ORIGINAL ARTICLE

Knowledge and Frequency of Needle Stick Injury Among Dental Students and House Officers of Bhitai Medical and Dental College, Mirpur Khas

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ABSTRACT

Objective: To evaluate the knowledge and experience of Needle Stick Injury (NSI) among dental students and house officers at Bhitai Dental and Medical College, Mirpur Khas.
Methodology: This descriptive cross-sectional study was conducted among dental students and house officers. The number of needle stick injuries and post exposure reporting in the past 12 months was assessed by a questionnaire-based survey. SPSS 19 was used to analyze the data.
Result: A total of 330 dental students and house officers participated in this study in which 76.3% were dental students and 23.3% were house officers. As many as 63% had experienced NSI. As many as 31% reported receiving NSI during re-capping of the needles, 21% during administering local anaesthesia injection, and 19% reported getting injured during the scaling procedure. A total of 78.6% of the participants did not report the exposure incident.
Conclusion: The most prevalent of causes reported was receiving injury during the recapping of needle. The reporting of NSIs was found to be insufficient, hence evaded proper follow up because the respondents feared stigmatization and discrimination. Furthermore, awareness was low regarding the means of prevention and protocol.

Key words: Needle stick Injury, Dentistry, Occupational Hazards, Post Exposure Prophylaxis, Blood-borne Pathogens

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عنوان: بھٹائی ڈینٹل اینڈ میڈیکل کالج میرپورخاص کے طلبا اور ہاؤس آفیسرز میں انجیکشن کی سوئی سے ہونے والے انفیکشن کا جائزہ۔

تعارف: اس تحقیق کا مقصد بھٹائی ڈینٹل اینڈ میڈیکل کالج میرپورخاص کے ڈینٹل کے طلبا اور ہاؤس آفیسرز میں انجیکشن کی سوئی سے ہونے والے زخم کے واقعات کی تعداد کا اندازہ لگانا ہے۔

طریقہ کار: اس وضاحتی کروس سیکشنل تحقیق میں ڈینٹل کے طالبعلموں اور ہاؤس آفیسرز سے سوالنامے کے ذریعے یہ معلوم کرنے کی کوشش کی گئی کہ انکے ساتھ گذشتہ 12 مہینوں کے دوران انجیکشن کی سوئی سے زخمی ہونے کے کتنے واقعات پیش آئے حاصل ہونے والے ڈیٹا کا جائزہ لینے کے لیے ایس پی ایس ایس (SPSS)19 استعمال میں کیا گیا۔

نتائج: کُل 330 شرکاء میں 76.3 فیصد ڈینٹل کے طالبعلم اور 23.7 فیصد ہاؤس آفیسر سوالنامہ پُر کیا جس میں سے 63 فیصد نے این ایس آئی کا اعتراف کیا۔ 31 فیصد میں این ایس آئی کی وجہ سوئی کی ری کیپنگ تھی۔ لوکل انستھیسیا انجیکشن سے 21 فیصد اور ڈینٹل اسکیلنگ طریقہ کار سے 19 فیصد ریکارڈ کی گئی۔ 78.6 فیصد افراد نے اس حوالے سے پیش آنے والے واقعے کو رپورٹ نہیں کیا۔

حاصلِ مطالعہ: ڈینٹل کے طلبا اور ہاؤس آفیسرز میں این ایس آئی کی سب سے بڑی وجہ سوئی کی ری کیپنگ تھی جبکہ حاصل ہونے والی معلومات ناکافی تھیں۔ جسکی وجہ شرکاء میں اس بات کا خوف تھا کہ انکے ساتھ امتیازی فرق کیا جائے گا۔ انجیکشن کی سوئی سے ہونے والے انفیکشن سے تحفظ کے لیئے حفاظتی اقدامات کی آگاہی درکار ہے۔

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INTRODUCTION

Dental healthcare workers (DHCWs) are at the greatest risk of exposure to blood-borne pathogens such as hepatitis B, hepatitis C and HIV mostly from percutaneous injury (PI) everyday[1-3]. PI wounds are caused during invasive procedures by accidental cut(s) which break the integrity of the skin, in which NSI is the most common route for blood-borne pathogens[4]. NSI has been reported among healthcare workers since 1980[5].

