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Sağlık Bilimlerinde Eğitim Dergisi

Determination of Cognitive, Affective, and Behavioral Attitudes of Healthcare Professionals Towards Radiation*

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Abstract

In this study, it was aimed to determine the attitudes of health personnel working in health institutions in Turkey towards radiation. In the study, it was investigated whether there was a significant difference in the cognitive, affective and behavioural attitudes of healthcare professionals towards radiation and its effects in terms of occupation, gender,years of service, institution and department variables. 'Radiation Attitude Scale for Healthcare Workers' and "Semi-structured Qualitative Data Collection Tool" were used as data collection tools.

From the information provided by healthcare professionals and the statistical results, the interpretation that 52% of the radiation-related retests performed in hospitals are unnecessary revealed how important a risk it is for patient health. It is thought that the development of affective and behavioural attitudes of healthcare professionals together with their cognitive attitudes towards radiation will be possible with a good radiation education. When the results of the study are compared with the literature, it is seen that more similar results are obtained.

Key words: *Radiation education, attitude towards radiation, effects of radiation, healthcare professionals, patient health*

Sağlık Çalışanlarının Radyasyona Karşı Bilişsel, Duyuşsal ve Davranışsal Tutumlarının Belirlenmesi

Öz

Bu çalışmada, Türkiye'de sağlık kuruluşlarında çalışan sağlık personellerinin radyasyona yönelik tutumlarını belirlemek amaçlandı. Çalışmada, sağlık çalışanlarının radyasyona ve radyasyonun etkilerine yönelik bilişsel, duyuşsal ve davranışsal tutumlarında meslek, cinsiyet, hizmet yılı, çalıştığı kurum, çalıştığı bölüm değişkenlerine yönelik anlamlı farlılık olup olmadığı araştırıldı. Veri toplama aracı olarak "Sağlık Çalışanlarına Yönelik Radyasyon Tutum Ölçeği" ve "Yarı Yapılandırılmış Nitel Veri Toplama Aracı" kullanıldı.

Sağlık çalışanlarının verdiği bilgilerden ve yapılan istatistik sonuçlarından, hastanelerde yapılan radyasyon ile ilgili tekrar testlerin %52 oranında gereksiz yapıldığı yorumu, hasta sağlığı için ne kadar önemli bir risk olduğunu ortaya çıkardı. Sağlık çalışanlarının radyasyona yönelik bilişsel tutumu ile beraber duyuşsal ve davranışsal tutumlarının geliştirilmesi iyi bir radyasyon eğitimi ile mümkün olacağı düşünülmektedir. Yapılan çalışmanın sonuçları literatürle karşılaştırıldığında daha çok benzer sonuçlar elde edildiği görülmektedir.

Anahtar kelimeler: *Radyasyon eğitimi, radyasyona yönelik tutum, radyasyonun etkileri, sağlık çalışanları, hasta sağlığı*

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INTRODUCTION

Mankind has lived intertwined with radiation since its existence. Radioactive elements in nature create a radiation level that is considered normal and natural in our environment (Gold et al., 1964; Lockhart, 1964; Guimond & Windham, 1980; Eisenbud, 1984; Coşkun, 2011). However, in the early 20th century, nuclear bomb tests, and studies related to developments in industry and technology caused the amount of radiation in nature to increase and reach amounts that threaten human health (Coşkun, 2011; Prăvălie, 2014). Although this pollution and deterioration in the environment is classified as air, water, and soil pollution, the deterioration that occurs in a part of the ecological balance negatively affects the structure of the whole system. For this reason, it is no longer possible to live isolated from radiation today. The increasing level of radiation in people's living space reaches dimensions that threaten human health (Bell & Shaw, 2005; Emara, 1996).

Many researchers working on radiation and many people exposed to radioactive materials have been exposed to the harmful effects of radiation (Menezes & Michalek, 2002; Coşkun, 2011; Kaya, 2012; Jain, 2021). For example, Becquerel burned himself with a radium element he carried in his pocket. Marie and Pierre Curie, another researcher, were also seriously exposed to skin burns during research on radiation. In Hiroshima, people in the active radiation field died, and the survivors were found to be at high risk of infection (Miller, 1968). After the introduction of computed tomography (CT) scanning in 1974 and high-resolution CT in 1985, these examinations were widely used without knowledge of their harmful effects because they were non-invasive (a medical examination method) and considered to be highly effective (McGuinness et al., 1994; Miller et al., 1992; Naidich & Garay, 1991). A few years after these studies, the danger of radiation was realized and staff were warned to take necessary precautions (Göksel, 1973; Şeker & Çerezci, 1997). In 1927, Herman Müller revealed that radiation could cause genetic disorders as a result of his research on insects. Although it is now known that exposure to high doses of radiation can cause serious damage to the body, it is not yet certain when low doses of radiation will cause such effects (Göksel, 1973; Şeker & Çerezci, 1997). Göksel (1973) stated that researchers working with radiation were exposed to fatal skin cancer and skin burns as a result of working carelessly without taking into account the warnings. Considering these situations, the attitude of the employees in health institutions, which is one of the areas where society is most exposed to radiation in daily life, towards the effects of radiation is very important for both their own and public health.

Today, the most important studies on radiation are carried out in the health field. According to the World Health Organization report, medical applications constitute a large part of artificial radiation sources (Alkhayal et al., 2023; Emara, 1996). Radiological Tests, Positron Emission Tomography (PET), Computed Tomography (CT), X-ray, Angiography, Electrocardiography (ECG), etc., which are applied in the diagnosis stage of diseases, can cause serious health problems for both healthcare professionals and patients if they are not applied carefully and diligently (Göksel, 1973; Şeker & Çerezci, 1997). If a healthcare worker's ignorance about radiation is taken into consideration, it is clear that radiation will become quite dangerous (Prabhat et al., 2011). However, in addition to the health hazards of radiation, its benefits cannot be ignored. Especially in the field of health, radiation is highly utilized in the diagnosis and treatment phase. This situation shows that individuals should have knowledge about radiation and use radiation-emitting devices consciously. Individuals' level of knowledge about radiation will enable them to develop the right attitude towards radiation and use radiation more consciously.

