

The Prevalence Of Needle Stick Injury and Their Reporting Among Nursing Students In Karachi, Pakistan.

Hakim Shah¹, Javid Ali^{1*}, Rubina Khan¹, Khalilullah², Rukhsana Muhammad Haroon¹, Mahboob Ali¹, Ajmal Khan³, Muhammad Imran⁴, Rasheed Ahmad Khan¹, Zubeda Bhutto¹, Zubeeda Bhutto¹, Ubaidullah Amir⁵, Abdul Aziz⁶

(1) Institute of Nursing, Dow University of Health Sciences Karachi Pakistan

(2) Khyber Institute of Health Sciences and Technology Karachi

(3) Indus College of Nursing Karachi Pakistan

(4) KV SITE Hospital Karachi Pakistan

(5) School of Science, Medicine and Health University of Wollongong, Australia

(6) Federal Urdu University Karachi

Corresponding Author: Hakim Shah¹, Javid Ali

Abstract

Objective: we aimed to measure the proportion of Needle stick injury (NSI) among nursing students of Karachi Pakistan.

Methods: we conducted cross sectional survey in ten nursing schools (Five private Five public) situated in Karachi and included all students of diploma nursing. A structured questionnaire was used to collect information about number of NSI during last six month. Data about the reporting of the incident and post exposure prophylaxis was also collected for those who experienced any NSI. Age was categorized into three different categories and proportion with percentage for different age group was calculated. Proportion of NSI and its 95% CI was calculated. Frequency with percentage was calculated for all other categorical variables. .

Result: Over all 850 students were approached and 742 (87%) consented to participate in the study. Among 742 student nurses, 283 (38.1 %) were of 1st year, 253 (34.1%) of 2nd year and 206 (27.8%) were from 3rd year. 427 (57.7 %) were male and 315 (42.5%) were female. Furthermore, 399 (53.8 %) were from Government schools of nursing and 344 (46.2%) were from private schools of nursing. Out of 742 participants 370 (49.9%) experienced NSI during last six month. About 155 (40%) reported the incident of NSI to higher authority and the most common reasons of not reporting was lack of reporting department, work load and lack of knowledge.

Conclusion; NSI is common among nursing students in Karachi. The only few of them report the incident to the concerned authorities and hence can not avail the post exposure prophylaxis. Therefore nursing students are at high risk of developing blood borne infection.

Keywords: Needle sticks injuries, nursing, students, and blood borne infections

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I. Background

Health care facilities are not immune to blood-borne infections, where the use of sharps and needles are wide spread. Infection through Needle Stick Injuries (NSI) are ubiquitous and prevalent, to a level inescapable in health care provider during the execution of their duties.¹ NSI considered to be the major risk factors associated with blood-borne infections.² According to an estimate by Centers for Disease Control and Prevention (CDC), in the US each year three million health care provider exposed to mucocutaneous injuries and to blood body fluids via sharp, with a 6 million Needle stick injuries.³

According to the World Health Organization (WHO) report, 40% have been infected with hepatitis B and C due to occupational exposure⁸. 67.8% of the hospital's employees at least once a year had NSI.⁹ A study conducted in china estimated that 71.3 % of healthcare provider at least once a year had NSIs.¹⁰ In similar studies conducted in different country estimated 55% in India.¹¹ In Thailand 55.5%¹² The underreporting NSIs is estimated 60.2%¹³.

Globally, Every year, 3 million HCW exposed to NSI, among these HCW nurses are most vulnerable and at greatest risk, as substantiated by the fact that nurses sustained 50% of all NSI.^{14,15}

High prevalence of NSI in Previous studies indicated that nurses are at greater risk of contracting blood born infection associated with NSI due to their continue exposure to needles and sharps in the course of their job. ^{4,6,7} Nurses especially students during the course of their training are generally exposed to Skin – penetrating injuries via contaminated sharps and needles which are the cause of biological hazards such as Hepatitis B, C and HIV AIDS.

