Awareness of Dentists Toward the Biological Effects of Ionizing Radiation and Its Protection Measures in Karaj

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ABSTRACT

Aim: This study aimed to investigate the awareness of the dentists about the biological effects of ionizing radiation and its protection measures in the city of Karaj, Iran.

Materials and Methods: In this descriptive-analytical study, the study data were collected using a self-administered questionnaire including items on demographic and awareness of dentists. The analysis of collected data was done through using ANOVA test in SPSS version 20. Then, the data were entered into the SPSS statistical software (v. 20) and analyzed using Student t test and One-way ANOVA.

Results: 90 of the dentists (69.2%) were male and 40 (30.8%) were female. 46.2% have more than 10-year work experience. 13.1% were employed in the public sector treatment centers. 80.8% did not participate in training courses of oral radiology. The overall mean score of dentists was 14.60 ± 3.81. There was no significant difference among dentists’ awareness in terms of gender, working in public or private treatment centers, working experience and participation in training courses (p>0.05).

Conclusion: According to results of the present study, the dentists did not have sufficient information about the biological effects of ionizing radiation and its protection.

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This may cause some problems in the society. Therefore, improving dentists’ awareness about radiation protection seems to be of great importance.

**Key words**: ionizing radiation, dental radiography, radiation protection, dentists, awareness

**INTRODUCTION**

Nowadays, dental radiographies play an important role in diagnosis and accurately following the treatment (1-3). Almost half of dental caries are only detectable through using X-ray radiographs. Although the radiation risk is negligible compared to its benefits, modern technology suggests that the absorption of radiation in the environment is increasing (2, 3). Studies have shown that the annual average radiation dose received by the public is 2.5 mSv that 15% of which is related to medical fields (4). Epidemiological studies have shown that exposure to radiation in dentistry increases the risk of cancers of the thyroid gland, salivary glands, bone marrow and skin. Therefore, dentists who use dental X-ray should be aware of the radiation intensity and the proper ways of reducing the dose (2, 5).

One of the main concerns of dentists is protecting patients against unnecessary radiation even the lowest dose. Some findings and recommendations for radiation protection have provided through guidelines of the International Radiation Protection Association (IRPA). These suggestions include-speed films, square and rectangular collimation, short circular cone collimator, equipment quality control testing, thyroid protecting lead apron, and protective dentistry coveralls (4, 6, 7). Attitudes and awareness of dentists about the equipment and techniques needed to reduce the radiation dose is very important. It has shown in various studies that dentists use techniques such as lead protection, thyroid shields, bisector technique, and film holders to reduce the radiation dose (12, 13). It is estimated that about 480 million dental radiographies are done annually that almost 15% of which include diagnostic x-ray tests. As a result, concerns about repeated exposure to low levels of ionizing radiation are increasing. One of the most important concerns is the poor knowledge of dentists and other health personnel about the dental radiography (14). Due to the importance of the topic, it is necessary to assess the awareness of dentists about methods of ionizing radiation protection and the possible effects of radiation on the body at different time periods. Therefore, the aim of this study was to assess the awareness of
general dentists about the biological effects of ionizing radiation and its protection measures in the city of Karaj.

MATERIALS AND METHODS
The present descriptive, cross-sectional study was conducted on 130 dentists of Karaj in 2015 who were selected through systematic random sampling. Inclusion criteria were graduation, employment in the city of Karaj and willingness to participate in the study. A questionnaire which including awareness and personal information was given to the dentists who participated in the study. The questionnaire consists of two parts including personal information and awareness. Dentists demographic information including age, gender, years in practice, training in the field of radiation protection after graduation and a brief history concerning their performance including the use of film holder and protective equipment, processing methods, film speed and the technique. The awareness questions include 27 structured questions about radiography equipment (film holder, speed and type of film, digital sensors, etc.), radiography methods (parallel-bisector), film processing (manual, automatic), radiation protection (use of lead aprons, thyroid collar, protective barrier, etc.), radiation biology and the case of X-ray prescription. It was given one point for a correct answer and zero point for incorrect one. Therefore, each person could gain a score between 0 and 27. According to the scores, the dentists’ awareness was divided into three categories including low (below 50%), average (50% -75%), and high (above 75%).

The data were analyzed by using SPSS software version 20. Independent T-test was used to compare awareness scores between male and female as well as the scores of the two groups with retraining experience and without such an experience. One-way analysis of variance (ANOVA) was used to compare the scores of dentists based on their experience and activities.

