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Original research article

EVALUATING THE OCCURRENCE OF NEEDLE STICK INJURIES AMONG NURSING STUDENTS

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Abstract: *Needlestick injuries (NSIs) pose significant occupational hazards for nursing students, who are at high risk due to their clinical practice. Understanding their knowledge, attitudes, and practices towards NSIs is crucial for developing effective prevention strategies.* ***Objective:*** *To assess the prevalence of NSIs among nursing students and evaluate their knowledge, attitude, and practice towards NSIs.* ***Methods****: This descriptive study was conducted at Sheikh Zayed Hospital Rahim Yar Khan from January 2023 to December 2023. Nursing students from the 2nd to final year were included, given their clinical exposure and high risk of NSIs. Data were collected through an online questionnaire based on previous studies, and distributed via email. Descriptive statistics were used to analyze the data, with means and standard deviations calculated for continuous variables and frequencies and percentages for categorical variables.* ***Results****: A total of 280 students participated in the survey. Sixty-seven students (23.9%) experienced NSIs, primarily during recapping (74.6%) and injections (21%). Most students (76.1%) did not report the incidents. The mean NSI knowledge score was 6.5 ± 1.3, and the mean attitude score was 27.5 ± 4.13, indicating a generally positive attitude. One hundred ninety-six students (70%) had received the Hepatitis B vaccine, 152 (54.2%) were worried about NSIs, 201 (71.7%) believed NSIs are preventable, and 150 (53.5%) felt NSIs are neglected. The mean practice score was 14.2 ± 2.1, indicating poor practice. Additionally, 140 students (50%) reported recapping needles before discarding, 98 (35%) wore gloves before injections/venipuncture, 64 (22.8%) practised one-handed recapping, 168* ***Conclusion:*** *(60%) used personal protective equipment (PPE), and 56 (20%) rinsed with water and soap after an NSI. Nursing students demonstrated good knowledge and a satisfactory attitude towards NSIs; however, their practice levels were low. Enhanced training and strict adherence to safety protocols are needed to improve their practices and reduce the incidence of NSIs.*

Keywords: Incidence, Knowledge, Needle Stick Injuries, Nursing Students, Sharp Disposal

Introduction

Healthcare workers, including nurses, face challenges during clinical practice which compromise their safety(1). Needle stick injuries (NSI) are one of the primary challenges faced by nursing students. NSI is an injury or wound resulting from blood transfusion and intravenous needle sets(2). Those injured by contaminated needles are exposed to the risk of acquiring Human Immunodeficiency Virus (HIV), Hepatitis B (HBV) and Hepatitis C (HCV). Exposure to blood and other body fluids during needle stick injury is a major occupational hazard and is associated with a risk of morbidity and mortality(3). Healthcare workers, especially nursing students, are exposed to the high risk of blood-borne infections as a result of needle stick injury. Various studies have reported a high prevalence of NSI (11.9%-85%) among nursing students(4, 5). A study suggested that NSI has a significantly higher prevalence in developing compared to developed countries(6).

Most incidents of NSI occur during blood sampling, suturing, drug preparation and administration and recapping. Other factors include ineffective infection control standards, insufficient resources, lack of experience and lack of training(7). In addition to physical health, NSI affects psychological well-being as well. A study concluded that NSI led to anxiety, fear and depression among nursing students and suggested that the students exposed to injury should be offered support(8). Post-exposure prophylaxis is significantly important in preventing HCV, HBC and HIV infection. Thus, healthcare workers and students must report the incident promptly to avoid catastrophic consequences (9). The incidence of infection can be reduced drastically by administering Hep B vaccines, pre-exposure and post-exposure prophylaxis and by safe use of devices (10).Most of the studies conducted on the incidence of NSI have ignored nursing students, though they are more exposed to the risk because of lack of experience. The current study aims to assess the prevalence of NSI among nursing students and to evaluate their knowledge, attitude and practice towards it.

