

Prevalence of Needlestick Injuries and Its Related Factors Among Nurses

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Abstract:

Aims and objectives: Needle Stick Injuries (NSI) is one of the common occupational hazard for nurses and can occur because of variety of causes. This study was aimed at finding out the prevalence of NSI and to explore the factors related to NSI incidences.

Methods and materials: This quantitative descriptive study was conducted among 150 nurses working two tertiary care hospitals in Haryana. Convenient sampling technique was used to selected nurses for the study. A self-developed socio-demographic profile and a questionnaire to assess needle stick injuries and related factors was administered to each of the study participants.

Results: Majority (79.3%) of nurses were GNM qualified. Overall, every third nurse (33.3%) had sustained needle stick injury at least once in the past. Only 19 (12.7%) nurses have received Hepatitis-B vaccination. Nearly two third of the participants (64.9%) did not think that it was important to have Hepatitis B vaccination. More than half (56%) of the NSI incidents occurred while the nurses were recapping the needle, 10% of the incidences occurred while passing needle and 10% while disposing the needle and or breaking. The most common cause of NSI as perceived by nurses was lack of proper equipment for disposal (50%) followed by increased workload (24%), carelessness (18%) and fatigue (8%). Majority (62%) of the NSI was sustained during night shift

Conclusion: Prevalence of NSI reported by the study is alarming and it needs attention to reduce the risk of occupational hazards. Study suggests that education and training of nurses and reinforcement to stick with the protocols is necessary for the nurses. Such interventions may reduce the risk of NSI incidents.

I. Introduction:

Occupational health and safety risks are high in organizations providing health care, particularly in hospitals. Hospitals are complex organizations where employees use electronic devices, carry heavy weights, are exposed to chemicals, use radioactive material and equipment, are exposed to biological material that carry risk of infection, and regularly use sharp tools.¹ All these activities put health care workers' health and safety at risk on a daily basis.

A significant portion of a health care worker's day is spent on activities related to the direct provision of patient care. As a result, even the smallest mistake can result in serious and irreversible outcomes. The level of risk with health care worker varies according to profession, occupation and division. In comparison to all health care workers, nurses, physicians, dentists, orderlies and housekeeping staff carry the highest risk of being exposed to blood-borne agents.² As nurses spend most of the time with patients and provide the most direct patient care, nurses are also the employee group that are most susceptible to worksite-related medical problems.³

Contaminated sharps present a significant risk of infection both to health care workers and to patients. It is not uncommon for health care workers to become infected by a patient while providing health care. Health care workers do not give enough importance to preventive measures when coming in contact with potentially infectious materials or to procedures in place regarding post-contact monitoring. There is also insufficient awareness of inadequate risk awareness, benefits of adhering to standard measures, importance of notification and serologic observation after sustaining a sharp injury.³

Needle stick injuries (NSI) are wounds caused by sharps such as hypodermic needles, blood collection needles, IV cannulas or needles used to connect parts of IV delivery systems. These injuries can occur because of variety of causes which includes factors like type and design of needle, recapping activity, handling/transferring specimens, collision between HCWs or sharps, during clean-up, manipulating needles in patient line related work, handling devices or failure to dispose of the needle in puncture proof containers.⁴

The major blood-borne pathogens of concern associated with needlestick injury are hepatitis B virus (HBV), hepatitis C virus (HCV) and HIV. However, other infectious agents also have the potential for transmission through needlestick injury, including: Human T-lymphotropic retroviruses, Cytomegalovirus,

Malarial parasites etc. Globally, about 35 million HCWs face the risk of sharps injuries from contaminated sharp objects every year. However, previous research has indicated that Sharp Injuries may be under-reported by 39.4% to 75%. Some HCWs are not seriously concerned about infection by sharp injuries and forget to report accidents. Yet sharp injuries constitute a significant risk of transfer of blood-borne pathogens, and proper prevention and treatment is, therefore, important for HCWs.⁵

It has been estimated that more than one million needle stick injuries are reported each year and each needle stick has the potential to be infectious. There are more than 23 infectious diseases that can be passed on by a needle stick or a sharps injury, but those most frequently discussed are human immunodeficiency virus (HIV) and hepatitis. A health care worker has a 0.1%–0.4% chance of contracting HIV through an infected needle. The likelihood of contracting hepatitis B or C through a contaminated needle is 1.2%–40% per needle stick. The average transmission rates are highest (22-31%) for hepatitis B that is positive for both hepatitis B surface antigen and hepatitis B antigen.⁶ Because needle stick injuries are often under reported, health care institutions should not interpret low reporting rate as low injury rate. Injuries recorded through standard occupational reporting systems may underestimate the true injury rate, as much as 10-fold.⁷

This study was planned to determine the prevalence of needle stick injuries and explore factors related to needle stick injuries among nurses working in two selected hospitals of Haryana.