In America annually 600,000 to one million needle sticks injuries occurs. Only 10% of such injuries are reported. one person is infected with hepatitis B out of each 6 NSIs, one person is infected with hepatitis C out of each 10 NSI, and in every 300 injuries, ⁽⁵⁾

In turn, a NSI may cast a potential risk for a patient if the infected health worker carries HBV, HCV or HIV. In spite of NSI seriousness as a medical event, it has been neglected, and underreported.

The local studies showed that the incidence of NSI among health care workers (HCW) were 71.9% in Lahore³³ and 67.% in Rawalpindi ³⁴ to the best of our knowledge no study has been conducted among student nurses in Pakistan except one study from Karachi which was primarily conducted on HCWs reported 50% prevalence of NSI among students nurses. ³⁵ However this finding was based on the sample size of 12 nursing students and hence results are inconclusive.

Therefore to substantiate this results it was a high time to conduct a study which specifically target student nurses in Karachi, Pakistan. This study aim to determine the prevalence of NSI and their reporting among student nurses from both public and private nursing institutes in Karachi, Pakistan.

II. Materials and Methods

Study design, setting and population

We conducted a cross sectional survey among students of diploma nursing program studying at both private and public sector nursing institutes offering nursing diploma in Karachi. The cross sectional research design is more adequate for using comparative and contrasting sub-groups. ³⁶ Out of total 22 (13 private and 9 public) nursing institutes in Karachi, we conveniently selected 10 institutes (5 public and 5 private) during 2017-2018. Permissions were obtained from the directors or principals of the selected institutions. All of the enrolled students of diploma nursing program were approached for written informed consent and participation into the study. After the written consent, we distributed the questionnaires in each class room and 60 minutes were given to fill the questionnaire without discussing with each other. The Principal Investigator was standing in each class to clarify any question or issue as it arises during the filling of the questionnaire.

Sample size calculation

Considering 10,000 total size of diploma nursing students in Karachi, Pakistan, assuming 50% prevalence of NSI (50% is a conservative proportion which provides the maximum sample size), 5% bound on error of estimation, and design effect of 2, the required minimum sample size to achieve the objective of this study was 800.

Data collection instrument and process

Data were collected using a structured questionnaire which consisted of two sections. The first section included questions about demographic data such as age, gender, name of institute, class, contact number and class number, and the second section consisted of information regarding any needle stick injury during last six months period, number of needle stick injuries, sharp injuries such as injury with scalpel, stitching needle, glass, razor, scissor etc, causes of needle stick injuries, reporting of the incident to the Principal or class coordinator, head nurse or infection control nurse, reasons for not reporting and any post exposure prophylaxis measures taken. We followed DAB strategy of Haque & Aston. ³⁷ The data was collected by the Principal Investigator using the self-administered questionnaire in English Language. Questionnaires were administered in the class room after obtaining the informed consent. One hour time was allowed to fill the questionnaires without allowing discussion or copying from each other. No incentive was provided for filling the questionnaire and participation in the study was totally voluntary.

Ethical approval was provided by the Dow University of Health Sciences.

Data analysis

Data was entered in SPSS version 16, cleaned and analyzed accordingly. Age was categorized into three different categories and proportion with percentage for different age group was calculated. Proportion of NSI was calculated. Frequency with percentage was calculated for all other categorical variables.

III. Results

We approached 850 students and 742 consented to participate with the response rate of 87%. Male were slightly higher than females (57.5% versus 42.5%). More than half of the students (399/742: 54%) were

studying at public sector nursing institutions. More than a third of the participants were studying at 1st year (38%) followed by second year (34%) and then third year (28%). Slightly lower than half of the students were in the age group of 16-20 years (361/742:48.6%). (Table 1)

Table 2 showed the prevalence of needle stick and sharp injuries. About half of the students reported that they faced at least one needle stick injury during the last six months (370/742: 49.9%). Only 2.8% of the participants reported that they faced at least one sharp injury other than needle stick during the last six months (Table 2). On further enquiry about the number of needle stick injuries, 43/370(11%) of the participants reported at least four needle stick injuries during the last six months. Only a third of the participants reported a single needle stick injury during the last six months. (Table 3).