Studies have shown that healthcare staff who live in constant contact with radiation do not have the necessary attitude about the effects of radiation on health (Goula et al., 2021; Batista et al., 2019). In a study conducted in a medium-sized province in Turkey, it was found that healthcare staff did not develop adequate attitudes about radiation and that necessary precautions were not taken for both themselves and patients (Güden et al., 2012). Informing radiology staff about radiation safety and increasing their awareness is very important in terms of patient and worker safety. In a study conducted by Vural (2012) with health personnel working in operating theatres in a province with a population of more than 1 million in the Marmara region of Turkey, it was stated that the personnel had good knowledge about radiation. Still, they did not have sufficient behavior to take the necessary precautions. In a study conducted with healthcare professionals in Saudi Arabia, it was observed that

although healthcare professionals had a high level of knowledge about radiation, their attitudes toward the subject were low (Alkhayal et al., 2023). This reveals that although healthcare personnel have the necessary knowledge, they do not develop sufficient positive attitudes towards radiation. In a study conducted in Hong Kong, it was observed that 76% of the healthcare personnel did not inform the patient. However, they agreed on the necessity of informing the patient about radiation (Kam, 2005). Studies show that the attitudes of healthcare personnel towards radiation in our country and the world are not at the expected level. According to Kam (2005), the development of positive attitudes of health personnel towards radiation is very important for public health. In this study, the "Radiation Attitude Scale for Healthcare Staff (RASHS) (Yalçın et al., 2020)", which was prepared to measure the attitudes of healthcare personnel working in Turkey towards radiation, was used to determine attitudes. In this study, answers to the following questions were sought:

"Is there a significant difference in the cognitive attitudes of healthcare professionals towards radiation and its effects on their health concerning the variables of occupation, gender, years of service, institution, and department?"

"Is there a significant difference in the affective attitudes of healthcare professionals towards radiation and the effects of radiation on their health in terms of occupation, gender, and years of service, institution, and department variables?"

"Is there a significant difference in the affective attitudes of healthcare professionals towards the effects of radiation on the patient's health in terms of occupation, gender, and years of service, institution, and department variables?"

"Is there a significant difference in the behavioral attitudes of healthcare professionals towards informing the patient about radiation and the effects of radiation in terms of occupation, gender, years of service, institution, and department variables?"

METHOD

Research Design

Using qualitative and quantitative data analysis together is a method that increases the validity and reliability of the scale (Creswell, 2003). In this study, quantitative and qualitative data were collected simultaneously and a mixed design was used. In this way, the data obtained by analyzing quantitative items supported by the data obtained from qualitative items.

Study Group

The research group was selected by purposive sampling method since the study was to cover healthcare staff in Turkey. This method, which is frequently used in discovering and explaining phenomena and events, enables in-depth research by selecting rich situations depending on the purpose of the research and is preferred when it is desired to study one or more special cases that meet certain criteria or have certain characteristics (Patton, 2002b; Cresswell & Plano Clark 2011; Büyüköztürk, 2012; Tarhan, 2015). The study group in this study consists of doctors, nurses, radiologists and technicians working in private and public health institutions in Turkey.

Data Collection

Data collection tools; The quantitative data collection tool measuring the attitude of healthcare professionals towards radiation consists of the RASHS scale and a semi-structured qualitative data collection tool. The RASHS scale is a four-factor Likert-type scale consisting of 18 items to determine the attitude of healthcare professionals about radiation, explaining 64.5% of the total variance and having a reliability coefficient (Cronbach's Alpha) of 0.914. This scale consists of four sub-factors; The first factor was "Radiation Information of the Practitioner" (RIP), the second factor was "Radiation Sensitivity of the Practitioner" (RSP), the third factor was "Practitioner's Sensitivity to the Patient" (PSP), the fourth factor was "Information of the Practitioner to the Patient" (IPP). To collect qualitative data, semi-structured interview questions were used, and a qualitative data collection tool consisting of eight items was used, which was piloted and finalized by taking the opinions of 5 different experts in the relevant field.

Data Analysis

Two scales used were applied to the research group through one-on-one interviews and by announcing them online with a snowball strategy in associations and social groups where healthcare workers are located, and to volunteer workers with a maximum diversity sampling strategy (Patton, 2002a; Dusek et al., 2015).

The data obtained were processed into the statistical data analysis program and the appropriate analysis method was selected according to the type of data. The data were analyzed and presented in tables findings.

FINDINGS

Analysis of Quantitative Data

The "One Sample Kolmogorov Smirnov" test was used to test the conformity of the data to normal distribution (Maag et al., 1971). Since the significance values of the Kolmogorov-Smirnov test results for the sub-factors were less than 0.05, it was deemed appropriate to use a non-parametric test method.

Following the selection of the appropriate test method, Kruskal-Wallis analysis was performed to determine whether the scores of the participants who constituted the sample group from the sub-dimensions of the scale differed according to the variables of gender, department, occupation, years of service, and the institution in which they worked, and Mann Whitney U test was performed to determine the source of the differences (between which groups), if any. Kruskal-Wallis test was performed to determine whether the scores obtained by health care staff from the sub-dimensions of the scale differed according to the profession variable.

