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## Research Article

# Sharps Safety and Management among Dental Practitioners

## Abstract

**Background:** The potential for transmission of blood borne infections is highest during handling of needles and sharps. The factors which relate commonly to sharps injuries include the inadequate design or inappropriate placement of sharps disposal container, overfilling of sharps disposal container and inappropriate sharps disposal practices by the care provider during patient treatment. The present study was undertaken to assess the knowledge and practice of sharps use and disposal in dentists practising in government and private sectors and also to provide correct methods and procedure regarding sharp use and disposal to increase awareness.

**Methods:** A questionnaire comprising of 20 self-administered questions regarding knowledge, use and disposal methods of sharps in dentistry was prepared. The questionnaire was sent to 220 dentists practising in Lucknow and nearby area. Out of them 86 dentists in government teaching institute and hospitals, 45 dentists in private teaching institute and hospitals and 29 dentists of private clinic had answered back. The resulting data was compared and statistically analyzed.

**Result:** Only 11% dentists were fully aware about the type of sharps used in the dentistry. 79% of dentists prefer to use gloves always at the time of injection. 81% of the dentists were agreed with use of mechanical needle cutter and electrical needle destroyer to destroy the needle tips, however only 37% were actually using these methods. 66% answered that incineration is best method of final disposal of sharps.

**Conclusion:** There is somewhat lack of motivation and awareness regarding the sharps use and their maintenance among dentists, which needs special attention.

## Introduction

Accidental percutaneous injury is commonly seen as the primary route of occupational exposure to blood borne pathogens. During dental practice, sharp devices and equipments such as needles, scalpels, root canal reamers, stitch cutters, glass ampoules, sharp instruments and broken crockeries and glasses are used and accidental injury may occur during the time of use or disposal. A recent study done on needle stick injuries have shown that these injuries leads to one fourth of the occupational injuries [1]. Dental staff working in clinics, may be exposed to blood-borne viruses (BBV) carried in blood, oral fluids and tissues. Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are the principal pathogens of concern to dental staff which spread through sharp injuries [2]. HBV is the most infectious of the three viruses with a 30% risk of seroconversion following a sharps injury involving a high risk carrier to a susceptible individual [3,4]. HBV has frequently been transmitted in dental practice, although infection rates have declined considerably in dental

staff as a consequence of immunization and improvements in infection control practices. However, there are evidences in the recent literature that significant groups of healthcare workers worldwide do not receive appropriate hepatitis B vaccination [5,6]. Hepatitis C virus (HCV) found in saliva, is most frequently acquired by direct blood to blood contact. The estimated risk of HCV transmission after needle sticks is 1.8% [7]. The risk of HIV infection following a dental sharps injury is comparatively low with 0.3% risk of transmission [8].

Use of sharps is inherent in practice of dentistry and now it is established fact that occupational blood exposures carry a certain risk of transmission for blood borne infections. The present study was therefore undertaken to assess the knowledge and practice of sharps use and disposal among dentists practising in Lucknow and nearby area. The correct method for use and disposal of sharps was sent to the practicing dentists after getting the answers of survey questionnaire to increase their knowledge and awareness.

## Methods

An epidemiological survey was conducted in dental practitioners practicing in government and private sectors. A closed ended questionnaire of 20 self-administered objective questions was made consisting of questions related to the knowledge of sharps used in dental clinics, attitude towards use and practice of sharps disposal technique. Ethical approval was taken from the institutional ethical committee. 220 dental practitioners working in government and private teaching institutes and hospitals and private dental clinics were selected by convenience sampling, contacted and questionnaire form was e-mailed to them. Participants were assured of the confidentiality of the project and were requested to provide appropriate answers. Among them 86 dentists in government teaching institute and hospitals, 45 dentists in private teaching institute and hospitals and 29 dentists of private clinic had answered back. Reminder was sent to the rest of dentists and after two reminders they were excluded from the study. The answers obtained were then compared and statistical analysis was done SPSS (Statistical Package for Social Sciences) software version 17.0.

## Result

Figure 1 shows the percentage of dentists answered the questionnaire. Only 11% dentists were fully aware about the type of sharps used in the dentistry. 4% of the dentists consider that gloves not necessary during the time of injection, though gloves are necessary as they provide primary barrier. 79% of the dentists always prefer to wear gloves during the time of injection. Figure 2 shows the percentage of dentist and staff exposed to needlestick injuries/sharp instrument injury. Most of the dentist and staff were exposed to needlestick injuries approximately 10% or less than 10% incidental rate.

