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Knowledge, Awareness and Practices regarding Sharp Injuries amongst the Dental students

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Abstract

Introduction: Dental students are at risk to various blood borne diseases transmitted by needle stick/sharp injuries (NSIs) during the course of their clinical training which have been. To reduce the risk from NSIs there should be an essential need to improve and update the knowledge of NSIs and its management by continued education programmes as seminars, lectures and workshops.
Aim: To assess the knowledge, awareness and practices regarding sharp injuries amongst the dental students.
Materials and Method: This cross-sectional survey based study was conducted among the 150 voluntarily participated dental students who were receiving their undergraduate clinical training in various dental colleges. Data was recorded on a structured questionnaire to elicit the level of knowledge, awareness and practice towards sharp injuries. All data was tabulated in terms of number and percentage.
Results: 64% dental students experience NSI in last six month. The main cause of NSIs was orthodontic wires (18.75%) followed by explorer (15.63%), endodontic file and scalpel blade (14.58%), scaler (11.46%), hollow needle and bur (9.38%). Highest number of NSIs was found during orthodontic wire bending and treatment (18.75%) followed by the endodontic treatment (15.63%), diagnosis (12.50%), scaling (10.41%), needle recapping and restoration (8.33%). Adequate number of students had good knowledge and awareness regarding Needle stick/sharp injury. In practice, maximum number of dental students washed hands, used glove and recapped needle after uses but only few students dispose sharps in puncture proof container and used needle destroyer before discarding the syringe during clinical procedure.
Conclusion: Dental students required training and teaching regarding management of sharp injuries and should be encouraged to report it to concerned authority.

Keywords: Needle stick/Sharp injury, Post exposure prophylaxis, Dental Students

Introduction

Health care workers (HCWs) are least concerned for their own health however, they are at increased risk for acquiring more than 20 different pathogens due to occupational exposure to blood and body fluids.[(1)] Needle stick injury/ Sharp injury (NSI) is defined "as par literal introduction into body of health care worker, during the performance of their duties, of blood or other potentially hazardous material by hollow bore needle or sharp instruments, including, but not limited to needles, lancets, scalpels, and contaminated broken glass; constitute a major hazard for the transmission of various blood borne diseases such as Hepatitis-B, Hepatitis-C and HIV.[(2)] The risk of infection depends on the prevalence of disease in patient population, type of viral infection, viral load and the precautions taken by the HCWs while dealing these patients.

According to WHO, the annual estimated proportions of HCWs exposed to blood borne pathogens globally were 2.6% for HCV, 5.9% for HBV and 0.5 % for HIV.[(3,4)] More than 90% of these infections occur in developing countries but most of these NSIs remain unreported.[(5)] NSI results in psychological impacts as tension and fear and distraction from their work. Most of the needle stick injuries can be prevented by using safety devices and by applying "Universal precautions" as a safety measure.

Dental students who works in various dental departments like, oral surgery, endodontoics, orthodontics, prosthodontics, pedodontics and periodontics are generally at a higher risk of occupational hazard due to lack of experience and skill in performing dental procedures during clinical training periods.[(6-7)] In dental practice, various sharp instruments and syringes are used that pose them at increased risk of sustaining NSIs.[(8-9)]

Despite the increased rate of NSIs among practicing dentists, there is no research on needle stick/sharp injuries among the undergraduate dental student in Lucknow. Hence, the aim of the present study was to assess the knowledge, awareness and practices regarding sharp injuries amongst the undergraduate and intern dental students in Lucknow, India.

Materials and Method

This cross-sectional study was conducted among the 150 dental students of B.D.S third year, final year and interns (50 each), from the various dental colleges of Lucknow, India. All subjects had voluntarily participated in the study and were fully informed about the design and purpose of the study.

A questionnaire was prepared and distributed among the dental students to elicit the level of knowledge, awareness and practice towards sharp injuries. All data was tabulated in terms of number and percentage.