Table 1. The Relationship Between the Scores Employees Receive From Sub-Factors and the Occupation Variable

	Occupation	N	Rank Means	sd	Chi-square	p
	Doctor	43	98.38			
	Radiologist	12	174.75			
RIP	Radiology technician	131	124.22	3	16.27	**0.01***
	Nurse	48	101.97			
	Total	234				
	Doctor	43	118.45			
	Radiologist	12	155.54			
RSP	Radiology technician	131	109.28	3	7.55	**0.05***
	Nurse	48	129.57			
	Total	234				
	Doctor	43	116.30			
	Radiologist	12	127.71			
PSP	Radiology technician	131	113.80	3	1.48	0.68
	Nurse	48	126.13			
	Total	234				
	Doctor	43	102.93			
	Radiologist	12	129.13			
IPP	Radiology technician	131	116.15	3	4.75	0.19
	Nurse	48	131.32			
	Total	234				

*p< 0,05

When Table 1 is examined, as a result of the Kruskal-Wallis test regarding the differentiation of radiation information by profession, when the values of the PSP and IPP sub-factors are examined, it is seen that there is no significant difference at the significance level (p> 0.05). When the values of the RIP and RSP sub-factors were examined (p< 0.05), it was seen that there was a significant difference at the significance level. To determine which occupational groups this difference exists between, the

Mann-Whitney U test was used, taking into account the rank average values of the occupational groups.

The analysis results obtained as a result of the Mann-Whitney U test applied for the RIP sub-factor are given in Table 2.

Table 2. Table of Bilateral Relations of RIP Sub-Factor Scores of Professional Groups

	Occupation	N	Rank Averages	Rank Sum	U Value	z	p
RIP	Doctor	43	24.05	1034.00			
	Radiologist	12	42.17	506.00	88.00	-3.50	**0.00***
	Total	55					
	Doctor	43	72.61628	3122.5			
	Radiology technician	131	92.3855	12102.5	2176.500	-2.263	**.024***
	Total	174					
	Doctor	43	45.72093	1966			
	Nurse	48	46.25	2220	1020.000	-.096	.92
	Total	91					
	Radiologist	12	44.41667	533			
	Nurse	48	27.02083	1297	121.000	-3.138	**.002***
	Total	60					
	Radiologist	12	101.1667	1214			
	Radiology technician	131	69.32824	9082	436.000	-2.603	**.009***
	Total	143					
	Radiology technician	131	94.50763	12380.5			
	Nurse	48	77.69792	3729.5	2553.500	-1.951	**.05***
	Total	179					

* p<0.05

When analyzing the results obtained in Table 2 regarding the RIP sub-factor, a significant difference is observed between doctors and radiologists at a significance level of (p<0.05). Upon examination of the mean ranks, a difference in favor of radiologists is evident. Similarly, a significant difference in favor of radiology technicians is observed between doctors and radiology technicians. There is a significant difference in favor of radiologists between radiologists and nurses, between radiologists and radiology technicians, and in favor of radiology technicians between nurses and radiology technicians. However, no significant difference is observed between doctors and nurses. The results of the Mann-Whitney U test applied for the RSP sub-factor are presented in Table 3.

Table 3. Table of Bilateral Relations of RSP Sub-Factor Scores of Professional Groups

	Occupation	N	Rank Averages	Rank Sum	U Value	z	p
RSP	Doctor	43	26.09	1122.00			
	Radiologist	12	34.83	418.00	176	-1.72	.08
	Total	55					
	Doctor	43	92.60	3982.00			
	R. Technician	131	85.82	11243.00	2597.000	-.778	.43
	Total	174					
	Doctor	43	43.755	1881.5			
	Nurse	48	48.010	2304.5	935.500	-.788	.43
	Total	91					
	Radiologist	12	36.083	433			
	Nurse	48	29.104	1397	221.000	-1.288	.19
	Total	60					
	Radiologist	12	97.625	1171.5			
	R. Technician	131	69.653	9124.5	478.500	-2.278	**.02***
	Total	143					
	R Technician	131	85.802	11240			
	Nurse	48	101.458	4870	2594.000	-1.822	.06
	Total	179					

*p<0.05

When the findings obtained in Table 3 are examined, it is seen that there is a significant difference in the level of importance between the radiologist and radiology technician professional groups, according to the analyses regarding the RSP sub-factor. When looking at the rank averages of these professional groups, it is seen that there is a difference in favor of radiologists ($p < 0.05$). No significant difference was detected between other occupational groups.

Although there was no significant difference as a result of the Krusskal Vallis test for the IPP sub-dimension, as a result of the Mann Whitney U test applied, it was determined that there was a significant difference in favor of nurses between the nurse and doctor professional groups.

Mann Whitney U test was performed to understand whether the scores received by healthcare professionals from the subscales differed according to the gender variable. The data obtained as a result of the test are given in Table 4.

Table 4. The Relationship Between the Scores Employees Receive From Sub-Factors and Their Gender.

	Gender	N	Rank Mean	Rank Sum	U Value	z	p
RIP	Mr	118	117.44	13857.50	6836.500	-.015	.98
	Woman	116	117.56	13637.50			
	Total	234					
RSP	Mr	118	108.14	12760.50	5739.500	-2.177	**.03***
	Woman	116	127.02	14734.50			
	Total	234					
PSP	Mr	118	107.85	12726.00	5705.000	-2.224	**.02***
	Woman	116	127.32	14769.00			
	Total	234					
IPP	Mr	118	105.62	12463.00	5442.000	-2.816	**.005***
	Woman	116	129.59	15032.00			
	Total	234					

*p<0.05

When examining the findings obtained in Table 4, it is observed that there is a statistically significant difference in favor of women in the RSP, PSP, and IPP sub-factors at a significance level of ($p<0.05$). To understand whether the scores of health workers in the sub-dimensions differ according to the variable of the institution they work for, a Kruskal-Wallis test was conducted. The test results revealed that there was no statistically significant difference in sub-factor scores based on the variable of the institution where the participants work.

