Exploring the Factors Associated with Needle Stick Injuries Among Healthcare Workers at Tertiary Care Hospital

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Abstract

Objective: To determine the frequency of Needle stick injuries (NSIs) and their associated factors among health care workers (HCWs).

Material and Methods: A descriptive cross-sectional study was conducted among HCWs who were working at Nishtar Hospital Multan from 19-02-2023 to 1-12-2023. After approval from the institutional ethical committee, data was collected by face-to-face interviews with one hundred and ninety-five study participants selected through a non-probability convenient sampling technique. Data analysis, including descriptive and analytical statistics was carried out using SPSS Version 26.

Results: Out of 195 study participants, the frequency of NSI was 129 (66.2%), 187 (95.9%) had awareness of NSI. The most common factor responsible for NSI was work overload (26.7%). The majority of the participants (65.6%) did not attend any needle safety prevention workshop in the past six months. Practicing in medicine and surgery wards, not wearing a pair of gloves, the time of injury and not attending any workshop were statistically significant factors associated with NSI among HCWs.

Conclusion: In our study, the frequency of NSI was high among HCWs. It is critical to address this issue and train the HCWs by setting up regular training sessions for them due to their poor practices of safety devices and personal protective equipment, inadequate post-exposure response, underreporting response, and lack of awareness of these hazards.

Keywords: Needle stick injury, Risk factors, Healthcare workers, Tertiary care hospital.

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Introduction

In hospitals and other medical facilities, sharp injuries are common and can have serious consequences.[1] Needle stick injuries (NSIs) are inadvertent bodily piercings caused by contaminated instruments including needles, ampoules, and lancets used in healthcare settings.[2]

According to the World Health Organization, annually 3 million healthcare workers (HCWs) worldwide are estimated to be exposed to blood-borne viruses. This led to the development of HBV in 2 million, HCV and HIV in 900,000 and 170,000 HCWs respectively, with the vast majority of incidents (90%) occurring in developing nations.[3]

NSIs besides physical sufferings also cause psychological anguish, dread, tension, and worry in HCWs. This leads to an increase in absences from work and has a direct detrimental impact on health care services.[4] In addition to this, the cost of their medical care, blood tests, and lost workdays places a heavy burden on the health care system.[5] It has been estimated that the cost of each NSI case to the healthcare system is between 650 and 750 USD, including direct and indirect costs.[6] Many factors enhance the risk of needle stick injury.

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The majority of the time, healthcare staff's flagrant negligence and dangerous practices are the reasons for needle stick injuries. According to experts, no single safety policy can be relied upon to be effective in all circumstances.[2] Moreover the risk of infection to the employee following NSIs depends on the blood-borne pathogens implicated, the degree of the injury, the employee's immune system, and the use of appropriate and effective prophylaxis after injury.[7]

Currently, there is a paucity of data regarding the true estimates of needle stick injuries, making it difficult to assess the true scope of the issue in Pakistan. So far studies conducted in Pakistan show the variability of prevalence from 37.5% to 71.6%.[8,9,10] Therefore it is vital to comprehensively identify and understand all relevant factors that are playing a key role in its prevalence including those that may be undercounted or underestimated. NSI preventative guidelines and healthcare curricula will be more effectively structured if the gaps in knowledge and the differences between knowledge and practice are recognized. This study will help in identifying areas for practice improvement and keeping these variables in consideration can help in developing effective preventive strategies for healthcare workers.

Material and Methods

After institutional review board permission, this descriptive cross-sectional study was conducted in Nishtar hospital Multan. After the taking approval from ethical committee IRB No 4548 dated 25-02-2023. Our study population comprised doctors who were included in patient care and willing to parti-cipate working as house officers, postgraduate residents and consultants in the Medicine, Surgery, Gynecological & Obstetric and Pediatric departments. Those who were in administrative posts in these departments and not willing to participate were excluded from our study. The calculated sample size was 195 with a 95% confidence level, a margin of error d=7% and prevalence p=55%[11] which was calculated by the following formula $n=z^2\ pq/d^2$. Data was collected through non-probability convenient sampling technique. Confidentiality was guaranteed and informed verbal consent was obtained. A self-designed questionnaire with closed-ended questions was used for in-person interviews. The first part of the questionnaire comprised of participant's demographic information including age and gender and the next part includes questions related to the circumstances surrounding needle stick injuries, risk factors for NSI, prior knowledge from any training in preventing needle injuries, pre-exposure immunization status, post-exposure response: reporting needle stick injuries and following protocol in case of injury. Data was analyzed by using IBM SPSS statistics 26. The result was presented in the form of tables. A Chi-square test was performed to assess the association of factors with needle stick injuries. A p value of <0.05 was taken as statistically significant.

Results

In our study, the frequency of needle stick injury was 66.2%.The majority of the study participants were female. Most of the participants were in the age group 20 to 25 years. Half of the research participants were aware of universal precautionary guidelines and 95.9% of the participants were aware of needle stick injury. 61.5% of participants with a history of needle stick injury reported washing immediately with soap and water. Most common cause of needle stick injury was work overload and 66.6% of injuries occurred during the day time. The details of the factors are given in Table 1.

