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NEEDLE STICK INJURIES;

KNOWLEDGE, ATTITUDE, PRACTICE AND PREVENTION AMONG DENTAL PRACTITIONERS AND STUDENTS OF ISLAMIC INTERNATIONAL DENTAL HOSPITAL ISLAMABAD.

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ABSTRACT… Objective: The aim of our study is to access the knowledge, attitude, practice and prevalence of needle-stick injuries among dental practitioners including both dentists and students of Islamic International Dental Hospital, Islamabad. **Study Design:** Cross sectional. **Setting:** Islamic International Dental College and Hospital. **Period:** June to July 2016. Sample size was 200 (111 dentists and 89 students). **Materials and Methods:** Questionnaires having questions regarding knowledge and attitude of students and dentists towards NSI were distributed. For the interpretation of results, frequencies and percentages were calculated and represented as bar graph and pie charts. Chi square test was applied to compare results of dentists and students and P values were calculated in order to check the significance of results. **Results:** The results showed that dentists (59.3%), at IIDH, were at a higher risk of needle stick injuries as compared to students (40.6%). They had sufficient knowledge regarding NSI. Among all the other departments, the prevalence of NSI was highest in the oral surgery department. Majority of the incidents occurred during needle recapping and disposal. Only about half of the students (51.4%) and dentists (50%) reported their injuries, the major reasons for which were carelessness and not considering it too important. **Conclusions:** Needle stick injuries are responsible for a number of blood borne diseases and are prevalent more among the dentists of IIDH as compared to dental students. NSI are mainly associated with recapping needles, while administering injections and cleaning instruments.

Key words: NSI, Needle-Stick Injury, Dentists, Syringes, Health Hazards, Blood-Borne Diseases, Post Exposure Prophylaxis.

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INTRODUCTION

Increased predisposition to blood borne diseases is one of the serious threats faced by health care workers (HCWS). Needle stick injury (NSI) is a potential source and main safety concern of blood borne diseases, mainly because of unawareness of occupational health safety measures.[1] It was found that among health care professions, dental practitioners sustain the most NSI[2] and that they undergo NSI at least once during clinical practice.[3]

Needle stick injuries has been identified as "a penetrating wound with an instrument that is potentially contaminated with another person's body fluid" The United nations institute of occupational safety and needs (NIOSH) defines NSI as," injuries caused by hollow bore needles such as hyoperdermal needles, intravenous stylets, blood collecting needles, IV needles, and needles used to connect parts of IV delivery system"[5] Sharps injury is defined as" skin penetrating stab wound caused by sharp instruments and accidents in a medical setting".[6]

Data from Various studies and researches shows that about thirty different diseases can be transmitted by NSI.[7] Major blood borne pathogens that are potentially important include Hepatitis B (HBV), Hepatitis C (HCV), and Human immunodeficiency virus (HIV). Less frequent infections also have the potential for transmission through NSI. These include Human T lymphotrophic retroviruses (HTLV I & II),

Hepatitis G virus (GB virus or GBV-C), Hepatitis D virus (HDV), which is activated in the presence of HBV, Cytomegalovirus (CMV), Epstein Barr Virus (EBV), Parvovirus B19, West Nile Virus (WNV), Transfusion-Transmitted Virus (TTV), Malarial parasites, prion agents such as those associated with Transmissible Spongiform Encephalopathy (TSE).[8,9]

Statistics from reports of WHO (2002) shows that, each year 2 million health-care workers experience percutaneous exposure to contagious diseases during their practice, among a total of 35 million[10] According to WHO, globally NSI are responsible for prevalence of 37.6% Hepatitis B, 39% Hepatitis C and 4.4% HIV in Health-Care Workers[11] Every year in USA 6,00,000 to 10,00,000 HCWs receive NSI from needles and sharps , whereas in the UK, annual prevalence is 1,00,000. Occurrence of NSI annually in developing countries is 16 million, while in developed countries it is 6–8 million.[12]

