

Original Research Article

Needle stick injuries in a tertiary care hospital in India: observations from a clinical audit

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ABSTRACT

Background: Needle stick injuries (NSI) is notably one of the most common and preventable occupational hazard amongst healthcare workers (HCW). This article reports the findings of a clinical audit for needle stick injuries (NSI) conducted at a tertiary care hospital, Pune, Maharashtra, India.

Methods: Clinical audit was conducted at the 123 bed ISO 9002 certified and NABH accredited tertiary care hospital having safety protocols and incident reporting mechanisms in place. Data included all reported and unreported events of NSI. Information about the unreported events was collected through personal interview of all HCWs (99 men and 180 women) and employed doctors (23 men and 09 women). The nature of events and situations when NSI occurred were described. This being a only exploratory analysis is done.

Results: With a total of 36,376 patients treated in the hospital during 2015, a total of 2,16,336 injections were given. Only 11 NSI events were documented during the year and all were reported voluntarily by the HCWs after the incident occurred. All events occurred in the HCWs and no doctors were involved in any of the NSI events. The number of NSI events per 1000 patients treated (IPD and OPD) was 0.302, i.e. 0.03%, and the annual incidence was 8.94% for the hospital beds. Female HCW's (63.6%) were involved more in NSI than males (36.4%).

Conclusions: Continuous education of all categories of HCWs plays a crucial role in capturing NSI. Staff should be encouraged to self-report without any delay and should treat each NSI as an emergency.

Keywords: Clinical audit, Health care workers, Needle stick injury

INTRODUCTION

Healthcare workers are exposed to a wide variety of biological material and are predisposed to various occupational hazards like exposure to drugs, blood borne and air borne infections, surgical trauma,¹ needle-stick injury (NSI),² stress and psychiatric conditions.³ NSI is notably one of the most common and preventable occupational hazard amongst healthcare workers.^{4,5} The actual incidence of NSI can be significantly higher than which is actually reported due to gross under-reporting.⁶ Although authentic data on NSI from India is not

available, as per a 2006 report, around 3-6 billion injections are given per year, of which 2/3rd injections are unsafe (62.9%).⁷ NSI can be caused by hypodermic needles, blood collection needles, intravenous (IV) cannulas or needles used to connect parts of IV delivery systems.⁸

NSI's can be a serious threat to health care workers (HCW) and may increase the risk of transmission of blood-borne pathogens such as human immunodeficiency virus (HIV), hepatitis-B virus (HBV) and hepatitis-C virus (HCV), safety practices should be

followed by healthcare workers handling sharp devices at all times.⁵ To minimize the risk due to sharp objects and NSI, safety protocols need to be in place, including work practice and engineering controls at all hospitals and healthcare facilities.⁹ Adequate training to handle sharp objects and good reporting mechanisms can be useful in minimizing events like NSI and other injuries to healthcare HCW's. The reporting of such injuries is a critical step in initiating early prophylaxis or treatment. Many institutions in India, have a staff student health service facility in place, which maintains records, and registers the incidence of NSI and has protocols for management and follow-up of NSI cases.¹⁰

However, due to unforeseen reasons many instances of NSI and other accidents are never reported and there is a gross under-reporting of such events. This article reports the findings of a clinical audit conducted for needle stick injuries (NSI) during the calendar year 2015 at a tertiary care hospital at Pune, Maharashtra, India.

METHODS

Study site and procedures

Clinical audit was conducted at Rao Nursing Home, Pune, Maharashtra, India which is a 123-bed tertiary care hospital catering to healthcare needs of the metro city. This ISO 9002 certified hospital and is NABH accredited. It has safety protocols and incident reporting mechanisms in place for reporting of accidents.

The HCW's of the hospital are sensitized and trained to document and report all kinds of events occurring in the hospital, and the hospital has a standard operating procedure (SOP) for providing post-exposure prophylaxis to HCW immediately following NSI or exposure to blood and body fluids, which is captured as a part of the incident reporting mechanism. The hospital also has a strong pre-exposure prophylaxis programme which includes vaccination against Hepatitis-B and annual follow-up for antibody detection.

The audit team comprised of trained personnel who collected information about all the needle-stick injuries occurred during the period 01 January 2015 to 31 December 2015. Data included all reported and unreported events of NSI during the period. Information about the unreported events was collected through personal interview of all healthcare workers (n=99 men and 180 women) and doctors (n=32, 23 men and 09 women) employed with the hospital during this period. This being a clinical audit involving healthcare workers and not involving any patients, approval from the institutional ethics committee was not obtained.

Outcomes

This being clinical audit findings, only exploratory analyses are done. The nature of events and situations when NSI occurred were described. Data are also presented for the total number of patients treated in in-patient department (IPD) and out-patient department (OPD).

