

# Assessment of Needle Stick Injury in an Institutional Set up: A Retrospective Analysis

Shobha Rodrigues<sup>1</sup>, Thilak Shetty<sup>2</sup>, Umesh Pai<sup>3</sup>, Sharon Saldanha<sup>3</sup>, Mahesh M<sup>3</sup>, Puneeth Hegde<sup>3</sup>,  
Mandakini Mohan<sup>4</sup>

<sup>1</sup>Professor & Head, <sup>2</sup>Professor, <sup>3</sup>Associate Professor, Department of Prosthodontics, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, <sup>4</sup>Senior Lecturer, Division of Clinical Dentistry, International Medical University, Kuala Lumpur, Malaysia

## Abstract

**Purpose:** Occupational exposure to blood borne pathogens with needle stick or other sharp tool injuries is a serious but preventable problem. this study will be conducted to investigate the incidence of Needle stick injury (NSI) among the Dental health care providers (DHCP) of Manipal College of Dental Sciences, Mangalore.

**Method:** The NSI incidence, demographics, contributing factors, and follow up following NSI report were reviewed.

**Results :** Six, eleven , seventeen and nineteen needle stick injuries were reported in 2010, 2011, 2012 and 2013 respectively . Most injuries were experienced by students and least by the Faculty.

**Conclusion:** Based on the results and within the limitations of this surveillance study it is concluded that occupational exposures can be reduced and reporting of all exposures is vital. The institution of appropriate PEP, psychological support and counselling of affected HCWs and stringent follow-up are all needed to reduce the burden of occupationally acquired infections in HCWs.

**Keywords:** Needle stick injury ( NSI) , Health care worker(HCW), dental students

## Introduction

Occupational exposure to blood borne pathogens with needle stick or other sharp tool injuries is a serious but preventable problem. Health care workers (HCWs) are at a risk of occupational acquisition of human immunodeficiency virus (HIV) infection and other viral infections (HCV and HBV) due to accidental exposure to infected blood and body fluids.<sup>1</sup> The reporting of such injuries is a critical step in initiating early prophylaxis.<sup>2</sup>

Needle stick injury (NSI) is a significant problem in general dental practice and exposes personnel to a serious risk of infection from blood-borne transmissible agents. Dental students are exposed to various oral infections or lesions, which may be due to manifestations of AIDS. As dental students lack knowledge, experience and skill, they are vulnerable to accidental exposure to blood and other body fluids when performing clinical activities. Even if there are timely and effective post exposure prophylaxis, such as for HBV and HIV, there can be serious psychological and economic consequences following NSIs. Also, unsafe practices such as not wearing gloves and the resheathing of needles predispose dental students to NSI. There should be a well-formulated coordinated approach for the provision of information support, and referral from healthcare workers who sustain occupationally related management of occupational exposures varies between institutions and often reflects the level of staff education

---

### Corresponding Author:

**Dr. Sharon Saldanha**

Email ID- shobha.j@manipal.edu Contact No- +91-9448100464, Address: Department No. 7, Manipal College of Dental Sciences, Lighthouse Hill road, Mangalore 575001

and previous experience in areas of infection control and transmission of blood-borne diseases. Despite published guidelines and training programs, needle stick injuries remain an ongoing problem. All patients should be considered to pose a potentially high risk of infection; also, recommended precautionary measures should be followed at all times<sup>3</sup> An effective and multifaceted management plan must be prepared for prevention and management of needle stick injuries in healthcare workers. After an occupational exposure, the healthcare worker should be counseled about the degree of risk associated with the type of exposure: needlestick injuries pose a greater risk than splashes, and those from a hollow-bore needle are a greater risk than from a solid needle.<sup>4</sup>

As dental students lack knowledge, experience and skill, they are vulnerable to accidental exposure to blood and other body fluids when performing clinical activities. This places them at the potential risk of blood-borne diseases such as hepatitis B virus (HBV), hepatitis C virus and human immunodeficiency virus (HIV). Even if there are timely and effective post exposure prophylaxis, such as for HBV and HIV, there can be serious psychological and economic consequences following NSIs.<sup>5-7</sup> Also, unsafe practices such as not wearing gloves and the resheathing of needles predispose dental students to NSIs.