NSI is the most serious health problem among DHCWs putting their lives and careers at risk[6,7]. One German study stated that the maximum number of participants had experienced NSIs at least once in their profession[8]. A number of published studies have reported the rate of NSI in different populations of DHCWs[9-13]. DHCWs usually face NSIs during dental procedures while using sharp objects and needles[14]. It frequently occurs during local anaesthesia infiltration, re-capping, and disposal of needles or syringe[15]. Among these, re-capping of needles is the most common cause of NSIs[16]. An injury can happen any time during invasive procedures and it can be due to lack of knowledge, lack of training, inexperience, improper handling, and fatigue due to work overload[9,17,18].

In 2002, the World Health Organization (WHO) estimated that up to 2 million healthcare workers experience percutaneous injury each year and are exposed to blood-borne viruses. It also declared that 37.6% of hepatitis B, 39% of hepatitis C, and 4.4% of Human Immunodeficiency Virus (HIV) among healthcare workers globally were acquired through these injuries[19].

In dental schools, the frequency rate of percutaneous injury ranges from 1.97 to 12.5 per 10,000 patient visits[10,20]. According to an observational study by Younai et al, the risk of NSIs among third year students is higher as compared to fourth year students and it is Attributable to lack of experience or improper handling during dental invasive procedures[5,10].

In Pakistan, the rate of NSI is approximately 2.9% in private dental practitioners, 2.4% in undergraduate students, 16.3% in faculty, and 44.7% in house officers. The prevalence rate of transmission for hepatitis C is 3.3% and hepatitis B is 33.3%[21,22].

Although a lot of studies were done on the awareness of NSIs among practicing dentists, little has been done for dental students. The aim of this study was to determine the incidence of NSIs among the 3rd and the 4th year dental students and house officers, to evaluate the level of knowledge, attitude, and management of post-exposure incidents.

METHODOLOGY

This study was conducted at Bhitai Dental and Medical College, Mirpur Khas and included 3rd and 4th year dental students and house officers. It was a descriptive cross-sectional study. The number of NSIs and post - exposure management in the past 12 months was assessed by a questionnaire-based survey. SPSS 19 was used to analyze the data.

RESULT

A total of 330 respondent participated in this study. Out of these, 252 (76.3%) were dental students and 78 (23.6%) were dental house officers. Distribution of male and female students was 24% and 52% respectively and male and female house officers were 14% and 9% respectively as shown in Graph 1.

Figure 1: Distribution of Male and Female participants

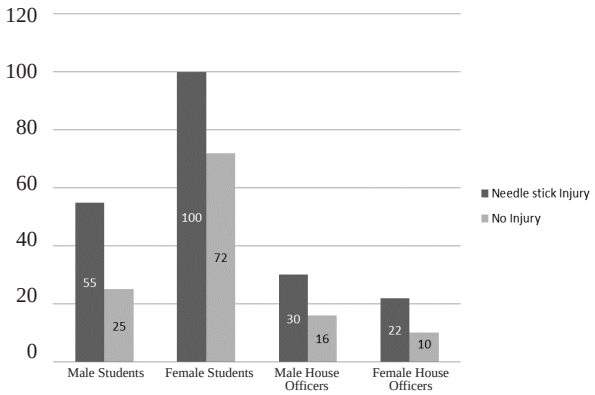

Figure 1: Distribution of Male and Female Participants

In this study, 207 (63%) of 330 had encountered an NSI (Graph 2). Of these, 131 (63.7%) had suffered NSI at least once in a lifetime. Forty-eight (21.7%) were injured twice and 31 (14.9%) were injured more than twice. We also found that only 45 (21.7%) had reported NSIs. Most of the participants (78.6%) did not report NSI to anyone while only 21.4% reported. Only 20.4% received post-exposure management. When participants were asked about hepatitis B vaccination, 73% reported being vaccinated. Sharp bins were used by 27.3% participants and 87% wore gloves during all dental procedures (Table 1).