The various incidences of NSI were estimated by calculating the ratio of the total number of NSI events during the year with the different denominators like total number of patients treated in the year (No. of NSI events per 1000 patients treated in the hospital), total number of patients treated in IPD in the year (No. of NSI events per 1000 IPD patients treated), total number of injections given in the year (No. of NSI events per 1000 injections) and total no of beds in the hospital (No. of NSI events per 100 beds in the hospital).

Statistical analysis

All data was tabulated in Microsoft office excel version 2013. Only exploratory and descriptive statistics are presented and no statistical tests were applied.

RESULTS

During the calendar year 2015, there were a total of 36,376 patients treated in the hospital of which 30,567 were treated on OPD basis and 5686 were admitted to the hospital (IPD). During the year, a total of 2,16,336 injections were given by the healthcare workers and doctors.

A total of 11 (eleven) NSI events were documented during the year and all were reported voluntarily by the healthcare worker after the incident occurred. All cases were IPD patients and no case of unknown source was captured in the cases of reported NSI. Based on the interview with all healthcare workers, there were no events which occurred and were not reported. The profile of NSI are described in Table-1.

All events occurred in the healthcare workers and no doctors were involved in any of the NSI events. The most common locations of NSI were the ward/nursing room (45.5%), intensive care unit-ICU (27.3%) and operating rooms (18.2%). The departments more commonly involved were nursing (54.5%), and ICU (27.3%). Events occur rarely at the casualty/emergency. Female HCW's (63.6%) were involved more in NSI than males (36.4%). However, the prevalence of NSI in males (4.0%, n=99) and females (3.9%, n=180) was same.

Table 1: Needle stick injury events during the year 2015.

Data for 2015	No.	
Total beds	123	
Total number of OPD patients	30567	
Total number of IPD patients	5686	
Total patients (OPD + IPD)	36376	
Total number of injections	216336	
Location of NSI	No.	% (n=11)
Ward	5	45.5
Intensive care	3	27.3
Operating room	2	18.2
Casualty	1	9.1
Department involved in NSI		
Nursing	6	54.5
Intensive care	3	27.3
Casualty	1	9.1
Infection control	1	9.1
NSI event type		
Harmful	10	90.9
Not harmful	1	9.1
Gender of HCW involved in NSI		
Female	7	63.6
Male	4	36.4

Table-2 shows the profile of NSI events occurred in the hospital. Most common situation when NSI occurred was during handling and disposal of the biomedical waste (BMW) by HCW's (36.4%). The number of NSI events per 1000 patients treated (IPD and OPD) was 0.302, i.e. 0.03%, and the annual incidence was 8.94% for the hospital beds (Table-3).

Table 2: Profile of NSI events during the year 2015.

Situation when NSI occurred	No.	% (n=11)	Reason
Collection of biomedical waste	4	36.4	Negligence and failure to follow protocol
During handling of sharps	3	27.3	Negligence
Cleaning of code trolley	1	9.1	Negligence
Suturing of surgical wound	1	9.1	During suturing the patient moved and HCW got NSI
During procedure	2	18.2	Open needle was kept on trolley which was unseen and NSI occurred.

Figure 1 displays the reasons for NSI, where the most common causes of NSI being the negligence by HCW and failure to follow the safety protocols.

Table 3: Incidence of NSI events during the year 2015.

NSI events	No. of NSI events
No. of NSI events per 1000 patients treated	0.302
No. of NSI events per 1000 IPD patients treated	1.935
No. of NSI events per 1000 injections	0.051
No. of NSI events per 100 beds in the hospital	8.943

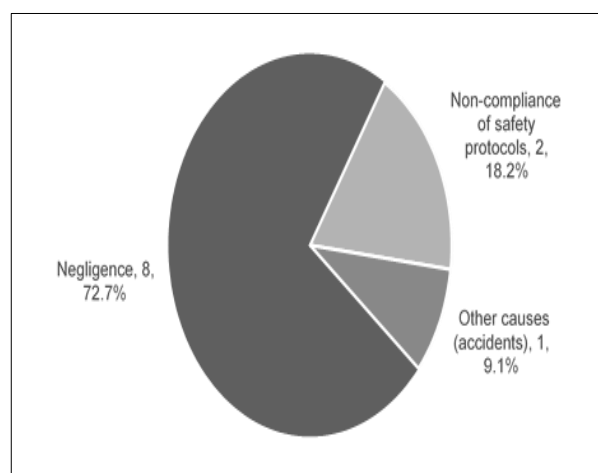


Figure 1: Reasons for NSI events (% ,n=11).

