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Investigation of awareness level concerning radiation safety among healthcare professionals who work in a radiation environment

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ABSTRACT

Radiation safety has become more important issue due to increased use of ionizing radiation in diagnosis and treatment. The aim of this study is to investigate the awareness and knowledge level concerning radiation safety among healthcare professionals who work in a radiation environment. The study population consisted of healthcare professionals who work in a radiation environment at a state hospital, a university hospital and a private hospital in Edirne province. The survey used in this study was prepared by the investigators after reviewing previous studies on similar subjects, and opinions were sought from experts in relevant fields. The survey consists of two parts and a total of 28 questions. Results of this study revealed that the rate of correct answers was 68.6% for questions on radiation safety among all healthcare professionals. The present study demonstrated an insufficient level of knowledge and awareness on radiation safety, even in the occupational groups that continuously work in a radiation environment. Periodic trainings should be conducted in hospitals. Pre-test and post-test exercises should be performed in order to increase the effectiveness of the trainings, and interactive case studies specific to the clinic should be included in the program. Finally, with electronic learning programs which may be implemented at national level, all relevant persons would have access to these programs.

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1. Introduction

Technological advances in healthcare have increased the use of ionizing radiation in diagnostics and treatment. Although the total radiation dose received by the US population between 2006 and 2016 decreased by 15–20%, the number of computed tomographic imaging procedures using X-rays has been reported to increase by 13% (NCRP, 2019). While all processes using ionizing radiation cause the patients and the society to receive more radiation compared to the past 30 years, it also causes an increase in the dose of the healthcare professionals who carry out the processes (Cornacchia et al., 2019; Stewart et al., 2012). It is stated that there is a link between the increase in the amount of radiation received from man-made ionizing radiation sources and the development of cancer for life (Guleria et al., 2019; Haylock et al., 2018; IAEA, 2018; Schauer & Linton, 2009; Tang & Loganovsky, 2018). With this increase, radiation safety has become more important compared to previous years in order to protect the health and wellbeing of healthcare professionals, patients and society. Recent studies have attempted to draw attention to the potential risks and awareness of doctors about occupational radiation exposure (Wakeford, 2018). However, despite the positive health effects of applications, the harmful implications of ionizing radiation on human health cannot be overlooked (European Society of Radiology, 2011; Stewart et al., 2012). Therefore, imaging, interventional procedures and therapeutic applications should be conducted in line with certain principles that minimize the potential risks for patients, healthcare professionals and society.

The general principles of radiation protection are justification, improving protection and safety, and applying dose limits. In any medical application that involves ionizing radiation, obtaining the most accurate and reliable result with the lowest possible dose is only possible if these main principles are followed. This is directly related to the level of knowledge about the negative effects of radiation on human health among healthcare professionals. Sufficient knowledge allows healthcare professionals to conduct the risk-benefit analysis of a given procedure to be performed for their patients, thereby protecting themselves and the patients from unnecessary radiation.

Studies evaluating the level of knowledge and awareness on radiation safety practices in healthcare professionals indicate knowledge gaps about the biological effects of radiation, even in groups who continuously work with radiation (C. I. Lee et al., 2004). Several healthcare professionals exhibit an insufficient level of knowledge concerning the doses utilized in certain radiological

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imaging procedures, including those who actually underestimate these doses (Faggioni et al., 2017; Yurt et al., 2014). Furthermore, healthcare professionals who continuously work with ionizing radiation appear to have doubts about which radiological procedures involve ionizing radiation and which are truly radiation-free (Saeed et al., 2018). Taken together, the basic training on radiation safety provided for the personnel who work with radiation proves to be insufficient for their entire working period; therefore, they should receive additional training on specific topics at regular intervals (European Commission, 2014; Paolicchi et al., 2016). Healthcare professionals who do not have sufficient knowledge concerning these topics may not be able to perform the risk-benefit analysis in clinical practice and thereby may expose themselves and their patients to the harmful effects of radiation.