II. Methods and materials:

This quantitative descriptive study was conducted among 150 nurses working two tertiary care hospitals in Haryana. Convenient sampling technique was used to selected nurses for the study. A self-developed socio-demographic profile and a questionnaire to assess needle stick injuries and related factors was administered to each of the study participants. The questionnaires were validated by nursing and medical experts and then tools were pretested to determine the reliability. The collected data were tabulated in master data sheet using MS-Excel and the data were analysed using SPSS 20.0.

III. Results:

As shown in table no. 1, the study included 150 nurses out of which 133 were (89.7%) were female. Majority (79.3%) of nurses were GNM qualified and only one nurse was M.Sc qualified. Majority (68.7%) of the nurses were married.

Table 1: Socio-Demographic and Personal Characteristics of Study Participants.

N=150			
S. No.	Socio-demographic Characteristic	Frequency (%)	
1	Gender	Male	17 (11.3)
		Female	133 (89.7)
2	Qualification	GNM	119 (79.3)
		B.Sc	14 (9.3)
		P.B.B.Sc.	16 (10.7)
		M.Sc.	1 (0.7)
3	Marital Status	Single	33(22.0)
		Married	103(68.7)
		Divorced/Separated	13(8.7)
		Widow/Widower	1(0.7)
5	Department	Emergency Room	14(9.3)
		Surgery	16(10.7)
		ICU	35(23.3)
		Medicine	49(32.7)
		ICCU	8(5.3)
		ENT	6(4)
		Paediatrics	2(1.3)
		CCU	10(6.7)
		Labour Room	5(3.3)
		Ortho	2(1.3)
		N3	0
		No	137 (86.7)

Table 2- Frequency and Percentage Distribution of Variables Related to Needlestick Injuries

N=150

S.No.	Variable	Frequency (%)	
1	Attended in-service education (ISE) before?	Yes	12 (8.7)
		No	138 (91.3)
1 (a)	No. of times attended ISE before? (n=12)	1	11 (84.6)
		2	2(16.7)
2.	Received Hep-B vaccine?	Yes	19 (12.7)
		No	131 (87.3)
2 (a).	No of Hepatitis B doses received (n=19)	One dose	6(31.6)
		Two dose	4(21.1)
		Three dose	7(36.8)
		Booster dose	2(10.5)
3.	Hepatitis B vaccination paid by	Self	12(63.2)
		Hospital for free	5(26.3)
		Other	2(10.5)
4.	Reasons for not receiving Hepatitis B (n=131)	Did not know it was available	29(22.1)
		Did not think it was important	85(64.9)
		People discouraged	13(9.9)
		Any other -specify	4(3.1)
11	Ever sustained NSI	Yes	50 (33.3)
		No	100 (66.7)
12	Frequency of NSI	None	100 (66.7)
		One	25 (16.7)
		Two	14(19.3)
		Three	8(5.3)
		Four or above	3(2.0)

Data given in **Table 2** illustrates the frequency and percentage distribution of personal and professional characteristics of study participants. Only 19 (12.7%) nurses have received Hepatitis-B vaccination out of which only 7(36.8%) received all three doses and only 2 nurses received booster dose. Most (86.7%) of the nurses have never attended any in-service education programme on prevention and management of needle stick injuries.

In regard to reason for not receiving Hepatitis B vaccine, nearly two third of the participants (64.9%) did not think that it was important to have Hepatitis B vaccination and 22.1% of nurses did not know that the vaccine was available of Hepatitis B.

Overall, every third nurse (33.3%) had sustained needle stick injury at least once in the past, out of which 16.7% (n=25) had NSI only once, 19.3% (n=14) had twice and 5.3% (n=8) had thrice and 25 (n=3) had four or more times.

Table 3: Analysis of Circumstances Related to the Incidences of Needlestick Injuries

N=50

S. No.	Variables	Frequency (%)	
1.	Nursing activity when NSI sustained	While passing Needle	7(14.0)
		Disposing needle bending/breaking	5(10.0)
		Recapping	28(56)
		Any other-yying at work area	10(20)
2	Perceived cause of the NSI by nurses	Workload	12(24)
		Fatigue	4(8.0)
		Lack of proper equipment for disposal	25(50)
3	Type of needle while sustaining needle stick injury	Any other(careless)	9(18)
		I/V cannula	12(24)
		Butterfly	4(8)
		Hollow Bore	29(58)
		Others specify suture	5(10)

