Original Article

Assessment Radiation Protection Knowledge, Attitude and Practice in Dental Radiography Staff

Tahereh Khani[1,2], Hadi Hasanzadeh[3*], Ahmad Bitarafan-Rajabi[4], Alireza Emadi[5], Mitra Bokharaeian[1,2], Abbas Ziari[6], Fatemeh Shabani[1,2], Hamed Masoumi[7], Shima Moshfegh[1,2], Danial Seifi[1,2], Mohamad Pursamimi[1,2], Athar Ehtiati[1,2], Shima Amin[1]

1- Student Research Committee, Semnan University of Medical Sciences, Semnan, Iran.

2- Department of Medical Physics, Semnan University of Medical Sciences, Semnan, Iran.

3- Cancer Research Center, Semnan University of Medical Sciences, Semnan, Iran.

4- Echocardiography Research Center, Cardiovascular interventional research center, Department of nuclear medicine, Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Sciences, Tehran, Iran.

5- Deputy of Research and Technology, Semnan University of Medical Sciences, Semnan, Iran.

6- Social Determinants of Health Research Center, Semnan University of Medical Sciences, Semnan, Iran.

7- Department of Medical Physics and Radiology, Faculty of Medicine, Gonabad university of Medical Sciences, Gonabad, Iran.

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ABSTRACT

Purpose- With the increasing usage of radiography in dentistry, it is important to consider different aspects of radiation protection status in dental clinics including knowledge, practice and the attitude of staff. This study aimed to assess radiation protection KAP (Knowledge, Attitude and Practice) in dental radiography staff.

Materials and Method- A questionnaire based survey was performed in different types of clinics (educational, public and private) in 5 geographical regions of Iran (capital, center, north, west and east) on 336 participants in 2015-16. The multiple choice questionnaire consisted of 68 questions with a coverage of the demographic, knowledge, attitude and practice of staff regarding radiation protection. The collected data were analyzed by the One-Way ANOVA test using SPSS statistical software.

Result- Our findings showed that there was no relation between KAP and sex (P=0.48) and KAP and work experience (P=0.61) of participants. A statistically significant difference was found between the time duration after graduation and KAP (P=0.00). In addition, there was a significant difference between the size of the clinic and KAP (P=0.04), but there was not any relation between the type of clinic and KAP (P=0.80). There was also a significant relation between region and KAP (P=0.00).

Conclusion- The result of the present study showed that the level of radiation protection KAP is associated with the time duration after the graduation of participant, size of the clinic and geographical region. Besides, no correlation between the type of clinic and KAP highlights the fact that in dental clinics, the absence of a radiation protection officer or a radiation training expert for training purposes causes a similar outcome regarding the radiation protection status in educational and non-educational clinics.

Keywords:
Dental Radiography,
Radiation Protection,
Knowledge,
Practice,
Attitude,
KAP.

1. Introduction

Medical imaging plays an important role in medical diagnosis [1] and it is essential for dentists to monitor the development of lesions and plan the treatment in dental radiography [2]. Despite its useful outcomes, dental radiography has the potential to be harmful [3]. According to the literature, there

Corresponding Author:
Hadi Hasanzadeh, PhD
Cancer Research Center, Semnan University of Medical Sciences, Semnan, Iran.
Tel:(+98)2333451336, (+98)9123339428
Email: Hasanzadeh.h@semums.ac.ir

is a relation between the dental X-ray exposure and the increased occurrence of thyroid cancer, intracranial meningioma and salivary gland tumors [4-6]. Although the dental radiography doses are low, the frequency of dental examinations causes the accumulated dose to the population becoming considerable [7]. So, the radiation protection of staff and patients is necessary and radiation protection knowledge, attitude and practice (KAP) in staff has a crucial impact on the dose reduction.

The purpose of this study was to survey radiation protection KAP between dental radiography staff in different types of clinics and several geographical regions of Iran from 2015 to 2016.