The primary aim of the present study is to investigate the awareness and knowledge level concerning radiation safety among healthcare professionals who work in a radiation environment. In addition, the planned study aims to provide clear results about radiation safety from the personnel in question, and guide the relevant measures that can be taken in the long term.

2. Materials and methods

2.1. Population and sample

There are a state, a university and a private hospital in the city where the research is carried out. The study was included in all three institutions. The study population consisted of healthcare professionals who work in a radiation environment. The departments included in this study were Cardiology, Radiology, Nuclear Medicine and Radiation Oncology. 123 health professionals in the university hospital (Radiology: 56; Cardiology: 23; Radiation Oncology: 26; Nuclear Medicine: 20), 47 in the state hospital (Radiology: 30; Cardiology: 13; Nuclear Medicine: 4; no radiation oncology unit), and 4 in the private hospital (Radiology: 4; no Cardiology, Nuclear Medicine and radiation oncology unit) work in radiation areas where the study is carried out. In the study, the sample was not selected and the entire universe was tried to be reached. Across the three hospitals, the total number of healthcare professionals working in radiation fields was 174, 144 of whom participated in the survey on a voluntary basis. As the working conditions (number of patient, number of imaging, physical conditions, frequency of on duty etc.) are different in public and private health sector, all hospitals were included in the study. Ethics Committee approval was obtained prior to initiation of the study, and the survey was started only after obtaining separate permissions for each hospital.

2.2. Data collection tool

The survey used in this study was prepared by the investigators after reviewing previous studies on similar subjects, and opinions were sought from experts in relevant fields. The survey consists of two parts and a total of 28 questions. The first part contains questions related to the demographics of healthcare professionals participating in the present study. The second part contains questions related to main principles and trainings concerning radiation safety. Questions in this part are particularly focused on basic information and trainings about radiation, tools used for the purpose of radioprotection in working environment, dosimeter usage and risk assessment. Furthermore, questions on patient safety, including special measures to be taken for women of child-bearing potential during procedures that involve radiation have been included in this part. For questions on radiation safety training, dosimeter usage and risk analysis, evaluation was based on options of either yes or no, and the reasons were probed in participants who indicated not using a dosimeter. Additionally, the participants were asked a question as to which procedures involve radiation in order to assess their level of awareness. Multiple-choice answers and single correct answers were used in questions on staff safety and patient safety.

2.3. Data analysis

SPSS.23 program was used for the data analysis. Frequency and percentage were calculated for the analysis of demographic data. For the 10 questions on knowledge level concerning radiation safety, each correct answer was scored as 1 and each incorrect answer as 0 to calculate the mean values and standard deviation. The highest possible score in these questions was 10. The differences in the level of knowledge about radiation safety between the groups according to experience, occupation and type of hospital were analyzed with one-way ANOVA. A minimum significance level of 0.05 was utilized during the analyzes.

3. Results

Demographics obtained in the survey conducted among healthcare professionals who work in a radiation environment are listed in Table 1. According to the results, 72.9% of the participating healthcare professionals were employed in a university hospital, with 24.3% employed in a state hospital and 2.8% in a private hospital while education status was high school in 3.5%, undergraduate/university in 70.8%, postgraduate in 6.9% and PhD in 18.8%. Occupational groups of the participants included doctors (18.8%), technicians (66.0%), nurses (10.4%),radiation physicists (4.2%) and other (0.7%). Of all the participants, 45.8%

Table 1. Demographic characteristics of the healthcare professionals who participated in the study.

		Number (N)	Rate (%)
Type of hospital	University	105	72.9
	State	35	24.3
	Private	4	2.8
Education	High school	5	3.5
	Undergraduate	102	70.8
	Postgraduate	10	6.9
	PhD	27	18.8
Occupation	Doctor	27	18.8
	Technician	95	66.0
	Nurse	15	10.4
	Radiation physicist	6	4.2
	Other	1	0.7
Department	Radiology	66	45.8
	Radiation Oncology	29	20.1
	Nuclear Medicine	21	14.6
	Cardiology	28	19.4
Experience	Less than 3 years	42	29.2
	4-10 years	36	25.0
	More than 10 years	66	45.8
Total		144	100

were healthcare professionals work in radiology, 19.4% in cardiology, 20.1% in radiation oncology and 14.6% in nuclear medicine. In terms of occupational experience, the participants were stratified as those with experience of less than 3 years (29.2%), 4–10 years (25.0%) and more than 10 years (45.8%).