In Pakistan, the prevalence of HCV in general population is 6 %, HBV is 4 % and HIV is 0.1%.[13,14] Prevalence of intravenous injections among intravenous medication clients ranges from 7.6% to 27%.[15] Based on the statistics from Centre for Injection Control Safety, HBV has 10 % prevalence among blood donors, while HCV has 20%.[16]

Deadly consequences of NSI can be strikingly reduced by increasing awareness of safe needle practice and execution of protocol.[11,17] Prevention can also be done by immunizing population who are at high risk for developing HBV and use of antiretroviral drug for HIV and follow up of the exposed HCV.[18] Wound should be washed thoroughly with soap water and disinfectants.[19] Moreover, escalation in knowledge, use of safety engineered devices and PEP (post-exposure prophylaxis) are important measures to lessen the chance and risk of infection among HCWs.[18,20] The use of 'safe needle devices' can also help prevent NSI. A safe needle device has built-in safety features that minimize the chances of getting pricked while handling syringes. The needle is inserted into the syringe manually while use. Not all needle sticks injuries can be prevented by this technique, but according to the research of Ippolito et al, 1997, needle stick injuries by hollow-bore needles can be reduced by as much as 83%. These devices involve self re-sheathing needles and blunted surgical needles.[21]

MATERIALS AND METHODS

Study Design
A cross-sectional study was conducted in order to assess the knowledge, attitude, practice and prevalence of NSI among the students and dentists of IIDH.

Sampling Technique
Convenient sampling.

Sample Size
Our sample size was 200 among which 111(55.5%) were the dentists (House Officers, specialists, Consultants) and 89(45.5%) were the students of 3rd and 4th year. Questionnaires were given to the participants and their participation was entirely voluntary.

Data Collection Duration
The study was conducted in the months of June and July, year 2016.

Questionnaire
Questionnaire for the study was taken from World Health Organization which was predesigned, pretested and modified. It contains both open and closed ended questions regarding knowledge, attitude, practice and prevalence of NSI among students and dentists. In the questionnaires students were asked to give answers to multiple questions regarding knowledge, attitude and practice. Based upon the answers of students and dentists, a comparable data is made to analyze the awareness of needle stick injuries among participants.

Data Collection Process
This study was done in Islamic International Dental College and Hospital Islamabad during June and July, 2016. The questionnaires were distributed in all the departments of dentistry. For all the participants, confidentiality was maintained.

Data Analysis

Statistical package for the social sciences, SPSS version 23.0 was used for analyzing the data and preparing the results. Results collected were presented in both graphical and tabular forms. In order to compare the knowledge, attitude, practice and prevalence between students and dentists chi square test was applied and also p values were calculated. For this study, $P < 0.05$ was kept as standard for statistical significance.

SAMPLE SELECTION

Inclusion Criteria

1- Male and female dentists (House Officers, Consultants, specialists) serving in IIDH.
2- 3rd and 4th year students of IIDC.

Exclusion Criteria

1- All those dentists who are non-practicing (demonstrators, teachers etc).

RESULTS

A total of 200 dental practitioners and students participated voluntarily in this research. Since none of the participants responded negatively, the response rate was 100%. A total of 36 (18.0%) males and 164 (82.0%) females were involved of which 111 (55.5%) were dental practitioners and 89(44.5%) were dental students. According to the results, a total of 91(45.5%) participants are reported to have sustained NSI at least once during their clinical practice. Of these 91 participants, 54 (48.6%) were dentists and 37 (41.6%) were students. The difference was not statistically significant (P=0.391) Figure-1 shows the percentages of NSI sustainers and non-sustainers. Figure-2 relates the percentages and frequencies of NSI sustained and not sustained when compared among dentists and students (P= 0.318) Among the participants, 32% (about one-third) did not know about the policy for reporting NSI in the hospital, while 40% answered that they have knowledge . Figure-3 and 4 shows the frequency of the times dentists and students were pricked, while practicing (P=0.318). Almost all (n= 198, 99%) of the participants knew what NSI is and almost 98% knew the diseases could be transmitted through it. There was a significant difference between dentists and students concerning the knowledge about transmission of diseases (P= 0.022). Regarding the types of diseases transmitted by NSI, most participants answered Hepatitis B, C and HIV/ AIDS (76.5%, P= 0.003). From the Table-I it is clear that they were well aware of the universal precautions and knew the importance of no recapping. The results regarding the importance of not recapping were significant (P= 0.007). In addition to this, their knowledge concerning the colour coding of disposal waste bins was very little.