Methodology

The descriptive study was conducted in Sheikh Zayed Hospital Rahim Yar Khan from January 2023 to December 2023. The study included nursing students from 2nd to final year, as they are practising clinically and ARE at high risk of NSI. The informed consent of the participants was taken. The ethical review board of the hospital approved the study. The research was conducted through a questionnaire based on previous studies(4, 11). The online survey forms were sent to students on their email addresses. The questionnaire comprised four parts. Part one had questions related to demographic data (age, gender and year of study) and prevalence of NSI (number, causes and report of incidences). Part two had eight questions related to knowledge about NSI and blood-borne diseases. The answers were scored as 0 or 1. Scores were added and higher scores represented a higher level of knowledge. Part three

had statements related to attitude towards NSI. A 5-point Likert-type scale was used to collect responses and the higher score showed a higher level of knowledge. Part four had statements related to practice (standard precautions, vaccination status, prevention and post-exposure prophylaxis). A 5-point Likert-type scale was used to collect responses and the higher score showed a higher level of practice. The questions had a good degree of inter-observer reliability. The questionnaire had Cronbach's alpha of 0.72, 0.71 and 0.80 in terms of practice, attitude and knowledge category respectively.

The SPSS version 23.0 was used for data analysis. Data was presented as frequency, percentage, mean and standard deviation. One-way analysis of Variance (ANOVA) and independent t-test were used to compare study variables. P value <0.05 was considered statistically significant.

Results

A total of 280 students took part in the survey. The mean age of the participants was 24.8±1.2 years. The majority of participants (n=182, 65%) were female. Of 280 participants, 128 (45.7%) were in final year. Sixty-seven (23.9%) students experienced NSIs. Most of the injuries occurred during recapping (74.6%) and injections (21%). Most students (76.1%) did not report incidents (Table I).

The mean NSI knowledge score was 6.5 ± 1.3. NSI knowledge scores are summarized in Table II. Findings of the attitude towards NSI are shown in Table III. The mean attitude score was 27.5± 4.13. In general, most students had a positive attitude. One ninety-six (70%) students had received the Hep B vaccine, 152 (54.2%) were extremely worried about the incidents of needle stick injuries, 201 (71.7%) strongly believed that it is preventable and 150 (53.5%) strongly agreed that it's neglected.

The mean practice score was 14.2± 2.1, which indicated poor practice. One forty (50%) students reported recapping needles before discarding them, 98 (35%) wore gloves before injections/ venipuncture, 64 (22.8%) practised one-handed recapping, 168 (60%) used PPE and 56 (20%) rinsed with water and soap after NSI (Table IV).

The female participants and students from senior years had higher scores in all domains compared to male participants and juniors. Final-year students who had more than 3 NSI incidents had lower NSI scores in all domains compared to other students.

Table I Demographic and clinical characteristics of the sample

Characteristics	**Frequency (%)**
Sex	
Male	98 (35%)
Female	182 (65%)
Age	
18-22	124 (44.2%)
23-27	84 (30%)
28	72 (25.7%)
Year of Study	
Second	25 (8.9%)
Third	31 (11%)
Fourth	96 (34.2%)
Fifth	128 (45.7%)
Previous education about NSI	
Yes	176 (62.8%)
No	104 (37.1%)
Reasons for **the incidents**	
Recapping	50 (74.6%)
Injection	14(21%)
Suturing	2 (2.9%)
Lumbar puncture	1 (1.4%)
Reporting of incident	
Yes	16 (23.8%)
No	51 (76.1%)

Table II Knowledge of NSI

Statement	**Answer**	**N (%)**
NSI is an unintentional wound caused by needle puncture during a clinical procedure	1	250 (89.3%)
	0	30 (10.7%)
Recapping of the syringe after the procedure reduces the risk of NSI	1	38 (13.6%)
	0	242 (86.4%)
Vaccination can prevent Hep B	1	228 (81.4%)
	0	52 (18.6%)
Proper technique and safe devices reduce the risk of NSI	1	259 (92.5%)
	0	21 (7.5%)

NSI increase the risk of acquiring HIV, HBV and HCV	1	231 (82.5%)
	0	49 (17.5%)
Maximum capacity of sharps container is 75%	1	215 (76.8%)
	0	65 (23.2%)
Washing with soap and water after NSI reduce the risk of infection	1	222 (79.3%)
	0	58 (20.7%)
Following sharp container protocol reduce the risk of NSI	1	229 (81.8%)
	0	51 (18.2%)

