IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 3 Ver.8 March. (2018), PP 72-77
www.iosrjournals.org

Knowledge and Practices of Needle Stick Injuries among Nurses in A Tertiary Care Hospital in Northeast India – A Cross Sectional Study

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Abstract: ***Introduction:*** *Needle stick injuries (NSIs) are wounds caused by needles in health care setup that accidentally puncture the skin and may result in exposure to blood or other body fluids. NSI is a major occupational health and safety issue faced by health care professionals globally. Needle prick injuries (NPI) are the commonest route by which blood- borne pathogens such as HIV and hepatitis B and C are transmitted from patients to healthcare workers. Such infections serve as high occupational risks and threats to healthcare workers, especially where basic rules of occupational safety and health are not implemented. Nurses have the highest rate of needle stick injury among all the health care workers.****Objectives:****a) To assess the knowledge of Needle stick injuries (NSI) among nurses in RIMS, Imphal b) To determine the practices of Needle stick injuries (NSI) among nurses in RIMS, Imphal****Materials and Methods:****A cross sectional study was conducted in a tertiary care hospital in Imphal among nurses from December 2016 to Jan 2017. Self-administered questionnaire was used for data collection. Descriptive statistics like mean, standard deviation were used. Chi square test and Fishers exact test was used to see the association and a P-value of <0.05 was taken as significant.* ***Results:****25.4% of the nurses had adequate knowledge. The nurses who experienced needle stick injuries in the past one year were 67.3%. By giving i.v injections(42.2%) was the frequent mode of NSI acquired among the nurses. Disposable syringe needle (64.1%) was the most common device involved in the injuries. The frequent cause of NSI was due to rush (47.3%). Majority (64.1%) washed the NSI injured site with water and soap soon after the injury. 65% of the participants performed blood test after injury. The nurses who received post exposure after NSI injury were only 27.5%. Most of them (57.8%) reported the NSI to their higher officials.*
Conclusion:*Needle stick injury is a serious occupational health problem among the nurses. Workshop on needle stick injuries and safe injection practices should be conducted at regular time intervals to increase their knowledge. Proper screening after NSI and importance of post-exposure prophylaxis should be greatly motivated among the nurses.*

Keywords:*Cross-sectional study, needle stick injuries, nurses*

Date of Submission: 05-03-2018 Date of acceptance: 19-03-2018

I. Introduction

Needle stick injuries among healthcare workers are common. They are one of the main ways of transmitting large numbers of pathogenic micro-organisms in healthcare institutions.[1]Needle stick injuries are wounds caused by needles that accidently harm the skin. Needle stick wounds are risky for health care providers, who work in clinical setting with hypodermic syringes and other sharp equipments. Injection safety is an important component to keep away from disease, which is transmitted by unsafe practice. Safe infusion practices are one that does not harm the supplier, does not expose the supplier to any avoidable hazard. This is accomplished by giving an infusion utilizing a sterile syringe, utilizing sterile procedure by an all-around prepared individual and disposes of it appropriately.The best practices for safe injection techniques are avoiding unnecessary injections, using sterile injection equipment and sharps, preparing and give infusion without contamination and disposing of sharps to prevent reuse and harmful waste.[2]

Needle stick injuries (NSI) are the commonest route by which blood- bornepathogens infections such as HIV and hepatitis B and C viruses are transmitted from patients to healthcare workers. Such infections serve as high occupational risks and threats to healthcare workers, especially where basic rules of occupational safety

and health are not implemented. It is estimated that the risk of contracting hepatitis B infection due to a needle prick injury is 100 times higher than that of contracting HIV.[3]Most people at risk for occupational exposures are in developing countries where there is paucity of standard reporting protocol.[4] World Health Organization, in its World Health Report 2002, reports that of 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year. Around 37.6% of hepatitis B, 39% of hepatitis C and 4.4% of HIV/acquired immunodeficiency syndrome in health- care workers around the world are due to NSIs.[5]

Nurses who work in health care institutions with less adequate resources or poor organizational climate and nurse leadership had a significant risk of needle stick injuries. Nurses in hospitals with favorable working environments are about 20–34% less likely to experience NSIs. Nurses working on hospitals with lower staffing rates and high levels of emotional stress and exhaustion related to their jobs had significantly higher likelihoods of needle stick injuries.[6] More than one-third of the health care personnel are exposed to each of the two types of hepatitis, i.e., hepatitis B virus (HBV) (37.6%) and HCV (39%) while 4.4% are exposed to HIV because of NSI's.[7]

Therefore, this study was conducted a) to assess the knowledge of needle stick injuries among nurses andto determine the practices of needle stick injuries among nurses in the hospital.