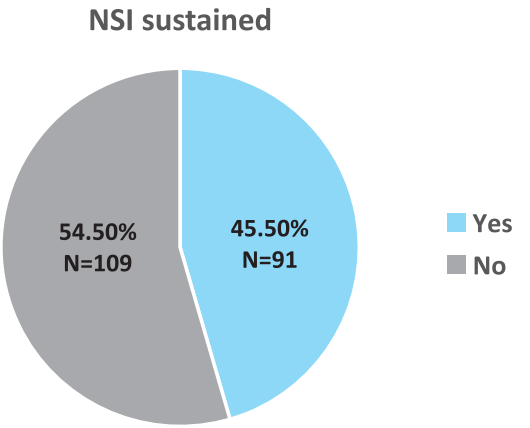


Fig-1. Percentages of participants sustaining and not sustaining NSI

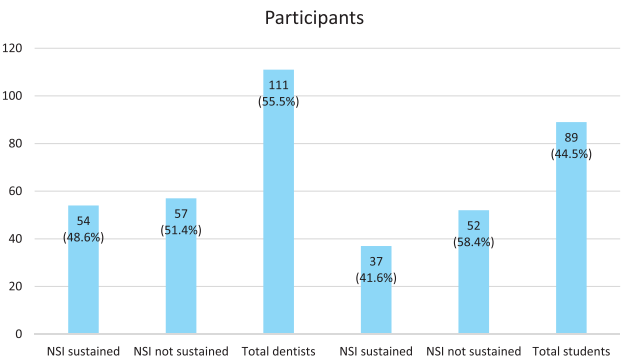
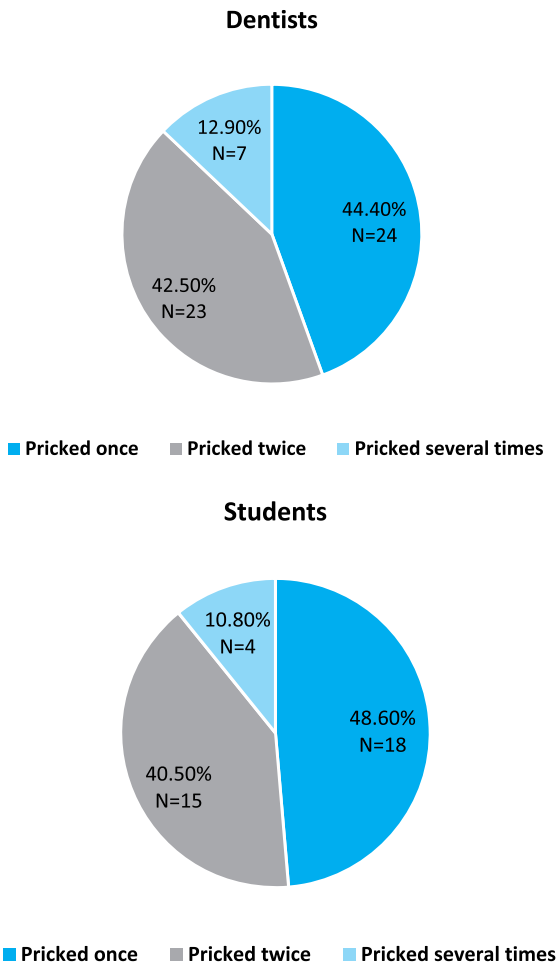


Figure-2. Frequencies and percentages of dentists and students on the basis of attaining NSI