There are various approaches and differences in the program curricula of various dental schools to prevent NSIs among medical students. One preventive strategy is to enhance training programmes on infection control, including the prevention of NSIs, while another is to improve students' knowledge of the management and reporting procedures following an NSI. An effective and multi focused training programme is essential, as its implementation can decrease the overall rate of NSIs in hospitals. Dental students are oriented about infection control during the course as part of the measures taken to reduce the incidence of NSIs among medical students. There are also standard operating protocols on measures to be taken and injury notification available at this Institution.

While there is a declining trend for the incidence of NSIs, there has been so such study performed in our Institution. In light of the above findings, this study will be conducted to investigate the incidence of NSI among the Dental health care providers (DHCP) of Manipal College of Dental Sciences, Mangalore.

**Materials and Method:**

Reports of NSI occurrences of DHCP originating from MCOODS, Mangalore that were entered in Adverse Event Reporting System, Kasturba Medical College, Attavar during the period from May 2010-November 2013 were the source of information. The NSI incidence, demographics, contributing factors, and follow up owing NSI report were reviewed. A standard operating protocol was introduced in January 2013 to help reduce the incidence of NSI. The incidence of NSI before and after introduction of this protocol was also reviewed. The results was then subjected to a descriptive analysis and areas of improvement in the current training system will be suggested.

**Results**

Are presented in Table 1 & 2

**Table 1: Number of Dental injuries reported (2010-2013) as against the total injuries occurring tin the Medical College**

2010	6	26
2011	11	40
2012	17	52
2013	19	40

**Table 2: Number of Needle stick injuries sustained by different Dental Health care workers Yearwise**

	Faculty	Post-graduates	Students	DSA	House-keeping Staff
2010	1	2	3	-	-
2011		1	9	0	1
2012	2	3	10	1	1
2013	2	3	14	--	-

## Discussion

Prevention and management of occupational exposures has been a thrust area of the hospital infection control committee since the last several years. Continuing education and training for HCWs has been very successfully carried out at our institute for many years. There has been a decline in sharps injuries from garbage bags, needle recapping and during injection administration, over the years due to constant awareness programs conducted at our hospital on infection control.

Regular education is also very important to discourage practices like needle recapping and encourage responsible storage, use and disposal of sharps. Only constant surveillance can ascertain exactly what interventions are wise to make and whether they will result in a positive change. Most of the NSI injuries were experienced by students. This may be because of the inexperience of the students.

In the study by Yang et al, 8 trainee nurses were exposed to NSIs about 2-4 times more frequently than other nurses.

Similarly, data presented in this study corroborates with other publications.<sup>9</sup>

The fact that NSIs were detected at lower rates among doctors may have been owing to less reporting of the injury in this group.

It is a known fact that not all NSI cases are reported. It is also known that the awareness of the identity of the source and the status of bloodborne infections causes a false sense of security after exposure and decreases the report frequency of reports.<sup>10</sup> The percentage of unreported NSIs in the literature ranges from 22%-82%.<sup>11-13</sup> Voide et al<sup>11</sup> conducted a questionnaire survey about NSIs among health care professionals. They found that although the most frequent injuries occurred among doctors (49.2%), the group that least reported NSIs was also doctors.

The results emphasize the risk of needle stick injuries in HCWs. The reporting date of needle stick injury is varied by job categories. In a study from United States, nurses accounted for 68%, interns for 35%, and resident doctors for 31% of BBF exposures.<sup>14</sup> Another study conducted in Mumbai, India, observed that the incidence of occupational exposure due to infected blood and body fluids were highest among resident doctors (76%), followed by nurses (11%), and interns (5%).<sup>15</sup>

Since students in our hospital have more patient contact there are more frequent uses of needles by them than other HCW's, and therefore they report a higher incidence of needle stick injury. These findings suggest the need for improved continuing education programs which verify competency of HCWs, especially students about standard precautions and risk of needle stick injuries.