To understand whether the scores of health workers in the sub-dimensions differ according to the variable of years of service, a Kruskal-Wallis test was conducted. The analysis results are presented in Table 5.

Table 5. The Relationship Between the Scores Employees Receive From Sub-Factors and Their Years of Service.

	Years of service	N	Rank Averages	Chi-square	sd	p
RIP	0-3	47	116.76	8.942	2	**.01***
	4-8	82	101.17			
	+9	105	130.59			
	Total	234				
RSP	0-3	47	129.98	3.262	2	.19
	4-8	82	108.40			
	+9	105	119.02			
	Total	234				
PSP	0-3	47	124.12	4.542	2	.10
	4-8	82	104.80			
	+9	105	124.46			
	Total	234				
IPP	0-3	47	107.48	1.952	2	.37
	4-8	82	115.99			
	+9	105	123.16			
	Total	234				

*p<0.05

When Table 5 is analyzed, it is seen that there is a significant difference at the significance level in the RIP sub-factor according to the year of service variable of the healthcare workers. Mann Whitney U test was applied to understand which groups were significantly different in the RIP sub-factor, taking into account the variables of the mean ranks of the groups. The results of the analyses related to the RIP sub-factor are given in Table 6.

Table 6. Table of Pairwise Relationships of RIP Sub-Factor Scores of Occupational Groups According to Years of Service.

	Years of service	N	Rank Means	Rank Sum	U Value	z	p
	0-3	47	70.11	3295.00			
	4-8	82	62.07	5090.00	1687.000	-1.185	.23
	Total	129					
RIP	0-3	47	70.65	3320.50			
	9	105	79.12	8307.50	2192.500	-1.121	.26
	Total	152					
	4-8	82	80.60	6609.00			
	+9	105	104.47	10969.00	3206.000	-3.033	**.002***
	Total	187					

*p<0.05

When the data related to the URB sub-factor were analyzed in Table 6, it was found that there was a significant (p<0.05) differentiation at the significance level between the variables of 4-8 and +9 years of service. When the rank averages between the groups were taken into consideration, it was seen that there was a differentiation in favor of the +9 years' variable. Mann Whitney U test was performed to determine whether the scores obtained by the healthcare workers from the sub-dimensions of the scale differed according to the department in which the participants worked. The data obtained as a result of the test are given in Table 7.

Table 7. The Relationship Between Employees' Sub-Factor Scores and Department

	Department of Study	N	Rank Means	Rank Sum	U Value	z	p
RIP	Radiology	141	124.77	17593.00	5531.000	-2.052	**.04***
	Other	93	106.47	9902.00			
	Total	234					
RSP	Radiology	141	111.62	15739.00	5728.000	-1.668	.09
	Other	93	126.41	11756.00			
	Total	234					
PSP	Radiology	141	112.61	15877.50	5866.500	-1.376	.16
	Other	93	124.92	11617.50			
	Total	234					
IPP	Radiology	141	116.56	16435.00	6424.000	-.272	.78
	Other	93	118.92	11060.00			
	Total	234					

*p<0.05

When the analyses related to the URB sub-factor obtained in Table 7 are examined, it is seen that there is a significant difference in the significance level (p<0.05) between radiology workers and other field workers. When the rank averages of these occupational groups were examined, it was determined that the difference was in favor of radiology workers.

Analysis of Qualitative Data

In addition to quantitative data in the research, the following questions were asked to obtain qualitative data, and the answers were interpreted and interpreted together with the answers received.

Question 1: "Do you attend in-service training and do you think it is necessary to attend?" was answered by 225 participants. All of the health workers who answered the question stated that it was necessary to participate in in-service trainings, and 3 participants stated that they did not participate in these trainings although they said that participation was necessary. Most of the participants gathered around the following statements of the participants:

• "I try to attend as much as possible. I cannot attend most of them due to busy work. It is necessary to attend these trainings and it is necessary to attend everything that has training in it at least once",

• "It needs to be done by a good trainer, but in official institutions it is usually a formality and technicians organize it themselves",

• "Yes, I agree. Yes, it is necessary to closely follow the new generation devices and laws, laws and practices".

Question 2: "Do you believe that the hospital management takes the necessary precautions against radiation for your health? If so, what kind of precautions are taken?" was answered by 217 people. While 73 of these healthcare professionals stated that precautions were taken, 69 stated that no precautions were taken, and 76 stated that precautions were partially taken but not sufficient to protect from radiation. The majority of the participants stated that most of the precautions taken were taken due to legal obligation.

Some of the answers given to the question by healthcare professionals who stated that the necessary rules are followed and precautions are taken are as follows;

• "They take precautions not because they care about our health but to achieve quality standards. All examinations are performed once every 6 months",

• "Yes, I think he did, there is a radiation safety and health committee in our hospital, and committees such as the radiation protection officer are constantly working for our benefit. In addition, the radiation protection apparatus is constantly checked",

Most of the healthcare workers who stated that partial precautions were taken for radiation protection but not enough for radiation protection stated that not many precautions were taken except for lead

aprons and dosimeters. The answers given by the health workers about this situation were gathered around the examples given below;

• "I don't believe it, there is only a lead vest to be worn by radiation technicians, when X-rays are taken, as nurses, we usually move away from the working environment for 30 s, there is no other precaution taken",

• "Necessary precautions are taken, but I don't think it is enough because it is difficult for the employees to use radiation protectors in patient density. There are precautions but it is difficult to use",

Some other answers to the question are as follows;

• "I listened with regret once again in this symposium that radiation is harmful only to the patient. It was tried to be imposed that it is not harmful in any way to the working technician. If it is so innocent for the employee, why are we taken back into service during pregnancy? Why does a technician in Europe have a limit of 20 exposures? Are their technologies not as advanced as in Turkey?",

• "Radiation meter is not used in cases accompanied by fluoroscopy in the operating theatre, this worries me and I think that the management is not taking measures to protect the health of the employees",

• "Absolutely no, there are no precautions taken in the operating theatre other than lead aprons, the rooms are permeable, while the procedure is performed in one room, those in the other room are exposed".