After attaining an NSI, 27 (50%)dentists and 19 (51.4%) students reported their injuries. The result was not statistically significant (P= 0.793). It has been noted that almost all participants reported their injuries to their supervisors. But most of the participants (n= 51, 56.04%) were not offered post-prophylactic medication after reporting

their injury (P= 0.041). The immediate measures taken after NSI by most of the participants was to wash injury site, squeeze out blood, check the patient's disease status and then report NSI. Figure-5 shows the different events that involved the occurrence of NSI while performing dental procedures. Recapping of injections is reported to have been the highest risk factor (dentists= 31.4%, students= 37.8%) of needle stick injuries among both dentists and students. Other lesser risk factors included disposing off sharps, administering injections and also suturing and scaling. Carelessness has been reported to be the major reason for NSI occurrence (dentists= 40.7%, students= 67.5%). 79.2% dentists while 62.9% students, are reported to have received hepatitis B vaccine. The difference is statistically significant (P= 0.012).



Figures-3 and 4. A comparison between dentists and students regarding the frequency of pricks sustained

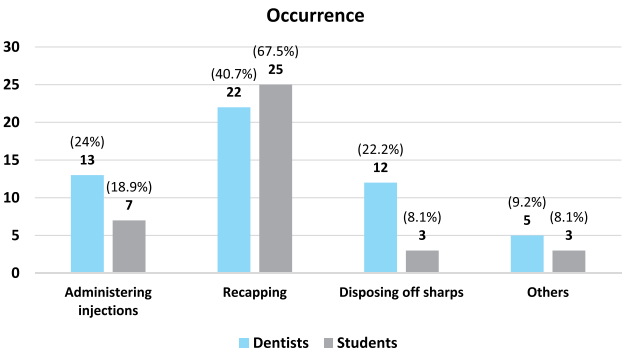


Figure-5. Percentages and frequencies regarding occurrence of NSI

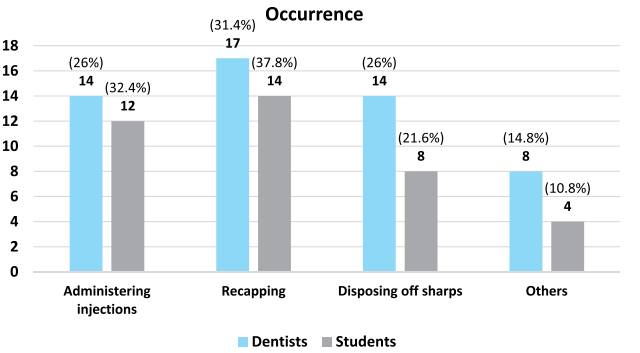


Figure-6. Frequencies and percentages for reasons of NSI

Table-I shows the knowledge, attitude and practice regarding NSI of dentists and students.

DISCUSSION

Needle stick injury (NSI), the most frequently occurring occupational hazard for medical personnel, poses a serious risk of infection with blood borne diseases. It has been reported that the prevalence of NSI is quite higher in developing when compared to developed countries. For example, in a developing country like Iran, 73.7% dental students attained NSI during their undergraduate clinical practice[22], while in UAE, only 23% under graduate dental students from Ajman University of science and technology, attained NSI.[23] The awareness concerning the consequences of NSI is gradually spreading across Pakistan. Of the diseases transmitted, Hepatitis B and C are one of the most common ones in this country, where its incidence is 4% and 6% respectively.[24]

