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Needlestick injuries in dentists and their assistants in Kerman, Iran: Prevalence, knowledge, and practice

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Original Article

Abstract

BACKGROUND AND AIM: Needlestick (NS) injuries are one of the most important subjects in the dental field which can cause so many dangerous blood-borne diseases. The aim of this study was to evaluate the prevalence, knowledge, and practice of dentists and their assistants about exposure to sharp contaminated instruments in Kerman, Iran, in 2012.

METHODS: In this cross-sectional study, self-administered questionnaires were distributed among 190 dentists and 250 assistants. Data were analyzed by chi-square and 2-sample tests.

RESULTS: 32% of dentists and 30.7% of assistants had experienced NS injury. The mean scores of knowledge and practice in dentists were 4.88 ± 1.69 and 3.37 ± 0.70 from the maximum scores of 10 and 4. There was only a significant correlation between knowledge score and gender (P = 0.02), and a near significant correlation between practice and gender (P = 0.06) (male > female). However, they had no correlation with age, length of professional experience, and educational degree. In assistants, the mean score of practice was 2.84 ± 0.67 from the maximum score of 5. Furthermore, 96.6% of dentists and 76.3% of assistants had been vaccinated against hepatitis B.

CONCLUSIONS: The obtained results show that the practice level of dentist in NS injury prevention and management is good but their knowledge and also their assistants' practice is undesirable. The level of knowledge and practice was the same for general and specialist dentists. It seems that specialist dentists cooperate better in vaccination and measuring of anti-HBs antibody titre.

KEYWORDS: Needlestick, Dentist, Knowledge, Practice, Hepatitis, Infection Control, Assistants, Prevalence

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Percutaneous injuries are one of the important health problems of dental health care workers, because such injuries are the main risk factors in transmission of blood-borne diseases like hepatitis B, C, and AIDS. Needlestick (NS) injury is the entrance of a bloody contaminated sharp instrument (needles, surgical blade, and etcetera) into the body, during or after treatment procedures of a patient. Most percutaneous injuries occur by the contaminated injection syringes, during recapping of the needles and taking away the contaminated sharp instruments.[1,2] Since NS is one of the work challenges of the health care services, the instruments' protection and safety protocols against accidental infections can decrease the transmission rate.[3]

Two major factors in NS injuries are the usage of injection syringes and recapping them. Tasks such as cleaning the instruments, changing the anesthesia cartridge of syringes, and recapping the needles are the most common causes of injures for dentists'

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assistants. The injection needles are the most important factors for NS injuries in students. However, in many cases, there is no report by the injured persons due to their lack of knowledge and belief in the need for treatment.[1,2]

Because of the importance of this subject, policies are adopted all over the world by the health care services to decrease the exposure risk of and infection by blood-borne pathogens. The WHO strategy contains four parts: 1. establishing international policies for the safe application of sharp infected instruments 2. ensuring the quality and safety of the applicable instruments 3. making the required instruments available in such a way that there would be no need to move these instruments, and 4. preventing the wrong and unsafe application of the infected instruments.[4] Due to the high-prevalence of NS injuries and the related dangers of blood-borne diseases, the aims of this study were to obtain valuable information about the prevalence, knowledge, and practice of dentists and their assistants about NS injury and blood-borne infections in Kerman, Iran.

Methods

This cross-sectional, descriptive-analytical study was conducted on 190 dentists who work in Kerman, Iran, in private practice (clinics), and their 250 assistants. The period of the study was January 2012 to December 2012. Two separate self-administered questionnaires designed, for dentists and assistants, very simply and clearly were pre-tested and their validity and reliability (Cronbach's alpha $\alpha = 0.91$) were ensured on 40 randomly selected samples. Then, they were distributed in all dental clinics of Kerman, Iran, and then were collected. This questionnaire consisted of three different parts according to the demographic information, knowledge, and practice of the dentists (contains 24 questions) and their assistants (contains 13 questions) about NS injury and infection control based on several anonymous studies. It was stated in all questionnaires that all collected information about participants would be treated as confidential. The ethical code of the study was k/90/245. Participants filled the questioners with consent. Data were analyzed by chi-square and 2-sample test using SPSS for Windows (version 18; SPSS Inc., Chicago, IL., USA). A P value of less than 0.05 was considered statistically significance.

