

## Knowledge, Awareness and Practices regarding Sharp Injuries amongst the Dental students in Lucknow, India

Dr. Sneh Lata Verma<sup>1\*</sup>, Dr. Gyan P. Singh<sup>2</sup>, Dr. Rana Pratap Maurya<sup>3</sup>, Dr. Tripti Tikku<sup>4</sup>, Dr. Kamna Srivastava<sup>5</sup>, Dr. Anshul Srivastava<sup>6</sup>, Dr. Rohit Khanna<sup>7</sup>, Dr. Reema Kumar<sup>8</sup>

<sup>1</sup>Reader MDS Orthodontics and Dentofacial Orthopaedics Dept of Orthodontics, Babu Banarasi Das College of Dental Sciences, Lucknow, India

<sup>2</sup>Associate Professor MDS Orthodontics and Dentofacial Orthopaedics Dept of Orthodontics, King George's Medical University, Lucknow, India

<sup>3</sup>Reader MDS Orthodontics and Dentofacial Orthopaedics Dept of Orthodontics, Babu Banarasi Das College of Dental Sciences, Lucknow, India

<sup>4</sup>Prof & HOD MDS Orthodontics and Dentofacial Orthopaedics Dept of Orthodontics, Babu Banarasi Das College of Dental Sciences, Lucknow, India

<sup>5</sup>Reader MDS Orthodontics and Dentofacial Orthopaedics Dept of Orthodontics, Babu Banarasi Das College of Dental Sciences, Lucknow, India

<sup>6</sup>MDS Orthodontics and Dentofacial Orthopaedics Dept of Orthodontics, Babu Banarasi Das College of Dental Sciences, Lucknow, India

<sup>7</sup>Prof MDS Orthodontics and Dentofacial Orthopaedics Dept of Orthodontics, Babu Banarasi Das College of Dental Sciences, Lucknow, India

<sup>8</sup>Prof., S.P.M. Dept. King George's Medical University, Lucknow, India

### Original Research Article

#### \*Corresponding author

Dr. Sneh Lata Verma

#### Article History

Received: 28.07.2018

Accepted: 14.08.2018

Published: 30.08.2018

#### DOI:

10.36347/sjds.2018.v05i08.001



**Abstract:** One of the most serious threats to Dental students, which they face during their clinical training, is the possibility of exposure to blood borne pathogens by Needle Stick Injuries (NSIs) as they work in a limited-access and restricted-visibility field and frequently use sharp devices. To assess the knowledge, awareness and practice regarding sharp injuries among post graduate and intern students of a dental college in Lucknow, India. 150 participants comprising of 90 post graduate students from various specialties of the dentistry (Orthodontics-15, Endodontics-17, Prosthodontics-18, Oral surgery-7, Oral medicine-4, Periodontics-13, Pedodontics-7, Community medicine-9) and 60 interns students were included in the study. The pretested structured questionnaire was comprised of forty questions, twenty five questions to elicit the level of knowledge and awareness and fifteen questions to elicit the practice towards the sharp injuries. Most of the students had adequate knowledge and awareness regarding NSI's but they were not practicing the universal precautions and biomedical waste management rules for sharp disposal. Intern students had more NSI as compared to postgraduate dental students. The main cause of injury was endodontic files during endodontic treatment, orthodontic wires followed by explorer, scalpel blade, hollow needle, burs and extraction instrument. Dental students required appropriate training and teaching regarding biomedical waste management and should be encouraged to report NSIs to concerned authority, setting up an NSI management center in dental hospital, as well as follow up of the injured individuals also required.

**Keywords:** Needle stick injury, dental post graduates, biomedical waste management.

## INTRODUCTION

One of the most serious threats to Dental students, which they face during their clinical training, is the possibility of exposure to blood borne pathogens by Needle Stick Injuries (NSIs) as they work in a limited-access and restricted-visibility field and frequently use sharp devices. Injuries from occupational accidents are associated with the agents of biological risk and have capability to create serious and potentially lethal infectious diseases which can be spread between

people by contact. The level of risk depends on the number of patients with type of infection and the precautions taken by them while dealing these patients. NSIs constitute a major hazard for the transmission of viral diseases such as Hepatitis-B, Hepatitis-C and HIV. It is a percutaneous piercing wound typically set by a needle point, but possibly also by other sharp instruments or objects. Variety of procedures like needle recapping, injuries sustained in the operating room, blood collection or intravenous line