Among dental students and house officers, NSI occurred most commonly during re-capping (31%) of the needles; local anaesthesia injections accounted for 21% of cases;

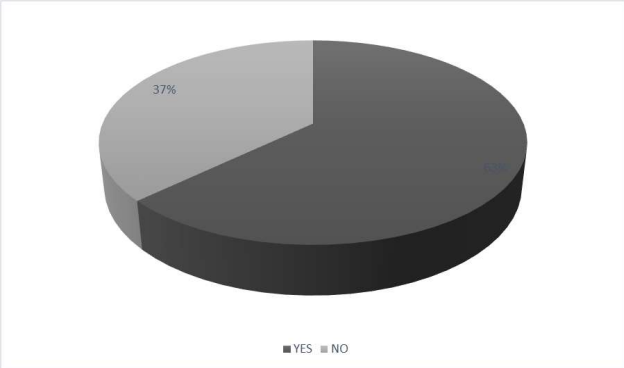

Figure 2: Needle Stick Injury Pie-chart

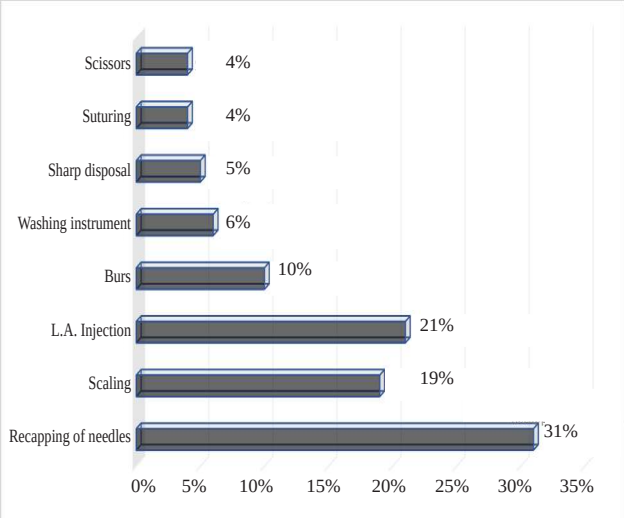

Figure 3: Distribution of Procedures That Cause Needle Stick Injury

Table 1: Prevalence of NSIs, Knowledge, and Attitude

1. How many times during last 12 months?	Once=63.2%, twice 21.7 % more than twice=14.9%	
2. Did you report anyone?	Yes=21.4%	No=78.6%%
3. Did you get the post exposure management?	Yes=20.4%	No=79.6%
4. Do you know the post exposure management protocol?	Yes=38.9%	No=61.1%
5. Are you vaccinated for hepatitis B?	Yes=72.9%	No=27.1%
6. Do you dispose the sharps in the sharp bins?	Yes=27.3%	No=72.7%
7. Do you wear gloves during dental procedures?	Yes=87%	No=13%

and 19% occurred during scaling of teeth. Other reasons reported included the use of instruments such as bur, scalpel, and sharp disposal as shown in Graph 3.

DISCUSSION

NSI is the most common route of transmission for blood-borne diseases among the dental healthcare workers[23]. In our study, 63% students had experienced NSI during different dental procedures, mostly due to inexperience or lack of supervision. According to international studies, inexperience, lack of supervision, excessive workload, and fatigue are the main reasons for NSIs among the dental students[24]. In our study, we found that re-capping of local anaesthesia (LA) injection and dental scaling were the two main causes of NSIs among dental students. Other studies also reveal that sharp needles such as infiltration, block needles, or syringes are the major source of PI among dental professionals[11,25]. In the present study, 48% house officers reported NSIs, citing recapping of the needle as the most common reason. One study in Karachi, Pakistan shows that the risk of NSI is higher in house officers[13]. Other studies have also shown increased rates of NSI in dental postgraduate trainees and dental students[12].

According to Aga Khan University Hospital, Karachi, every year, 12–27% NSIs are reported[26]. One study in Iran has shown that 45% participants had encountered NSI, and the most common reason given was inexperience and lack of knowledge[9].

In dental professionals, the risk of occupational exposures to blood-borne viruses like hepatitis B, hepatitis C and HIV through needle stick injury is a challenging issue[9,27]. In Pakistan, reported frequency of hepatitis B and hepatitis C is 4 to 6%[28]. Aslam M, et al have found that 34% health workers were exposed to hepatitis B or hepatitis C via NSI. Among the blood-borne diseases, hepatitis B is preventable[29]. Worldwide, approximately 80% healthcare workers know about hepatitis B vaccination[30]. In the present study, 70% of the dental students and house officers were found to have been vaccinated against hepatitis B. This affirms that dental professionals should be aware of the threat of NSI and be equipped with protocols regarding the risk of blood-borne infections in their clinical areas. However, 30% dental professional were found not taking NSI seriously. Multiple educational and awareness sessions should be planned to educate them regarding the importance of NSI.