II. Materials And Methods

A cross-sectional study was conducted in a tertiary care hospital of Imphal, Manipur, among all nurses from Dec 2016 to Jan 2017. Those who refused to participate and those who could not be contacted even after three consecutive visits and nurses working in administrative office were excluded from the study.

The operational definitionof NSI for the study was, "any prick to the respondent by a needle previously used on a patient, is work related and sustained within the hospital premise".[5]The patients who experienced NSI in the past one yearare considered to be "Recent NSI".

2.1 Study Instrument: Data were collected using a pre-tested and predesigned self- administered questionnaire that consisted questions on particulars of the respondent and questions about the needle stick event in the last 1-year. It consisted for three parts:

Part A: Socio-demographic characteristics of the participants

Part B: Knowledge about Needle stick injuries

Part C: Practice measures after Needle stick injuries by the nurses

Knowledge scoring: There were six questions regarding needle stick injuries. The score distribution for each question was as follows: First question has two options, second question has eight options, third question has three options and score of one was given for each correct option. Fourth to sixth question has one correct option and a score of one was given for each. Maximum score was 16 and minimum score was 0. Respondents scoring more than 75th percentile of highest obtainable score was categorized as having adequate knowledge.

2.2 Data Collection:The respondents were approached in their respective departments and after taking an informed verbal consent, the questionnaires were distributed. The completely filled questionnaires were collected on the same day or the next day. The participants were assured about their anonymity.

2.3 Statistical Analysis:Descriptive statistics such as mean, percentage and standard deviation were used. Chi-square test and Fishers exact test was used to see the association between NSI and some selected variables of interest and a p value of < 0.05 was taken as significant.

2.4 Ethical Issues:Ethical approval was sought from RIMS Ethics Board, Imphal

III. Results

Out of 498 eligible respondents, 406 participated in the study with a response rate of 81.5%. The mean age of the respondents was 36.82(±7.62) years, ranging from 22 years to 62 years. **Figure 1** demonstrates that 103(25.4%) had adequate knowledge.**Table 1** shows the socio-demographic characteristics of the participants and majority (47.3%) of the nurses are in the age group 31-40 years. 97.3% are female. Half of them (51.5.%) are GNM by educational qualification. Most of them (49.3%) work for 41-50 hours in a week. 235(61.2%) of the participants give less than 20 injections per day. 186(45.8%) of the participants belong to the category of less than 10 years of service.

Table 2 Characteristics of the recent NSI of the participants. Among the nurses who experienced recent NSI, majority (72.8%)experienced only once in the past one year. NSI is commonly acquired by the participants while giving i.vinjection (42.2%), followed by recapping of needle. Disposable syringe needle (64.1%) was the most common device leading to NSI among the nurses. During rush (47.1%) was the circumstance due to which NSI was frequent in occurrence. NSI mostly occurred in the morning shift (49.5%). The prevalence of NSI among the nurses within the last 1-year was 25.3% (N = 103).

In **Table 3**, shows that 42.2% of the patients did not report the NSI and only 27.5% (28/103) took post-exposure prophylaxis (PEP). Of all the nurses who had NSI, 65% did blood test to rule out blood borne diseases acquired due to NSI. About 36.7% of the nurses had attended seminar or workshop on post exposure

prophylaxis. Nurses who received training on safe injection practices were 31.2% only.**Fig 2,** theprevalence ofNeedle stick injuries among nurses within the last one-year was 103(25.3%).

It was observed that educational qualification was significantly associated with recent NSI. GNM nurses had high chances of NSI injury compared to M.Sc. Nursing staff and it was found to be statistically significant. There was no significant association between recent NSI and number of injections given per day and years of service.