administration, suturing and checking blood sugar can lead to accidental NSI [1]. The probability of transmission varies depending on whether the exposure is with a hollow-bore needle or a solid needle due to higher fluid content and pathogen load. World Health Report 2002 stated that amongst the 35 million HCWs, two million experiences percutaneous exposure to infectious diseases each year. More than 90% of these infections occur in developing countries but most of these NSIs remain unreported. It is also found that 37.6% of Hepatitis-B, 39% of Hepatitis-C and 4.4% of HIV/AIDS in health care workers around the world are due to needle stick injuries[2]. Other infections transmittable through needle stick injuries are syphilis, malaria, and herpes[3].

In India, in spite of large number of awareness programs, it is not possible to estimate the annual incidence of NSI in different occupations because of the scarcity of data[4]. Moreover most of the NSIs remain unreported as many dental professionals and students are not aware of the preventive and immediate prophylactic measures to be taken in case of such happenings[5].

Dental students work in various dental departments where they can be exposed to injuries. The most frequently reported places for injuries have varied across the literature. In South Africa, 91% of junior doctors reported sustaining a NSI in the previous year. Results of another cross-sectional study conducted in Iran among medical and dental students showed that 74.3% had experienced NSIs, and the highest incidence among the dental students was seen in Endodontics, Surgery and Periodontics Departments. According to another study conducted in a Dental Institute in London, it was found that oral surgery clinics were the major source of reporting of NSIs compared with other specialised dental clinics within the institute[5].

Determinants of NSIs are overuse of injections, recapping of needles after use, lack of supplies of disposable syringes, safer needle devices, sharps-disposal containers, work pressure, passing instruments from hand to hand in the operating suite, lack of awareness of hazard and lack of training among HCWs [6-8]. More than 80% of the needle stick injuries can be prevented through the use of safety devices and effective safety programmes and by applying "Universal precautions" as a safety measure. Both financial and psychological impacts may occur due to NSIs. The financial impact includes both direct and indirect costs, whereas, psychological impact include tension and fear, and absent from their work[2,9].

Although modern dentistry has been cited as the least hazardous of the all the occupations, risks like NSI still challenge the status of this occupation. In literature, no studies are available regarding needle stick/sharp injuries among the dental student in

Lucknow. Hence, the aim of present study was to assess the knowledge, awareness and practices regarding sharp injuries amongst the undergraduate and intern dental students in Lucknow, India.

### AIM & OBJECTIVES

The aim of the present study was to assess the Knowledge, Awareness and Practices regarding Sharp Injuries amongst the post graduate and intern students of a dental college in Lucknow, India.

### OBJECTIVES

- To assess the knowledge and awareness regarding sharp injuries among post graduate and intern students of a dental college of Lucknow, India.
- To assess the practices regarding sharp injuries among the post graduate and intern students of a dental college of Lucknow, India.

### MATERIALS & METHODS

The sample for this survey based study included 150 participants comprising of 90 post graduate students from various specialties of the dentistry and 60 interns students (Table 1, Figure 1&2). All students voluntarily participated in the study and were fully informed about the design and purpose of the study and verbal informed consent was obtained from each participant.

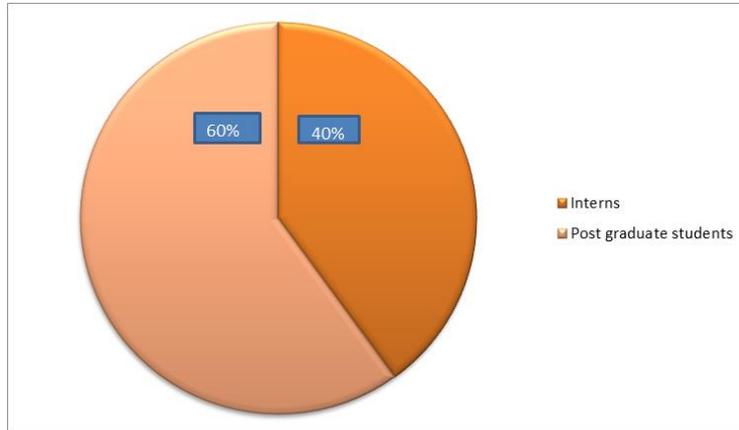
Data was recorded on a pretested structured questionnaire (Table2) distributed among the students in their respective clinical departments and collected at the same time. The questionnaire was comprised of forty questions, out of which twenty five questions were to elicit the level of knowledge and awareness and fifteen questions were to elicit the practice towards the sharp injuries. The questionnaire was used to collect demographic data, prevalence of sharps injury, frequency of sharps injuries, department of injury occurrence, mechanism of injury, type of device causing injury, reporting of injury, reasons for not reporting injury, protective practices, prevalence of hepatitis B immunization, prevalence of hepatitis B status immunization, perception of risk of acquiring Sharp instruments injuries ,BBVs from dentistry, level of awareness of rate of transmission of BBVs HIV; and level of knowledge of prevalence of BBVs. The recorded data was divided into of two parts: firstly, to assess the statement regarding knowledge and awareness; and secondly, to assess practice and incidence of sharp injuries. The data were recorded in number (N) and percentages (%) which were tabulated in the following manner:

