THE INVESTIGATION OF KARAJ CITY DENTISTS’ KNOWLEDGE ON THE PROPER PRESCRIPTION OF RADIOGRAPHY

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ABSTRACT

Introduction Today the use of modern diagnostic methods and techniques in the field of dentistry has caused significant changes in patients care and individuals’ health care. One of the most important diagnostic techniques in dentistry is radiography that effective use of it requires dentist’s sufficient knowledge of the application and its proper administration. The aim of this study was to determine the knowledge of dentists in the city of Karaj on proper prescription of radiography in the year 2015-2016.

Materials and Methods In this descriptive-analytical cross-sectional study 150 general dentists practicing in the city of Karaj were randomly visited and designed questionnaire consists of three parts of the dental radiographic characteristics in the form of awareness questions among dentists was completed and gathered in person. The level of dentists’ knowledge on the proper prescription of radiography was evaluated in 25 different fields and in each field the knowledge level was compared. Data were analyzed using One Way ANOVA test and Independent t-test (p value<0/05).

Findings among 150 general dentists in Karaj city, 106 (70/7%) were male and 44 were female (29/3%). No significant difference was in mean scores of dentists’ knowledge according to sex (p value=0/575),

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the mean score of knowledge in dentists with 1 to 5 years work experience was 12.84±3.25 and the mean score of knowledge in dentists with 11 to 15 years work experience was 10.65±3.65 and 16 years and more was 10.45±3.20, that this difference was statistically significant (p value=0.04).

**Conclusion** The results of this study showed that dentists’ knowledge on proper prescription of radiography isn’t desirable and the principles of proper radiography prescription little attention are given, thus, measures including continuing training of dentists to learn more about new principles should be considered.

**INTRODUCTION**

In the field of dentistry proper diagnosis of the disease is one of the essential pillars in proper diagnosis of the disease and because the tests alone are unsuccessful in identifying all diseases, the par clinical tests that one of most important of them is radiography, should be used(1). Several studies have shown that dental radiography is an essential and useful tool in the diagnosis and treatment of oral diseases such as caries, periodontal disease and oral pathology (2). In dentistry, radiographic evaluation in most cases before, during and even after treatment is necessary. Hence, if the proper protective measures are not taken, both dentists and patients are at risk of exposure to radiation (3). Considering the usefulness of information about radiography, the adverse effects of ionizing radiation on the patient should not be ignored (4). The side-effects on human including carcinogenic effects should be considered (5). Given the increasing use of x-rays, dentists must have adequate and proper knowledge on use of radiography (1). In some countries, such as Belgium, dentists are required to pass courses to get certification on radiation protection to allow for the use of X-ray equipment in dental offices (3).

Bardal and colleagues study aimed to examine the knowledge of general dentists on appropriate intraoral radiography and panoramic radiography prescription showed general dentists’ knowledge on panoramic radiography is average and in those who had graduated more than five years ago, was 42.8 percent. Also, general dentists’ knowledge who have recently graduated or less than 5 years ago, has been 50 percent (6). The results of another study also showed that panoramic radiography compared with other types of intraoral radiography has limits in the diagnosis of caries and periodontal problems (7). Ez al-Dini and colleagues study in the city of Yazd has showed that participants were in a high level of knowledge on prescription of
panoramic, computed tomography and periapical radiographies, while had an average knowledge on occlusal radiography, patients prone to decay, patients with periodontal disease and poor knowledge in the fields of bitewing radiography and patients insensitive to decay (1). In another study the use of bitewing radiography was compared with other methods for diagnosing dental caries and it was shown that other methods such as trans-illumination are not helpful and effective as much as bitewing radiography (8).

A study done to assess the knowledge of general dentists of Isfahan city on proper prescription of radiography showed that knowledge of dentists in Isfahan city on proper radiographic prescription is less than expected. Thus, strategies such as continuing training of dentists to more learn about them is necessary (9). In another study it was shown that in terms of level of knowledge on the proper use of radiographic methods there is no significant different between male and female dentists. While in terms of the level of education, the proper prescription of occlusal radiography is more informed among the general dentists (10). The aim of this study was to evaluate the knowledge on proper prescription of radiography by dental practitioners in the city of Karaj.

MATERIALS AND METHODS
This descriptive-analytical study was done in a cross-sectional method. The study population included 150 general dentists in Karaj. The sampling method was simple random one. General dentists ‘knowledge on proper prescription of radiography in the year 2015-16 was evaluated according to the information received through completed questionnaires.