Of the participants, 98.6% reported having knowledge of radiation protection. Among these, the knowledge was a result of their specialty training in 61.8%, the training provided at the hospital they worked in 31.3%, the training provided at the time of medical equipment installation in 0.7%, personal web-based research in 1.4%, and interaction with fellow colleagues in 3.5%. Moreover, level of knowledge about the risks of ionizing radiation was self-rated as excellent by 13.2% of the participants, good by 30.6%, adequate by 36.1% and insufficient by 20.1%.

According to the legislation in Turkey (Ministry of Health, 2012; Turkey Atomic Energy Agency, 2015), The Radiation Safety Committee must be established in hospitals. These committees have duties such as providing radiation safety, regular training in hospitals and preparing radiation safety handbook. When the answers to the questions on this subject are examined, 85.4% of the participants indicated the presence of a radiation safety committee at the hospital where they worked, 56.9% stated having knowledge of the scope and responsibilities of the committee. On the other hand, 54.2% of the participants reported the presence of a document on radiation safety. Of the participants, 60.4% indicated the presence of periodic training on radiation safety in place at the hospital where they work and 63.9% stated that these trainings raise awareness on radiation safety while 36.1% found the trainings inefficient in this regard (Table 2).

According to the legislation in Turkey (Ministry of Health, 2012), the use of a dosimeter is mandatory in radiation areas, and the principles of use are detailed in the legislation. For this reason, questions regarding dosimeter use and safety measures were asked. Regular usage of pocket dosimeter was reported by 89.6% of the participants while 10.4% stated not using a pocket dosimeter. Of the 15 participants reporting non-usage of dosimeter, the reason was stated as not having a dosimeter (20%), forgetting to wear the dosimeter (60%) and the perception of inaccurate measurements obtained with the dosimeter (20%) (Table 3). In addition to the dosimeter, use of lead apron was reported by 21.4% of the participants, with lead glass usage in 19.4 thyroid collar in 18.9%, lead shielding barriers in 17.4%, lead glasses in 8.2%, lead gloves in 5.1% and gonad protection in 4.9% while 4.7% reported not using any additional protection.

In this survey study, 81.8% of 54 participants working in the radiology unit, 79.3% of the 23 participants working in the radiation oncology unit, 95.2% of the 20 participants working in nuclear medicine and 27 participants working in the cardiology unit 96.4% stated that they think that the risk levels of exposure to harmful effects of radiation in their unit are higher than other departments (Table 4). These results may be interpreted as subjective opinions provided by the participants with regard to the perception that the departments they work lead to more exposure to radiation than that in other departments.

Some of the participants stated that procedures that involve ionizing radiation, namely chest X-ray, mammography, PET, fluoroscopy, radiological procedures, angiography, radiotherapy, bone densitometer, CT, scintigraphy and iodine-131 treatment do not

Table 2. Level of knowledge about radiation safety training and the Radiation Committee.

Questions		N	%
Is the a Radiation Committee at the hospital where you work?	Yes	123	85.4
	No	21	14.6
Are you adequately informed concerning the scope and responsibilities of radiation safety committees?	Yes	82	56.9
	No	62	43.1
Are there periodic trainings on radiation safety at the hospital where you work?	Yes	87	60.4
	No	57	39.6
Is the information provided during the trainings efficient to raise awareness on radiation safety?	Yes	92	63.9
	No	52	36.1
Is there a specific guideline or document on radiation safety at the hospital where you work?	Yes	78	54.2
	No	66	45.8
Total		**144**	**100**

Table 3. Dosimeter usage.