Results

Results about knowledge, awareness and practices regarding NSIs among overall dental students and for different batches of dental students are shown in Table 1and 2. The main cause of NSIs among all dental students was orthodontic wires (18.75%) followed by explorer (15.63%), endodontic file and scalpel blade (14.58%), scaler (11.46%), hollow needle, bur (9.38%) and extraction instrument (6.25%). Maximum sharp injuries in BDS 3rd students was due to wires during Orthodontic treatment, for BDS final year student by scalpel blade while for interns by endodontic files during Endodontic treatment(Table 3 and Fig. 1). Procedures during which highest number of NSIs occurs was orthodontic wire bending and treatment (18.75%) followed by the endodontic treatment (15.63%), diagnosis (12.50%), scaling (10.41%), needle recapping and restoration (8.33%), washing of sharp instruments and disposal of sharp instruments (7.29%), extraction/surgical procedure (5.20%), collision with sharp instrument (4.17%) and least during local anesthesia administration (2.08%). In BDS 3rd year and final year student highest number of NSIs were observed during orthodontic wire bending/treatment while in interns it was found during endodontic treatment (Table 4 and Fig. 2).

Table 1: 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.	Definition of Needle stick/Sharp injury (NSIs)		105	70.00
2.	Risk of NSIs		132	88.00
3.	More than 20 different types of pathogen may be transmitted by NSIs		125	83.33
4.	Hepatitis-B can be prevented by vaccine		142	94.67
5.	Currently no vaccine is present to prevent Hepatitis-C infection		105	70.00
6.	Knowledge about universal precaution		123	82.00
7.	NSI is an occupational hazard in dental community		123	82.00
8.	Hypodermic needle increases the risk for NSIs		116	77.33
9.	Most NSIs occurred during recapping of used needle		122	81.33
10.	Most of NSIs have been neglected and unreported		106	70.67
11.	Affected area should be rinsed and washed thoroughly with soap and water after NSIs		140	93.33
12.	Post exposure prophylaxis (PEP)		110	73.33
13.	Timing of Post-exposure Prophylaxis		102	68.00
14.	Stress and anxiety after NSIs		106	70.67
15.	Hazardous nature of biomedical waste		110	73.33
16.	Proper hand washes before and after procedure		128	85.33
17.	Most NSIs occurred during disposal of used needles		121	80.67
18.	Segregation of biomedical waste at the point of its generation		122	81.33
19.	Universal precaution		124	82.67
20.	Personal preventive measure		111	74.00
21.	Correct method of sharp disposal		95	43.33
22.	Recapping of needle after use		120	80.00
23.	Reporting of needle stick injury		101	67.33
Questions about Practice regarding NSIs				
24.	Dealing with any sharp objects during clinical training		148	98.67
25.	Experience about any NSI in last six month		96	64.00
26.	Number of NSIs in last 6 months	1-2 times	63	65.62
		3-4 times	24	25.00
		More than 4 times	9	9.38
27.	Injury washed with soap and water immediately		88	91.67
28.	NSIs reported to the assigned authority		53	55.20
29.	Received any teaching/training in BMW		53	35.33

30.	Disposal of all kinds of waste including sharps into general garbage	132	88.00
31.	Recapping of needle after its use	122	81.33
32.	Dispose needle and sharp objects after its use in puncture proof container	10	6.67
33.	Wear gloves and other protective measures	112	74.67
34.	Washed hands before and after procedure	125	83.33
35.	Used needle destroyer before discarding needles	8	5.33
36.	Vaccinated for Hepatitis-B	145	96.67

