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Research Article

# KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING NEEDLESTICK INJURIES AMONG DENTAL STUDENTS

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**ABSTRACT**

**Objective:** To assess the knowledge, attitude and practices among dental students on needle stick injuries (NSIs).

**Methods:** A validated questionnaire of 23 questions regarding the basic knowledge, attitude and practices about NSIs was distributed among 100 students randomly belonging to 3rd year, final year, and internship (5th year trainee) of undergraduate dental program in Saveetha Dental College and Hospital, Saveetha University, Chennai. The data extracted were tabulated, statistically analyzed and results obtained. Results were calculated on the basis of frequency and percentages using SPSS.

**Results:** About 87% of students had received hepatitis B (HBs) vaccination of which only 47% had carried out anti-HBs antibody check-up. Although 35% had suffered NSI, 15% of them did not report the incident of NSIs. However, only 37% of students knew about Universal Precaution guidelines. 76% of students had the habit of recapping the needle after injection.

**Conclusion:** This study revealed that knowledge of dental students about the risks associated with NSIs and use of preventive measures was inadequate. A standard protocol regarding the training as well as adapting preventive measures should be formulated in all dental institutions. 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.

**Keywords:** Knowledge, Awareness, Needle stick injuries, Universal Precaution Guidelines, Hepatitis B, Hepatitis C, Health-care workers.

## INTRODUCTION

Health-care professionals are the most negligent as far as their own health is concerned. They are exposed to high risk of various infections and also become victims of lifestyle diseases due to their stressful schedules and a high degree of professional responsibility. Increase in the incidence of deadly infections due to greater exposure to micro-organisms and viruses that cause blood borne diseases, such as the human immunodeficiency virus (HIV) and the hepatitis B (HBs) and hepatitis C viruses, has led the medical community to initiate efforts to prevent and limit exposure among health-care workers (HCWs) [1].

Needlestick injury (NSI) means the par literal introduction into the body of health-care worker, during the performance of their duties, of blood or other potentially hazardous material by a hollow bore needle or sharp instruments including, but not limited to, needles, lancets, scalpels, and contaminated broken glass [2]. 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.

HCWs incur 2 million NSIs per year that result in infections with HBs and hepatitis C and HIV. The World Health Organization estimates the global burden of disease from occupational exposure to be 40% of the HBs and hepatitis C infections and 2.5% of the HIV infections among HCWs as attributable to exposures at work [3]. While 90% of the occupational exposures occur in the developing world, 90% of the reports of occupational infection occur in the United States and Europe [4].

The World Health Organization defines "a safe injection" as one that does not harm the recipient, does not expose the provider to any avoidable risk, and does not result in any waste that is dangerous to the community. Irrational and unsafe injection practices are rife in developing countries [5]. More than 80% of the NSIs can be prevented through the use of safety devices and effective safety programs [2]. NSIs can be prevented by applying "Universal Precautions" as a safety measure [6]. Many studies have been done to assess the knowledge about NSI among HCWs and varied results were obtained. The rationale of this study is to assess the level of knowledge, attitude and practices regarding NSIs among undergraduate dental students of our institution.

## METHODS

### Year of study

The study was conducted during the academic year in January 2016.

### Study population and location

This study was conducted among the dental students who were attending the 3rd year, final year, and internship (5th year trainee) of undergraduate program in Saveetha Dental College and Hospital, Saveetha University, Chennai.

### Study sample size

A total of 100 students were randomly enrolled in the study including 3rd year, final year, and intern students.

### Questionnaire

A validated questionnaire of 23 close-ended questions was distributed among all the students of the study and the questions were designed to assess their basic knowledge, attitude and practices regarding NSIs. The data extracted were tabulated, data management and statistical analysis were performed, frequencies and percentages were calculated, and results obtained using SPSS.

## RESULTS

Table 1 gives the number of participants in each year of study. 57% were male students, 43% were female students (Fig. 1). Table 2 shows the level of knowledge and preventive measures taken by dental students regarding NSIs.

About 87% of students had received HBs vaccination of which only 47% had carried out anti-HBs antibody check-up. Although 35% had suffered NSI, 15% of them did not report the incident of NSIs. However, only 37% of students knew about Universal Precaution guidelines. 72% of students were aware of the diseased transmitted by NSIs such as HB virus, hepatitis C virus, HIV and they were aware that HBs vaccine (HBV) is the most common to get transmitted among them. 76% of students had the habit of recapping the needle after injection.