		N	%
Do you regularly use a pocket dosimeter?	Yes	**129**	**89.6**
	No	**15**	**10.4**
Total		**144**	**100**
If not, what's the reason?	I don't have a dosimeter	**3**	**20**
	I keep forgetting it	**9**	**60**
	I don't think it provides accurate measurements	**3**	**20**
Total		**15**	**100**

Table 4. Assessment of risk levels of radiation exposure by department.

	Yes		No	
Department	n	%	n	%
Radiology	54	81.8	12	18.2
Radiation Oncology	23	79.3	6	20.7
Nuclear Medicine	20	95.2	1	4.8
Cardiology	27	96.4	1	3.6

involve radiation and that procedures that do not in fact involve radiation, namely MRI and USG involve radiation (Figure 1).

Of the participants, 20.8% did not know that the ALARA ('as low as reasonably achievable') principle meant the lowest possible radiation dose. Similarly, those with incorrect answers to questions on main methods of radiation protection comprised 35.4% of the study population while 41.7% of the participants provided incorrect answers concerning the use of dosimeter with lead shielding. The rate of incorrect answers about the mean dose limit over five years and one year among radiation staff was 35.4% and 44.4%, respectively. The rate of respondents who gave incorrect answers regarding the frequency of annual health checks required for radiation staff was 33.3**%.** According to the legislation, radiation workers should have a health check once a year (Ministry of Health, 2012). As for questions on patient safety, approximately one out of three participants (29.2%) provided negative answers about informing patients concerning applications that involve radiation. For applications involving radiation to be performed in women of child-bearing potential, the rate of correct answers on questioning of pregnancy were considerably high. Similarly, the rate of knowing the most appropriate time for test for women of child-bearing potential was 67.4% (Table 5).

The arithmetic mean and standard deviation values of the scores of the participants in 10 questions related to radiation safety were calculated and given in Table 6. When all questions related to the subject were evaluated, the average score of the participants in the questions on information level of radiation safety was 6.86 (±1.88). In other words, considering that the possible highest total score was 10, the success rate was found to be 68.6%. Furthermore, the differences in the level of knowledge on radiation safety was investigated statistically between groups by occupation, experience and type of hospital, and no significant difference was seen with regard to knowledge level based on years of experience and type of hospital. On the other hand, the evaluation based on occupational groups revealed that radiation physicists had a significantly ($p < 0.05$) higher level of knowledge compared to other healthcare professionals. While radiation physicists had the highest score with 8.16 on average, the groups of professionals that followed were technicians, doctor and nurses, respectively. Other healthcare professionals were the group of those with the lowest score of 4.00 on average.

4. Discussion

The technological advances in recent years have increased the use of medical applications that involve radiation; and consequently, both patients and healthcare professionals are known to be exposed to higher doses of radiation (Schauer & Linton, 2009). The awareness and level of knowledge of radiation among healthcare