The risk of NSI may be reduced by barriers such as gloves but these are not effective against sharp instruments[31]. In our study, 87% reported wearing gloves during dental procedures as compared to Sumathi Muralidhar[16], who showed that 26% DHCWs were not using gloves. A study in Iran revealed that 96.2 % were using gloves at the time of injury.[9]

In this study, 78.6% did not report the exposure incident fearing stigmatization and discrimination. We also discovered that post-exposure management was completely inadequate in those students who had reported the exposure incident[30].

Reviewing the studies and comparing with our results, we found it extremely important to design, introduce, apply, assure, and reassure compliance to the protocols regarding NSIs in our dental and clinical departments.

CONCLUSION

NSIs are a major route for transmission of blood-borne infections among dental students and house officers, who are aware of this fact. However, reporting of NSIs and post-exposure management was found to be completely insufficient. Preventive protocols should exist in all clinical departments. A dire need exists to invest resources in educating students at the time of their orientation prior to beginning their clinical rotations, stressing the importance of reporting an NSI. Hepatitis B vaccination should be made mandatory in order to minimize the risk of blood-borne diseases. Awareness and educational sessions for blood-borne diseases like HIV, hepatitis B and hepatitis C should be planned for all dental healthcare worker to protect them from these diseases.

Authors'contributions: Dr Irfan Ali and Dr Faisal Hameed conceived the idea, searched for literature search, collected, analysed and reviewed data, wrote the introduction, and discussion. Dr Ali Maqbool and Dr Muhammad Kazim searched for literature, worked on results and discussion. Dr Muhammad Aqeel Aslam and Dr Saaduddin Siddiqui reviewed the literature, worked on discussion and edited the manuscript. Dr Nabeel Hafeez reviewed the literature, result, and conclusion. All authors contributed to the final manuscript.

References

1 Siew C, Chang SB, Gruninger SE, Verrusio AC, Neidle EA. Self reported percutaneous injuries in dentists: implications for HBV, HIV, transmission risk. J Am Dent Assoc. 1992; 123: 36–44.

2 Siew C, Gruninger SE, Miaw CL, Neidle EA. Percutaneous injuries in practicing dentists: a prospective study using a 20-day diary. J Am Dent Assoc. 1995; 126:1227–34.

3 Gooch BF, Siew C, Cleveland JL, Gruninger SE, Lockwood SA, Joy ED. Occupational blood exposure and HIV infection among oral and maxillofacial surgeons. Oral Surg Oral Med Oral Pathol Oral RadiolEndod. 1998;85(2):128–34.

4 Greene, E.S., Berry, A.J., Arnold, W.P. and Jagger, J. Percutaneous injuries in anesthesia personnel. Anesth. Analg. 1996: 83:273-278

5 May D, Brewer S. Sharps injury: prevention and management. Nurs Stand. 2001; 15: 45–52.

6 Talaat M, Kandeel A, El-Shoubary W, Bodenschatz C, Khairy I, et al. Occupational exposure to needlestick injuries and hepatitis B vaccination coverage among health care workers in Egypt. Am J Infect Control. 2003; 31(8): 469-474.

7 Salehi AS, Garner P. Occupational injury history and universal precautions awareness: a survey in Kabul hospital staff. BMC Infect Dis. 2010; 10: 19.

8 Wicker S, Rabenau HF. Occupational exposures to blood borne viruses among German dental professionals and students in a clinical setting. Int Arch Occup Environ Health 2010; 83(1): 77-83.

9 Askarian M, Malekmakan L, Memish ZA, Assadian O. Prevalence of needle stick injuries among dental, nursing and midwifery students in Shiraz, Iran. GMS. Krankenhhyg-Interdiszip. 2012; 7(1): Doc05

10 Younai FS, Murphy DC, Kotelchuck D. Occupational exposures to blood in a dental teaching environment: results of a ten-year surveillance study. J Dent Educ. 2001; 65(5): 436–448.

11 Sullivan M, Masters O, Venkatesan P. Needlestick injuries amongst medical students in Birmingham, UK. J Hosp Infect. 2000; 44(3): 240–241.

12 Ikram K, Siddiqui HK, Maqbool S. Frequency of Needle Stick Injury among Dental Students and Dentists of Karachi. World J Dent, 2015;6(4):213-216.