4	Shift in which NSI sustained	Day	17(34.0)
		Afternoon	2(4)
		Night	31(62)
5	Site of injury in the recent NSI	Hand	5(10.2)
		Palm	9(18.4)
		Finger/thumb/index finger	32(65.3)
		Any Other/feet etc	3(6.1)
6.	Reported NSI?	Yes	9(18)
		No	41 (82)
6.1	NSI reported to (n=9)	Ward in charge	1(11.1)
		Doctor	6(66.7)
		Any other person	2 (22)
6.2	Reason for not reporting (n=41)	Did not know whom to report	12(29.3)
		There is no use of reporting it	6(14.6)
		Scared to report	12(29.3)
		Other reasons	11(26.8)
7	Action taken after needlestick injury was reported (n=9)	Blood test was done	5(55.6)
		No action was taken	3(33.3)
		Any other action please specify	1(11.1)
8	Area in which the most recent needlestick injury occurred	Patient Room	12(24.0)
		Outside Patient Room (hallway, nurses station, etc	4 (8.0)
		Emergency Department	12 (24.0)
		Intensive/Critical Care unit: specify type:	8(16.0)
		Operating Room/Recovery	1(2.0)
		Procedure Room	7(14.0)
		Others, please specify	6 (12.0)
9	Source Patient was identifiable in the last needlestick injury?	Yes	30 (60.0)
		No	13 (26.0)
		Do not Know	7 (14.0)
10	The victim of NSI was the original user of needle?	Yes	29(58)
		No	16(32)
		Not known	8(16)
11	Status of the needle in the most recent needlestick injury	Contaminated	27 (54)
		Uncontaminated	9 (18)
		Unknown	14 (28)
12	Depth of the most recent needlestick injury	Superficial (little or no bleeding)	17(34)
		Moderate (skin punctured, some bleeding)	21(42)
		Severe (deep stick/cut, or profuse bleeding)	12 (24)
13	If the most recent needlestick injury was to the hand, did the needle penetrate through the following?	Single pair of gloves	97(64.7)
		Double pair of gloves	14(9.3)
		No gloves	25(16.7)
		Do not remember	13 (8.7)

Data presented in **Table 3** depicts the circumstances in which the NSI was sustained and the actions taken by nurses following NSI was sustained. Overall, more than half (56%) of the NSI incidents occurred while the nurses were recapping the needle. One fifth (20%) of the NSI incidences occurred due to any other lying at work area and 14% NSI were while passing needle and 10% while disposing the needle and or breaking.

The most common cause of NSI as perceived by nurses was lack of proper equipment for disposal (50%) followed by increased workload (24%), carelessness (18%) and fatigue (8%). More than half (58%) of the NSI involved a hollow bore needle, followed by I.V. cannula (24%), suture needle (10%) and butterfly (8%). Regarding duty shift in which the NSI sustained, Majority (62%) of the NSI was sustained during night shift and only 4% of the incidents were during afternoon duties. Fingers/thumb/index finger together were the most common (65.3%) site of injury with almost third thirds of the total incidents involving any of these areas followed by involvement of palm (18.4%) and hand (10.2).

Out of 50 nurses who sustained NSI in the past, only 9 (18%) nurses have reported the incident out of them only one reported the incident to ward in-charge, 6 nurses (66.7%) reported to Doctor and 2 nurses reported to other persons. The analysis of reason for not reporting the incident from 41 nurses who did not reported the NSI incident revealed that 12 nurses (29.3%) did not know whom to report and another 12 nurses (29.3%) were scared to report the incident. While 26.8% of the nurses citing other reasons 14.6% of nurses

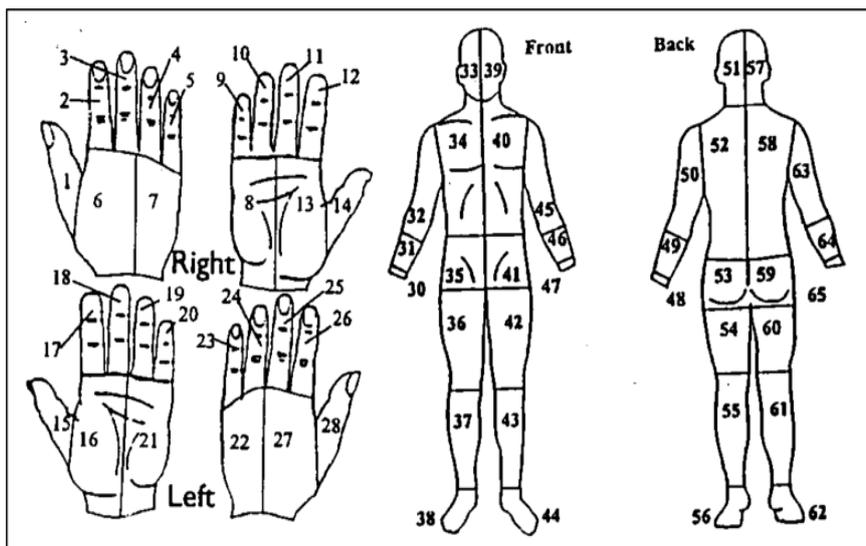
believed that there was no use of reporting the incident. In more than half (55.6%) of the reported NSI incidents (n=9), immediate blood test was done and one third of the reported cases (33.3%) were left with no action.