Results

Of the 190 dentists' questionnaires 175 (response rate: 92.1%), and of the 250 assistants' questionnaires 228 (response rate: 90.2%) were completed. 56.6% of dentists were male and 43.4% were female. 98.2% of assistants were female and 1.8% were male. The average age of the dentists was 35.39 ± 8.24 and of the assistants was 27.4 ± 5.90. In the group of the dentists, 67.4% were general dentists and 32.6% were specialists. 38.29% of dentists had graduated from the School of Dentistry, Kerman University of Medical Sciences. The dentists' assistants, according to their educational level were: 64.03% diploma; 15.79% associate's degree, and 20.18% Bachelor's degree.

56 dentists (32%) and 70 assistants (30.7%) had experienced NS injury at least once. The frequency of NS injuries in dentists and assistants are given in table 1.

Table 1. The frequency of needlestick injuries by different instruments

Job / Instrument	Dentists Count (%)	Assistants Count (%)
Injection needle	11 (19.6)	20 (27.8)
Matrix band	3 (5.4)	4 (5.6)
Bur	19 (33.9)	12 (16.7)
Elevator	5 (8.9)	0 (0.0)
Orthodontic wire	6 (10.7)	4 (5.6)
Taking away the instruments, washing	0 (0.0)	30 (44.4)
etc.	12 (21.4)	0 (0.0)
Total	56 (100)	70 (100)

96.6% of the dentists and 76.3% of the assistants had been fully vaccinated against

hepatitis B, which includes three doses at months 0, 1, and 6. Anti-HBs antibody titre measurement was significantly higher in the specialist dentists in comparison with the general dentists ($P < 0.05$)

The dentists' knowledge score was 4.88 out of 10, and the knowledge score of the male dentists was significantly higher than the females ($P = 0.02$). The relation between knowledge score and educational degree showed a near to significant relationship ($P = 0.06$). However, knowledge score did not have a significant relationship with other variables such as age, educational degree, and length of professional experience ($P > 0.05$). The average practice score of the dentists was 3.37 out of 4. The male dentists' practice score was higher than the female dentists and this difference is near to significant ($P = 0.06$). The relevance of this score with other variables of age, educational degree, length of professional experience, and educational degree was not significant ($P > 0.05$). In the field of dental practice, the most appropriate performances are using of gloves for all patients (100%), asking questions about different infectious diseases before starting treatments (83.43%), avoiding removal of the soft and sharp wastes altogether (78.86%), and avoiding the reapplication of the matrix band (64.57%). In assistants, the average score of practice was 2.84 out of 5. The statistical test showed that this score does not have any significant relationship with the variables of age, sex, length of professional experience, and the educational level. 78.8% of dentists and 49.1% of assistants feel the need for education on NS injury and infection control.

Discussion

NS injuries are very common. The first case of NS was reported in 1830. The reports indicate an increase in the prevalence of NS injury between 1990 and 1999 all over the world.[6] The exact numbers of NS injury is not known, because many health care workers do not report NS injuries due to fear of losing their job or disturbing their professional prestige, or not believing in prophylactic treatment efficiency. According to published papers, about 40-76% of NS accidents are not reported.[7]

In our study 32% of dentists and 30.7% of assistants had experienced a NS injury at least once. According to the study by Kakoei et al. in 2004 about awareness and practice of the dentists of Kerman about hepatitis B, it was announced that 52.9% of the dentists of Kerman had experienced a NS injury.[8]

The increased number of younger dentists, from 2004 to 2012, had more knowledge on NS and infection control protocols than older dentists, and the education programs in Kerman city were somewhat successful in increasing their knowledge.

The difference in the number of NS cases in the different studies can be attributed to the definition of this word and also to the considered time span in various researches. In some studies, including this study, all injuries resulting from sharp instruments like needles, scalpels, bur, and other sharp instruments have been considered, but in some others, only the injection needle was considered.

In this study, the most common factors of injuries for the dentists included bur (33.9%), needle (19.6%), orthodontic wire (10.7%), elevator (8.9%), and matrix band (5.4%). For the assistants, cases like washing the instruments, taking the instruments from the tray, or arranging them in the tray were the most common cases (44.4%), and needle (27.8%) and bur (16.7%) were the most common instruments.