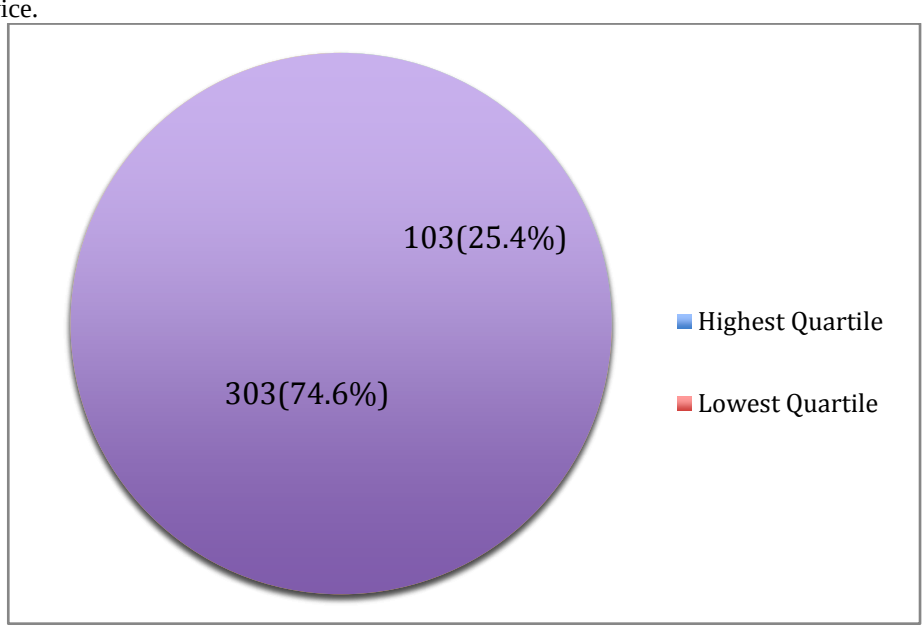

Fig 1: Distribution of participants by knowledge (n=406)

Table1. Socio-demographic characteristics of the participants (n=406)

Variable	Frequency	%
Age (years)		
21-30	97	23.9
31-40	142	47.3
41-50	101	24.9
>50	16	4.5
Sex		
Female	395	97.3
Male	11	2.7
Educational Qualifications		
GNM*	209	51.5
Bsc Nursing	148	36.5
Msc Nursing	46	11.3
Others	3	0.7
Hours of work per day		
<30	12	3
31-40	119	29.3
41-50	200	49.3
51-60	68	16.7
>60	7	1.7
No of injections/day		
<20	253	61.2
21-40	111	27.3
41-60	32	7.9
61-80	4	1.0
>80	2	0.5
Years of service (in years)		
<10	186	45.8
11-20	171	42.1
21-30	40	9.9
>30	9	2.2

G.N.M – General Nursing Midwifery

Table 2. Characteristics of the recent NSI (n=103)

Variable	Frequency	Percentage
Frequency of NSI in past one year		
1	75	72.8
2	5	4.9
≥ 3	2	1.9
Don't remember	21	20.4
Mode of acquiring NSI *		
Giving iv injection	43	42.2
Giving i.m injection	17	16.7
Blood sampling	16	15.7
Recapping neeedle	19	18.6
others	9	2.2%
Circumstances leading to injury*		
Fatigue	12	11.8%
Lack Of Assistance	17	16.7%
During Rush	48	47.1%
Un Co-Operative Patient	25	24.3%
Others	1	1%
Type of device leading to injury*		
Disposable syringe needle	66	64.1%
Iv catheter stylet	26	25.2%
Suture needle	7	6.8%
Scalp vein set	4	3.9%
Others	3	0.7%

*- Multiple Answers Allowed

Table 3. Measures taken after NSI (n=103)

Measures	Frequency	Percentage
Preventive Measure After NSI		
Wash with water	29	28.4
Wash with water and soap	66	64.1
Apply spirit	4	4
Squeeze wound	3	2.9
Nothing	1	1
Blood Test Done After NSI		
Yes	67	65
No	36	35
Received Any Post Exposure Prophylaxis[#]		
Yes	28	27.5
No	74	72.5
Report NSI Incident To Higher Authority[#]		
Yes	59	57.8
No	43	42.2

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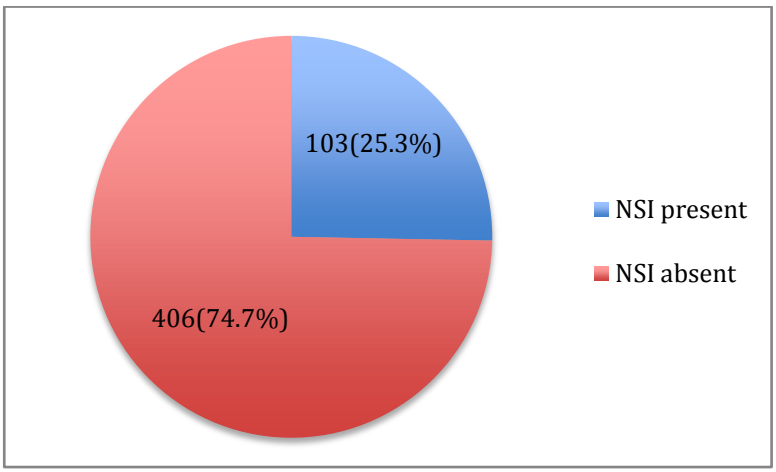

Fig 2: The prevalence of needle stick injury among the nurses in the last one-year (n=406)

