

NEEDLE STICK INJURIES AMONG DENTAL HEALTH CARE PROVIDERS: A SURVEY DONE AT HYDERABAD AND KARACHI

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ABSTRACT

The objective of this study was to assess the frequency of needle stick injury (NSI) among dental health care providers including dental technicians. A cross sectional survey was conducted among dental health care providers running independent dental clinics at Hyderabad and Karachi during the month of April 2013 and a total of 166 qualified dentists and 88 dental technicians were interviewed.

Ninety (54.2%) out of 166 qualified dentists and 45 (51.1%) out of 88 dental technicians had been the victims of NSI at least once in preceding 12 months. 104 (62.6%) dentists knew about universal guidelines for prevention of needle stick injury, whereas only 7 (8%) technicians knew about safety guidelines.

Only 67 (40.4%) dentists out of 166 and 7 (8.0%) technicians out of 88 reported about the needle stick injury to health authorities (or seniors). Common reasons for non-reporting among qualified dentists were: 55 (33.1%) believed that there was no benefit to report, 45 (27.1%) did not know where to report & 32 (19.3%) assumed that needle was new. In the category of technicians, 52(59.1%) did not want to report. 03(3.4%) believed needles were used for first time and 5 (5.7%) believed nothing will happen.

The risk of blood borne viral infections due to needle stick injury among dental health care providers, especially dental technicians is very high. Based on local studies and international guidelines, national guidelines for Pakistan should be developed by experts to minimize the chances of needle stick injury.

Key Words: Needle Stick Injury, Dental Health Care Providers, Hepatitis B & C.

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INTRODUCTION

Needle stick injury, accidental cut or puncture of skin by a needle or sharp during medical procedure, is one of the major risk factors for blood borne viral infections, specially Hepatitis B (HBV), Hepatitis C (HCV) and human immune deficiency virus (HIV). Infection with HBV and HCV may lead to chronic hepatitis and cirrhosis of liver.¹

Risk of NSI among dental health care providers (DHCPs) is very high^{2,3}, and most of DHCPs suffer needle stick injury at least once during their career.⁴ A number of reports have been published evaluating the occurrence of NSI during dental procedures.⁵⁻¹⁰ It occurs commonly during infiltration of local anesthetic agent, recapping of needles and disposal of sharps¹¹.

Incidence of NSI in dental schools ranges from around 2-12 per 10,000 patient visits.¹² Younai et al. reported substantially higher rate of NSI among third year students of dental schools⁹, suggesting greater risk due to poor skills and techniques in performing invasive procedures.

In Pakistan, prevalence of hepatitis B virus in general population ranges from 1-12% and the data for HCV shows an incidence of 2-13%.¹³ Substantial HBV and HCV transmission occurs in certain high risk groups including health care workers, drug abusers and patients receiving blood component therapy. In a meta-analysis, incidence of positive HBsAg was shown at 2.4 to 20%.¹³ Peak incidence was observed in dentists (17%) and janitorial staff (20%). In this meta-analysis, prevalence of HCV ranged from 4-10%, with highest rate (10%) in health care workers.

Magnitude of injuries with needles and sharps can be reduced and prevented by creating awareness about risks of NSI, propagation of safety guidelines, execution of protocols and appropriate training of safe techniques among health care workers.^{14,15} Based on published data, proportion of NSI can be reduced with adherence to infection control guidelines and widespread use of safety-engineered devices.^{16,17}

Most dental health care providers work in small clinics and settings in the private sector, often with inadequate awareness and resources for safe handling of sharps. Very limited studies have been conducted to report the true prevalence of NSI in these settings.¹⁸⁻²⁰ Although surveys and research has been done, very few studies were done in this part of the world which included dental technicians running their own independent dental clinics.

This survey will help evaluate the true prevalence of NSI and preventive measures taken by dental health care providers to avoid needle stick injury.

METHODOLOGY

This cross sectional survey was conducted among dental health care providers running private clinics at Hyderabad and Karachi. Dental health care providers included qualified dentists and dental technicians running their own independent dental clinics.