Question 3: "Do you believe that the hospital management takes the necessary precautions against radiation for the health of the patient? If so, what kind of precautions are taken?" 89 health workers stated that no precautions were taken, 21 health workers stated that partial precautions were taken, and 32 health workers stated that precautions were taken. Most of the 32 health workers who thought that precautions were taken stated that precautions were taken by mentioning examples such as lead vests, screens, gonad protectors and signs, and keeping the patient's relatives away. Some participants stated that precautions were taken not because of the health of the patient, but only by following the regulations. Although the answers given by the employees to the question about this situation are similar, a few of them are exemplified below;

• "The conditions that should be standard in a shooting room are applied. Other than that, no protection is provided",

• "In order to avoid shortcomings in inspections rather than precautions...",

• "We do not take any measures with the patient in mind",

Many employees stated that unnecessary examinations are not prevented and patients are not given enough information. The answers related to this situation are similar to the examples given below;

• "I think that patients are not given enough information and not given enough importance",

• "Unnecessary filming of patients in the hospital is best prevented. For a single patient, sometimes more than one unnecessary treatment is requested, why is the patient asked for X-rays again when he/she has already been asked for tomography, MRI, USG?",

• "He does not. There is a problem with clinicians. For example, 1 day ago, he/she can have the same radiograph taken and the next day he/she can ask for the same radiograph again. The ISO audit fulfills what it wants, again, and a lot of radiation is taken with unnecessary requests",

Some employees gave answers that the profit to be obtained from the patient is prioritized.

• "Studies are carried out for the revolving fund rather than the health of the patient",

• "Absolutely not. Because the performance system applied now has turned into a completely commercial system, radiological (tomography- x-ray-scope) examinations are performed on all patients entering the hospital".

Some participants stated that since the hospital management does not have the opportunity to control the radiation to which the patient will be exposed, protecting the patient's health depends only on the conscience and attitude of the practitioner. The answer prepared for this is as follows;

• "It is not a situation that management can easily control, it depends on the attention and conscience of the person using the device",

• "In terms of radiation, the technicians who shoot should take the necessary precautions and measures for the patient rather than the hospital management"

Some participants stated that they minimized the amount of unnecessary radiation that patients would be exposed to because they worked in coordination with radiologists. Some of the different answers to the question are as follows:

• "No, the necessary precautions and measures are not taken, the radiology room and the blood center are next to each other, and the waiting conditions are irregular when pregnant women take a sugar test",

• "I do not believe that the necessary precautions are taken, the hospital management does not know exactly what needs to be done",

• "Protective equipment can be provided for staff, but I don't think clinicians think so on behalf of the patient",

• "More time and resources should be devoted to patient education".

Question 4: "What kind of precautions do you take yourself to protect yourself from the harmful effects of radiation?", 181 people stated that they take precautions as much as they can, 11 people stated that they do not work in the field of radiology and 17 people stated that they do not take any precautions. Many health workers who took precautions stated that they took precautions such as the use of lead aprons, gloves, screens, ventilation, and consumption of liquid and dairy products. However, very seldom employees gave all the precautions of the ALARA (distance, low dose, time) principle together. Many of these answers are equivalent to the sample answers listed below;

• "Lead apron, nutrition (protein and yogurt consumption), showering every day, plenty of liquid consumption",

• "I do not pass through the floors where radiological procedures are performed unless I have to, there are generally imprudent practices",

• "I adjust the radiation dose well. I adjust the radiation dose according to children, old and young people",

• "I follow all the rules I have to follow during irradiation, shooting areas, the air is cleaned by central ventilation with aspiration system and floor suction ventilation, dosimeter monitoring, lead protectors, 6-monthly blood, eye-skin controls",

• "I use the protection apparatus during shooting. I follow the ALARA principle. I avoid unnecessary requests and radiographs".

Most of the employees stated that they do not use lead aprons because they are too heavy by giving answers such as "I wear lead aprons occasionally, the reason why I do not wear lead aprons is that they are too heavy". Some employees gave answers such as "We do not have many precautionary options due to hospital facilities, I move away from the radiation area", "I do not pass through the floors where radiological procedures are performed unless I have to, there are generally imprudent practices" and stated that they could not take adequate precautions due to the inadequate facilities of the hospital in this regard.

Question 5: "Do you ask the patient when the last test was performed before performing radiological tests?" When the answers given by healthcare workers to the question, were examined, 114 of the workers answered "Yes, it should be asked," and 60 of the workers answered "No, it is not asked". Some of the employees, on the other hand, did not answer because they were out of their branch,

partially answered that it should be asked, but that they did not ask because of the intensity and had no idea. Many health workers stated that it is necessary to ask. Some of these answers are listed below;

• "It should be asked and I do ask, even if more than one examination is requested on the same day, I do not have it done, I spread it to different times. For example, if the patient requested Dexa, mammography, and X-ray, I schedule them on different days",

• "It must be asked. Unnecessary use of radiation and unnecessary exposure should be prevented. Since the frequency range or intensity is different, the doctor may state that he cannot make the diagnosis and ask for it again. The hospital should prefer the right useful device when purchasing such important devices".