Results
130 general dentists in the city of Karaj participated in this study. 90 dentists (69.2%) were male and 40 dentists (30.8%) were female. The average age of the sample was 37.31±5.65 years. The sample were divided into three categories based on clinical experience: less than 5 years (n = 33 or 25.4 %), between 5 and 10 years (n = 37 or 28.5 %), more than 10 years (60 people or 46.2%). Dentists were divided into three groups in terms of the types of activities: 77 subjects (59.2%) were employed in the private sector, 17 subjects (13.1 %) in community health centers and 36
subjects (27.7 %) were employed in both sections. In this study, 25 subjects (19.2%) were involved in retraining processes and 105 subjects (80.8%) had not attended the course. In addition, according to the results of the study90.8% of dentists had x-ray machine in their office but 9.2% had not had the device.

The distribution of patients based on the dentist awareness in each group is summarized in table 1. These results indicate that most of the dentists had intermediate level of awareness with the frequency of 67 and the percentage of 51.5. Furthermore, 53 subjects (40.8 %) had poor awareness and 10 subjects (7.7 %) had high level one. Therefore, it is shown that the sample of the study mostly had average and higher awareness. There was no significant difference among dentists’ awareness in terms of gender, working in public or private treatment centers, working experience and participation in training courses (p> 0.05).

DISCUSSION

Today, there are parts, equipment and techniques available in dental radiography that can reduce the received dose of radiation by patients (15). Since one of the criteria in determining the level of applied safety and quality and quantity of the used protection in each of the dental units using X-ray is the awareness of the authorities of the unit about the case, this study was done to investigate the awareness of dentists about the biological effects of ionizing radiation and its protection measures in the city of Karaj. The results of this study showed that the awareness of dentists about the dangers of X-ray and protection measures in dental radiography is at an average level.

The results of the studies of Salti et al (16) in Damascus, Asha et al (1) in Georgia and Binnal et al (17) in India reflects the lack of awareness in the field of radiation protection (16). The study of Ilguy and colleagues revealed that awareness of general dentists in Turkey about reducing radiation dose techniques, radiographic equipment and quality of dental radiography services is very limited and their knowledge and awareness should be improved to reduce any unnecessary radiation (11). After studying awareness of dentists about applied equipment and technics in intraoral radiology in Flanders, Belgium, Aps found that there is a need for continuing training in this area (18). Jawadzadeh and Alipur investigated the awareness of dentists in the field of protection against moderate radiation in the city of Rasht, Iran (9) that it is consistent with this study. Haghanifar et al. (4) reported the awareness level of dentists relatively good in the city of
Babol. Shahab et al. (15) reported the awareness level of dentists participating in the 48th Congress of Iranian Dental Association was not satisfactory. Despite the results of the present study, Badrian et al. (3) and Sheikhi and colleagues (19) in Isfahan and Abdinian and colleagues (20) in Yazd reported that the awareness level of dentists in these two cities were low in the field of radiation protection. The difference in the type of questionnaire used is an important factor which may explain the disparity between the yielded results.

In the present study, there was not significant difference between "participation in retraining" and "awareness" that can be due to the fact that the frequency percentage of dentists who participated in retraining courses (19.2%) was less than those that had not participated in any retraining courses (80.8%) and that is consistent with Javadzadeh and Alipur study (9). In a study conducted by Badri and colleagues, the awareness level (good, average, poor) of people participating in retraining courses and those who did not participate in these courses, despite some differences, was similar (3). This result could indicate that the methods of retraining courses is not suitable. Therefore, it cannot produce the desired outcome. It is suggested that the efficiency of these courses should be increased by a brief test after the training.

Similar to the results of Javadzadeh and Alipur (9) and Svenson et al. (13) studies, there was no significant difference between gender and the awareness in the present study. Furthermore, there was no significant difference between work experience and the awareness that is consistent with the study of Javadzadeh and Alipur (9). However, Svenson et al. (13) showed that dentists with 5-25 years of work experience had higher level of awareness compared to ones with higher or lower work experience.

CONCLUSION
The results of this study showed that the awareness of dentists was at an average level. It can be concluded that comprehensive educational resources and efficient ways of transferring the information of these resources to the students make the population awareness and average level of awareness in this study indicates weakness in these cases.
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REFERENCES


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