- Knowledge, awareness and practice regarding sharp/needle stick injury in overall dental students.
- Knowledge, awareness and practice regarding sharp/needle stick injury in postgraduates and interns.

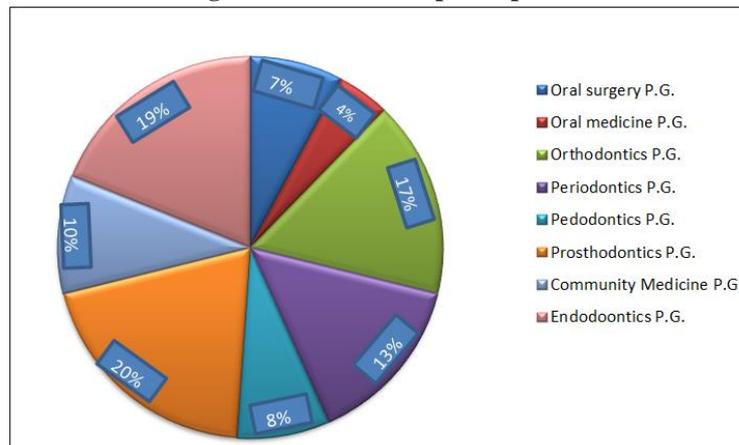
- Incidence of Sharp/needle sticks injury in dental students during various clinical procedures.
- Causes of sharp/needle stick injury in post graduate students and interns.

**RESULTS**

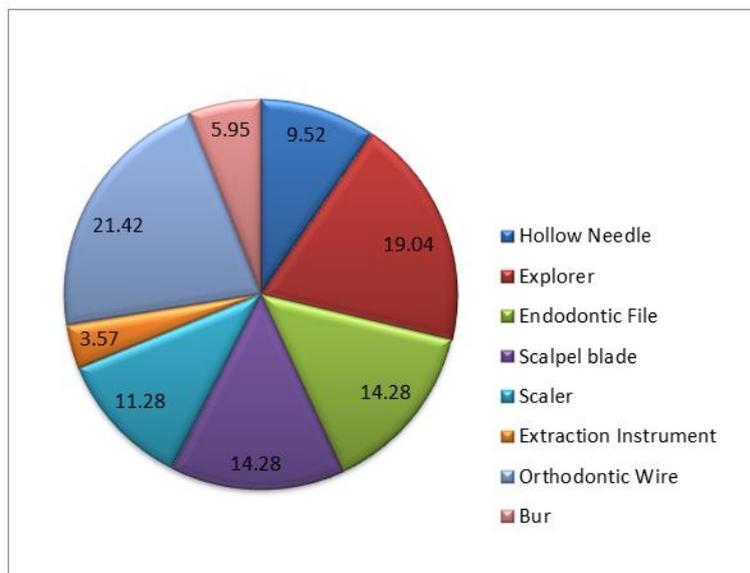
Results of the study are summarized in Table3-6 & Figure 3-4.