2. Materials and Methods

Based on the existing scientific evidence on radiation hazards and the literature linking radiation protection and health, a draft questionnaire was developed selecting relevant items and its content validity verified by conducting expert panels. All items were assessed carefully calculating Content Validity Ratio (CVR) with the advice of the panelist including medical physicists, epidemiologists and linked center's staff. In this step, the panelists were askd to specify whether an item is necessary or not. They scored each item from 1 to 3 as "not necessary (1), useful but not essential (2) and essential (3)", respectively. The CVR was calculated as $(N_e - N/2)/(N/2)$, in which the N_e is the number of panelists indicating "essential" and N is the total number of panelists. It is notable that the number of panelists was 10; the CVR of bigger than 0.62, caused the item to be accepted. After finalizing the questionnaire, a pilot study was conducted on 15 employees to check out the reliability of questionnaire and to ensure its face validity. The tendency of the scale towards consistency was confirmed by repeated measurements. Two sets of responses (with a 2 week time interval) were used in measuring test-retest reliability via estimating the value for a Pearson's coefficient. The overall reliability of the final version was good ($r=0.81$, $P<0.001$).

After validating the questionnaire and before any questionnaire distribution, the project and its validated questionnaire were approved by the Semnan University of Medical Sciences ethical committee (93/583768). Besides, a written consent was provided at the beginning of the questionnaire which was read by the participants before completing the questionnaire. They were assured about the confidentiality of their completed questionnaires. A survey by questionnaire was performed across the three types of clinics (educational, public and private) in 5 geographical regions (capital, center, north, west and east) in Iran in 2015-16. This study was conducted on 336 participants who work in dental clinics as dentist, radiation worker and secretary. The multiple choice questionnaire consisted 68 classified questions on various aspects of demographic characteristics, knowledge, attitude and practice regarding the radiation protection. The number of questions related to demographic characteristics, knowledge, attitude and practice were 7, 26, 11 and 24, respectively. Data analysis and drawing the graphs were performed by *Microsoft Excel* (Version 2010) and *SPSS* statistical software (version 16.0) with the *One-Way ANOVA* ($p<0.05$). Before analysis, all variables were reviewed for the accuracy of data entry and missing values with two different researches.

3. Results

All of the distributed questionnaires were collected and the response rate was 100%. Among the participants, 68% were female and 32% were male (Figure. 1) with an average age of 31 and 34 years, respectively. Among the participants, 25% were dentists, 60% were radiation workers and 15% were secretaries (Figure 2).

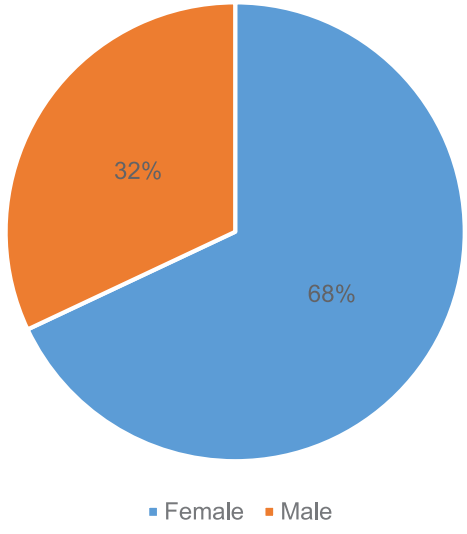

Figure 1. Gender distribution of the participants.

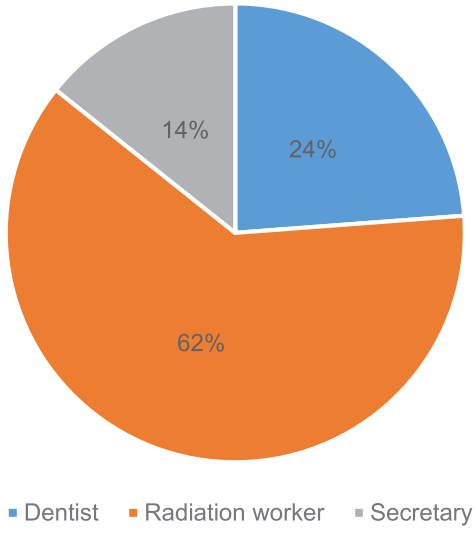

Figure 2. Distribution of the percentage of participants' job.