The top reason behind the occurrence of needle stick injury was administration of injection (both intramuscular and intravenous) (36.8%), followed by two hands needle recapping after the administration of injection or cannulation (19.5%), and then phlebotomy (18%) and administration of IV infusion (16.6%) (Table 4). None of the student received prophylactic immunoglobulin as a part of post exposure prophylaxis. Only a small fraction; of the students (16.9%) washed the wound under running water. Majority (36.3%) of the students who faced needle stick injury washed the wound with antiseptic solution. Similarly, 35% allowed the wound to bleed and 8.2% applied the adhesive medicated plaster over the wound. (Table 5).

Only a small fraction of the students (155/370:42%) who faced the needle stick injury reported the incident to their superior however none of them reported it to the infection control department. Out of 155 who reported the incident, 67.7% reported it to the head nurse, followed by supervisor (18%) and then matron (5.5%), Principal of the school (4.5%). (Table 6). On enquiry regarding the reasons for not reporting the incident, most of the students reported excessive work load (51%) as the major reason of failure to report the incident. 19% of the students who faced needle stick injury did not report it to their superior authority because they were unaware of such reporting. Similarly 15% of the students reported there was no such reporting mechanism for reporting of the needle stick injuries in their institution. (Table 7).

Table 1: Sociodemographic characteristics of the nursing students in Karachi, Pakistan (N=742)

Socio-demographic characteristics	N (%)
Gender (male)	427(57.5)
Type of nursing school:	
State owned public	399(53.8)
Private	343(46.2)
Nursing class of the participant:	
1 st year	283(38.1)
2 nd year	253(34.1)
3 rd year	206(27.8)
Age in years:	
16-20	361(48.6)
21-25	354(47.7)
>25	27(9.7)

Table 2: Prevalence of at least one needle stick injury during past 6 months among nursing students in Karachi, Pakistan (n=742)

Contaminated sharp/needle stick injury	N(%)
Atleast one needle stick injury during past 6 months	370(49.9)
Atleast one sharp injury during past 6 months except needle stick injury	21(2.8)

Table 3: Distribution of the number of needle stick injuries among nursing students in Karachi, Pakistan (n=370)

Distribution of NSI	N(%)
One time	126(32.2)
Two times	155(39.6)
Three times	67(17.1)
Four times	26(6.6)
More than four	17(4.4)

Table 4: Distribution of the various reasons behind the occurrence of needle stick injury among nursing students in Karachi, Pakistan (n=370)

Reason for the occurrence of NSI	N(%)
Drawing blood	74(18)
Blood transfusion	27(6.9)
Intravenous infusion	65(16.6)
Administering injection	144(36.8)
Two hand recapping of needle	76(19.4)

Any other reason	5(1.27)
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Table 5: Post exposure measures after occurrence of needle stick injuries among the nursing students in Karachi, Pakistan

Post exposure measures	N(%)
Washed the wound under running water	66(16.9)
Allowed to bleed	140(35.8)
Wash the wound with antiseptic solution	142(36.3)
Applied an adhesive medicated plaster	32(8.2)
Allowed to bleed and washed	10(2.6)
Washed and allowed to bleed	1(0.3)

Table 6: Incident reporting to the relevant authority after the occurrence of needle stick injury among nursing students in Karachi, Pakistan (n=155)

Reporting	N(%)
Head nurse	105(67.7)
Supervisor	28(18.1)
RMO	8(5.2)
Matron	7(5.5)
Principal	7(4.5)

Table 7: Reasons for not reporting the incident of needle stick injuries among nursing students in Karachi, Pakistan

Reasons for not reporting	N(%)
Excessive work load	121(51.3)
Lack of knowledge to report	44(18.6)
Lack of reporting mechanism	36(15.3)
Unable to report due to laziness	24(10.2)
Any other reasons	11(4.7)