Question	Dentists			Students			P Values
KNOWLEDGE							
Do you know what NSI is							
Yes	111			87			0.197
No	0			2			
can diseases be transmitted through NSI							
Yes	111			83			0.036*
No	0			4			
Are you aware of:							
The risk of becoming infected with HIV or Hepatitis							
Yes	110			85			0.174
No	1			4			
Don't know	0			0			
The universal precautions against NSI							
Yes	107			87			0.222
No	1			2			
Don't know	3			0			
The importance of no recapping							
Yes	89			73			0.007*
No	8			14			
Don't know	14			2			
The location and use of disposal containers							
Yes	102			82			0.134
No	7			4			
Don't know	0			3			
Color coding of sharps disposal containers	**correct**	**Incorrect**	**Don't know**	**correct**	**incorrect**	**Don't know**	
Red	44	45	22	16	52	21	<0.001*
Blue	39	23	49	10	11	68	<0.001*
Black	7	39	65	7	10	72	0.001*
PRACTICE							
Can you demonstrate the practice of safe injections							
Yes	97			76			0.921
No	9			8			
Don't know	4			4			
Are new sterilized sharps available in your department							
Yes	106			82			0.416
No	5			6			
Sometimes	0			1			
Do you use needle removers before disposing off sharps							
Yes	37			38			0.308
No	57			42			
Sometimes	17			9			
Is there an availability of sufficient sharps boxes							
Yes	32			43			0.005*
No	79			46			
Do you immediately collect sharps in sharps boxes after use							
Yes	32			31			0.623
No	58			41			
Sometimes	21			17			
ATTITUDE							
Do you report your injury after an NSI							
Yes	27			19			0.793
No	22			16			
Sometimes	5			4			
To whom do you usually report to							
Supervisor	21			20			0.298
Infection control staff	7			2			
Occupational health programme	3			1			
Others	4			1			
After NSI, are you offered post-exposure prophylaxis (PEP)							
Yes	17			16			0.042*
No	29			21			
Sometimes	8			0			

Table-I. Comparison between dentists and students regarding NSI
***Statistically Significant**

According to a research, the chance of receiving hepatitis B after getting pricked by sharps is 20-40%.[25] A survey of the Islamic International Dental Hospital revealed that 45.5% of dental practitioners and dental students were exposed to this potential risk. This incidence is still lower than previous studies conducted in many other dental and medical institutions. Hyderabad & Karachi were revealed to have 54.2% prevalence, a study done in Karachi in 2010 showed 55% prevalence in dentists and 45% in students, 52% in Hyderabad, 62% in India, 53.3% in London and 66.5% in North Jordan.[24,26,30] On the other hand, it is found to be higher than the study done in Institute of Oral Health Sciences Karachi in 2012 (30%).[30]

In IIDH, out of a total of 91 participants who sustained NSI, 48.6% were dentists and 41.6% were students. Compared to other studies.[25,27,29] overall knowledge of IIDH dentists and students regarding NSI, universal precautions and risk of becoming infected with Hepatitis B, C and HIV was remarkably good (98%). But they were poorly informed of disposal of used sharps and majority could not accurately describe the color coding for disposal bins. Upon the questions regarding color coding only 45% dentists and 16.5% students were able to answer correctly, whereas 53.5% dentists and 36.5% students answered incorrect.

Results of this study are comparable with other reports in terms of causes and occurrence of needle stick injuries. Although, the Occupation Safety and Health Administration (OSHA) has set up recent guidelines, restricting the act of recapping[24], in IIDH recapping of needles (34.6%) was found to be the highest risk factor for occurrence of NSI followed by administering injections, disposing of sharps, scaling and suturing. Other researches also show recapping to be the highest prevailing reason for NSI.[25,29,30] While in contrast, a research in King's College London Dental Institute in 2012, showed needle recapping to be the least reported reason of injury and administration of injections to be the most.[28] According to the results of IIDH, majority of the participants knew the importance of no recapping but did not practice it. Therefore, a strict policy of no recapping of used syringes should be implemented in the hospital unless a safer means of recapping is available as recommended by the UK department of health.[31]

About the reasons concerning the occurrence of NSI, 67.5% dentists and 40.7% students stated carelessness as their main cause. Other reasons included being overburdened, tiredness and less clinical experience. About 79.2% dentists and 62.9% students are reported to have been vaccinated against HBV.