13 Pavithran VK, Murli R, Kirshan M, Shamala A, Yalamalli M, Kumar AV. Knowledge, attitude, and practice of needle stick and sharps injuries among dental professionals of Banglore,India J Int Soc .Prev Community Dent. 2015; 5(5):406-412.

14 Kapoor V, Gambhir RS, Singh S, Gill S, Singh A. Knowledge, awareness and practice regarding needle stick injuries in dental profession in India: a systematic review. Niger Med J. 2013; 54(6):365-370.

15 Zaidi MA, Beshayh SA. Griffith R. Needle stick injuries: an overview of the size of the problem, prevention and management, occupational and environmental health and safety, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates. J Med Biomed Sci 2010;2(2):53-61.

16 Muralidhar S, Singh PK, Jain R.K, Malhotra M, Bala M. Needle stick injuries among health care workers in a tertiary care hospital of India. Ind J Med Res .2010; 131: 405-410.

17 Rogers B, Goodno L. Evaluation of interventions to prevent needlestick injuries in health care occupations. Am J Prev Med. 2000;18(4l): 90–98. doi: 10.1016/S0749-3797(00)00145-8. Available from: http://dx.doi.org/10.1016/S0749-3797(00)00145-8

18 Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM, Centers for Disease Control and Prevention (CDC) Guidelines for infection control in dental health-care settings--2003. MMWR Recomm Rep. 2003;52(17):1–61

19 World Health Organization. Occupational Health-Needlestick injuries 2002. Available from: https://www.whi.int/occupational_health/topics/needinjuries/en/.

20 Zuberi BF, Zuberi FF, Hasan SR, Kumar R, Memon SA, Afsar S. Frequency of acute hepatitis C after needle stick injury and its treatment outcome. Pak J Med Sci. 2009;25(5): 766-769

21 Sjostrom HT, Skyman E, Hellström L, Med KM, Grinevika V. Cross-infection prevention, basic hygiene practices and education within nursing and health care in Latvia: a Swe- dish-Latvian practice development project. Nurse Educ Today 2003;23(6):404-411

22 MUNGURE E.K, GAKONYO J.M, MAMDANI Z , BUTT F, Awareness and experience of Needle Stick injuries among dental students at the University of Nairobi, Dental Hospital. East African Medical Journal.2010; 87(5): 211

23 Zafar A, Habib F, Hadwani R, Ejaz M, Khowaja K, Khowaja R, et al. Impact of infection control activities on the rate of needle stick injuries at a tertiary care hospital of Pakistan over a period of six years: an observational study. BMC Infect Dis. 2009; 9: 78-80.

24 Cleveland JL, Barker L, Gooch BF, Beltrami EM, Cardo D. Use of HIV postexposure prophylaxis by dental health care personnel: an overview and updated recommendations. J Am Dent Assoc. 2002, 133(12): 1619-1626

25 Trim JC, Adams D, Elliott TS. Healthcare workers' knowledge of inoculation injuries and glove use. Br J Nursing 2003; 12(4): 215–221.

26 Khurram M, Ijaz K, Bushra TH, Khan NY. Needle stick injuries. A SURVEY, attitudes and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan. J Pak Med Assoc 2008;58:57-60

27 Thomas DL, Gruninger SE, Siew C, Joy ED, Quinn TC. Occupational risk of hepatitis C infections among general dentists and oral surgeons in North America. Am J Med. 1996; 100(1):41–45. doi: 10.1016/S0002-9343(96)90009-1

28 Abbas Z, Jafri W, Shah SHA, Khokhar N, Zuberi SJ. PGS Consensus Statement on management of Hepatitis B Virus Infection 2003. J Pak Med Assoc. 2004; 54(3): 150-58

29 Aslam M, Taj T, Ali A, Mirza W, Ali H, Dar M, Badar N. Needle stick injuries among health care workers of public sector tertiary care hospitals of Karachi. J Col Physic Surg, Pakistan 2010;20(3):150-153.

30 Sukriti, Pati NT, Sethi A, Agrawal K, Agrawal K, Kumar GT, et al. Low levels of awareness, vaccine coverage, and the need for boosters among health care workers in tertiary care hospitals in India. J Gastroenterol Hepatol. 2008; 23(11): 1710-5

31 Jabbar AM, A survey of needle sticks and other sharp injuries among dental undergraduate students Int J Infect Control 2011, 7(3): doi:10.3396/ijic.V7i1.022.11