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Original Research Article

Assess the prevalence of needle stick injury in a tertiary care hospital in Western Maharashtra

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ABSTRACT

Background: A needlestick injury is a penetration of the skin by a needle or other sharp object that has been in contact with another person's blood, tissue or other body fluid before the injury. A retrospective record based cross sectional study was conducted among healthcare workers at a tertiary care hospital to study the prevalence, demography and epidemiology of needlestick injuries.
Methods: A retrospective observational study among the health care workers at a tertiary care facility in Western Maharashtra was conducted over a 12-month period. Data from 51 reported NSI cases was tabulated and analyzed for socio-demographic and epidemiological details.
Results: The overall needlestick injuries prevalence among the 331 healthcare workers was 15.40%. Nurses were the most affected healthcare worker group (43.1%). Injuries most commonly occurred during injection administration (27.5%) using hollow bore needles (78.4%). Most injuries were superficial (74.5%) and occurred while wearing a single pair of gloves (70.6%). A statistically significant association was observed between job category and gender (p=0.022), type of contact (p=0.020), purpose of needle used (p=0.014) and glove usage (p=0.000). No significant differences were found based on age or gender alone.
Conclusions: The study found a 15.4% prevalence of needlestick injuries among healthcare workers. Nurses were the most affected while administering injections with hollow bore needles. Focused training, robust reporting and post-exposure management are essential to reduce occurrence of needlestick injuries.

Keywords: Health care workers, Needle stick injuries, Occupational hazards, Superficial injuries

INTRODUCTION

A needlestick injury (NSI) is a penetration of the skin by a needle or other sharp object that has been in contact with another person's blood, tissue or other body fluid before the injury.[1] NSI characteristically occur due to use of sharp equipment in a rapid-paced environment with staff working under duress or in inadequate staff strength. NSI add to the cost burden of the health care facility and also results in reduced manhours of trained health professionals.[2] Data from National Institute for Occupational Safety and Health (NIOSH) suggest that 42% NSIs occur prior to disposal while 38% occur while the sharps are being used.[3]

Prompt reporting is essential for early initiation of postexposure prophylaxis. This includes first aid, counseling, NSI assessment, investigation and follow-up. The pooled prevalence of needlestick injuries among healthcare workers worldwide during previous one year was 32.4%.[4]

METHODS

This article aims to study the prevalence of needle stick injuries at a tertiary care hospital in the past 12 months, the job category of HCWs who are most prone to needle stick injury and the factors associated with needle stick injury.

Inclusion criteria

All HCW working in patient care areas of the hospital where use of needle and sharps is common such as Intensive care units, Operation Theatres, High Dependency unit, Trauma care, Wards. This includes Doctors, Nurses, attendants, housekeeping staff and medical students.

Exclusion criteria

All healthcare staff not directly associated with patient care where needles and sharps are not used, in non-clinical departments such as administration etc. A retrospective record-based cross-sectional study was conducted among the health care workers (HCW) at a tertiary care facility in Western Maharashtra.

The study population was HCWs who were in direct contact with sharp medical equipment and who were likely to be exposed to NSI. 51 incidences of needlestick injuries were reported over a period of 12 months (from May 2024 to May 2025).

The study has been reviewed and approved by appropriate Institute Ethics Committee (SIU/IEC/617).

Data from 51 reported NSI cases was tabulated in an excel sheet and analyzed for socio-demographic and epidemiological details by using IBM SPSS software. The results were expressed in percentage and proportion in tabular and graphical manner. Mann Whitney U test for comparing non-normally distributed variables as per gender, age and job Category for Needle stick Injuries. A p value of less than or equal to 0.05 was considered as statistically significant.

Ethical approval

An institutional database was used for the collection of data after obtaining written approval from the Institutional Ethics Committee.

RESULTS

Out of a total of 331 healthcare workers at the hospital, 51 reported incidents of needlestick injury making the overall prevalence of needlestick injury at the hospital to be 15.40%.