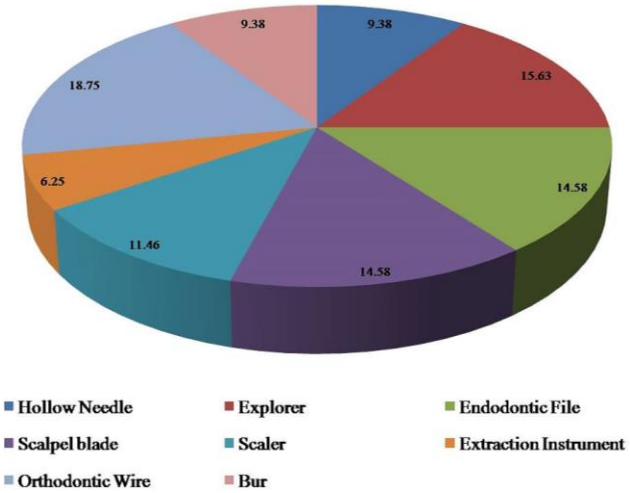

Fig. 1: Cause and incidence of sharp/ needle stick injury (NSIs) among Dental Students

Table 2: 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	Third Year (N=50)		Final Year (N=50)		Intern (N=50)	
		N	%	N	%	N	%
1.	Definition of Needle stick/Sharp injury (NSIs)	31	62.00	35	70.00	39	78.00
2.	Risk of NSIs	42	84.00	44	88.00	46	92.00
3.	More than 20 different types of pathogen may be transmitted by NSIs	39	78.00	41	82.00	45	90.00
4.	Hepatitis-B can be prevented by vaccine	40	80.00	45	90.00	47	94.00
5.	Currently no vaccine is present to prevent Hepatitis-C infection	30	60.00	35	70.00	40	40.00
6.	Knowledge about universal precaution	35	70.00	42	84.00	46	92.00
7.	NSI is an occupational hazard in dental community	38	76.00	41	82.00	44	88.00
8.	Hypodermic needle increases the risk for NSIs	37	74.00	39	78.00	40	80.00
9.	Most NSIs occurred during recapping of used needle	40	80.00	41	82.00	41	82.00
10.	Most of NSIs have been neglected and unreported	35	70.00	32	64.00	39	78.00
11.	Affected area should be rinsed and washed thoroughly with soap and water after NSIs	45	90.00	47	94.00	48	96.00
12.	Post exposure prophylaxis (PEP)	34	68.00	38	76.00	38	76.00
13.	Timing of Post-exposure Prophylaxis	30	60.00	35	70.00	37	74.00
14.	Stress and anxiety after NSIs	35	70.00	34	68.00	37	74.00
15.	Hazardous nature of biomedical waste	32	64.00	36	72.00	42	84.00
16.	Proper hand washes before and after procedure	40	80.00	43	86.00	45	90.00
17.	Most NSIs occurred during disposal of used needles	39	78.00	41	82.00	41	82.00
18.	Segregation of biomedical waste at the point of its generation	36	72.00	42	84.00	44	88.00
19.	Universal precaution	37	74.00	42	84.00	45	90.00

20.	Personal preventive measure		34	68.00	39	78.00	38	76.00
21.	Correct method of sharp disposal		30	60.00	32	64.00	33	66.00
22.	Recapping of needle after use		37	74.00	40	80.00	43	86.00
23.	Reporting of needle stick injury		30	60.00	35	70.00	36	72.00
Questions about Practice regarding NSIs								
24.	Dealing with any sharp objects during clinical training		48	96.00	50	100.00	50	100.00
25.	Experience about any NSI in last six month		28	56.00	36	72.00	32	66.00
26.	Number of NSIs in last 6 months	1-2 times	18	64.29	23	46.00	22	68.75
		3-4 times	7	25.00	9	18.00	8	25.00
		More than 4 times	3	10.71	4	8.00	2	6.25
27.	Injury washed with soap and water immediately		25	89.29	34	94.44	29	90.63
28.	NSIs reported to the assigned authority		15	53.58	21	58.33	17	53.12
29.	Received any teaching/training in BMW		13	26.00	19	38.00	21	42.00
30.	Disposal of all kinds of waste including sharps into general garbage		43	86.00	45	90.00	44	88.00
31.	Recapping of needle after its use		38	76.00	43	46.00	41	82.00
32.	Dispose needle and sharp objects after its use in puncture proof container		4	8.00	3	6.00	3	6.00
33.	Wear gloves and other protective measures		34	68.00	37	74.00	41	82.00
34.	Washed hands before and after procedure		39	78.00	41	82.00	45	90.00
35.	Used needle destroyer before discarding needles		3	6.00	2	4.00	3	6.00
36.	Vaccinated for Hepatitis-B		50	100.00	48	96.00	47	94.00