Although 27(50%) dentists and 19(51.4%) students reported their injuries after attaining NSI, most of the participants were not offered post-prophylactic medication. Still, NSI reporting in present study is higher than previous studies conducted nationally[24,25,30] and internationally[28,29] These findings show that a post exposure management strategy should be developed by hospital authorities and the matter of NSI should be taken more seriously. Furthermore, an effective system for reporting of needle stick injuries should be established and awareness among dental practitioners regarding post exposure measurements should be enhanced.

CONCLUSIONS

Needle stick injuries are responsible for a number of blood borne diseases and are prevalent more among the dentists of IIDH as compared to dental students. NSI are mainly associated with recapping needles, while administering injections and cleaning instruments. Even though both, dentists and students are prone to NSI, only half of them report their injuries, despite having the knowledge of the diseases caused by it. Care while carrying out dental procedures and the development and use of safer needles may prevent NSI occurrences and diseases.

REFERENCES

1. Guruprasad Y, Chauhan DS. **Knowledge, attitude and practice regarding risk of HIV infection through accidental needlestick injuries among dental students of Raichur, India.** Natl J Maxillofac Surg. 2011;2(2):152-5.

2. Ramos-Gomez F, Ellison J, Greenspan D, Bird W, Lowe S, Gerberding JL. **Accidental exposures to blood and body fluids among health care workers in dental teaching clinics: a prospective study.** Journal of the American Dental Association. 1997;128(9):1253-61.

3. Wicker S, Rabenau HF. **Occupational exposures to bloodborne viruses among German dental professionals and students in a clinical setting.** International archives of occupational and environmental health. 2010;83(1):77-83.

4. Lum D, Mason Z, Meyer-Rochow G, Neveldsen GB, Siriwardena M, Turner P, et al. **Needle stick injuries in country general practice.** The New Zealand medical journal. 1997;110(1041):122-5.

5. Norsayani MY, Noor Hassim I. **Study on incidence of needle stick injury and factors associated with this problem among medical students.** Journal of occupational health. 2003;45(3):172-8.

6. Centers for Disease Control and Prevention. **Bloodborne infectious diseases: HIV/AIDS, Hepatitis b, Hepatitis C 2008 [22 feb 2015].** Available from: http://www.cdc.gov/niosh/topics/bbp/emergnedl.html.

7. **Vanish Point.** Available from: http://www.vanishpoint.com/simple4.aspx?pageID=166.

8. American Nurses Association (ANA). **Needlestick Prevention Guide 600 Maryland Avenue, SW, Suite 100 West Washington 2004 [12 october 2013].** Available from: http://www.who.int/occupational_health/activities/2needguid.pdf.

9. **NHS Employers. Prevention of sharps injuries [06 / 12 / 2013 2.13pm].** Available from: http://www.nhsemployers.org/your-workforce/retain-and-improve/staff-experience/health-work-and-wellbeing/protecting-staff-and-preventing-ill-health/partnership-working-across-your-organisation/health--safety/prevention-of-sharps-injuries.

10. **World Health Organization. Protecting health-care workers - preventing needlestick injuries 2002.** Available from: http://www.who.int/occupational_health/topics/needinjuries/en/.

11. **Centers for Disease Control and Prevention. Preventing Needlestick Injuries in Health Care Settings Columbia Parkway Cincinnati,: NIOSH; 1999.** Available from: https://www.cdc.gov/niosh/docs/2000-108/pdfs/2000-108.pdf.

12. Azap A, Ergonul O, Memikoglu KO, Yesilkaya A, Altunsoy A, Bozkurt GY, et al. **Occupational exposure to blood and body fluids among health care workers in Ankara, Turkey.** American journal of infection control. 2005;33(1):48-52.

13. Hamid S, Umar M, Alam A, Siddiqui A, Qureshi H, Butt J, et al. **PSG consensus statement on management of hepatitis C virus infection--2003.** JPMA The Journal of the Pakistan Medical Association. 2004;54(3):146-50.

14. Zafar A, Aslam N, Nasir N, Meraj R, Mehraj V. **Knowledge, attitudes and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan.** JPMA The Journal of the Pakistan Medical Association. 2008;58(2):57-60.