Out of the 51 NSI incident reports, 51% were female and 51% were above the age of 23 years. Nurses were the most common subset of healthcare workers to be affected (43.1%). Female gender was predominant amongst nurses. Administering injections, was the commonest procedure (27.5%) resulting in NSI with greatest frequency (33.3%) during the procedure. Hollow bore needles were the commonest devices causing injury (78.4%). Superficial injuries (74.5%) were generally observed. Out of the 51 reported cases of NSI, HCWs wore at least a single pair of gloves in majority (70.6%) of the cases (Table 1).

A statistically significant association was observed between job category and gender (p=0.022), type of contact (p=0.020), purpose of needle used (p=0.014) and glove usage (p=0.000). No significant differences were found based on age or gender alone (Table 2).

Table 1: Demographic pattern.

Gender	N	%
Male	25	49
Female	26	51
Age range (in years)		
<23	25	49
≥ 23	26	51
Job category		
Doctor	3	5.9
Nurse	22	43.1
Attendant	2	3.9
Housekeeping staff	14	27.5
Student	9	17.6
Others	1	2
Type of contact		
Needlestick injury	46	90.2
Sharps	3	5.9

Continued.

Gender	N	%
Mucocutaneous exposure to body fluids	2	3.9
HHH		
Unknown	18	35.3
Negative	23	45.1
HIV	3	5.9
HBV	4	7.8
HCV	3	5.9
Purpose of use of sharp item		
Unknown	9	17.6
Injection	14	27.5
Draw blood	9	17.6
Place IV line	5	9.8
Surgical procedure	4	7.8
Others	10	19.6
How did the injury occur		
Before using item	1	2
During use	17	33.3
Recapping needles	6	11.8
Device left in inappropriate place	8	15.7
clearing item	7	13.7
Left near disposal container	1	2
After disposal	8	15.7
Others	3	5.9
Type of device		
Hollow bore	40	78.4
Plain	6	11.8
Instrument	3	5.9
Glass	2	4
Type of injury		
Superficial	38	74.5
Deep	13	24.5
Gloves used		
Single	36	70.6
Double	7	13.7
Not used	8	15.7
Result baseline test		
Reactive	1	2
Non-reactive	50	98

Table 2: Comparison of other parameters according to job, age and gender.

Parameters	Gender (P value)	Age range (P value)	Job category (P value)
Gender	-	0.211	0.022*
Age range	0.232	-	0.066
Job category	0.370	0.127	-
Type of contact	0.332	0.165	0.020*
HHH	0.544	0.976	0.061
Purpose of use of sharp item	0.777	0.184	0.014*
How did injury occur	0.334	0.664	0.149
Type of device	0.386	0.104	0.113
Type of injury	0.530	0.094	0.632
Gloves used	0.678	0.384	0.000*
Result baseline test	0.595	0.308	0.933

*P<0.05 is statistically significant; hhh=hiv,hcv and hbv.

DISCUSSION

This study investigated the prevalence and patterns of needlestick injuries among healthcare workers at a tertiary care hospital in western Maharashtra. The overall prevalence at the tertiary care facility was 15.40%. This is similar to a study by Jayaprada et al, in Tirupathi where a total of 47 NSIs were recorded in a year and the incidence rate per annum was 0.13 and also similar to study by Rajpal et al where prevalence of NSI was 77/384 (20.1%) 5,6. Occurrence of NSI in the study was lower than the worldwide pooled prevalence of 32.4% by Mengistu et al and 36.1% by Khursheed et al in Aligarh.[4,7] The prevalence of needlestick injury 12 months preceding the study was 37.1% by Negash et al in Eritea 31% by Raj et al in Kochi, 23.8% by Umar et al in Manipur, 22.2% by Abalkhail et al in Saudi Arabia but higher than the prevalence of NSI of 1.02% by Malhotra et al.[8-12] The wide variation in prevalence is possibly due to lack of knowledge, training, awareness and communication skills. Work fatigue and stressful work environment may also result in higher NSI occurrence amongst HCW. Lower prevalence could be due to improvement in all these factors or due to under reporting due to lack of awareness or fear of losing daily wages in absentia.