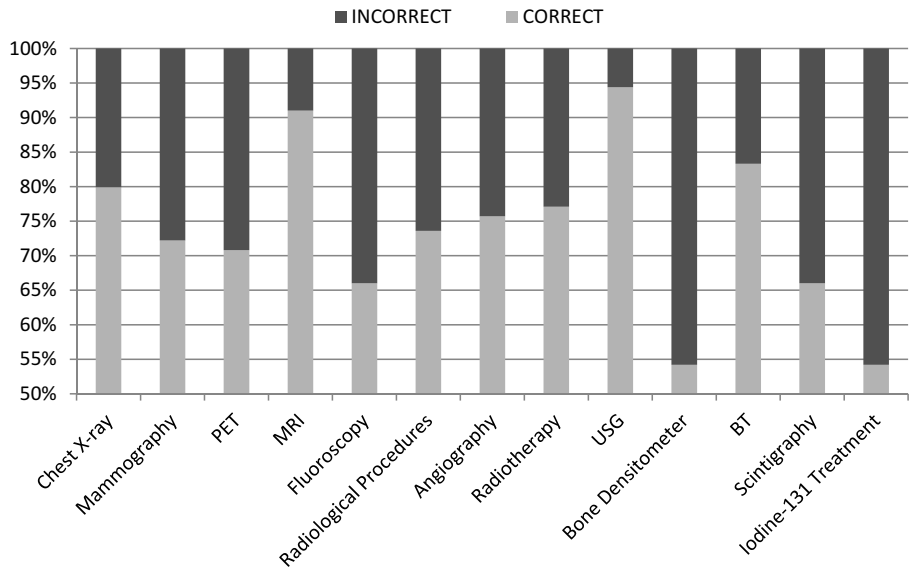

Figure 1. Which of the following are applications that involve ionizing radiation?

Table 5. Questions on the level of knowledge about radiation safety.

	Correct		Incorrect	
	n	%	n	%
Questions on staff safety				
What is the ALARA principle?	**114**	**79.2**	**30**	**20.8**
What are the main methods of radiation protection?	**93**	**64.6**	**51**	**35.4**
Where do you keep your pocket dosimeter when you use lead shielding?	**84**	**58.3**	**60**	**41.7**
What is the mean dose limit over five years allowed for radiation staff?	**93**	**64.6**	**51**	**35.4**
What is the mean dose limit over one year allowed for radiation staff?	**80**	**55.6**	**64**	**44.4**
How often is the Health Form filled in?	**96**	**66.7**	**48**	**33.3**
Questions on patient safety				
Should the patient be informed about the risks posed by radiation?	**102**	**70.8**	**42**	**29.2**
Should women of child-bearing potential be asked about pregnancy before tests that involve ionizing radiation?	**129**	**89.6**	**15**	**10.4**
Except emergency situations, how should pregnancy be ascertained before performing a test that involves ionizing radiation in women of child-bearing potential?	**101**	**70.1**	**43**	**29.9**
What is the safe timing to perform tests that involve ionizing radiation such as radiography (e.g. CT) or scintigraphy in women of child-bearing potential except emergency situations?	**97**	**67.4**	**47**	**32.6**

Table 6. Comparison of knowledge level by occupation, experience and type of hospital.

		N	*X*	Sd	p-value
Occupation	Doctor	27	6.81	1.98	0.011
	Technician	95	7.03	1.68	
	Nurse	15	5.60	2.58	
	Radiation physicist	6	8.16	0.40	
	Other	1	4.00	-	
Experience	Less than 3 years	42	6.38	1.96	0.133
	4-10 years	36	7.00	1.86	
	More than 10 years	66	7.10	1.81	
Type of hospital	University	105	6.77	1.87	0.272
	State	35	7.25	1.93	
	Private	4	6.00	1.41	

professionals directly involved in radiation-containing applications is highly important and effective in terms of risks that may arise for both the patients and themselves due to excess radiation during the tests (European Society of Radiology, 2011). The present study aimed to investigate the awareness and level of knowledge of applications that involve radiation and radiation safety among healthcare professionals who work in a radiation environment with radiation exposure.

Results of this study revealed that the rate of correct answers was 68.6% (6.86 correct answers on average in 10 questions) for questions on radiation safety among all healthcare professionals. A study conducted in healthcare professionals who are continuously involved in radiation-containing applications showed a success rate of 66.14% in theoretical knowledge across participants (4.63 correct answers on average in 7 questions) (Borgen & Stranden, 2014). The success rate in the present study was higher than that in comparative studies performed with other healthcare professionals (Khan et al., 2018). Nearly all of the participants in this study (98.6%) stated that they had knowledge of radiation protection and that they mostly (61.8%) gained this knowledge during training. Taking into account that the target audience is the group of healthcare professionals who actively perform applications that involve radiation, the knowledge of radiation safety provided during occupational training may be predicted to contribute to the success rate. According to the legislation in Turkey (Ministry of Health, 2012; Turkey Atomic Energy Agency, 2015), radiation safety committees are responsible for radiation safety in hospitals. In-service training are given to physicians, nurses and technicians. Training generally organized once a year by radiation committees. (Ministry of Health, 2012). However, there is no information about whether any tests or examinations have been carried out to assess the knowledge level of health professionals on radiation safety during training. Based on this situation, most of the participants who took place in this survey reported the presence of a radiation safety committee at the hospital where they worked (85.4%), that periodic training were in place (60.4%) and that training was effective in raising awareness on radiation safety (63.4%). It may be said that periodic training conducted for healthcare professionals working with radiation increases their knowledge level about radiation safety. Additionally, interactive and case-based training modalities are stated to be more effective in terms of raising awareness (Sheng et al., 2016).