Most of the staff stated that when clinicians were contacted about this issue, they preferred not to ask and not to follow up because they faced the reactions of the clinicians. Many of them stated that they had no say in the decision and had to carry out the given examination. The responses were generally grouped as follows;

• "No, we do not ask. We are legally obliged to carry out the examination requested. We do not have any authority in this regard, if we had authority, it could have been prevented.",

• "I cannot ask too much. As a result of such inquiries, I am exposed to mobbing practices of clinician physicians. For this reason, I do not make many inquiries except for pediatric patients",

Some healthcare professionals said, "I do not ask because of the patient density and the density of the unit I work in. It needs to be asked, that at least the number of requested examinations will decrease, and the patient and the employee will be exposed to less radiation", "We do not have the opportunity to ask this to every patient. I will think about it, I may ask it in the future", "Frankly speaking, I do not ask, but I need to ask. It is important to ask so that the examinations are not too much" and stated that they did not ask because of the intensity, but it was necessary to ask. Some other responses related to the question are grouped as follows;

• "The patient is examined several times on the same day and different doctors ask for the same tests. We warn them and send them back. I want the doctors to look at the system and ask for tests after making an evaluation. They should look at the date and request accordingly",

• "No. When I encounter a patient with a pathological request, I take the patient's history and history and make an effort for a clearer result"

• "It is the most important factor in protecting the developing organism from possible abnormalities due to radiation, especially in pediatric shots. It needs to be asked"

• "We don't ask, because the logic of the organization is against us. The more examinations, the more money. Let the patients and employees die, as long as the money comes to the institution (!)",

• "Asking doesn't help much. The more tests, the more happiness (for patients)",

Question 6: "Do you not like the radiological tests performed by different hospitals and request the same tests again? Do you believe such a request is necessary? What kind of precautions should be taken to prevent such demands? When the answers given by radiology employees to this question were examined, 92 people answered no, thinking that re-application of radiological tests was unnecessary, 70 people answered yes, thinking that it was necessary, while 57 people answered partially and it varies depending on the situation. 15 people did not answer this question.

Many of the employees said, "All hospitals should be connected with a single system and the devices in all hospitals should be standardized.", "Devices must be of the same quality and setting". "Sometimes, financial concerns in private hospitals may also cause this." etc. He gave answers and stated that the reason for requesting a retest was that the results from one hospital were not considered sufficient by the other hospital because the devices and technologies used in the hospitals were not of the same standard. He also said, "From the doctor's point of view, I think he is right. Unfortunately, I have often encountered mammograms and X-rays that were taken and given to the patient in such poor quality that they could not be interpreted. Answers such as "The technician will pay attention to the work he does", and "We sometimes do not like the radiographs taken elsewhere, so technicians who

are knowledgeable in their field should be trained", indicate that the failure of the practitioner to work carefully and meticulously can lead to a decrease in image quality and a repeat test. Many participants agree that the hospital repeats the tests because it sees it as a profit. Some of these are as follows:

• "It's not necessary. The patient is loaded with radiation for no reason. This practice is completely related to the financial gain of the hospital",

• "Unnecessary. Unfortunately, due to the performance-based system applied in our country, patients are seen as customers, so every hospital repeats the examinations to save income for their hospitals",

When the other answers given were analyzed, some of the employees stated that clinicians and doctors should read the tests carefully and in detail and keep reports in order to prevent repetition. Many health workers also stated that repeat tests threaten the health of both patients and health workers. Other responses are as follows;

• "Repeat tests should be performed, especially in service procurement devices. The reason is that there are more patients, and more profit, and when the time and scan are kept short, all kinds of pathology escape is likely to be high because incomplete sequences are discarded. As a precautionary measure, the number of shots should be shortened in service-purchased devices and a very serious control should be taken",

• "I have serious doubts about the necessity of this. The reason for not liking it is important! I think this issue is very open to abuse. It is suitable for rent-seeking. A common pool can be made. In other words, collecting all patient examinations and reports in one system! Plus, such as who took and reported them...", "...a warning system that informs which practitioner is responsible for a bad scan caused by the practitioner will also contribute.",

Question 7: When the answers of the healthcare professionals to the question "Do you think that when the test should be performed for the second time in cases where RTNT is thought to be risky, information should be given about why the test is renewed so that the patient is not anxious? Why?" were analyzed, 178 of the healthcare professionals said yes information should be given, 5 said no information should be given, some said "I do not know about the subject" and 31 did not answer the question.

When the answers given by healthcare professionals to the questions were analyzed, many people said "I think so because relieving the patient's anxiety and giving information will relieve the patient", "Information should be given. The patient is prevented from being anxious, the questions in the patient's mind will be answered" and stated that information should be given to the patient because informing the patient will relieve the patient and that he/she also gave information. Again, many healthcare professionals stated that if the reason for retesting is due to the patient's error, technical malfunction, or error and negligence, they inform the patient because the patient has the right to know and as a conscientious obligation. Some of the answers given in this direction are similar to the examples below;

• "Absolutely, because the dose that the patient can receive is doubled and the patient should know that he/she is harmed twice, and he/she should not accept radiological examination (tomography- X-ray-scopy-angiography) even in the slightest discomfort, considering the harm of radiological examination."

• "I believe that the patient has the right to receive information about himself/herself. I respect the patient's right to know about all examinations and procedures performed on his/her body and I think that he/she should be informed",

Some of the answers given on other issues are as follows;

• "I think about it, but I do not make an effort to convince the patient, because I am rebuffed by the patient",

• "Not many people ask, they think that additional shooting is done to make better quality",

Question 8: When the answers given by the health workers to the question "Do you believe that there is sufficient communication between radiologists and clinicians? What kind of problems does lack of

communication cause?" were analyzed, 122 of the health workers said that there was no communication, while 34 said that there was communication.

Healthcare workers said "There are times when it is insufficient. It is understood that there is no communication or it is at an inadequate level by looking at the answers such as "The doctor group in the training phase requests tests that require radiation without communicating with the radiologist, which causes unnecessary tests to be performed.". It is stated that this situation results in unnecessary tests and examinations, loss of time for the patient, and increased workload of technicians. Some of the employees stated that financial gain is prioritized more in hospitals, so they do not focus on such issues. Some of the answers given are as follows;

• "Communication is very rare. Nowadays, it seems more important to worry about how to increase the hospital's income and how to get more revolving funds. Lack of communication is of course a problem",

• "Absolutely not. Radiologists read what they see, clinicians want to see everything, the hospital looks at the money they will get, there is a complete disconnect."