A structured, self-administered questionnaire was designed to assess the frequency of needle stick injury

among dental health care providers. It contained multiple choice and 'fill in the blank' style questions. Information was gathered on gender, age, qualification of dentist, total number of hours worked per week and approximate number of patients attended per day. The questionnaire also included data regarding the frequency of being injured by a hollow needle while at work during the last one year. Questionnaire was filled in person by data collection team, which included one male and one female data collector. All dentists were visited at their clinics and verbal consent to participate in the survey was obtained.

Needle stick injury was defined as a percutaneous injury of any depth caused by a small-, medium- or large-bore hollow syringe needle which did or did not involve visible blood at the time of injury. Data were analyzed using the Statistical Package for the Social Sciences.¹⁶

The survey instrument was distributed and collected during April 2013.

RESULTS

One hundred sixty-six qualified dentists and 88 dental technicians were interviewed in Karachi and Hyderabad. Most of the participants were employed in government sector and were running their private clinics in the evening. 08 dentists and 13 dental technicians refused to participate in the survey and were excluded from the study. Demographic data of the participants is given in Table 1.

In qualified dentist category, 90 (54.2%) out of 166 participants had suffered needle stick injuries at least once in preceding 12 months. 58 (34.9%) dentists were injured twice and 18 (10.9%) more than twice in last one year. Frequency of needle stick injury, knowledge about universal precaution guidelines and attitude are given in Table 2.

Most common reason for not reporting the occurrence of NSI in qualified dentists was the perception that there was no use and benefit of reporting to health authorities. However, dental technicians did not report the NSI because they were not supposed to run independent dental clinics. Other reasons for not reporting NSI are given in Table 2.

When asked regarding time of injury, it was observed that 40 (44.4%) dentists and 26 (42.0%) technicians were injured during infiltration of local anesthetic drug. Details of timing of NSI are given in Table 3.

TABLE 1: DEMOGRAPHIC DATA

Variable	Qualified Dentists (166) n (%)	Dental Technicians (88) n (%)
Gender		
Males	121(72.9%)	88 (100 %)
Females	45 (27.1%)	00
Age		
25 to 35 years	35 (21.0%)	15 (17.0%)
36 to 45 years	47 (28.3%)	26 (29.5%)
Older than 45 year	84 (50.7%)	47 (53.5%)
Mean years of experience	11	16
Mean number of patients per day	17	18
Hepatitis B vaccination status (at least one dose)		
Yes	135 (81.3%)	09 (10.2%)
No	31(18.7%)	79 (89.8%)

TABLE 2: FREQUENCY OF NSI, KNOWLEDGE AND ATTITUDE

Variable	Qualified Dentists (166) n (%)	Dental Technicians (88) n (%)
Incidence of NSI in last one year		
Only once	90 (54.2%)	45 (51.1%)
Two times	58 (34.9%)	25 (28.4%)
More than two times	18 (10.9%)	18 (20.5%)
Knowledge regarding safety guidelines		
Yes	104 (62.6%)	07 (8.0%)
No	62 (37.4%)	79 (92.0%)
Reporting to concerned authorities Regarding NSI		
Yes	67 (40.4%)	07 (8.0%)
No	99 (59.6%)	81 (92.0%)
Reason for not reporting		
No use to report	55 (33.1%)	21 (23.9%)
Did not know where to report/ Did not want to report	45 (27.1%)	52 (59.1%)
Needle was new	32 (19.3%)	03 (3.4%)
Did not get time to report	15 (9.0%)	04(4.5%)
Forgot to report	10 (6.0%)	03(3.4%)
Nothing will happen	09 (5.5%)	05 (5.7%)

TABLE 3: TIME OF NEEDLE STICK INJURY

Time of Needle Stick Injury	Qualified Dentists (90) n (%)	Dental Technicians (62) n (%)
Time of injury (1st time only)		
During infiltration anaesthesia	40 (44.4%)	26 (42.0%)
During dental procedure	25 (27.7%)	11 (17.8%)
During recapping	15 (16.8%)	09 (14.5%)
Before starting procedure	05 (5.6%)	12 (19.3%)
During disposal of needles	03 (3.3%)	02 (3.2%)
Others	02 (2.2%)	02 (3.2%)