**Fig-1: Distribution of participants**



**Fig-2: Distribution of Post graduate dental students**



**Fig-3: Causes of Sharp/Needle stick injury (NSIs) among Dental Students**



8. Most of needle stick injuries occurred during recapping of used needle.  
 Yes  No
9. Most of needle stick injuries have been neglected and unreported.  
 Yes  No
10. After a needle stick injury the affected area should be rinsed and washed thoroughly with soap and water.  
 Yes  No
11. Do you know about post exposure prophylaxis (PEP)?  
 Yes  No
12. A needle stick injury may lead to significant stress and anxiety for the affected injured person.  
 Yes  No
13. Biomedical waste if not treated properly can be hazardous to community and our environment.  
 Yes  No
14. Proper hand washes before and after procedure can reduce the risk of transmission of diseases.  
 Yes  No
15. Post-exposure Prophylaxis (PEP) should be initiated within one hour of the injury.  
 Yes  No
16. Most injuries occurred during disposal of used needles.  
 Yes  No
17. Biomedical waste should be segregated at the point of its generation.  
 Yes  No
18. Segregated waste at the point of its generation reduces the chance of injury to waste handler.  
 Yes  No
19. Universal precaution should be followed during all clinical procedure.  
 Yes  No
20. To avoid injury all the sharps should be disposed in:  
 Poly bags  Puncture proof containers
21. Decontamination/disinfection of sharp waste reduces the chance of infection.  
 Yes  No
22. Needle after use should be recapped.  
 Yes  No
23. Disposal of sharp box should be done when it is:  
 Less than 3/4<sup>th</sup> filled  More than 3/4<sup>th</sup> filled
24. All needle stick injury should be reported.  
 Yes  No
25. Risk of infection after injury depends on the amount of blood contact and amount of virus load in the patient at the time of exposure.  
 Yes  No

**Questions regarding Practice and Incidence about Needle stick/Sharp injuries**

26. Do you deal with any sharp objects during your daily clinical training?  
 Yes  No
27. Have you experienced any NSI during clinical training in last six month?  
 Yes  No
28. Number of NSIs you get in last 6 months during clinical training.  
 1-2  3-4  More than 4
29. What was the main cause of NSIs?  
 Hollow Needle  Explo<sup>s</sup>ion  Endodontic e  
 Scalpel/Blade  Scaler  Bur   
 Extraction instrument  Ortho<sup>n</sup>tic wire
30. Have you received any teaching/training in biomedical waste management (BMW)?  
 Yes  No
31. During which procedure you get NSIs?  
 Local anesthesia administration  Diagnos<sup>i</sup>s  Endodontic reatment  
 Extraction/Surgical procedure  Scaling  Needle reca<sup>p</sup>ing  
 Collision with sharp instrument  Ortho<sup>n</sup>tic wire bending /Treatment  
 Restoration  Wa<sup>s</sup>hing of sharp instrument  Sharp instrum<sup>e</sup>nt disposal
32. Do you dispose all kinds of waste including sharps into general garbage?  
 Yes  No
33. Do you recap needle after its use?  
 Yes  No

34. Where you dispose needle and sharp objects after its use?  
 Red plastic bags                      Punct<sup>ure</sup> proof containers  
 Yellow plastic bag                      Bla<sup>ue</sup> plastic bag
35. Do you wear gloves and other protective measures during work?  
 Yes                                              No
36. After sharp injury what should be the first action?  
 It should be washed with soap and water  
 It should be bandage immediately  
 Pricked finger should be put into the mouth
37. Have you reported the incident of needle stick injury to assigned authority?  
 Yes                                              No
38. Do you use needle destroyer before discarding needles?  
 Yes                                              No
39. Do you wash your hand before and after procedure?  
 Yes                                              No
40. Are you vaccinated for Hepatitis-B?  
 Yes                                              No

I am voluntarily participating in this survey study and purpose of the study was explained to me.