DISCUSSION

Accidental exposure to biological material (blood/body fluid of patients), exposure to drugs, multi-drug resistant (MDR) microorganisms and injury by sharps (needle, scissors and sharp instruments) is a risk to all healthcare workers (HCWs). The risk of sharp injuries is greater in healthcare workers as compared to people in the community.^{11,12} The common infections acquired through these exposures include HIV and hepatitis virus (B-virus and C-virus),¹¹ and the average transmission rates as quoted by Rodrigues C, are highest for percutaneous injuries from hepatitis B (22-31%).¹³

The United States (US) EPINet surveillance program published a report in 2003 reports a rate of 23.87 percutaneous injuries (PI) per 100 occupied beds in hospitals in US.¹⁴ These rates were reported to be different in teaching and non-teaching hospitals with non-teaching hospitals reporting only 18.7 injuries per 100 occupied beds as against 26.8 injuries in teaching hospitals. Also, during a 10-year period in UK, the health care workers were reported to be at risk of occupationally acquired blood-borne virus infections.¹¹ An article published a decade back from a similar setup in India, reported about 380 HCW's having NSI during the period of 6 years (1998-2003) with active surveillance.¹⁵ Most NSI's occurring during intravenous line insertion (N=112), followed by blood collection (N=69), surgical blade injury (N=36) and recapping needles (N=36). A commentary based on this report emphasized on the need for active intervention to prevent NSI's and safeguard the health and interests of all HCW's across India.^{13,15} A teaching-hospital from Mumbai reported only 38 instances of NSI over a period of one year (June 2000-2001) which were self-reported by the HCW's. However, there are reports of gross underreporting of accidental exposure and NSI in hospitals across India and world.⁵

This article reports the findings of the clinical audit conducted to identify the incidence of needle stick injuries in a tertiary care hospital which has safety protocols for biomedical hazards and training of health care workers for prevention and reporting of accidents during routine patient care activities. With about 36,376 patients treated in this hospital and a total of 2,16,336 injections administered in the year, only 11 events of NSI were reported. There were no events which were not reported. Thus, the annual incidence of NSI observed was only 8.94 for every 100 hospital beds in our hospital setup.

In a recent study reporting the incidence of NSI in tertiary care hospital, a total of 312 self-reported events were recorded over a period of 3 years (January 2011-December 2013) with more males (51%) than females (49%).⁹ Interns (90) had the highest percentage (28.8%) of NSI, followed by junior residents (64 i.e. 20.5%), post-graduate students (61 i.e. 19.5%) and nursing staff

(53 i.e. 17%). However, the events per every 100 beds data was not reported by the authors. This study called for the need of regular education programme of interns and residents regarding the prevention of NSI, universal precautions and post-exposure measures.⁹ The NSI incidence observed in our hospital is less compared to other reports of NSI ranging from 18.7 (non-teaching hospitals) to 23.8 (teaching hospitals) for every 100 beds in US. NSI events occurred commonly in the ward/nursing room (45.5%), ICU (27.3%) and operating rooms (18.2%) with more women HCW's (63.6%) involved than men (36.4%). A cross-sectional survey conducted in a dental college from India to assess the knowledge, attitude, practices, and self-report information of NSI's in 2012 reported that 27.5% dentists had an NSI in the past 12 months, resulting in 0.27 NSIs per dental professional per year.¹⁶ The prevalence of NSI's reported by other studies conducted nationally and internationally are 41% from India¹⁷, 54.2% from Pakistan¹⁸, 63.3% from Iran¹⁹, and 74% from Saudi Arabia.²⁰

The most common causes of NSI were found to be due to negligence by HCW and failure to follow the safety protocols. In the survey report by Pavithran VK et al from dental teaching institute, the most common situation for NSI was reported to be during recapping of the needle after its use which is basically due to negligent handling of used needles.¹⁶ Even in present study we found that needle injuries occurred due to negligent approach towards handling the needles. HCW's need repeated training in safe practices.

The attitude of the healthcare professionals toward the non-reporting of NSIs is found to be poor.¹⁶ Hence, awareness activities, training activities and regular quality control measures are needed to implement safe practices by the HCW's. It is highly recommended that health care service employers should adopt safety-engineered devices and there should be safe systems at work to minimize hazard to HCW's.¹¹

CONCLUSION

There is a need of HCW's to adopt safe practices, use safety-engineered devices, institute safe systems of work and promote adherence to standard infection control procedures. Hence, continuing awareness programs, education and training is needed to inculcate safe practice habits during healthcare service by the HCW's. Continuous education of all categories of health care workers plays a crucial role in capturing NSI. Staff should be encouraged to self-report without any delay and should treat each NSI as an emergency. As hospitals are subjected to a large amount of staff attrition and recruitment a robust induction and in-service programme forms the backbone for NSI reporting and prevention of NSI amongst health care workers.

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