The first aid is a crucial factor to decrease the risk of infection from NSI. Washing the wound immediately and thoroughly with soap and water is the most important management. It is ensured that unsafe work practices such as recapping needles are avoided, used needles are disposed of promptly in an appropriate sharp instrument disposal container. Finally, efforts are being made to improve the surveillance systems for needle stick injuries and collected data are analyzed to develop and assess methods to decrease the risk to HCW exposure.

Safe use of dental equipment, provision of education, Implementation of institutional protocol, and their reflection on outcomes and behaviors have seen a decreasing trend in NSI.

## Conclusion

Based on the results and within the limitations of this surveillance study it is concluded that occupational exposures can be reduced and reporting of all exposures is vital. The institution of appropriate PEP, psychological support and counselling of affected HCWs and stringent follow-up are all needed to reduce the burden of occupationally acquired infections in HCWs.

**Conflict of Interest :** Nil

**Source of Funding :** Self

## References

1. Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M. Needle stick injuries among health care workers in a tertiary care hospital of India. *Indian J Med Res* 2010; 131:405-10.
2. Wicker S, Nürnberger F, Schulze JB, Rabenau HF. Needle stick injuries among German medical students: time to take a different approach? *Med Educ* 2008; 42:742-5.
3. Kinlin LM, Mittleman MA, Harris AD, Rubin MA, Fisman DN. Use of gloves and reduction of risk of injury caused by needles or sharp medical

- devices in healthcare workers: results from a case-crossover study. *Infect Control Hosp Epidemiol* 2010; 31:908-17.
4. McCormick RD, Maki DG [1981]. Epidemiology of needle-stick injuries in hospital personnel. *Am J Med* 70:928-932.
  5. Tereskerz PM, Pearson RD, Jagger J. Occupational exposure to blood among medical students. *N Engl J Med* 1996; 335:1150-3.
  6. U.S. Public Health Service. Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post exposure Prophylaxis. *MMWR Recomm Rep* 2001; 50:1-52.
  7. Quinn MM, Markkanen PK, Galligan CJ, et al. Sharps injuries and other blood and body fluid exposures among home health care nurses and aides. *Am J Public Health* 2009; 99 Suppl 3:S710-7.
  8. Yang Y-H, Liou S-H, Chen C-J, Yang CY, Wang CL, Chen CY, et al. The effectiveness of a training program on reducing needlestick injuries/sharp object injuries among soon graduate vocational nursing school students in southern Taiwan. *J Occup Health* 2007;49:424-9.
  9. Shen C, Jagger J, Pearson RD. Risk of needle stick and sharp object injuries among medical students. *Am J Infect Control* 1999;27:435-7.
  10. Jeffe DB, Mutha S, L'Ecuyer PB, Kim LE, Singal RB, Evanoff BA, et al. Healthcare workers' attitudes and compliance with universal precautions gender, occupation, and specialty differences. *Infect Control Hosp Epidemiol* 1997;18:710-2.
  11. Voide C, Darling KE, Kenfak-Foguena A, Erard V, Cavassini M, Lazor-Blanchet C. Underreporting of needlestick and sharps injuries among healthcare workers in a Swiss University Hospital. *Swiss Med Wkly* 2012;142:w13523.
  12. Fritzsche C, Heine M, Loebermann M, Klammt S, Podbielski A, Mittlmeier T, et al. Reducing the underreporting of percutaneous exposure incidents: a single-center experience. *Am J Infect Control* 2016;44:941-3.
  13. Au E, Gossage J, Bailey S. The reporting of needlestick injuries sustained in theatre by surgeons: are we under-reporting? *J Hosp Infect* 2008;70:66-70.
  14. Alvarado-Ramy F, Beltrami EM, Short LJ, Srivastava PU, Henry K, Mendelson M, et al. A Comprehensive approach to percutaneous injury prevention during phlebotomy: Results of a multicenter study, 1993-1995. *Infect Control Hosp Epidemiol* 2003;24:97-104.
  15. Rele M, Mathur M, Turbadkar D. Risk of needle stick injuries in health care workers-A report. *Indian J Med Microbiol* 2002;20:206-7.