*Date:*

*Signature:*

**Table-3: Knowledge, Awareness and Practice regarding Sharp/Needle stick injury (NSIs) among overall Dental Students**

S.N.	Questions about Knowledge and Awareness regarding NSIs	Overall Dental Students (N=150)		
		Number (N)	Percentages (%)	
1.	Risk of NSIs	140	93.33	
2.	NSI is an occupational hazard in dental community	139	92.66	
3.	More than 20 different types of pathogen may be transmitted by NSIs	139	92.66	
4.	Hepatitis-B can be prevented by vaccine	110	73.33	
5.	Knowledge about universal precaution	125	83.33	
6.	Currently no vaccine is present to prevent Hepatitis-C infection	120	80.00	
7.	Hypodermic needle increases the risk for NSIs	111	74.00	
8.	Most NSIs occurred during recapping of used needle	126	84.00	
9.	Most of NSIs have been neglected and unreported	110	70.33	
10.	Affected area should be rinsed and washed thoroughly with soap and water after NSIs	138	92.00	
11.	Post exposure prophylaxis (PEP)	128	85.33	
12.	Timing of Post-exposure Prophylaxis	112	74.66	
13.	Stress and anxiety after NSIs	115	76.66	
14.	Hazardous nature of biomedical waste	118	78.66	
15.	Proper hand washes before and after procedure	128	85.33	
16.	Most NSIs occurred during disposal of used needles	132	88.00	
17.	Segregation of biomedical waste at the point of its generation	134	81.33	
18.	Segregation of waste reduces chances of spread of infection	127	84.66	
19.	Universal precaution	134	89.33	
20.	Decontamination/disinfection of sharp waste reduces the chance of infection.	126	84.00	
21.	Personal preventive measure	115	76.66	
22.	Correct method of sharp disposal	98	65.33	
23.	Recapping of needle after use	110	73.33	
24.	Reporting of needle stick injury	102	68.00	
25.	Determinants of risk of infection	93	62.00	
Questions about Practice regarding NSIs				
26.	Dealing with any sharp objects during clinical training	146	97.33	
27.	Experience about any NSI in last six month	84	56.00	
28.	Number of NSIs in last 6 months	1-2 times	68	80.09
		3-4 times	12	14.28
		More than 4 times	4	04.00
29.	Injury washed with soap and water immediately	108	72.00	
30.	NSIs reported to the assigned authority	58	38.66	
31.	Received any teaching/training in BMW	50	33.33	
32.	Disposal of all kinds of waste including sharps into general garbage	132	88.00	
33.	Recapping of needle after its use	129	86.00	
34.	Dispose needle and sharp objects after its use in puncture proof container	25	16.67	
35.	Wear gloves and other protective measures	136	90.66	
36.	Washed hands before and after procedure	138	92.00	
37.	Used needle destroyer before discarding needles	8	5.33	
38.	Vaccinated for Hepatitis-B	142	94.67	

**Table-4: Knowledge, Awareness and Practice regarding Sharp/Needle stick injury (NSIs) among different batches of Dental Students**

S.N.	Questions about Knowledge and Awareness regarding NSIs	Post graduate students (N=90)		Interns (N=60)		
		N	%	N	%	
1.	Risk of NSIs	83	92.22	57	95.00	
2.	NSI is an occupational hazard in dental community	83	92.22	56	93.33	
3.	More than 20 different types of pathogen may be transmitted by NSIs	86	95.55	54	90.00	
4.	Hepatitis-B can be prevented by vaccine	70	77.77	40	66.66	
5.	Knowledge about universal precaution	81	90.00	44	73.33	
6.	Currently no vaccine is present to prevent Hepatitis-C infection	85	94.44	35	58.33	
7.	Hypodermic needle increases the risk for NSIs	73	81.12	38	63.34	
8.	Most NSIs occurred during recapping of used needle	87	96.67	39	65.00	
9.	Most of NSIs have been neglected and unreported	70	77.78	40	66.67	
10.	Affected area should be rinsed and washed thoroughly with soap and water after NSIs	86	95.55	52	86.67	
11.	Post exposure prophylaxis (PEP)	81	90.00	47	78.34	
12.	Timing of Post-exposure Prophylaxis	73	81.12	39	65.00	
13.	Stress and anxiety after NSIs	75	83.34	40	66.67	
14.	Hazardous nature of biomedical waste	78	86.67	40	66.67	
15.	Proper hand washes before and after procedure	86	95.55	42	70.00	
16.	Most NSIs occurred during disposal of used needles	87	96.67	45	75.00	
17.	Segregation of biomedical waste at the point of its generation	85	94.44	49	81.67	
18.	Segregation of waste reduces chances of spread of infection	80	88.88	47	78.33	
19.	Universal precaution	84	93.34	50	83.34	
20.	Decontamination/disinfection of sharp waste reduces the chance of infection.	80	88.88	46	76.66	
21.	Personal preventive measure	75	83.34	40	66.67	
22.	Correct method of sharp disposal	70	77.78	28	46.67	
23.	Recapping of needle after use	74	82.23	36	60.00	
24.	Reporting of needle stick injury	74	82.23	28	46.46	
25.	Determinants of risk of infection	68	75.56	25	41.62	
Questions about Practice regarding NSIs						
26.	Dealing with any sharp objects during clinical training	86	95.56	60	100.00	
27.	Experience about any NSI in last six month	34	40.47	50	59.52	
28.	Number of NSIs in last 6 months	1-2 times	25	73.52	36	72.00
		3-4 times	7	20.58	10	20.00
		More than 4 times	2	05.88	4	08.00
29.	Injury washed with soap and water immediately	80	88.88	28	46.67	
30.	NSIs reported to the assigned authority	42	46.67	16	26.67	
31.	Received any teaching/training in BMW	30	33.33	20	33.33	
32.	Disposal of all kinds of waste including sharps into general garbage	70	77.77	52	86.66	
33.	Recapping of needle after its use	67	74.44	52	86.66	
34.	Dispose needle and sharp objects after its use in puncture proof container	16	17.78	9	15	
35.	Wear gloves and other protective measures	80	88.88	56	93.33	
36.	Washed hands before and after procedure	82	91.12	56	93.33	
37.	Used needle destroyer before discarding needles	5	05.00	3	05.00	
38.	Vaccinated for Hepatitis-B	86	95.55	56	93.34	