In applications that involve radiation, the protection of both the personnel and patients from radiation is directly related to the level of awareness. In the present study, healthcare professionals in cardiology and nuclear medicine units stated that their risk of radiation exposure was higher than that of those in other units. The other group who reported a perception of higher risk of exposure to radiation was those who work in the radiology department. The radioactive sources utilized in nuclear medicine and the interventional procedures performed more frequently in cardiology and radiology departments result in increased radiation exposure for the staff. Therefore, healthcare professionals who work in these departments use protective apparatuses such as lead shielding, lead glass and thyroid protection. However, 10.4% of the participants in the present study reported mostly forgetting to use a dosimeter. This translates into the presence of

a group -although a small one- that does not show the necessary caution/importance in this regard among healthcare professionals who work in a radiation environment.

Both the types and numbers of procedures that involve radiation used in diagnosis and treatment have increased considerably with the advances in technology (UNSCEAR, 2000). Ensuring that healthcare professionals have knowledge of all applications that involve radiation is effective in preventing the excess radiation that may result from unnecessary examinations both for themselves and their patients. Almost all of the healthcare professionals who participated in the present study answered correctly that MRI and ultrasound are among the non-radiation procedures performed for diagnostic-therapeutic purposes. However, the rate of those answering incorrectly that nuclear radiation tests such as PET, bone densitometry and iodine-131 treatment are non-radiation procedures was considerably high. Of the participants, 29.2% stated PET as a non-radiation procedure while this rate was 45.8% for bone densitometry and 45.8% for iodine-131 treatment. Bone densitometry is performed to assess bone density using very low energy X-rays. However, in both PET scan and iodine-131 treatment, the patient continues to emit radiation to their surrounding after the procedure due to the radioactive material administered during the application. Since nearly all of the participants stated that they have knowledge of radiation protection, it is an unexpected result to obtain a high rate of incorrect answers concerning such tests.

Most of the studies investigating the level of knowledge and awareness about radiation safety are conducted among doctors, students and patients, who do not work continuously in a radiation environment. In particular, the awareness and knowledge level of doctors who request patients to undergo procedures that involve radiation have been shown to be extremely important in terms of patient safety and reducing the dose exposure of patients (Campanella et al., 2017; Chun-sing et al., 2012). The questions asked in these studies are mostly about the dose of the requested radiological imaging procedure (e.g., tomography/CT), the risk of cancer or side effects that may occur (Campanella et al., 2017; Chun-sing et al., 2012; Ramanathan & Ryan, 2015; Senemtaşi Ünal et al., 2018). In the present study, knowledge-based questions were asked about radiation safety, such as those on ALARA principle, main methods of radiation protection and dose limits. Questions about the necessity of informing patients in the event of an imaging test involving radiation and the procedures to be performed for patients who are likely to become pregnant were also included. Taking into account the fact that the target audience herein was a group of healthcare professionals who continuously work in a radiation environment, questions on protecting themselves and patients from the radiation arising from relevant procedures were designed as well. According to the results, one fifth of the participants gave incorrect answers concerning the ALARA principle and approximately one in three participants did not know the main methods of radiation protection. The rate of those who provided incorrect answers about the use of dosimeter with lead shielding and about the mean dose limit over five years and one year were found to be quite high. Almost all of our participants stated having received training on radiation safety and most reported attendance at regular trainings. Although it is compulsory to inform the patient about harmful effects of radiation related to the procedure to be performed in our country, it was observed that some considered this unnecessary. While it is mostly stated that 'pregnancy interrogation should take place when performing the necessary radiological procedures for pregnant patients or those with child-bearing potential', one in three participants provided an incorrect answer about who should do this and how. Information on precautions to be taken during radiological procedures conducted for pregnant patients or those with child-bearing potential have been described in several publications and guidelines (American College of Radiology, 2018).