**Table 1: Participants year-wise**

| Year of study | Participants | Percentage |
|---|---|---|
| 3rd year | 31 | 31 |
| Final year | 42 | 42 |
| Intern | 27 | 27 |

## DISCUSSION

Healthcare providers who have occupational exposure to blood are at increased risk for acquiring blood borne infections. The level of risk depends on the number of patients with that infection in the health

**Table 2: Knowledge, attitude and practices regarding needle stick injuries**

| Questions | Options | Participants | Percentage |
|---|---|---|---|
| Did you ever have (contaminated) needle stick injury? | Yes | 35 | 35 |
| | No | 65 | 65 |
| If yes, have you reported the incident of needle stick injury to the health care department/head of department? | Yes | 85 | 85 |
| | No | 15 | 15 |
| Needle stick injury are reported | Always | 30 | 30 |
| | Sometimes | 55 | 55 |
| | Never, it goes unnoticed | 15 | 15 |
| Do you know about universal/standard precaution guidelines? | Yes | 37 | 37 |
| | No | 63 | 63 |
| Are you aware about the diseases caused by needle stick injury? | Yes | 72 | 72 |
| | No | 28 | 28 |
| The commonest clinical activity to cause needle stick injury? | Dental wiring | 11 | 11 |
| | Suturing | 27 | 27 |
| | Recapping the needle | 43 | 43 |
| | Passing the instrument | 19 | 19 |
| | All of the above | 0 | 0 |
| What type of measures much be taken after needle stick injury? | Squeeze the blood | 9 | 9 |
| | Washing the site with water | 48 | 48 |
| | Washing the site with soap water | 35 | 35 |
| | Washing the site with alcohol | 8 | 8 |
| Do you use gloves while treating the patient? | Yes | 92 | 92 |
| | No | 8 | 8 |
| Do you have habit of recapping the needle after injection? | Yes | 76 | 76 |
| | No | 24 | 24 |
| Which of the following technique is safe while recapping used needle? | Single-handed | 82 | 82 |
| | Double-handed | 18 | 18 |
| Are you aware about postexposure prophylaxis? | Yes | 67 | 67 |
| | No | 33 | 33 |
| Have you attended any infection control programme in your college/conferences held? | Yes | 38 | 38 |
| | No | 62 | 62 |
| Which diseases are transmitted by needle stick injury? | Hepatitis B | 63 | 63 |
| | Hepatitis C | 11 | 11 |
| | HIV | 20 | 20 |
| | Tuberculosis | 6 | 6 |
| Have you been vaccinated against hepatitis B virus? | Yes | 87 | 87 |
| | No | 13 | 13 |
| If yes, how many doses of hepatitis B vaccination you had? | <3 doses | 13 | 13 |
| | 3 doses | 55 | 55 |
| | 3 doses followed by booster dose | 32 | 32 |
| | Don't remember | 0 | 0 |
| Have you been tested for post-hepatitis B vaccine immunization? | Yes | 47 | 47 |
| | No | 53 | 53 |
| Do you think hepatitis B vaccination is mandatory for all dental practitioners? | Yes | 93 | 93 |
| | No | 7 | 7 |
| Do you bend used needles before disposal? | Yes | 88 | 88 |
| | No | 12 | 12 |
| Are you aware of the proper biomedical waste disposal methods? (colour coded bags to dispose different type of wastes) | Yes | 95 | 95 |
| | No | 5 | 5 |
| Improper waste disposal methods can cause infection due to sharps/needles/blades? | Yes | 83 | 83 |
| | No | 17 | 17 |
| Do you practise proper waste disposal methods? | Always | 68 | 68 |
| | Sometimes | 21 | 21 |
| | Never | 11 | 11 |
| Do you use personal protective equipment's to prevent needle stick injury? | Yes | 78 | 78 |
| | No | 22 | 22 |
| Do you think there should be more emphasis and training on infection control during dental curriculum and continuing dental education programme on the same should be conducted? | Yes | 89 | 89 |
| | No | 11 | 11 |

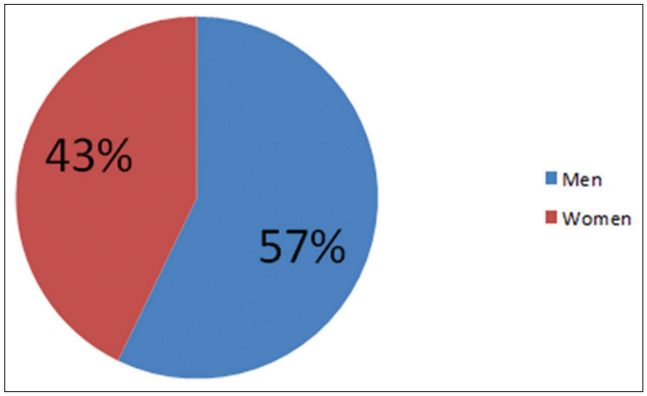


**Fig. 1: Sex distribution of participants**

care facility and the precautions the HCWs observe while dealing these patients [7]. NSIs is an important issue that needs to be addressed for preventing various blood borne diseases among the dentists.

In our study, 35% of students had contaminated NSI, among them 15% had not reported the incident to the head of the department/health care department, because one-third of the participants were not aware of the postexposure prophylaxis (PEP). In a study by Siddique *et al*., [8] a high percentage of subjects (94%) had NSIs. It is believed that only one out of three NSIs is reported in the United States, while these injuries virtually go undocumented in many developing countries [9]. In our study, 55% of students answered that NSIs are reported only sometimes.