**Table-5: Cause of Sharp/Needle stick injury (NSIs) among Dental Students**

S. N.	Cause of NSIs	Post graduate students (N=34)		Intern (N=50)		Total (N=84)	
		N	%	N	%	N	%
1.	Hollow Needle	2	05.80	6	12.00	8	09.52
2.	Explorer	7	20.58	9	18.00	16	19.04
3.	Endodontic File	2	05.80	10	20.00	12	14.28
4.	Scalpel blade	6	17.64	6	12.00	12	14.28
5.	Scaler	6	17.64	6	12.00	12	11.28
6.	Extraction Instrument	0	0.00	3	06.00	3	03.57
7.	Orthodontic Wire	10	29.41	8	16.00	18	21.42
8.	Bur	3	08.82	2	04.00	5	05.95

**Table-6: Sharp/Needle sticks injury (NSIs) among Dental Students during various Clinical procedures**

S. N.	Clinical Procedure	Post graduates (N=34)		Intern (N=50)		Total (N=84)	
		N	%	N	%	N	%
1.	Local anaesthesia administration	2	05.80	4	08.00	6	07.14
2.	Diagnosis	4	11.76	3	06.00	7	08.33
3.	Endodontic treatment	5	14.70	9	18.00	14	16.66
4.	Extraction/Surgical procedure	1	02.94	4	08.00	5	05.95
5.	Scaling	2	05.80	5	10.00	7	08.33
6.	Needle recapping	4	11.76	6	12.00	10	11.90
7.	Collision with sharp instrument	2	05.80	1	02.00	3	03.57
8.	Orthodontic wire bending/Treatment	6	07.14	8	16.00	14	16.66
9.	Restoration	3	08.82	3	06.00	6	07.14
10.	Washing of sharp instruments	3	08.83	1	02.00	4	04.76
11.	Disposal of sharp instruments	2	05.80	6	12.00	8	09.52

## DISCUSSION

Health care workers (HCWs) are at increased risk for acquiring various infectious blood borne diseases due to occupational exposure to blood. The incidence of NSI is considerably higher than current estimates, due to gross under reporting [4,10]. According to WHO, the annual estimated proportions of HCWs exposed to blood borne pathogens globally were 2.6% for HCV, 5.9% for HBV & 0.5 % for HIV [3,5]. In USA 6,00,000 to 10,00,000 receive NSI from conventional needles and sharps every year, while in UK it is 1,00,000 HCWs/year<sup>11</sup>. As per the 2008-2009 HIV estimates, there are an estimated 23.9 lakh people currently living with HIV/AIDS in India with an adult prevalence of 0.31% in 2009[10].

Dental students are generally considered at a higher risk because they undertake exposure prone techniques during their training years and use sharp instruments more often[12,13]. Several studies have highlighted that knowledge and compliance among dental students is inadequate regarding prevention and management of sharps injuries. Lack of experience and skill in performing dental procedures during clinical training places dental students at risk of exposure to blood-borne viruses (BBVs) [14].The carrier rate following transmission is 20% for HBV, 80% for HCV and almost 100% for HIV of exposure to blood-borne viruses (BBVs)[7].

The risk of infection for dentists depends on the prevalence of disease in patient population, nature and frequency of exposure. Potential exposures are not limited to needle sticks alone because manipulation of other sharp instruments or mucous membrane exposures to infected bodily fluids also can result in the transmission of infectious diseases.