In the study, nurses represented the largest affected group (43.1%), followed by housekeeping staff (27.5%) and students (17.6%). These findings are consistent with prior studies showing the highest burden of NSIs among nursing staff due to their frequent patient contact and procedural duties. This is in contrast to study by Shenoy et al, Rajpal et al found the rate of incidence to be 22% among the doctors in comparison to 15% among the nursing staff. 26.6% and 31.3% in nurses, 37.5% and 16.7% in technicians, 15% and 12.5% in ward boys/ aaya and 15.6% and 9.4% in sweepers of public and private hospitals respectively in Meerut.[6,13]

Resident Doctors were most affected, 91.4%, while Nursing were only 19.1% in a study by Goel et al in Delhi.[14] NSI was highest among doctors who were junior residents 47.1% and least among non-clinical SRs (0%) in a study by Umar et al, in Manipur.[10] Also, by Malhotra et al in Delhi, Shenoy et al in Manipal, Khursheed et al in Aligarh and Abalkhail et al in Saudi Arabia.[11-13]

Findings similar to ours was seen in study by Jayaprada et al in Tirupathi where Nurses (38.3%) were found to have the highest exposure rate followed by sanitary workers (21.3%) and doctors (17%) 5 Dhayagude et al reported NSI incidents to be maximum in nursing staff (39%), followed by doctors (33%) and 24% in multipurpose worker.[15] Similar findings in eritrea were also seen by Negash et al.[8]

Nurses were the largest group to have NSI occurrence since they give injections, place IV canula and administer IV fluids as advised by doctors. Thus, they come in contact with needles and sharps more frequently. Hollow bore needles accounted for the majority (78.4%) of injuries a trend also reported globally due to the high-risk nature of these devices. Most of the needlestick injuries occurred while administering injections (27.5%), with 33.3% of injuries occurring during the procedure. Similar findings were seen By Shenoy et al, Jayaprada et al, Malhotra et al and Negash et al while Umar et al found recapping as the commonest cause of NSI.[5,8,10,12,13] This finding emphasizes the need for procedural safety and proper technique training, especially in injection and IV-line placement practices. Notably, significant associations were found between job category and type of contact (p=0.020), purpose of use of the sharp item (p=0.014) and glove use (p=0.000). In majority of the reported NSI cases (70.6%) the HCWs were wearing at least a single pair of gloves while performing procedures (Table 2).

NSI contribute to transmission of blood borne infections like Human immunodeficiency virus (HIV), Hepatitis B and C infections. Rarely NSI injuries can also lead to transmission of other infections like syphilis, tuberculosis (TB), malaria and herpes. Bacterial infections like *B abortus*, *Corynebacterium diphtheriae*, *Mycoplasma caviae* can also occur at the NSI site.[13] Awareness of all of all the possible infections possible following NSI underlines the importance of NSI as an important preventable occupation hazard to which HCW are exposed.

In terms of post-exposure outcomes, only one HCW tested positive in the baseline test, indicating that most incidents were low-risk or managed effectively post-exposure. However, the risk of transmission for HIV, HBV or HCV following a contaminated NSI cannot be overlooked, with previous literature suggesting risk rates of up to 30% for HBV in unvaccinated individuals.

The limitations of our study are that it lacks equal representation across various HCW categories. Secondly it was carried out at a single center. Also, larger studies to identify knowledge gaps in standard safe procedure practice.

CONCLUSION

This study found a 15.4% prevalence of needlestick injuries among healthcare workers, with nurses being the most affected group and hollow bore needles the leading cause. Most injuries occurred during injection administration. Gloves were used while performing majority of the procedures. Significant associations were observed between job category and factors such as type of contact, purpose of needle use and glove usage. These findings highlight the need for targeted interventions particularly for nursing and support staff including hands-on training, safer needle practices and institutional support for timely reporting and post-exposure management. Strengthening awareness and adherence to

infection control policies is crucial to reducing the burden of NSIs in healthcare settings.

In conclusion, NSI is a preventable occupational hazard. NSI results in financial burden on healthcare system. This includes Direct cost of testing and treating NSI as also Indirect cost in terms of time and effort spent by trained staff in managing cases of NSI. NSI result in psychological and emotional trauma to the affected healthcare personnel. The findings echo global calls for prevention strategies such as safety-engineered devices, routine use of double gloves during high-risk procedures, comprehensive training, strict adherence to standard precautions, better nurse to bed ratio, free mandatory vaccination for HCW including housekeeping staff and free PEP investigation and Prophylaxis. Moreover, institutional reporting systems and post-exposure prophylaxis protocols must be strengthened to mitigate long-term health risks and psychological stress among HCWs. Preventing NSI will also reduce the expenditure on Post exposure investigations and prophylaxis, as also the anxiety and stress after suffering an NSI.