Table 1: *Characteristics of study participants*

Variables	Frequency	Percentages
Gender		
Male	83	42.6%
Female	112	57.4%
Age		
20-25 years	97	49.7%
26-30 years	72	36.9%
31-35 years	13	6.7%
36-40 years	7	3.6%
Above 40 years	6	3.1%
Category		
House Officer	113	57.9%
PGR	61	31.3%
Senior Resident	7	3.6%
Consultant	14	7.2%
Ward of Practice		
Medicine	72	36.9%
Surgery	56	28.7%
Obs and Gynae	38	19.5%
Paediatrics	29	14.9%
Aware Of needle stick injury		
Yes	187	95.9%
No	8	4.1%

Knowledge about universal precaution guidelines		
Yes	115	58.97%
No	80	41.02%
Fully vaccinated against Hepatitis B		
Yes	147	75.4%
No	48	24.6%
Years of work practice		
Less than 6 months	82	42.1%
1-5 years	89	45.6%
More than 5 years	24	12.3%
Attended any workshop about needle stick injury within months		
Yes	67	34.4%
No	128	65.6%
Needle stick injury from the previous 1 year		
Yes	129	66.2%
No	66	33.8%
Causative factor for needle stick injury (n=129)		
Recapping	48	37.20%
Workload	52	40.31%
Sleepiness /tiredness	7	5.42%
During surgery	20	8.75%
Blood test sampling	2	1.55%
After Needle Stick injury did you wash immediately with soap and water		
Yes	79	61.24%
No	50	38.7%
Time of Injury		
Day	86	66.6%
Night	43	33.3%
Nature Of injury		
Superficial	8	6.2%
Deep	121	62.1%
Did you receive medical attentio after needle stick injury		
Yes	42	32.55%
No	87	67.44%
Report needle stick injury to health authorities		
Yes	34	26.35%
No	95	73.64%

Table 2: *Association of factors with needle stick injury*

Factors	Needle stick injury		p-value
	Yes	No	
Age			
20-35 years	120	62	**0.700**
36-40 years and above	9	4	
Gender			
Male	60	23	**0.119**
Female	69	43	
Attended workshop about NSI			
Yes	38	29	**0.044**
No	91	37	
Ward of practice			
Medicine	52	20	
Surgery	29	27	**0.018**
Gynecological and obstetrics	24	14	
Paediatrics	24	5	
Time of injury			
Day	83	3	**0.000**
Night	46	1	
Wearing a pair of gloves			
Yes	37	29	**0.05**
No	92	37	

Further analysis after applying the chi-square test revealed that needle-stick injury was significantly associated with prior safety workshops on needle prevention and the type of ward where participants were practicing. Statistical significant association of needle stick injury with daytime and not a wearing pair of gloves was also noted (table- II)

Discussion

NSIs are a significant and ongoing source of exposure for healthcare workers to dangerous and occasionally fatal diseases. Our study highlighted that the overall frequency of needle stick injury among healthcare workers in the previous 12 months was 66.2%. The findings are parallel to the work conducted in teaching hospitals in Iraq (53.8%) and the research reported by Getaw (60.2%).[12,13] However our results were inconsistent with the study conducted by Zemene et al (11.57%) and in India (20.1%).[14,15] This variation could be explained by differences in how standard operating procedures are used, occupational health and safety systems, policy availability and execution, inadequate NSI management, and unsafe work settings.[11]

In the current research, two-thirds of study participants

were aware of needle stick injury and 43.6% of participants did not report needle stick injury to a higher authority, one of the studies carried out in Saudi Arabia revealed that 94.7% had knowledge of needle stick injury but 52.7% (48/91) did not report their injuries.[16] Another finding from Alsabaani and colleagues has also found that 47.3% % of healthcare workers did not report their injuries.[17]

Another important observation of our study is that work overload is the main risk factor for needle stick injury. This contrasts with the research conducted by Zemeene et al where sleep at work was reported as the most common risk factor.[14] Research conducted in another tertiary care hospital in Pakistan reported that injecting medicine and drawing blood (42%) was mostly a reason for needle stick injury.[18] The various risk factors for needle stick injuries among healthcare workers in different research studies can be attributed to variations in work settings, overloaded hospitals and access to appropriate safety equipment.

It was noted by our study that most of the participants (65.6%) with needle stick injuries did not attend any workshop in the last 12 months. The interventional study has found that sensitization for the prevention and management of NSIs are essential in preventing occupational hazards and contributed to a significant improvement in the level of knowledge and practice regarding needle stick and sharp injuries.[19] Studies conducted in Ethiopia also supported our work where participants who had no training on safety and health were more significantly associated with needle stick injury.[20,21]

In the present research, day time duty was significantly associated with needle stick injury. Likewise a study conducted by Kifah et al and in Iran reported that 68% and 97.2% of needle stick injury occur during the morning shift. Hadis and colleagues reported that the possible reason for the increasing prevalence of needle stick injury in the morning hours would be that the majority of patients found it feasible to visit hospitals during these hours .[22,23]

Our research indicated the majority of participants do not have habits of wearing a pair of gloves (66.53%). Mehdi et a in his study showed that the 79.3% of study participants stated that wearing gloves is not necessary.[24] This is comparable to the study conducted in Turkey where 36.9% of healthcare workers had not been wearing gloves at the time of the incident.[25] The variations in wearing gloves among healthcare workers in different settings before needle stick injuries may be influenced by factors such as the availability of gloves, compliance with safety protocols, and individual perceptions of risk.

Conclusion

In our study, it was found that NSI is still one of the major problems among health care providers. The most effective way to reduce its incidence is by implementing a thorough plan that tackles the institutional, behavioral, and device-related factors that influence the occurrence of NSIs. Developing an active surveillance system, assessing, and using needle devices with safety features are essential components of this effort and continuing training initiatives must be a part of any preventive strategies of hospitals.

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UA, MB: Data Collection

AA: Literature Search

AA: Statistical Analysis

BI: Drafting, Revision

RA: Writing of Manuscript