Most of the sharps injuries are due to the absence of sharps bin at the site of the procedure and used needles left in trays, kidney dishes, among drapes and among trash. It is also found that noncompliance or failure to adhere to guidelines can become a contributory factor to needle stick injuries [8]. The commonest clinical activity to cause the NSIs among health care workers in a tertiary care hospital of India were blood withdrawal (55%), followed by suturing (20.3%) and vaccination (11.7%). In which recapping of needles was a common cause for NSIs[4]. In a dental environment, the incidence of NSIs can be reduced if a dental professional abides by the current and universally accepted standard precautionary measures against NSIs[15].

In the present study, 93% students were having knowledge about the risk of NSI during clinical procedures. In similar studies *Saini R* [16] at Maharashtra reported on an average 89.23% students had correct knowledge about NSI, *Garima et al.* [17] reported 22% students knew the definition of

needle stick injury and 58.6% knew the immediate measure to be taken i.e. to wash the wound with soap and water. In present study, more than 90% dental students had knowledge about different types of pathogens transmitted by NSIs and 73 % knew that hepatitis-B can be prevented by vaccine while 80% knew about the nonavailability of vaccine to prevent hepatitis-C infection. *Gichki et al.* [15] found 71% of the sample in their study had good knowledge about the transmission of pathogens through NSI, 83% knew that there is no effective vaccine available against HCV. *Lakshmi S et al.*[18] in their study population found that 91% knew the correct meaning NSI and 6.4% assumed it is an injury sustained while handling blood products.

80% students in the present study, had knowledge and awareness about universal precautions. 74% dental students believed that hypodermic needle increases the risk for NSIs and 84% aware that most of needle stick injuries occurred during recapping of used needle. 70% dental students confirmed that most of NSIs have been neglected and unreported while 90% believed that after NSIs affected area should be rinsed and washed thoroughly with soap and water. 85.33% students knew the importance of post exposure prophylaxis (PEP) while only 74.33% knew the correct timing for post-exposure prophylaxis. *Cervini and Bell*[19] have shown that PEP practices for NSI are inadequate among medical students. *Siddiqui et al.* [20] found only 10% of HCW who were aware of PEP. In the present study more than 70% students admitted that a needlestick injury may lead to significant stress and anxiety to them, whereas *Saini et al.* [16] reported only 47% students lead to stress and anxiety after NSIs. *Osman* [21] found anxiety and stress the most frequent immediate post injury reaction reported by 59.4% students and 28.1% directed anger to themselves while 12.5% felt indifferent following the injury. More than 75% students believed that biomedical waste if not treated properly can be hazardous to community and our environment and agreed that universal precaution should be followed during all clinical procedure[22]. 74% believed that personal preventive measure to be taken during handling with sharps but very few know that sharps should be disposed in puncture proof container to avoid injury.

When we asked questions regarding practice and incidence about needle stick/sharp injuries in present study amongst 150 dental students it was found that 97.33% students deal with sharp objects during their daily clinical training. In spite of having appropriate knowledge regarding NSI they are not practicing well and indulging in to it..*Osman et al.* [21] found 69.6% dental students exposed to a sharp instruments injury during the past twelve months. *Garima M et al.* [17] 43%, *Verma Y et al.*[6] 75.7% *Sharma et al.* [23], 79.5 % *Askarian et al.*[24] 72.2% and *Nee et al.*[25] reported 62.2% prevalence of NSIs in their studies. In contrast *Pavithran et al.* [26] showed

that only 27.5% participants had an NSI in same duration. Prevention of NSIs can be achieved through elimination of needle recapping and use of safer needle devices, sharp collection boxes, gloves and personal protective gear.

In the present study main culprit of NSIs was orthodontic wires (21.42%) during orthodontic wire bending followed by explorer (19.04%), endodontic file and scalpel blade (14.58%), scaler (11.46%), hollow needle and bur (5.75%) and minimum by extraction instrument (3.57%). Almost similar findings were obtained by *Osman et al.* [21] *Muralidhar et al.* [4], *Gupta et al.* [8], *Verma et al.* [6].

The most frequently reported places for injuries have varied across the literature. Endodontics, surgery, prosthodontics, operative dentistry, pediatrics and periodontics departments were reported as places for injury occurrence [12,24]. A ten year prospective study in the United States has shown that more than 70% of local anesthetic-related NSIs occur during needle insertion or withdrawal and the remaining during patient movement at time of injection[27]. Other procedures for injuries identified in this study such as sharps disposal, needle re-capping, washing instruments, scaling, wound suturing were also reported in similar studies[12,4,24,28].