It confirms the importance of prevention of NSI by improving safety practices during procedures, safe needle practices, hands on training, timely reporting and post exposure management.

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REFERENCES

1. Chen FL, Chen PY, Wu JC, Chen YL, Tung TH, Lin YW. Factors associated with physicians' behaviours to prevent needlestick and sharp injuries. PLoS One. 2020;15(3):229853.
2. Cunningham TR, Sinclair RC, Harney AM, Smallwood SW, Christianson AL. A safety information campaign to reduce sharps injuries: Results from the Stop Sticks campaign. J Comm Health. 2010;3(3):164-84.
3. Rapiti E, Hutin Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers Prüss-Ustün A, Rapiti E, Hutin Y. Am J Ind Med. 2005;48:482–90.
4. Mengistu DA, Tolera ST, Demmu YM. Worldwide prevalence of occupational exposure to needle stick injury among healthcare workers: A systematic review and meta-analysis. Canadian J Infect Dis Med Microbiol. 2021;2(1):9019534.
5. Jayaprada R, Vineela K, Ramakrishna N, Yamini S, Bhargav KM. A study of needle-stick injury incidence amongst healthcare workers and its root cause analysis in a tertiary care teaching hospital. J Clin Sci Res. 2022;11(2):72–6.
6. Rajpal S, Garg SK, Bano T, Singh G. Prevalence of needle stick injuries among health care workers of various hospitals: a cross sectional study in an urban district of North India. Int J Community Med Public Health. 2021;8(4):1976.
7. Khursheed M, Khan F, Hashmi ZA, Khan HM, Sultan A. A study on the prevalence of needle stick injuries among health-care workers of a tertiary care hospital in Aligarh. J Patient Saf Infect Control. 2021;9(3):87–90.
8. Negash FB, Hailemichael A, Haileslassie E, Hawaz E, Zerai S, Tesfamariam Z, et al. Prevalence, response and associated factors of needlestick injury among health care workers in Orotta National Referral Hospital, Eritrea. BMC Health Serv Res. 2024;24(1):364.
9. Raj A, Ali J, Agraja A, Anjali A, Andrew S. Prevalence of Needle Stick Injuries Among Healthcare Workers at a Tertiary Care Centre in Kochi, India. Cureus. 2024;16(10):64.
10. Umar AY, Devi HS, Laikhuram P. Needlestick and sharp injuries among health care workers in a tertiary care hospital in Manipur, India: A cross-sectional study. Indian J Public Health. 2025;69(1):33–8.
11. Abalkhail A, Kabir R, Elmosaad YM, Alwashmi ASS, Alhumaydhi FA, Alslamah T, et al. Needle-stick and sharp injuries among hospital healthcare workers in Saudi Arabia: A cross-sectional survey. Int J Environ Res Public Health. 2022;19(10):6342.
12. Malhotra S, Avnisha, Ilanchezhiyan, Garg P, Bhatia NK, Kaur A, et al. Prevalence of needle stick injuries among health care workers in a tertiary care hospital in Delhi, India. Ind J Microbiol Res. 2025;12(1):125–9.
13. Shenoy M S, Vangara H, Rego JE, Saldanha I, Lobo G, Kassim S, et al. Trends of needle stick injuries among health care workers in a tertiary care center in South India. Clin Epidemiol Glob Health. 2025;31(13):101903.
14. Goel V, Kumar D, Lingaiah R, Singh S. Occurrence of needlestick and injuries among health-care workers of a tertiary care teaching hospital in North India. J Lab Physicians. 2017;9(1):20–5.
15. Dhayagude S, Tolpadi A, Mane A, Modak M. Financial impact of needle stick injury on a tertiary care teaching hospital. Clin Epidemiol Glob Health. 2024;29(16):101726.

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