DISCUSSION

Reported frequency of hepatitis B and hepatitis C is 4% and 6% respectively in Pakistani population.²¹ Needle stick injuries are one of the common and high risk reasons leading to transmission of hepatitis B and C infections in dental health care providers²², which can occur during preparation of syringes for local anesthetic infiltration before dental procedure, during actual intervention and at the time of disposal of needles and sharps.²³

Surveys conducted among North American DHCPs showed about 01 NSI per year²⁴; In Scotland frequency of NSI was shown as 1.7 per year.²⁵ However, frequency of needle stick injuries is high in Pakistan.²⁶ This survey studied NSI among qualified dentists as well as dental technicians running their own private clinics. In the present study, 46% qualified dentists and 49% dental technicians suffered NSI for two or more times during the last 12 months. This seemingly higher incidence appears to be due to lack of awareness of risks and knowledge regarding safety guidelines.

Findings of this study are comparable with other reports in terms of incidence and circumstances leading to needle stick injuries. In a study by Deisenhammer et al., NSI among health care workers is reported to have occurred most commonly during drawing of blood samples²⁷, while in the current study, majority of injuries occurred during infiltration anaesthesia, dental procedure and recapping of syringe needles. This is followed by injury at the start of dental procedure, disposal of sharp objects and changing the anesthetic capsule during the course of intervention.

It has been observed that NSIs are generally underreported.²⁸ Aiken et al.²⁹ recognized that NSIs are more common than institutional figures suggest. Shiao et al.³⁰ conducted a detailed epidemiological study and showed that 81.8% of NSIs were not reported by Taiwanese health care workers. Previous investigation of British medical students also showed that 75% did not report their NSIs.³¹ In this study, 60% qualified dentists and 92% dental technician did not report the occurrence of NSI to concerned health authorities or seniors. One of the important reasons for under-reporting was dentists' perception that there was no benefit to report the occurrence of NSI in Pakistan. However, dental technicians running their own private clinics did not want to report the NSI because they were not supposed to run independent dental clinics.

Lack of knowledge about the risks associated with NSI and ways and means to minimize it are amongst the common causes leading to high rate of NSIs in health care workers. In the present study, 37% qualified dentists and 92% of dental technicians did not have knowledge about the recent guidelines to decrease the frequency of NSI and thus prevent associated risks.

Significant reduction in the incidence of NSI can be achieved by implementing a tangible program, which must include creating awareness about the risks of NSI, preparing dynamic guidelines and practicing proposed precautions. Standard precautions include use of personal protective equipment (gloves, masks, protective eyewear or face shield) and gowns which prevent skin and mucous membrane contact with needle and blood.³² In 1985, the Centre of Disease Control (CDC) and the Occupational Safety and Health Administration (OSHA) in the United States introduced Universal Precaution Guidelines intended to prevent needle stick injury among HCWs and reduce this occupational hazard to the lowest levels possible.³³ After application of these practices, NSIs decreased from an estimated one million exposures per year in 1996 to 385,000 per year in 2000 in North America.³⁴ Studies from US hospitals have also reported the use of traditional syringes as a leading cause of NSI among DHCPs³⁵; Use of safer devices has diminished the risk of NSI to healthcare workers significantly.^{17,36} OSHA standards and updated CDC guidelines recommend safe work practices to avoid the risk of needle stick injuries.^{37,38} It is therefore imperative to have better knowledge and proper training for decreasing the rate of NSIs meaningfully.^{39,40}

CONCLUSION

Needle stick injury is one of the most important and common potential sources for spread of Hepatitis B, Hepatitis C and even HIV among dental health care providers. It has been observed that awareness among dental health care providers about the risks of this occupational hazard is far less than ideal in Pakistan. Dental health care workers, which include qualified dentists as well as dental technicians, do not take appropriate care for prevention of NSIs. It is recommended that robust methods and measures to create awareness about hazards of NSI among dental health care workers be identified and applied. Further, depending upon the international guidelines and studies conducted in Pakistan, local guidelines leading to safe dental practices should be formulated and implemented. Hepatitis B vaccination, awareness of risks, implementation of safety guidelines and use of safe techniques and equipment can lead to decreased chances of needle stick injury in Dental health care workers in Pakistan.

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