Figure 3 shows the percentage of dentists immunized against titanus and hepatitis. Only 3% dentist had answered positively for the patient had history of blood borne disease after needlestick injury/sharp instrument injury contaminated with blood and the precautions taken was only by first aid measures. Though 78% were ignorant for the correct method of first aid measures and they used to stop the bleeding and then washing with water which is not a correct method. 45% of the dentists were immunized for the tetanus and hepatitis both. 12% of the dentists were not immunized for the hepatitis. Most of the dentists (46%) consider HIV to be most infectious when compared with hepatitis B and hepatitis C.

46% dentists had answered that after use the contaminated needle can be broken, 8% dentists agreed that needle should be recapped after use. 22% dentists preferred to break, recapping or removing the needle from the device while on the contrary 24% of the dentists did not opted any of the technique and preferred other methods. 96% dentists were agreed using leakproof and puncture proof containers for disposing the needle after use while among them only 36 % dentists were actually using that container and rest were disposing the needle in infectious waste(16%) or general waste(31%) or combination (17%). 33% of dentists were agreed that in dental clinic, the containers for

sharps should be placed in easily accessible area in patient's room while 74% placed the container at corner of the room or at back of doors (3%). 81% of the dentist were agreed that mechanical needle cutter and electrical needle destroyer both should be used to destroy the needle tips However due to unavailability in the clinic only 37% were actually using these methods. 24% dentist were using only mechanical needle cutter and 16% were using electrical needle destroyer. 13 % dentist answered that final sharp disposal should be done by open burning, 66% were agreed that incineration is best method to dispose, 11% dentists answered that autoclaving is best method while 10% dentists answered that deep burial is the best method to finally dispose the sharps.

## Discussion

Knowledge of sharps is required for consideration of proper precautions to avoid blood borne diseases. A sharp is any item

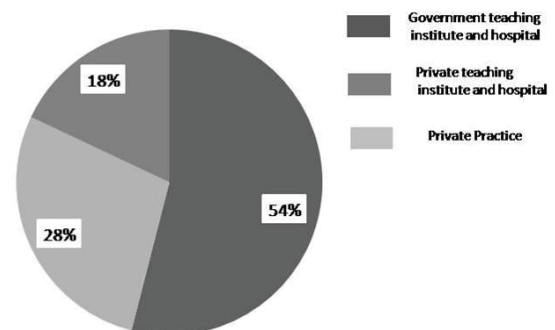


Figure 1: Graph showing percentage of dentists answered the questionnaire.

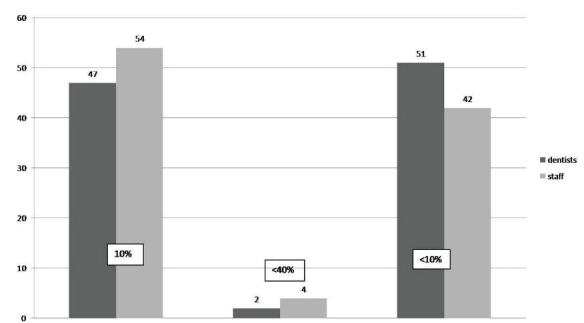


Figure 2: Graph showing percentage of dentist and staff exposed to needlestick injuries/sharp instrument injury.

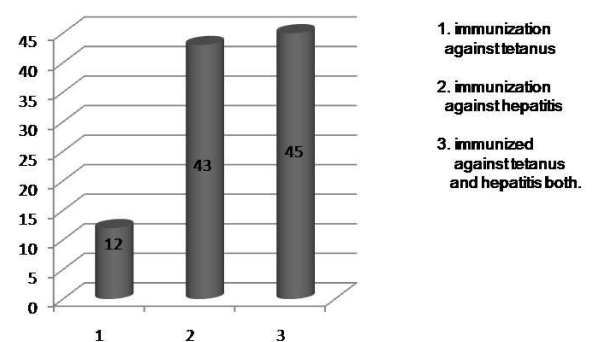


Figure 3: Graph showing percentage of dentist immunized against hepatitis and tetanus.

that is capable of penetrating the skin besides the more familiar category of hypodermic needles, e.g. ampoules, blades, wires, scissors, stitch removers, single use surgical instruments, endodontic files and reamers. Sharps used in clinics need special attention while being segregated and stored because needles can act as a pool where pathogens may survive for a long time because of the presence of blood. The transmission risk is influenced by the type and number of microorganisms present in the blood, presence of visible blood on the needle, depth of the injury and size and type of needle used [9]. Studies of the effect of latex gloves upon the volume of blood inoculated during needlestick injury have shown a significant benefit ratio, which reduces the volume of transferred blood by 46-86% [10].

The result of study shows that needlestick injury is not very frequent but not unusual also. Having life threatening effects and hazards, precautions to avoid these injuries are necessary. Regardless of the source of exposure, the injured person should be assessed by a trained health care worker or doctor with experience in the management of blood borne diseases and infections. In recent years, needlestick injuries have assumed far greater importance. The reasons for a change in attitude have been due to the fears regarding the transmission of HIV, HBV and hepatitis C (HCV). The transmission of blood borne viruses in dental health-care settings can have serious consequences but is fortunately a rare event. Once the transmission takes place, in few cases virus gets eliminated totally by body's immune system whereas others become carrier. In HBV it is 20%, HCV it is 80% and in HIV it is almost 100%.