In present study, students who get NSIs, 91.67% washed injured sites immediately with soap and water and only 55.20% reported NSIs to the assigned authority. *Sharma et al.* [23] reported in their study that 60.9% HCWs washed the site of injury with water and soap and only 7.8% of the HCWs took post-exposure prophylaxis (PEP) against HIV/AIDS after NSIs. In a study conducted by *Verma et al.* [6] found that the action taken by HCWs after NSIs included washing the site with soap and water (53.5%), applying alcohol/betadine/antiseptics (41%), expressing blood from NSI site (1.5%), applying pressure (2%), tying the part (2%) or doing nothing (1%). *Sharma et al.* [23] observed that patient overload and fatigue due to long hours of working was the commonest reason for causing the needle stick injury. *Gichki et al.* [15]. Found that 99% respondents believed that the injury should be reported 91% agreed that the post exposure prophylaxis should be initiated within one hour of injury. *Lakshmi et al.* [18] in their study reported that 85.9% students had knowledge that prophylaxis can prevent diseases transmitted after an NSI.

In this study, Students were unaware (only 35.33% had received teaching) regarding the objectives of biomedical waste management and 86.66% students disposed all kinds of waste including sharps into general garbage and recapping the needles as a routine practice. *Lakshmi et al.* [18] reported that 64.1%, students were aware to reduce the occurrence of NSI by wearing gloves while 88.5% students were aware that

NSI could transmit diseases transmitted by blood and 79.5% students knew that HIV and HBV could be transmitted by NSI.

Although post exposure prophylaxis (PEP) for HCW can dramatically reduce the risk but is not so effective for HCV and HIV. In present study, 96.67% students were vaccinated for hepatitis-B vaccine. Other studies have reported complete vaccination rates ranging from 95% - 100% [13,14,24]. Unvaccinated individuals may have a 6% - 30% risk of becoming infected with the virus following an injury [14]. However, the effectiveness of the vaccine is the most significant factor that needs to be tested among healthcare students [13]. Pavithran *et al.* [23] showed that 81.5% of dental professionals were vaccinated against hepatitis B. Number of HCWs vaccinated for Hepatitis-B varied in different studies, Garima *et al.* [17] showed 64.3% students, Wicker *et al.* [29] reported an average of 78.2% and Radha *et al.* [30] reported range between 83% in doctors and 8% in nurses for HBV vaccination.

NSIs remains a major health hazard in dental colleges especially the ones which deal with high patient load. The implementation of universal precautions, elimination of needle recapping, use of safer needle devices, and use of sharps containers for safe disposal will reduce NSIs. The primary prevention of NSI can be achieved by setting up model injection centers and NSI management centers in colleges, as well as follow up of the injured individuals are recommended. In all health care settings, active Infection control and biomedical waste management teaching and training should be an integral part of the curriculum of all disciplines including medical, dental and paramedical by well designed seminars, programs, and workshops. Record keeping and reporting of sharp injuries should be considered as an essential part of infection control activity. Post exposure prophylaxis and follow up facility by the hospital management seem quite necessary. In due course this multifaceted approach will definitely improve the attitude of Dental students towards NSIs.

#### CONCLUSION

- Intern students had more NSI as compared to postgraduate dental students. The main cause of injury was endodontic files, orthodontic wires followed by explorer, scalpel blade, hollow needle, burs and extraction instrument.
- Highest number of NSIs was found during endodontic treatment, followed by the diagnosis, scaling, needle recapping, local anesthesia restoration, orthodontic wire bending/treatment, washing of sharp instruments, disposal of sharp instruments, extraction/surgical procedure and collision with sharp instrument.
- Majority of students had adequate knowledge and awareness regarding Needle stick/sharp injury.

Approximately all dental students had knowledge that NSIs can transmit hepatitis-B and were vaccinated for Hepatitis-B vaccine.

- In practice, maximum number of dental students washed hands, used glove but most of them do not follow the biomedical waste management rules for sharp disposal.
- Dental students required training and teaching regarding biomedical waste management and should be encouraged to report NSIs to concerned authority. Setting up an NSI management center in dental hospital, as well as follow up of the injured individuals also required.

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