With regard to answers on radiation protection of the staff and patients, knowledge gaps were noted, even in those who had received and continued to receive training on radiation safety. Studies have revealed that healthcare professionals who continuously work in a radiation environment have a higher level of knowledge of radiation safety compared to others, although insufficient training is observed even in these groups, highlighting the fact that such training should be provided not only through working life but also during specialty training (Borgen & Stranden, 2014; R. K. Lee et al., 2012; Paolicchi et al., 2016). In the present study, level of knowledge about radiation safety was evaluated by experience level, occupation and type of hospital, and no significant difference was found ($p > 0.05$) for experience and type of hospital. Several studies have shown that occupational experience increases knowledge level, in other words, further training contributes to level of knowledge favorably (Macía-Suárez & Sánchez-Rodríguez, 2018; Senemtaşi Ünal et al., 2018). In the present study, the rates of correct answers were similar in the groups with less than three years of experience and more than 10 years of experience, and no significant difference was observed between these groups. While the unwillingness of senior employees to change their habits and update their knowledge is expected (Szarmach et al., 2015) to make a difference between the level of knowledge, a different result was obtained in this study. It is considered that not being able to make radiation safety training systematic, not attending to training due to work intensity, and not evaluating the training with objective measurement tools (pre-test, post-test, scale etc.), may cause lack of awareness and level of knowledge of the participants to be similar.

In the evaluation based on occupational groups, radiation physicists were associated with a significantly higher level of knowledge about radiation safety compared to other healthcare professionals ($p < 0.05$). The other groups with correct answers to relevant questions were technicians, doctors, nurses, and other healthcare professionals, in this respective order. A study investigating the awareness on radiation safety among nurses who work in the same department with radiology technicians did not reveal a significant difference between these two occupational groups (Senemtaşi Ünal et al., 2018). In the study presented herein, the finding that radiation physicists were those with the highest level of knowledge was not unexpected taking into account that they are in charge of taking necessary precautions for radiation protection who may also provide training on this subject matter. The lowest level of knowledge noted in nurses and other healthcare professionals is likely to result from the lack of training in this regard during their basic training and knowledge gained only through periodic trainings.

In conclusion, insufficient level of knowledge about applications that involve radiation is a highly important parameter in radiation protection both for healthcare professionals and patients. The present study demonstrated an insufficient level of knowledge and awareness on radiation safety, even in the occupational groups that continuously work in a radiation environment. In order for all hospital personnel to work safely in applications that involve radiation, all of the necessary conditions need to be fulfilled. This may ensure that both the staff and patients and their relatives are exposed to the lowest possible radiation dose. For this; periodic trainings should be conducted in hospitals and training content should include all applications that involve radiation and be specific to the relevant clinic. Regular training programs should also be provided for other healthcare professionals who do not continuously work in a radiation environment but are still subject to radiation exposure. Pre-test and post-test exercises should be performed in order to increase the effectiveness of the trainings, and interactive case studies specific to the clinic should be included in the program. With the establishment of radiation safety committees in all hospitals, it would be possible to monitor and conduct regular trainings. And finally, with electronic learning programs which may be implemented at national level, all relevant persons would have access to these programs.

Due to ethical factors, identity information was not obtained from healthcare professionals who participated in the study. Furthermore, the responses were not shared with third parties (such as hospital management). Based on this, the answers are thought to reflect the actual situations. In the study, using only a questionnaire is a limitation. In future studies, besides the questionnaire, in-depth interviews with healthcare professionals can be used to determine the main causes of situations objectively, such as lack of information, lack of awareness.

Disclosure statement

No potential conflict of interest was reported by the authors.

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