IV. Discussion

NSI is a potential public health problem and is a major risk factor for transmission of various blood borne infections among the nurses. In our study, the response rate was 81.5%. Similar response rate were seen in Zung Li et al(74%) and Rajput PS et al(77%). The female are majority (97.3%) in our study. Similar findings are also seen in other studies.[3,7,10,13,15,17] In this study, 25.4% of the participants had adequate knowledge. But in one study conducted by Zia M et al, 77.1% of the participants had good knowledge.[2] This may be because in this study categorized, nurses with with knowledge score above 75th percentile as having good knowledge. 32.7% experienced needle stick injury in the past one year in this study. Similar findings were seen among nurses in other studies.[1,5,16,18,20]But in a study conducted by Ahmed AS in Egypt, there was a high prevalence of needle stick injuries among nurses of 55.93%.[6] The number of NSI in past one year was 18.4%. Another study by Suliman M et al[10] showed a higher prevalence of 45.2% of one NSI in past one year among nurses. On the contrary, study by Priyangani YM et al in SriLanka showed a very low prevalence of 7.7%.[12]

The most common activity leading to NSI in this study was giving i.v injection(42.2%). Similar findings were seen in studies conducted by Ahmed SS[6] and Priyangani YMH[12], where i.v injections was the most common activity associated with NSI. But, needle recapping was common activity in other studies.[7,9]Disposable syringe needle(64.1%) was the most common device leading to NSI injury. These findings were also observed by other researchers.[1,5,6,7,9] Rush(47.1%) was the frequent circumstance leading to NSI among nurses in our study. Similar results were also seen by other authors.[5,9]However study by Li Z et al[3] and Rajput PS[7] revealed that un co-operative patient leads to higher cases of NSI in their study. After NSI, majority of the participants wash the wound with water and soap which was seen in concordance with study by Laishram et al.[5] However, in one study by Ahmed SS in Egypt shows that nurses mainly used antiseptics to clean the injury site.[6]In this study, only 35% didn't do blood test after NSI injury. Similar findings were seen by Rajput SS in Maharastra.[7] In this study 27.5% received post exposure prophylaxis after NSI. However studies conducted by some authors showed poor post exposure prophylaxis of less than 10%. [5,6,19] But in one study by Makade KG in Chattisgarh showed a higher rate of 88.2% post exposure prophylaxis. [14]

In this study 57.8% of nurses reported NSI to their higher officials. Similar finding was noted by Kruger WH et al. [11] But, in Gujarat a study by Shah R, the response rate was low (8.3%). [16] In this study, 31.2% had received training on safe injection practices. However, study by Rajput PS revealed that 69.7% of the participants didn't receive any training.[7] Reporting to the concerned authorities, screening after NSI and promotion of safety measures should be greatly encouraged. There was association between NSI and educational qualification of the nurses in this study. Those nurses with higher educational qualification have lesser chances of NSI. Similar association was seen in study by Ahmed AS.[6]However this association between NSI and educational qualification was not seen in other studies.[5,7]NSIs among nurses are common and are often not reported and the majority of them did not take PEP. These findings warranted the need for ongoing attention to strategies to reduce such injuries in a systematic way and to improve reporting system so that appropriate medical care can be delivered.

V. Conclusion

In our study one fourth of the nurses had adequate knowledge. The prevalence of NSI among nurses in the last one yearwas 25.3%. NSI occurred more frequently while giving i.v injections. NSI was occurring mainly due to rush. Disposable syringe was the common device leading to injury. Five out of ten participants experience NSI in the morning shift. Two third of the participants washed the injury site with water and soap. One third fail to do blood test after NSI. Only three out of ten did receive post-exposure prophylaxis. Advantages of this study were good response rate and NSI in the past year was evaluated, hence chances of recall bias may be reduced. Limitation was the findings could be generalizable to similar settings. Since most of the NSI occurred in the morning shift, steps should be taken to increase the number of nursing staff to tackle the patient load.Knowledge on NSI and precaution measures would have a great impact in reducing the burden. The importance of blood test and post exposure prophylaxis will limit the spread of blood borne infections.

VI. Recommendation

This study provides an important insight regarding the knowledge, prevalence of NSI and practical measures after NSI in the hospital, which can be considered, in order to plan for effective steps to conduct workshop on post-exposure prophylaxis and safe injection practices among nurses to update their knowledge and to reduce the NSI burden.

Acknowledgement

We are deeply grateful to all the study participants in the study for their kind cooperation.

Conflict of Interest: The authors declare no competing interests.

Author's Contribution: SK and ML, conceived the research work. SK and ML coordinated the data collection.

SK and MLcarried out the data analysis. SK contributed in literature review. SK wrote the draft of manuscript. SBK interpret the results and revised the manuscript. All the authors contributed in the revision of the paper and agreed on the final manuscript.

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