In this study, a questionnaire made by Mehdizadeh and colleagues (9) which contained 25 questions to assess dentists’ attitude was used. The scoring of the questionnaire was in this way that each question was rated 0/8 and questions in the questionnaire were scored separately and finally each person was given a total score of 0 to 20. A total of 18 questions out of 25 questions of questionnaire were multiple choices which each of these questions were examined separately.

To evaluate the degree of knowledge according to work experience, the subjects were divided into 4 groups and their mean scores were compared in the 4 groups: Group 1: People with work experience less than 5 years, Group 2: People with work experience of 5-10 years, Group 3: people with work experience of 10-15 years, group 4: people with work experience of more than 15 years. Finally, this information was entered into a computer and was studied and analyzed.
using SPSS version 20. To compare the mean of several variables one-way ANOVA test was used. The Independent t-test was used to compare the mean between the two variables. In this study, the p-value of less than 0.05 was considered as significance level.

**Findings**

In this study, a questionnaire was used to assess dentists' knowledge about prescription of radiography. The sample group consisted of 150 dentists who were active in the city of Karaj. These people have an average age of 37.28 years with a standard deviation of 5.76 years. The least age was 28 and maximum age was 51 years. The gender distribution of the sample group consisted of 106 male dentists (70.7%) and 44 female dentists (29.3%). Among the members of the sample group 38 (3.25%) people had work experience of 5 years, 35 people (23.3%) had work experience of 6 to 10 years, 44 people (29.3%) had work experience of 11 to 15 years and 33 (22%) people had work experience of 16 years or more.

In this study, individuals could acquire in knowledge questionnaire score of 0 to 20. The mean knowledge score was achieved 11.473 ± 3.553. Also, at the end of the study, sample group scores were divided into three categories: 0 to 10 years, 11 to 15 years and 16 to 20 years that results are shown in the table below.

**Table 1. Frequency and distribution percentage of knowledge scores**

<table>
<thead>
<tr>
<th>percentage</th>
<th>Frequency</th>
<th>score</th>
</tr>
</thead>
<tbody>
<tr>
<td>36/7</td>
<td>55</td>
<td>0-10</td>
</tr>
<tr>
<td>40/0</td>
<td>60</td>
<td>11-15</td>
</tr>
<tr>
<td>23/3</td>
<td>35</td>
<td>16-20</td>
</tr>
</tbody>
</table>

According to the above results, 55 subjects of the sample group in the knowledge questionnaire gained score 10 or less. On the other hand, 60 subjects gained score of between 11 and 15 and 35 subjects gained score between 16 and 20.

To compare the knowledge scores of male and female dentists, independent t test has been used that is shown in Table 2.

**Table 2. Independent t test to compare the knowledge score of general dentists on proper prescription of radiography based on gender**

<table>
<thead>
<tr>
<th>p-value</th>
<th>T</th>
<th>SD</th>
<th>Mean</th>
<th>Number</th>
<th>Gender</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/575</td>
<td>0/563</td>
<td>3/61</td>
<td>11/36</td>
<td>106</td>
<td>Male</td>
<td>Gender</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/42</td>
<td>11/72</td>
<td>44</td>
<td>Female</td>
<td></td>
</tr>
</tbody>
</table>
The results in Table 2 show that there is no significant difference between men and women dentists in terms of score of knowledge about the proper radiographic prescription (p=0.575). To compare the knowledge score between dentists with various work experience, one-way analysis of variance test was used that the results are shown in Table 3.

**Table 3.** One-way analysis of variance test (ANOVA) to compare the knowledge score of general dentists on proper radiographic prescription based on work experience

<table>
<thead>
<tr>
<th>p-value</th>
<th>F</th>
<th>SD</th>
<th>Mean</th>
<th>Number</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.009</td>
<td>4.012</td>
<td>3.25</td>
<td>12.84</td>
<td>38</td>
<td>1-5 years</td>
</tr>
<tr>
<td></td>
<td>3.61</td>
<td>11.97</td>
<td>35</td>
<td>6-10 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.65</td>
<td>10.65</td>
<td>44</td>
<td>11-15 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.20</td>
<td>10.45</td>
<td>33</td>
<td>16 years and more</td>
<td></td>
</tr>
</tbody>
</table>

The results in the table above indicate that between four dentists in terms of work experience, there are significant differences in knowledge scores (p=0.009). To find out the obtained difference derived between what groups, the Scheffe post hoc analysis (Table 4) was used.