IV. Discussion

This is the first study from Pakistan which measured the proportion of NSI and reporting of this incident to the relevant authorities among representative sample of students of diploma nursing program. This study found that about half of the students experienced NSI during the last six months and more than a quarter of the students reported at least three NSIs. An earlier study from Karachi conducted among HCWs also reported that among the nursing students the prevalence of NSI during last one year was 50%.³⁵ The prevalence reported in earlier study is lower than our prevalence as our time duration was only six months rather than 1 year in the earlier study. In addition, the earlier study was primarily conducted among HCWs in general and hence the study was not sufficiently powered for the nursing students (n=12 nursing students). Other studies from Uttarakhand India and Jordan reported that 58% of the diploma nursing students from India³⁶ and slightly lower than half (46%) of the Baccalaureate nursing students from Jordan³⁷ reported at least one NSI during the academic year respectively. This comparison clearly demonstrates that NSIs are predominantly higher among nursing students in Pakistan.

About two third of the students who experienced NSI did not report it to the relevant authorities because of work load, lack of knowledge, or lack of any such reporting mechanism. The study from India also reported that more than half (54%) of the nursing students experiencing NSI did not report it however this study did not report the reason for not reporting the incident³⁸. In contrast the study from South Jordan reported that less than half (43%) of the students did not report the incident after NSI which is lower than our findings³⁹.

In this study more than a quarter of the students reported at least 3 NSI during the last six months which is substantially higher than the study conducted in India (only 5% students reported at least 3 NSI) and study conducted in Jordan (only 9% of the students reported at least 3 NSI during the academic year).

In Pakistan, nursing students of diploma program have a curriculum requiring extensive clinical rotations which starts immediately after the first three months preliminary training during their first year of diploma program. Most of these clinical rotations are independently done with a minimal supervision by the registered nurse and at times these student nurses are rotated in shift duties to compensate for the skilled nurses shortage. Most of the nursing schools do not provide free hepatitis B vaccination before the initiation of these clinical rotations and hence majority of the nursing students are unvaccinated especially against hepatitis B. On top of it, Pakistan has one of the highest prevalence of hepatitis B and C in the region and there is concentrated epidemic of HIV AIDS among the IV drug users and sex workers. Therefore, nursing students in Pakistan are at

high risk of contracting blood borne infections especially when the prevalence of NSI is higher, timely reporting of the incident is lower and facilities for post exposure prophylaxis are not available.

This study has the strength of enrolling sufficiently large number of students from several private and public sector nursing schools located in Karachi, Pakistan and hence the results has the potential to be generalized to nursing students of Diploma program in Pakistan and similar setting in the region. Beside the strength, there are also few limitations which need to be considered while generalizing the findings of this study. Firstly, this was a cross sectional survey and the data on the occurrence of NSI was based on the six monthly recall with the potential to result in imperfect recall bias. While the data on number of NSIs might have biased to some extent due to imperfect recall, it might have not affected information on recalling the occurrence of any NSI during last six months. Secondly, we collected data by using the self-administered questionnaire in English language. While most of the nursing students can read and understand English as their curriculum is taught in English, there is a possibility that some of the students might have not understand the questions and also might have not asked for the assistance from the Principal Investigator.

We recommend the establishment of registry for monitoring the NSI among health care workers including the nursing students in each public and private hospital of Pakistan so that to accurately measure the incidence of NSIs and provide useful reliable data for infection control and policy implications.

Substantially higher number of students of diploma nursing program in Pakistan experience NSIs and most of these NSI are unreported creating an alarming situation for the public health professionals and policy makers. Awareness, vaccination against Hepatitis B, and availability of proper reporting mechanism and post exposure prophylaxis should be instituted in each hospital for the diploma nursing students. Nursing students are used as a cheap labor in Pakistan and it is their constitutional right to obtain all these facilities free of cost before the initiation of clinical rotation in the wards.

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