Table III Attitude towards NSI

	Frequency (%)				
Item	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Hep B vaccine administered	196 (70%)	42 (15%)	14 (5%)	8 (2.8%)	20 (7.1%)
Concerned about NSI	152 (54.2%)	75 (26.7%)	31 (11%)	19 (6.7%)	3 (1%)
NSI is preventable	201 (71.7%)	36 (13%)	14 (5%)	16 (5.7%)	13 (4.6%)
Concerned about patient care	70 (25%)	140 (50%)	19 (6.7%)	25 (8.9%)	26 (9.2%)
NSI is a common health concern	221 (78.9%)	28 (10%)	8 (2.8%)	15 (5.3%)	8 (2.8%)
Immediate reporting is important	224 (80%)	44 (15.7%)	12 (4.2%)	0	0
NSI is neglected	150 (53.5%)	78 (27.8%)	11 (4%)	11 (4%)	30 (10.7%)

Table IV Practice for NSI

	Frequency (%)				
Practice	**Always**	**Often**	**Sometimes**	**Rarely**	**Never**
Resheathing needles before discarding	140 (50%)	70 (25%)	44 (15.7%)	16 (5.7%)	10 (3.5%)
Wearing gloves before the procedure	98 (35%)	128 (45.7%)	19 (6.7%)	16 (5.7%)	19 (6.7%)
One-handed resheathing	64 (22.8%)	131 (46.7%)	24 (8.5%)	53 (18.9%)	8 (2.8%)
Use of PPE	168 (60%)	50 (18%)	28 (10%)	20 (7.1%)	5 (14%)
Rinsing with water and soap after NSI	56 (20%)	19 (6.7%)	31 (11%)	56 (20%)	118 (42.1%)

Discussion

NSI is a major health hazard, and like other healthcare professionals nursing students are also exposed to the risk. In the current study, we evaluated the incidence of NSI and knowledge, attitude and practice among nursing students. The mean NSI knowledge score was 6.5 ± 1.3. The results showed that students had satisfactory knowledge of needle stick injuries. This is in line with the findings of previous studies which found that students were well aware of NSI (12, 13). Most of the students were in their senior years and had prior education and training regarding NSI, as these students were more exposed to risk factors of NSI. The results regarding attitude showed that students in general had positive attitudes towards NSI. This is dissimilar to the findings of a previous study which showed low scores for attitude towards NSI(14). The findings about preventive measures and post-exposure treatments show that less than half of the students followed post-exposure protocol, this is consistent with findings of a previous study(15). Inappropriate post-exposure practice is the most significant risk factor for NSI. Nursing students should be taught post-exposure and preventive measures before entering clinical practice.

The prevalence of NSI in our sample was 23.9%, which was higher than reported by a previous study (21.5%) (16). A meta-analysis showed that NSI was more prevalent in Asian countries compared to the European states (17). A most common cause of NSI in the current study was improper recapping, similar to the previous study(18). The majority of the students did not report the incident, and previous research suggests that underreporting of NSI is a major issue which further increases health concern(19). In the current study females had higher scores compared to males in all domains, this is similar to the results of a previous study(20). However, another study found no significant difference between male and female students across any domain(11). In this study, final-year students who had more than 3 NSI incidents had lower NSI scores in all domains compared to other students. This is due to a lack of knowledge, experience and skill to perform invasive procedures. Lack of clinical experience is a risk factor for NSI among medical students(21). Our study has a few limitations. First, the use of only surveys may lead to recall bias and inaccurate results. Second, as the study was conducted in a single hospital, the results cannot be generalized. Larger studies are recommended for further analysis

Conclusion

The nursing students had good knowledge and a satisfactory attitude towards NSI, but the level of practice regarding NSI

was low. The risk of NSI among nursing students and unreported cases remains a major challenge. It is important to raise awareness among students and conduct continued professional development courses related to cross-infection control and safe use of sharp devices to reduce the risk of infection through NSI.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department concerned. (IRB/SKZCN/21-0125 Dated 15-10-21)
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

Authors Contribution

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Final Approval of version & Data Analysis
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