The relationship between demographic characteristics and radiation protection knowledge, Practice, Attitude and KAP of participants are given in Table 1. According to the analysis, there was not any significant relationship between the sex of participants and their radiation protection knowledge (p= 0.20), practice (p= 0.26) and KAP (p= 0.48); but their attitude were at the border of significant difference (p = 0.05). The highest attitude level regarding radiation protection was for male participants with the mean score of 45.92. The time since graduation and radiation protection practice were at the border of a statistically significant difference (p= 0.06), while a significant relationship between this factor and the radiation protection knowledge (p= 0.01), attitude (p= 0.00) and KAP (p= 0.00) was observed. The highest mean score of knowledge, attitude and KAP of radiation protection was 50.25, 53.75 and 54.78, respectively for the personal with the time since their graduation of more than 15 years. As shown in Table 1, there was no statistically significant difference in the work experience and radiation protection knowledge (p= 0.80), attitude (p= 0.40) and KAP (p= 0.61), but the practice was at the border line of a statistically significant difference (p= 0.06).

Table 1. Relationship between demographic characteristics and radiation protection knowledge, attitude, practice and KAP.

Characteristic		Knowledge			Practice			Attitude			KAP		
		Mean	SD	Sig	Mean	SD	Sig	Mean	SD	Sig	Mean	SD	Sig
Sex	Male	44.08	13.77	0.20	50.52	17.63	0.26	45.92	14.74	0.05	46.84	11.64	0.48
	Female	41.09	15.00	0.20	52.93	18.97	0.26	42.57	14.87	0.05	45.80	13.09	0.48
Time since graduation	≤15	43.59	12.97	0.01	54.22	17.64	0.06	44.03	14.43	0.001	47.28	10.85	0.00
	>15	50.25	14.66	0.01	60.53	14.84	0.06	53.57	9.37	0.001	54.78	11.28	0.00
Work experience	≤15	42.53	14.36	0.80	52.82	18.41	0.06	43.4	14.96	0.40	46.25	12.41	0.61
	>15	43.05	17.02	0.80	46.77	19.23	0.06	45.53	14.37	0.40	45.12	14.63	0.61

Table 2 shows the relationship between the type of clinic and radiation protection knowledge, attitude, practice and KAP. According to the analysis, there was not any significant relationship between the type of clinic and the level of practice (p= 0.97), attitude (p= 0.40) and KAP (p= 0.80), but in the case of knowledge it was at the border line of a statistically significant difference (p= 0.07). The highest level of knowledge regarding the radiation protection was for the personnel who worked in non-educational clinics (Mean Score=45.61), while the lowest was for the personnel of educational clinics (Mean Score=35.89).

Table 2. Relationship between type the of healthcare center and radiation protection knowledge, attitude, practice and KAP.

Characteristic		Knowledge			Practice			Attitude			KAP		
		Mean	SD	Sig	Mean	SD	Sig	Mean	SD	Sig	Mean	SD	Sig
Type of clinic	Educational	35.89	15.38	0.07	52.66	14.66	0.97	47.61	14.39	0.40	45.39	11.91	0.80
	Non Educational	45.61	13.97	0.07	51.55	17.52	0.97	44.94	15.70	0.40	47.37	11.47	0.80
	Private	42.63	14.59	0.07	52.22	18.96	0.97	43.20	14.82	0.40	46.02	12.86	0.80

The relationship between the geographical region and knowledge, practice, attitude and KAP of the radiation protection is presented in Table 3. There was a significant relationship between the region and the level of knowledge (p= 0.00), practice (p= 0.00), attitude (p= 0.00) and KAP (p= 0.00) toward the radiation protection of participants. The personal who worked in the central region had the highest level of knowledge (Mean Score=46.95), attitude (Mean Score=48.17) and KAP (Mean Score=50.06) while the highest level of practice (Mean Score=58.18) of participants belongs to the capital region of the country. The participants of the eastern region had the lowest level of practice (Mean Score=36.46), attitude (Mean Score=36.60) and KAP (Mean Score=36.38) and also the lowest level of knowledge was for the personnel who worked in the western region (Mean Score=35.20).