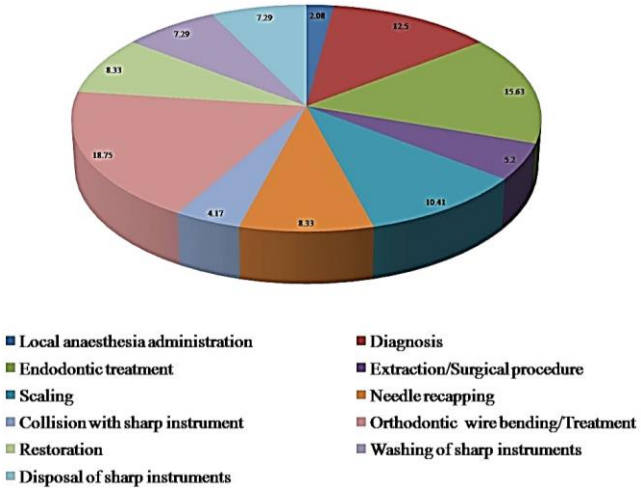

Fig. 2: Sharp/ Needle sticks injury (NSIs) among Dental Students during various Clinical procedures

Table 3: Cause and incidence of sharp/ needle stick injury (NSIs) among dental students

S. N.	Cause of NSIs	Third Year (N=28)		Final Year (N=36)		Intern (N=32)		Total (N=96)	
		N	%	N	%	N	%	N	%
1.	Hollow Needle	1	3.57	3	8.33	5	15.62	9	9.38
2.	Explorer	6	21.42	5	13.89	4	12.50	15	15.63
3.	Endodontic File	1	3.57	5	13.89	8	25.00	14	14.58
4.	Scalpel blade	5	17.86	7	19.44	2	6.25	14	14.58
5.	Scaler	5	17.86	3	8.33	3	9.38	11	11.46
6.	Extraction Instrument	0	0.00	3	8.33	3	9.38	6	6.25
7.	Orthodontic Wire	8	28.57	6	16.67	4	12.50	18	18.75
8.	Bur	2	7.14	4	11.11	3	9.38	9	9.38

Table 4: Sharp/ needle sticks injury (NSIs) among dental students during various clinical procedures

S. N.	Clinical Procedure	Third Year (N=28)		Final Year (N=36)		Intern (N=32)		Total (N=96)	
		N	%	N	%	N	%	N	%
1.	Local anaesthesia administration	0	0.00	1	2.78	1	3.13	2	2.08
2.	Diagnosis	5	17.86	4	11.11	3	9.38	12	12.50
3.	Endodontic treatment	1	3.57	5	13.89	9	28.13	15	15.63
4.	Extraction/ Surgical procedure	0	0.00	3	8.33	2	6.25	5	5.20
5.	Scaling	4	14.28	3	8.33	3	9.38	10	10.41
6.	Needle recapping	1	3.57	4	11.11	3	9.38	8	8.33
7.	Collision with sharp instrument	1	3.57	2	5.56	1	3.13	4	4.17
8.	Orthodontic wire bending/ Treatment	8	28.57	6	16.67	4	12.50	18	18.75
9.	Restoration	2	7.14	3	8.33	3	9.38	8	8.33
10.	Washing of sharp instruments	3	10.71	3	8.33	1	3.13	7	7.29
11.	Disposal of sharp instruments	3	10.71	2	5.56	2	6.25	7	7.29

Discussion

In the present study, most of the students were familiar with the risk of NSI during clinical procedures and they knew the definition of NSIs. They also had knowledge about pathogens transmitted by sharp injuries, vaccine available for Hepatitis Band non-availability of hepatitis-C vaccine. Similar findings were found by Saini R[10] Gichki et al[11] and Lakshmi et al[12] in their study. Whereas, Garima et al[13] in their study reported that only 22% students knew the definition of NSIs and 58.6% knew the immediate measures to be taken.

