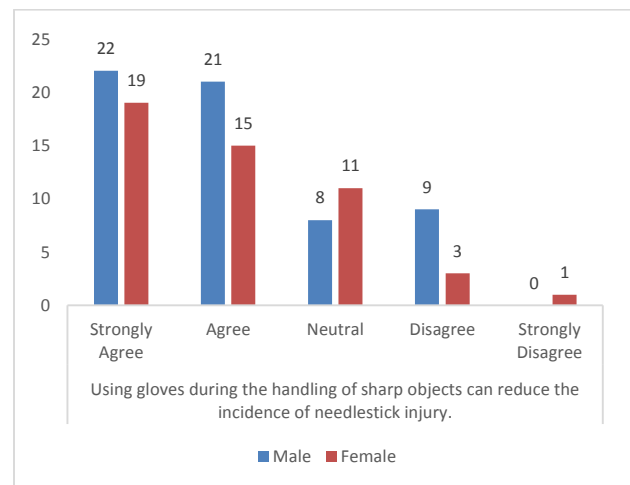


Figure 4.4: Frequency of risk factors among gender

Table 4.9 and figure 4.7 shows that 22 males and 19 females strongly agreed that using gloves during handling sharp objects can reduce the incidence of NSSIs whereas 21 males and 15 females agreed while 8 males and 11 females remained neutral. 9 males and 3 females disagreed while only 1 female strongly

disagreed with safety boxes at reducing the incidence of NSSIs. These results were statistically insignificant ($p>0.05$).

DISCUSSION

Our study reported that the awareness of NSSIs among males was 50% which was less than females (75%). Higher awareness among females was seen because a majority of females were doctors and nurses by profession. Consequently, a higher frequency of NSSI was observed in males (49% i.e. 29 out of 60) when compared to females (40.8% i.e. 20 out of 29). Assen et al. (2020) reported the incidence of NSSIs in Dessie city hospital to be 28.3% which was highest among nurses (44.4% of the total sample). Yadav et al. (2020) reported the incidence of NSSIs in Maharashtra, India to be 73.7% and the highest prevalence of NSSIs was among doctors.^{3, 14}

Our study reported the incidence of NSSIs among healthcare workers which was 45% and the highest prevalence was among supportive staff (78.6%) followed by technicians (47.8%), doctors (41.3%), technologist (36.4%) and nurses (26.6%). NSSIs were more common in supportive staff when compared to other healthcare workers. This was due to their lack of awareness and improper training regarding NSSIs. The lowest incidence of NSSIs was observed among nurses. This might be due to the nature of their work in an operation theatre.

In our study, HCWs who had work experience of fewer than 5 years (45.0% of the total sample) were at higher risk of attaining NSSIs when compared to HCWs who had greater experience. This was in correspondence to what was reported by¹⁵. It is because HCWs with less experience pay less attention to the risk factors that can lead to NSSIs.

Khan et al. (2020) reported the awareness to be 49.0% in the doctors and nurses whereas higher awareness (79.9%) was observed in our study. Other studies reported different awareness amongst healthcare professionals i.e. 70% by Jahangiri et al. (2016) and 10% by Motavaf et al. (2014).^{16, 17, 18}

Our study further reports that 84.5% of the participants, in the operation theatre of Shalamar Hospital, are aware of correct, immediate measures to be taken after needlestick and sharp injuries. This study also reports that 36.7% of respondents (40 out of 69) who had never received training or formal education, were at greater risk of receiving NSSIs and vice versa. This was in correspondence to a study performed by Sharma et al. (2010) on the prevalence of NSSI's among HCW's in Delhi, India.¹⁹

Respondents with absence of safety instructions in the work place were at a greater risk of receiving NSSIs as compared to the environment with the presence of safety instructions. These results are similar to another study conducted by Iqbal et al. (2013) on doctors working in a tertiary care hospital of Karachi, Pakistan.²⁰

37.6% of the participants strongly agreed that using gloves during handling of sharp objects can remarkably reduce the incidence of NSSI whereas 33% agreed and 17.4% remained neutral.²¹ reported that the most frequently used body part in needlestick and sharp injuries were fingers (45.2% of the cases). This could be because fingers are more exposed when handling needles and other sharp objects, during needles recapping and maintaining intravenous lines. Therefore, using gloves may reduce the incidence of needlestick and sharp injuries.

Moreover, the present study reveals most of the participants 59.6% strongly agreed and 32.1% agreed that the presence of safety boxes at the workplace may reduce the incidence of needlestick and sharp injuries. This shows good awareness since the presence of safety boxes is known to reduced NSSI by avoiding the reusage of needles and ensuring safe disposal of needles.

Despite the knowledge of needlestick and sharp injuries, 45.0% of healthcare professionals experienced it. This may be due to the unavailability of adequate resources and personal protective equipment at workplaces or inappropriate needle handling techniques. Mengesha and Yirsaw (2014) also reported similar

results by the study conducted by them in Ethiopia where half of the healthcare workers recapped needles after using them.²²

Limitations: The limitations of this study are as follows:

- i. Our study included responders from only Shalamar Hospital, Lahore
- Suggestions:** Suggestion for this study are as follows:
 - i. Awareness regarding NSSI should be brought about by discussing NSSIs not only in conferences but also by instilling them in the healthcare curriculum.
 - ii. NSSIs protocols included in the Standard Operating Procedures of the operation theatres of hospitals.

CONCLUSION

Transmission of bloodborne pathogens can be prevented by preventing needle stick and sharp injuries. Organized structured training on needle stick and sharp injuries to blood and body fluid prevention and universal precautionary steps improved the knowledge, as well as reduced the incidents among healthcare workers. Insufficient occupational safety hazards services, lack of safety instructions protocols, absence of a written protocol for reporting needle stick and sharp injuries are some factors that contribute to incidence of needle stick and sharp injuries. Initial prevention of needle stick and sharp injuries is due to the implementation of education about needle stick and sharp injuries, discarding recapped needles, using gloves during the handling of needles and sharp objects, by making the hospital protocols about needle stick and sharp injuries and using containers for the safe discarding will decrease the incidence of needle stick and sharp injuries. Additional reductions are possible by using more safer needle devices.

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