In regard to the area where NSI occurred, nearly half (48%) of the total incidents have occurred either in patient room (24%) or in emergency department (24%), 16% of the NSI have occurred in intensive/critical care units and only one NSI incident (2%) has occurred in operating room/recovery room. In 60% of the NSI incidents, the source patient was identifiable and in 26% cases the sources was not identifiable. In majority (58%) of the cases, the victim of the NSI was the original user of the needle. In more than half (54%) of the NSI incidents, the needle or sharp involved was contaminated and the status of the needle was unknown in 28% of NSI incidents. In relation to depth of the needle stick injury, 42% of the incidents involved a moderate depth followed by 34% superficial injury and 24% involving a severe injury including deep stick, cut or profuse bleeding.

Table 4 Location of the Sustained Needlestick Injury

Location of the injury*	Frequency (%)
1	1(2)
2	1(2)
8	1(2)
12	1(2)
15	1(2)
16	6(12.2)
17	21(42.9)
18	4(8.2)
21	2(4.1)
25	1(2)
26	2(4.1)
31	3(6.1)
38	3(6.1)
45	2(4.1)

Figure1 Picture Illustrates the Possible Locations of Needlestick Injuries with Numerical Codings



IV. Discussion

Study revealed 33% of the nurses sustained Needle Stick injuries at least once in the past. Similar study conducted by Saleem T, Khalid U, Ishaque S, Zafar A revealed 26.1% nursing students had received a needle stick injury in the past.⁹

Study revealed that most of the nurses have not received Hepatitis B vaccine (87.3%) and most of the nurses were not aware of the importance of the Hepatitis B vaccination. Study conducted by Kapoor V, Gambhir RS, Singh S, Gill S, Singh reveals that 89% of students were aware of taking post-exposure prophylaxis after accidental NSI.¹⁰

In present study, the results shows that more than half (56%) of the NSI incidents occurred while the nurses were recapping the needle. One fifth (20%) of the NSI incidences occurred due to any other lying at work area and 14% NSI were while passing needle and 10% while disposing the needle and or breaking. Muralidhar S, Singh PK, Jain R.K, Malhotra M, Bala M mentioned in their study the commonest clinical activity to cause the NSI was blood withdrawal (55%), followed by suturing (20.3%) and vaccination (11.7%). The practice of recapping needles after use was still prevalent among HCWs (66.3%). The most common cause of NSI in current study as perceived by nurses was lack of proper equipment for disposal (50%) followed by increased workload (24%), carelessness (18%) and fatigue (8%). More than half (58%) of the NSI involved a hollow bore needle, followed by I.V. cannula (24%), suture needle (10%) and butterfly (8%). Muralidhar S, Singh PK, Jain R.K, Malhotra M, Bala M mentioned in their study high rate of ignorance and apathy is the cause of NSI.¹¹

In present study NSI sustained in 50 nurses in the past, only 9 (18%) nurses have reported the incident out of them only one reported the incident to ward in-charge, 6 nurses (66.7%) reported to Doctor and 2 nurses reported to other persons. The analysis of reason for not reporting the incident from 41 nurses who did not reported the NSI incident revealed that 12 nurses (29.3%) did not know whom to report and another 12 nurses (29.3%) were scared to report the incident. Siddique K, Mirza S, Shoaib SF, Anwar I, Zafar A reported in their study Forty seven (26.1%) students had received a needle stick injury in the past; however, only 14 students (29.7%) had reported the incident either to their consultant or the Infection Control Office.¹³

In regard to the area where NSI occurred, nearly half (48%) of the total incidents had occurred either in patient room (24%) or in emergency department (24%), 16% of the NSI have occurred in intensive/critical care units and only one NSI incident (2%) has occurred in operating room/recovery room. Whereas study conducted by Siddique K, Mirza S, Shoaib SF, Anwar I, Zafar A described in their study healthcare personnel working in surgery department (43.3%) were most frequently affected and the commonest place was Emergency room (42.2%).¹³ Chakravarthy M, Singh S, Arora A, Sengupta S, Munshi N. concluded in their study the common locations of care causing injuries were operation theater (53.8%), medical (15.3%), and cardiac ICU (7.6%). But, the incidence varies in contrast to the Indian data where common locations are the patients' room (35%)

V. Conclusion

Needle stick injury is one of the most common occupational hazard for nurses working in hospitals and 33.3% prevalence of NSI is alarming and it will have serious consequences in physical and mental health of staff nurses. Study suggests that education and training of nurses and reinforcement to stick with the protocols is necessary for the nurses. Such interventions may reduce the risk of NSI incidents.

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