Table 3. Relationship between the regions studied and radiation protection knowledge, attitude, practice and KAP.

Characteristic		Knowledge			Practice			Attitude			KAP		
		Mean	SD	Sig	Mean	SD	Sig	Mean	SD	Sig	Mean	SD	Sig
Region	Capital	45.94	13.44	0.00	58.18	17.45	0.00	45.23	14.12	0.00	49.79	11.94	0.00
	Center	46.95	15.71	0.00	55.06	15.94	0.00	48.17	13.34	0.00	50.06	10.77	0.00
	North	40.68	14.22	0.00	55.57	17.44	0.00	44.54	10.94	0.00	46.93	10.56	0.00
	West	35.20	10.18	0.00	41.53	16.78	0.00	41.07	18.49	0.00	39.27	13.02	0.00
	East	36.08	15.38	0.00	36.46	13.76	0.00	36.60	17.15	0.00	36.38	11.15	0.00

4. Discussion

Dental radiography is an imaging modality that could be harmful despite its potential diagnostic gains. Therefore, the awareness and performance of staff who work with radiation in this field is necessary. This study was conducted to investigate the knowledge, attitude, practice and KAP of the radiation protection between dental radiography staffs.

Our finding showed that the gender of participants did not have any significant relationship with their level of knowledge, practice and KAP of radiation protection while the attitude was at the border of a statistically significant difference (p= 0.05). Among the participants, male participants had a higher level of attitude (Mean score=45.92).

It was observed that the working experience of participants had no effect on their level of

knowledge, attitude and KAP of radiation protection while the personal with working experience of less than 15 years had a better level of practice (Mean score=52.82). Similarly, another work conducted in Tehran showed that there was not a significant relationship between staff awareness, gender and job experience [8] as well as in the study by Soylemez *et al* conducted in 2011-2012 [9]. Some studies, including one conducted in 2011, indicated whenever the working experience of radiographers is low, their awareness and knowledge about the radiation is poor too [10] and a study conducted in 1997 showed that the dentists with a working experience between 5-25 years had a significant difference in knowledge with others [11].

According to our findings, there is a relationship between the time since graduation and radiation protection KAP (p= 0.00). The mean score of knowledge (50.25) and attitude (53.57) of participant that have a time since graduation more than 15 years is higher while the practice was at the border of a statistically significant difference (p= 0.06). The highest mean score of practice was 60.53 for the personal with the time since graduation of higher than 15 years. A study conducted in 2005 by Arslanoğlu *et al*. showed that doctors who graduated more than 10 years ago had less knowledge than others [12]. Our analyses showed that there is not any significant relationship between the type of clinic and practice (p= 0.97), attitude (p= 0.40) and KAP (p= 0.80) of radiation protection while the knowledge was at the border of a statistically significant difference (p= 0.07). Also in other studies, such as a survey conducted in Indonesia, it was shown that there is no significant difference in the type of clinics [13]. However, Svenson *et al.* on Swedish dentists indicated the knowledge of dentists who work in the public clinics was higher than those who work in private clinics [11].

Finally, our findings showed the results of the the radiation protection KAP associated to different regions: central region has the maximum mean score of knowledge (46.95), attitude (48.17) and KAP (50.06), while for the practice, the capital has the maximum mean score (58.18) and the eastern has the minimum mean score of practice (36.46), attitude (36.60) and KAP (36.38) and the western has the minimum mean score of practice (35.20).

5. Conclusion

The result of the present study showed that the level of radiation protection KAP is associated with time duration after the graduation of participant and region. Our study confirms the awareness and performance of radiation protection in the eastern region could be improved by holding courses on the radiation protection and continuous training courses and brochures including key points regarding radiation protection principles in dental clinics. Besides, no correlation between the type of clinic and KAP highlights the fact that in dental clinics, due to the absence of a radiation protection officer or a radiation training expert for training purpose, an educational clinic does not differ from a non-educational dental clinic.

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