15. Mohammad A Rai HJW, Syed H Ali and Vivek R Nerurkar,. **HIV/AIDS in Pakistan: the battle begins.** Bio Med Central ,Open Access Publisher. 2007.

16. **Safe injections. HCV Center for Injection Safety 2006 [6 november 2008].** Available from: http://www.safeinjections.org.

17. Bosan et al. **A review of hepatitis viral infections in Pakistan.** Journal of Pak Med Association 2010;60.

18. MMWR recommendations and reports AB. **Management of Occupational Blood Exposures.** 2001 [cited september,30,2013]. Available from: https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5011a3.htm.

19. Purva M. **Hand hygiene: Back to the basics of infection control.** Indian Journal of Medical Research. 2011;134.5(611–620).

20. **Centers for Disease Control and Prevention. Device Screening and Evaluation Forms 2001 [07 December 2013].** Available from: http://www.cdc.gov/oralhealth/infectioncontrol/forms.htm.

21. Krisiunas E. **Safe Needle Devices.** Available from: https://webbertraining.com/files/library/docs/52.pdf.

22. Mehrdad Askarian LM, Ziad A. Memish, Ojan Assadian. **Prevalence of needle stick injuries among dental, nursing and midwifery students in Shiraz, Iran.** 2012;7(1).

23. Jaber MA. **A survey of needle sticks and other sharp injuries among dental undergraduate students.** international journal of infection control, 2011-ijic. V7i1.

24. Sindhiya jan b, Tauseefullah Akhund M, MPH, Muhemmed Jamil Akhtar M, FCPS, Jan Muhammad Shaikh M, FCPS. **Needle stick injuries among dental health care providers:A Survey done at Hyderabad and Karachi.** Pakistan Oral & Dental Journal 2014;34, No. 2.

25. Mubashir Aslam TT, Arif Ali, Waseem Mirza, Hammad Ali. **Needle stick injuries among health care workers of public sector tertiary care hospitals of Karachi.** Journal of the College of Physicians and Surgeons Pakistan 2010;Vol. 20 (3): 150-153.

26. Muhammad Shahzad B, FCPS (oral maxillofacial surgery), Syed Ghazanfar Hassan B, FFD RCSI(Ireland), Muhammad Rizwan Memon B, FCPS (Prosthodontic), Uzma Bashir b, Salman Shams B. **Needle stick injuries among dental students, house officers and paradental staff working at liaquat medical university hospital, Hyderabad.** Pakistan Oral & Dental Journal April 2013;Vol 33, No. 1.

27. Priyanka Yadav AJ, Mayank Agrawal, Jyoti Latha Ballal, Sonam Agrawal. **Occupational Exposures to Blood among Dentists in Jaipur District.** Int J Dent Med Res. 2014;1 (2).

28. Kamis Gaballah DW, Kamal Sihmbly, and Tara Renton. **Needle stick injuries among dental students: risk factors and recommendations for prevention.** Libyan J Med 2012;7.

29. Y. Khader SB, Z. Amarin. **Self-reported needle-stick injuries among dentists in north Jordan.** Eastern Mediterranean Health 2009;15(1).

30. Aeeza Malik MSS, Ambrina Qureshi. **Needle-stick injury: a rising bio-hazard.** J Ayub Med Coll Abbottabad. 2012;24(3-4).

31. Department UH. **Guidance for Clinical Health Care Workers: Protection Against Infection with Blood-borne Viruses Recommendations of the Expert Advisory Group on AIDS and the Advisory Group on Hepatitis.**

Even the nicest people have their limits.

– Unknown –

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Huda Khalid	Study design and data collection.	
2	Dr. M. Khalid Siddique	Drafting of article and data analysis.	
3	Dr. Hamna Khalid	Data analysis & interpretation and drafting.	
4	Aimon Aftab	Data collection and analysis	
5	Humaira Anwar	Data collection and search of reference.	
6	Kinza Iftikhar	Data collection	