NS injury has happened in 1-15% of oral surgery procedures, often occurring while fixing the breaks by wires or suturing. It seems that the length of professional experience has no effect on the number of injuries occurring among general or specialist dentists.[9] The results of the study by Hashemipour et al. on the prevalence of needlestick injuries among medical and dental students of Kerman University of

Medical Sciences, the highest number of accidents for dental students belonged to Departments of Endodontics, and Surgery and Periodontics. The average of NS incidence is 3.16% for each dentist and 3.43% for each specialist during a year.[6]

In the dentists of Briston from 1980 to 1988, the most common professional injuries occurred by the anesthesia needles and the stitch needles (45%), while the burs and the surgical blades caused 16% and 7% of all injuries, respectively. Most of these injuries occurred during cleaning of the instruments before sterilization.[10]

In a prospective study in USA, contaminated burs were introduced as the most common cause of NS injuries among dentists.[11] This result is consistent with the results of the present study.

In our study, the assistants prepared the instruments and sterilized them, which is why these injuries were higher in them. The present study shows that 96.6% of dentists and 76.3% of their assistants had been fully vaccinated against hepatitis B (three doses).

The study by Sharifi et al. on dentists of Qazvin, Iran, showed that 96.8% of them were vaccinated.[12] In the study by Alavian et al. it was stated that the vaccination against hepatitis B was done in 74.8% of the participating dentists in the forty-fourth international congress of the dentists of Iran.[13] In comparison with the result of our study, this shows the moderate level of vaccination.

In several studies the rate of vaccination was between 68% and 98.9% in countries such as Nigeria, Thailand, Saudi Arabia, England, and USA.[13]

Hepatitis B vaccine has been available worldwide since 1982, and from that time caretakers, including dentists, have been encouraged to get vaccinated.[14] Therefore, the number of vaccination of the dentists in the published reports increased gradually from 10% to 98.9% in 1990.[13] The degree of knowledge about infection transmission, specially hepatitis B, have also increased. The present study indicated that 78.8% of dentists and 49.1% of their assistants want to receive further education on infection control and NS injury. The study by Askarian and Assadian indicated that more that 85% of dentists in Shiraz, Iran, feel the need for education on infection control.[15]

The results of this research showed that the studied dentists have effective infection control practices and the gained average score is 3.73 out of 4 (84.25%), which is acceptable.

The average score of the dentists' knowledge is 4.88 (48.8%) out of 10, which is not acceptable. The low practice score can indicate the lack of attention of this medical community to possible blood-borne infection transmission, and the lack of useful programs of improving education on the problems related to infection control procedures or insufficient participation in these programs.

In the study by Askarian and Assadian with the aim of evaluation of knowledge and practice about infection control on dentists of Shiraz, the average score of their practice was 4.97 out of 9 (55.22%) and the average score of their knowledge was 6.71 out of 9 (74.56%).[15]

Most of the hepatitis B transmitters do not have any clinical illness manifestations. Most new infections of hepatitis C are subclinical and do not have clinical manifestations.[16] Therefore, infection control strategies are essential for all patients.

In a study done by Behnaz and Behnaz on the dentists of Yazd, Iran, it was reported that their knowledge level about the prevention procedures of blood-borne diseases is 92.1% and did not have a significant relationship with variables like age, sex, educational level, and length of professional experience.[17]

In the current study, 87.4% of the dentists after experiencing NS injury had a suitable performance and washed the injured area with much water and soap.

According to the study by Mosharrafian et al. 43.7% of dentists rinsed muco-cutaneous exposed sites after NS injury, which is lower than the results of this study.[18]

The average score of practice for the assistants was 2.84 out of 5 (56.8%) which was low compared with the dentists' scores in this field. This can be due to the lack of education of the assistants on avoidance of transmission of disease by the related dentists and also the necessity for the primary education of the assistants in the field of infection control.

Conclusion

The obtained results of this examination showed that the practice of the dentists on NS injuries is acceptable, but their knowledge and their assistants' practice in infection control procedures in NS injuries are unacceptable.

Conflict of Interest

Authors have no conflict of interest.

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