Regarding the causes of sharp injuries and the universal precautions most of the students were aware that the major sharp injuries occurred during recapping of used needle.70.67% students were agreed that most of NSIs had been neglected and unreported while 93.33% was aware that after sharp injuries, affected area should be rinsed and washed thoroughly with soap and water. Most of the students knew the importance of post exposure prophylaxis (PEP) and correct timing for post-exposure prophylaxis. In contrast to our findings Cervini and Bell,[14] Alam M[15] and Siddiqui et al[16] found PEP practices for NSI were inadequate among medical students. Present study results showed that sharp injury may lead to significant stress and anxiety for the affected injured person whereas Saini et al[10] reported only 47% students lead to stress and anxiety after NSIs. Osman[17] 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.

Maximum students were aware to ill effects of the biomedical waste and also believed that it should be segregated at the point of its generation so that risk of transmission of diseases can be reduced. 80% students believed that needle should be recapped after use and 67.33% students said that all needle stick injury should be reported but only 43% participants had knowledge that all the sharps should be disposed in puncture proof container to avoid injury.

Regarding practice and incidence about sharp injuries it was found that approximately all students deal with sharp objects during their daily clinical training. Amongst them 64% students experienced to NSIs during clinical training in last six month. Prevalence of NSI differed invariably by the different authors in their studies.[13-14,18-22]

In the present study maximum sharp injuries were caused by the orthodontic wires (18.75%) followed by explorer (15.63%), endodontic file and scalpel blade (14.58%), scaler (11.46%), hollow needle and bur (9.38%) and minimum by extraction instrument (6.25%) during respective procedures. In other studies Endodontoics, surgery, prosthodontics, operative dentistry, pediatrics and periodontics departments were found as places for occurrence of injury.[10,15-16,26] 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.[6,8,18,21,23]

In the present study, students who get NSIs, 91.67% washed injured sites immediately with soap and water but and only 55.20% reported NSIs to the assigned authority. The action taken after NSIs in the study by Verma et al[19] included washing the site with soap and water, applying alcohol/betadine/antiseptics, expressing blood from injured site, applying pressure and tying the part. Sharma et al[21] reported 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. They also 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[11] found that 99% respondents believed that the injury should be reported and 91% agreed that the post exposure prophylaxis should be initiated within one hour of injury. Lakshmi et al[12] in their study found that most of the students were aware NSI would have a psychological effect and diseases transmitted after an NSI can be prevented by prophylaxis and vaccinations.

In this study, only 35.33% had received teaching about biomedical waste management. Most of the students disposed all kinds of waste including sharps into general garbage and had practiced to recapped needle after its use. Very few students were used needle destroyer before discarding needles and disposed needle and sharp objects in puncture proof container. Most of the students used gloves and other protective measures during clinical procedure and washed hands before and after any clinical procedure. Lakshmi et al[12] 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. HBV exposures pose the highest risk for infection, but had an effective vaccine for it. Although Post exposure prophylaxis for health care workers can dramatically reduce the risk of infection but is not so effective for HCV and HIV. Approximately all students were vaccinated for hepatitis-B vaccine in present study. Other studies showed different range of vaccinations from ranging from 60% - 100%.[6,9,13,18,24-25] Unvaccinated individuals may have a 6%-30% chances of becoming infected with the virus following an injury.[6] However, the effectiveness of the vaccine is the most important factor that needs to be tested among healthcare students.[7]

Conclusions

Sharp injuries can be reduced by following standard protocol regarding the training as well as adapting preventive measures. Reporting a sharp injury and the use of prophylactic measures are quite important. Therefore, every dental care centres and colleges should have infection control committee for providing infection control training and to look after the injured individuals.

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