The incidence of infection with HB virus has declined in dentists in recent years largely due to the widespread immunization with HBV [10]. In our study, 87% of participants were vaccinated against HB virus, 13% had taken <3 doses. This is in accordance to the study by Siddique *et al*. [8] in which 82.7% were vaccinated against HB. While in a study at a hospital in Dublin, only 41% of HCW were HB immune [11].

In many health facilities, even though the dentists are vaccinated, the seroconversion status after vaccination is not assessed. We had a similar finding where only 47% of students were tested for anti-HBs. In a study, about 3% of subjects were found to be negative for anti-HBs after vaccination [12]. The centers for disease control (CDC) recommendation is to test for antibody after completion of three injections of HBV vaccine, and if negative, give a second three-dose vaccine and test again for anti-HBsAg antibodies. If there is no antibody response, no further vaccination is recommended [13].

Another important issue to be considered is the awareness about PEP. HBs immunization and postexposure management are integral components of a complete program to prevent infection following blood borne pathogen exposure and are important elements of workplace safety [14]. In our study, 33% were unaware about PEP. This is in accordance to a study by Chacko and Isaac in which 31.6% were unaware of PEP [15].

Cervini and Bell [16] have shown that PEP practices for NSI are inadequate among medical students and our findings corroborate this fact. In a study conducted at Armed Forces Hospital, Sarourah, 93% HCW were unaware about PEP [17]. Only 10% of HCW were aware of PEP, according to the study by Siddiqui *et al*. [8].

Certain clinical practices, such as recapping needles, were related more to the likelihood of being injured. Many studies have also condemned the practice of recapping needles. The recapping of needles has been prohibited under the Occupation Safety and Health Administration (OSHA) blood borne pathogen standard [18]. It is documented that 10-25% injuries occurred while recapping a used needle [19]. In our study, 43% of participants considered recapping the needle to be the most common cause for NSIs. However, 76% of students had the habit of recapping the needle and among them 82% of them used the single handed technique as they felt it is safer than the double-handed technique for recapping the needle.

In 1985, to increase awareness among HCWs of the dangers of sharp injuries and other types of disease transmission, the CDC and the OSHA in the United States introduced the "Universal Precaution Guidelines," which have become the worldwide standard in both hospital and community care settings [20]. Universal Precautions, which in reality is the set of work practice recommendations designed to help minimize occupational exposure to blood borne pathogens, have been shown to be very effective [21].

Awareness related to safe medical practices regarding NSI, i.e., Universal Precaution guidelines, in this study was found to be only 37% which is comparatively very low when we compare data from various countries. In a survey at Armed Forces Hospital, Sarourah, 61% HCW were aware about the Universal Precaution Guidelines [17]. In a study by Shah *et al*. [22] 81% HCWs knew about Universal Precaution Guidelines. In contrast, only 21.6% were aware of Universal Precaution Guidelines in the survey conducted by Siddique *et al*. [8].

The risk of transmission after exposure to HIV-infected blood in one of the studies has been highlighted to be about 0.3%, whereas it is estimated to be up to 100 times greater for HBs virus (30%) and could be as high as 10% for hepatitis C virus [23]. Many students were aware that AIDS and HBs and hepatitis C can spread by NSI, but very few were aware of the large number of other diseases linked to NSI. In a study from Iran the awareness of risk of HIV/AIDS from NSI was 87.8% [24]. Thus, increasing student awareness and educating them on NSI risks and hazards is an important issue to be considered as it may improve their attitude and practices in adapting preventive measures.

Around 78% of them use personal protective equipment to prevent NSIs and majority (92%) use gloves while treating patients, which is in accordance to a study by Askarian *et al*. (96.2%) [25], whereas in a study by Muralidhar *et al*. [26] it was only 74%. The majority of the students (95%) were aware of the proper waste disposal methods and hazards of improper waste disposal, but only 68% were following them always. This shows that there is a need to motivate the students to implement the protocols regarding biomedical waste management and they must be trained in handling and disposal of sharps.

Only few of them (38%) had attended infection control programs in the college or conferences. Most of them were not sure about Universal Precaution Guidelines and 89% of them felt there should be more emphasis and training on infection control during dental curriculum and continuing dental education program on the same should be implemented.

According to a CDC report, use of safety engineered devices would reduce NSIs by 76% [27]. Preventive strategies have to be devised and reporting of NSIs need to be made mandatory. All dental students must be vaccinated against HB virus, tested for post-HBs immunization and awareness about PEP to be created.

## CONCLUSION

This study revealed that knowledge of dental students about the risks associated with NSIs and the use of preventive measures was inadequate. A standard protocol regarding the training as well as adapting preventive measures should be formulated in all dental institutions. 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.

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