Among the participants, health workers who stated that there is communication between radiologists and clinicians stated that fewer retests are performed in their hospitals, which reduces the burden of the hospital and increases reliability. Some of the answers given about this situation are as follows;

• "Our communication is very good, but it is more difficult in big centers. One-to-one interpretation and discussion is always a more effective and reliable method",

• "We work with communication, there definitely should be, because a faulty examination that may be overlooked by the clinician, a marking error on the procedure sheet, causes the patient to receive radiation (the procedure should be performed according to the patient's complaint before the shooting, for example, left instead of right knee)".

• "I do not think there is enough communication. I think the main reason for this situation is related to work intensity. With the existence of this problem, I think that unnecessary examinations prevent the diagnosis from being obtained by giving less radiation to the patient", "Communication is almost non-existent. Radiologists can't keep up with all the films in the hospital" etc. When the answers are examined, it is seen that another reason for miscommunication is patient density and staff shortage. Some of the other answers given to the question are as follows;

• "I think that most of the time the communication is bad, I don't think that even the radiologists communicate among themselves. This, of course, creates a very troublesome situation for the patients. The patient may be treated wrongly, misguided, etc.",

• "If there was sufficient communication, there would not be so many problems. Most importantly, a lung film is requested before the patient is examined by a doctor. Many patients do not need this film, but have it taken for the convenience of the doctor".

RESULTS AND CONCLUSIONS

In this study, the data obtained as a result of the application of the SÇRT scale prepared to determine the attitudes of healthcare workers towards radiation were analyzed. Taking into account the problems related to the sub-dimensions of the scale, the sources of the problems that cause situations where employees do not develop a positive attitude towards radiation were identified and solutions were proposed.

The reason why health workers in radiology departments are more sensitive than other departments in their cognitive attitudes is that they are directly intertwined with radiation, the training they receive, in-service training, etc. can be shown. When the occupational groups are analyzed separately, it is an expected result that the attitudes of radiologists toward radiation in the knowledge dimension are higher than other occupational groups. Since RTNT is the specialty of radiologists, it is expected to obtain significant results in favor of radiologists in this factor. However, the fact that radiology technicians have higher attitudes than doctors shows that the attitudes of doctors on this issue are

lower than expected. Palacı et al., (2018) concluded as a result of their study on radiology technicians that it is very difficult to train technicians who can optimally use advanced technological devices and have technical knowledge and awareness about radiation protection with the 2-year associate degree level education received by technicians. Based on this, it was expected that the cognitive attitude towards radiation would be significant in favor of doctors. The reason for the difference in favor of technicians in this factor can be explained by the continuous RTNT applications of technicians and their positive attitude towards the level of knowledge on this subject. However, in the same way, physicians in other branches were expected to show a significant difference in this factor with other occupational groups such as radiologists due to both their demand for RTNT from patients and the training they received. While it was expected that there would be a significant difference in the level of importance between the nurse and physician occupational groups in favor of physicians, it was observed that there was no difference at the expected level. In some studies, in the literature, it is seen that doctors' attitudes toward radiation are lower than expected (Son et al., 2011; Saroki et al., 2016; Tok et al., 2015). This situation shows that the attitudes of doctors in their level of knowledge about radiation should be questioned and the reason should be examined.

In this context, a special study on radiation can be conducted with doctors from every branch. In addition, depending on the results of the data obtained from the qualitative scale, healthcare professionals stated that in-service training is necessary regardless of the occupational group and that they want to participate. Based on this, increasing the cognitive attitude of all healthcare professionals with effective and efficient in-service training will positively affect the health of both employees and society due to the demand and implementation of RTNT in every department of hospitals. Considering the participants' answers to the related question, it was concluded that the content of the in-service training program should be given the necessary importance based on the knowledge of the trainer, the needs of the participants, and the quality of in-service pieces of training should be increased. Other studies in the literature also support this recommendation (Mervat et. al., 2017; Partap et al., 2019). Similar results were obtained in a study on doctors and nurses in Sri Israel, strongly recommending the development of a program based on educational intervention to increase knowledge about the dangers of radiation and the levels of radiation exposure from examinations and procedures (Rassin et al., 2005). A recommendation for a robust curricular implementation of radiation safety in post-graduate continuing education and practical courses that can help improve attitudes and knowledge of radiation safety among healthcare workers should be implemented (Alkhayal et al., 2023). In a study conducted with nurses in Lanka, it was observed that as a result of the pieces of training on the effects of radiation, the deficiencies of the nurses were largely completed and the training provided was of great importance in the field of health (Chandrarathne et al., 2023). In this way, it is expected that individuals who are open to new information and training will increase their knowledge and cognitive attitude about radiation and indirectly their affective-behavioral attitudes by meeting their needs in this regard.

It was observed that nurses gave more information about the radiation to which the patient would be exposed and what to do afterward than doctors. The fact that doctors request RTNT from patients shows that they should have a higher attitude toward providing information about the radiation to which the patient will be exposed and what to do afterward. However, when the question about what is done to prevent the patient from being anxious when the test has to be applied for the second time is analyzed according to the occupational variable, all of the respondents from nurses gave positive answers, while almost one-fourth of the doctors gave negative answers for the question. This situation shows that 25% of the doctors do not develop a positive attitude at a sufficient level at the point of informing the patient. This rate is too high to be underestimated. In addition, since radiology technicians have one-to-one communication with the patient and are the person who performs RTNT, they are expected to tell the patient about the harmful effects of radiation, the necessity of the test, and what to do to reduce the harmful effects of radiation on the body as a result of the procedure. However, there was no significant difference between radiology technicians and other occupational groups in this factor. The reason for this situation may be a subject of research.