**Table 4.** Scheffe post hoc test to compare scores between the groups

<table>
<thead>
<tr>
<th>P Value</th>
<th>Mean difference</th>
<th>Group</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.763</td>
<td>0.870</td>
<td>6-10 years</td>
<td></td>
</tr>
<tr>
<td>0.047</td>
<td>2.18</td>
<td>11-15 years</td>
<td>1-5 years</td>
</tr>
<tr>
<td>0.041</td>
<td>2.38</td>
<td>16 years and more</td>
<td></td>
</tr>
<tr>
<td>0.423</td>
<td>1.31</td>
<td>11-15 years</td>
<td></td>
</tr>
<tr>
<td>0.354</td>
<td>1.51</td>
<td>16 years and more</td>
<td>6-10 years</td>
</tr>
<tr>
<td>0.066</td>
<td>0.204</td>
<td>16 years and more</td>
<td>11-15 years</td>
</tr>
</tbody>
</table>

Scheffe post hoc test showed that the score of subjects with 1 to 5 years work experience is significantly higher than those with work experience of 11 to 15 years (p=0.047) and subjects...
with work experience of 16 years and more (p=0.041). There was no significant difference between the other groups.

**DISCUSSION**

The aim of this study was the investigation of Karaj city dentists’ knowledge on the proper prescription of radiography. In the current study, mean of knowledge score was achieved $11.473 \pm 3.553$. In the Ez al-Dini and colleagues (1) study the mean knowledge score of general dentists was obtained $14.58$ and in a Mehdizadeh and colleagues (9) study $14.27 \pm 3.43$ and in the Sarvari Zanjani and colleagues (4) was $11.5$. Generally, it is deducted that dentists’ knowledge on proper radiographic prescription isn’t desirable. This level of knowledge can be due to some of the following reasons: lack of adequate study, as well as not using new scientific resources, forgetting the previous information with the passage of time, poor education in school, inadequate training sessions in terms of quantity and quality and absence of dentists in all training sessions.

According to the Swan and Lewis in 1993 in Ontario between 3 to 79 percent of prescribed radiographies by general dentists have been in accordance with the America Dentists Association (ADA) principles (11).

The results of this study showed that the mean score for female subjects on the proper administration of Radiology was $11.72 \pm 3.42$ and in male subjects was $11.36 \pm 3.61$. Between the male and female dentists there was no significant difference in knowledge score on proper radiography prescription (p=0.575). In the Haghanifar and Zabihi’s (12) study, the mean score of knowledge in female dentists was more than male, but this difference was not statistically significant. In the studies by Mehdizadeh and colleagues’ study (9), Ez al-Din and colleagues (1) and Sarvari Zanjani and colleagues (4) also there was no significant difference in terms of knowledge between male and female dentists.

In this study, there was a significant difference between their occupational history and knowledge level (p=0.009) and the knowledge score in subjects with a work experience of 1 to 5 years was significantly higher than those with work experience of 11 to 15 years (p=0.047) and subjects with work experience of 16 years and more (p=0.041). In study by Mehdizadeh and colleagues (9) dentists with less work experience (less than 5 years) significantly had greater knowledge on proper radiographic prescription than those with more work experience (more than 5 years). But
in the study of Haghanifar and Zabihi (12) the knowledge level of dentists with more work experience has been reported more than those with less work experience. White and colleagues in a study prescribed radiographies in accordance with the FDA criteria for 490 patients. The results of this study showed that the use of FDA guide for the radiography prescription has been led to 43% decrease in the amount of radiation, as a result, dentists using these criteria, can reduce the amount of radiation to the patient, while it does not harm the diagnosis or treatment of disease (13).

In the present study, the difference of university effect on dentists’ knowledge and attitudes has not been addressed. Since educational systems are different in various universities, in the case of significant difference between the knowledge of people graduated from different universities, successful educational systems can be recognized and analyzed. It is also possible to hold retraining courses for dentists and after holding the course, a study similar to the current study can be done and the retraining course effect be examined. Since the subjects in the workplace have answered the current questionnaire, it is believed they didn’t have adequate accuracy in answering and perhaps by creating a more suitable environment or distributing the questionnaire in retraining sessions, more accurate and better results could be obtained.

CONCLUSION
The results of this study showed that dentists’ knowledge on proper prescription of radiography isn’t desirable and the principles of proper radiography prescription little attention are given, thus, measures including continuing training of dentists to learn more about new principles should be considered.

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REFERENCES


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