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# **NEEDLE STICK INJURIES;**

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

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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.<sup>1</sup> It was found that among health care professions, dental practitioners sustain the most NSI<sup>2</sup> and that they undergo NSI at least once during clinical practice.<sup>3</sup>

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

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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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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"<sup>5</sup> Sharps injury is defined as" skin penetrating stab wound caused by sharp instruments and accidents in a medical setting".<sup>6</sup>

Data from Various studies and researches shows that about thirty different diseases can be transmitted by NSI.<sup>7</sup> 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).<sup>8,9</sup>

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<sup>10</sup> 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<sup>11</sup> 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.<sup>12</sup>

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

Deadly consequences of NSI can be strikingly reduced by increasing awareness of safe needle practice and execution of protocol.<sup>11,17</sup> 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.<sup>19</sup> 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.<sup>21</sup>

## **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. lt 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**

 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 nonsustainers. 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



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).

Dentists





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 guite 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<sup>22</sup>, 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

#### **NEEDLE STICK INJURIES**

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Do you use needle removers before disposing off sharps           Yes         37         38         0.308           No         57         42         0.308           Sometimes         17         9         9           Is there an availability of sufficient sharps boxes         79         46         0.005*           No         79         46         0.005*           Do you immediately collect sharps in sharps boxes after use         7         9           Yes         32         31         0.623           Sometimes         21         17         0           ATTITUDE         17         10         0.623           Sometimes         21         17         0.623           Sometimes         21         17         10           No         222         16         0.793           Sometimes         5         4         10           No         222         16         0.793           Sometimes         5         4         10           Sometimes         5         4         10           Sometimes         5         4         10           Occupational health programme         3         1	Sometimes		0		1					
Yes         37         38           No         57         42         0.308           Sometimes         17         9         Is there an availability of sufficient sharps boxes           Yes         32         43         0.005*           No         79         46         0.005*           Do you immediately collect sharps in sharps boxes after use          0.005*           Yes         32         31         0.623           Sometimes         21         17         0           ATTITUDE         20         1         0.623           Sometimes         21         17         0           ATTITUDE         20         1         0.623           Sometimes         21         17         0           Sometimes         21         17         1           Yes         27         19         0.793           Sometimes         5         4         0.793           Sometimes         5         4         0.298           Occupational health programme         3         1         0.298           Occupational health programme         3         1         0.042*           Ves         17	Do you use needle removers before disposing	off sharps								
No         57         42         0.308           Sometimes         17         9         0           Is there an availability of sufficient sharps boxes         32         43         0.005*           Yes         32         43         0.005*           Do you immediately collect sharps in sharps boxes after use         46         0.005*           Ves         32         31         0.623           No         58         41         0.623           Sometimes         21         17         0           ATTITUDE         17         0         0.623           Sometimes         21         17         0.623           Sometimes         21         17         0           ATTITUDE         10         10         0.623           Sometimes         21         17         0.793           Sometimes         5         4         0.793           Sometimes         5         4         0.793           Sometimes         5         4         0.298           Infection control staff         7         2         0.298           Occupational health programme         3         1         0.298           Othe	Yes		37		38		0.308			
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No         27         19         0.793           No         22         16         0.793           Sometimes         5         4         0           To whom do you usually report to		27 10								
10         10         0.793           Sometimes         5         4         0.793           To whom do you usually report to	No	21		18		0 703				
To whom do you usually report to	Sometimes	5				0.785				
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Componition         21         20           Infection control staff         7         2         0.298           Occupational health programme         3         1         0.298           Others         4         1         1           After NSI, are you offered post-exposure prophylaxis (PEP)         17         16         0.042*           Sometimes         8         0         0         0.042*	Supervisor	anvisor 01 00					0.298			
After NSI, are you offered post-exposure prophylaxis (PEP)     1     0.298       Yes     17     16       No     29     21     0.042*	Infection control staff	7		20						
Observation         0         1           Others         4         1           After NSI, are you offered post-exposure prophylaxis (PEP)         17         16           Yes         17         16           No         29         21         0.042*           Sometimes         8         0         0	Occupational health programme	2		<u>∠</u>						
After NSI, are you offered post-exposure prophylaxis (PEP)       Yes     17     16       No     29     21     0.042*       Sometimes     8     0	Others	4		1 1						
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\*Statistically Significant

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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.<sup>24,26,30</sup> 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.<sup>25,27,29</sup> 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<sup>24</sup>, 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.<sup>31</sup>

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<sup>24,25,30</sup> and internationally<sup>28,29</sup> 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.

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Even the nicest people have their limits.

– Unknown –

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2	Dr. M. Khalid Siddique	Drafting of article and data analysis.	June e
3	Dr. Hamna Khalid	Data analysis & interpretation and drafting.	Hama
4	Aimon Aftab	Data collection and analysis	AiMor
5	Humaira Anwar	Data collection and search of reference.	Haus
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