There is no data on the effect of first aid treatment in reducing the risk of BBV transmission following occupational exposure. Nevertheless it is recommended that for percutaneous (needlestick/sharp-object) injuries the wound should be washed (and not scrubbed) for several minutes with soap and water, or a disinfectant with known activity against BBVs (10% iodine solution or chlorine compounds) [2]. Pressure above the wound to induce bleeding from the contaminated injury should also be performed. For a mucous membrane exposure copious irrigation with tap water, sterile saline or sterile water for several minutes should be done. The rationale behind such first aid measures is to decrease the pathogen effect below the threshold of an infectious dose. Therefore dilution with water may lower the number of organisms below that required to initiate infection [2]. Pre-exposure vaccination and the use of standard precautions to prevent exposure to blood are the most effective strategies for preventing dental health-care employees from occupational exposure to occupational infection with HIV, HBV, or HCV [11].

The clinician, who uses a sharp, is responsible for the safe management and disposal of the sharp. Sharps must not be passed by hand to hand between a health care worker and any other person. Reusable sharps must be placed immediately after use in a sharps container. Needles should not be left on the bench or bracket table until the end of the appointment. However, anesthetic cartridges should be retained until completion of treatment, so that they may be counted. Dental

burs should be removed from the handpiece after use. Leak proof sharps container should be used for all sharps, including needles, burs, matrices, scalpel blades, sutures etc. Anesthetic cartridges and used disposable syringes should also be placed in the sharps container. Sharps containers should be puncture-resistant, waterproof and leak-proof with an opening that is wide enough to allow sharps to be dropped into the container by a single hand operation. The container should be clearly labelled with biohazard symbol. The container should not be more than two-thirds full and securely sealed with a lid before disposal. Sharps containers should be placed so that visitors cannot easily access them. The size of the container will vary according to need. It should be of the appropriate size for the dental surgery/unit to ensure that it is changed regularly and not kept for long periods of time. Sharp objects should never be placed in contaminated clinical waste bags or containers. The standard precautions during sharps include major features of universal precautions (designed to reduce the risk of transmission of blood borne pathogens) and body substance isolation (designed to reduce the risk of pathogens from moist body substances) and apply them to all patients receiving care in hospitals regardless of their diagnosis or presumed infection status [12].

Avoiding occupational exposures to blood is the primary way to prevent transmission of blood borne viruses in dental clinics. Methods used to reduce sharp injuries in dental settings include engineering and work practice controls and the use of personal protective equipment (PPE), immunization of the staff, education and training for managing the problem [12]. Engineering control, isolate or remove the blood borne pathogens hazard from the workplace. These are technology-based and incorporate safer designs of instruments and devices. Examples include sharps disposal containers, rubber dams, and self-sheathing anaesthetic needles. These controls should be used as the primary method to reduce exposures to blood borne pathogens following skin penetration with sharp instruments or needles. Work practice controls are behavior-based and are intended to reduce the risk of blood exposure by changing the manner in which a procedure is performed. Examples include using the "scoop" technique to recap an anaesthetic needle, removing burs before placing the hand piece in the dental unit, placing sharps containers within reach at eye level in every patients room and restricting the use of fingers during suturing and when administering anaesthesia. Uncapped needle and sharps should not be passed between dentist and the assistant.

Data showed that most of the dentists were aware of the final disposal methods. Sharps should undergo incineration whenever possible, and can be incinerated together with other infectious waste. Encapsulation is also suitable for sharps. After incineration or other disinfection, the residues may be landfilled [13].

The limitation of the study was that it was done among very few dentists and limited to Lucknow and nearby area in Uttar Pradesh. Though further studies are required at broad level to sensitize dentists for biomedical waste disposal.

The present survey was considered beneficial for increasing awareness regarding knowledge and practice of sharps among dental practitioners. In developing country like India surveys related to infection control measures are needed to motivate and encourage correct practice in dentistry. Biomedical waste management is still not very common due to lack of concern, motivation, awareness and finances. A study performed in California in 1992, it was emphasized to monitor needle stick injuries, communicate findings to all personnel, and include needle stick prevention in educational programs. It was concluded that more convenient placement of needle disposal containers, communication of findings, and education do decrease needle stick injuries in healthcare workers [14]. Although sharps injuries are one of the most common types of injury incurred by health care workers, the estimated rates of injury can vary due to uncertainties about underreporting [15]. An effective communication strategy is imperative keeping in view the low awareness level among different category of staff in the health care establishments regarding biomedical waste management.

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