It is an expected situation that radiologists develop a positive attitude towards the radiation sensitivity of the practitioner. The reason why radiology technicians who perform radiological tests are lower

than all other healthcare professional groups was determined as the intensity of radiology tests, workload, difficulty in using protective equipment, intensive overtime, and the necessity of continuous radiological test application of the employees due to their job in the light of the answers given. In other words, patient and work intensity cause affective desensitization in the employees and thus behavioral attitude is negatively affected. Likewise, the fact that the employees working in the radiology department develop more positive attitudes in the cognitive sense than the employees working in other departments, but do not show similar attitudes in terms of both their own and patient health in the affective sense supports these reasons. Miller et al. (1983) emphasized the importance of lead apron in their study and stated that the radiation dose, which was 17-245 mrem in the case of lead apron use, decreased to 0-5 mrem in the case of apron use. In this context, the negligence of the employees towards their health increases the amount of radiation exposure per year. Considering that technicians are the group of employees most exposed to radiation, their low behavioral attitudes indicate that they endanger their health.

Since healthcare workers are the most exposed to radiation in the field of health, the fact that they are constantly faced with the risk of radiation shows that they should primarily pay attention to their health (Ulutaşdemir et al., 2015). In his study, Miller et. al. (1983) stated that moving 1.5 meters away from the radiation-emitting device reduces the radiation dose by 77% and that measures such as a lead apron and, the use of thyroid protectors and screens are very important for the health of the employee. Considering this risk situation, it is seen that the number of employees applying the ALARA principle is not at the expected level. Some health workers even justify not answering the questions by the fact that they do not work in the radiology department. However, the fact that all employees are at risk from time to time due to their assignments in these areas and their entry and exit shows that they should be informed about the effects of radiation and protection methods. According to the results of the study conducted on health workers in Trinidad, it was revealed that all personnel, regardless of working in a radiated area, should receive training at regular intervals and develop a solid attitude about radiation (Partap et al., 2019). Although the employees say that they take precautions for themselves, it is seen from the answers given that they do not take sufficient precautions. The reason for this situation may be that people have insufficient or incorrect information about radiation and radiation protection.

Some healthcare workers stated that since no system measures the unnecessary radiation to which patients will be exposed and there is no supervision in this regard, the radiation to which patients will be exposed is left to the conscience and compassion of the employees. These answers emphasize how important the attitude of healthcare workers about radiation and the consequences of radiation exposure is for public health. The more positive attitudes healthcare workers develop on this issue, the more they will significantly reduce unnecessary radiation exposure to both themselves and patients. Several technicians working in private hospitals stated that they prevented unnecessary radiation exposure to patients because they worked in coordination with radiologists. These statements reveal the importance of coordination and communication within the hospital.

In the light of some of the answers given by the participants, the fact that the shooting rooms and other places are next to each other in hospitals shows that patients are exposed to radiation without realizing it. In the follow-up of the hospital management, the compliance of the conditions of the hospital with the "TAEK Licence Conditions" and "Radiation Protection Regulation" can be reviewed again. In addition, answers such as "Public information is necessary", "I do not believe that the necessary precautions are taken, the hospital management does not know exactly what to do", and "More time and resources should be allocated to patient education" emphasize the need to give importance to the education of both the hospital, the staff and the society on radiation. Goula et al. (2021) also emphasize how radiation exposure can be minimized by significantly improving the working environment in healthcare institutions and maintaining the trust and sense of security of healthcare workers.

The fact that there was no significant difference in the attitudes of healthcare workers at the level of knowledge towards radiation depending on the gender variable shows that there is a similarity in the level of knowledge of women and men towards radiation and the effects of radiation on human health. However, although there was no difference between men and women in the level of knowledge about

radiation, it was observed that men did not show the necessary sensitivity in the sensitivity dimension both in terms of their own health and patient health and in informing the patient. In short, while there was no difference in the cognitive attitudes of all healthcare workers on radiation according to gender, in the affective and behavioral dimensions (sensitivity to the harmful effects of radiation, sensitivity to the harmful effects that the patient will be exposed to, the employee's informing the patient about radiation and reducing exposure ...), it was seen that female workers had a positive attitude compared to male workers.

The culture of the society in which the individual lives determines the characteristics that reveal the expectations about how a woman and a man should behave, think, and act, that is, the characteristics that socially construct women and men. This is the main reason why women are more emotional, cautious, and sensitive (Akın & Demirel, 2003; Eryılmaz, 2020; Üner, 2008; Powell & Greenhouse, 2010). This situation can be shown as the underlying reason for women having higher attitudes in the study. Failure of healthcare professionals to show sufficient sensitivity to radiation and its harmful effects to which patients will be exposed will seriously threaten the health of society (Prabhat et al., 2011).

Considering the working hours of healthcare professionals, the fact that employees with 9 years or more have a more positive cognitive attitude toward both themselves and their patients compared to others can be interpreted as knowledge and experience. Studies in the literature agree that radiation sensitivity will increase in direct proportion to experience as the years of service of healthcare professionals increase (Alotaibi et al., 2015; Alzubaidi et al., 2017). However, it is unexpected that Healthcare workers who have been working for many years show similarities with other health workers in their affective and behavioral attitudes towards themselves and the patient. Similarly, in the studies of Erkan et al. (2009), Slechta and Reagen (2008), and Reagen and Slevhta (2010), there was no difference in favor of multi-year employees. The underlying reasons for not obtaining such a result can be examined.

Prabhat et al. (2011), in their study titled "Knowledge, attitudes and perceptions of graduates and trainee dentists in the field of radiographic protection (KAP)" determine the knowledge, attitudes, and perceptions of trainee dentists and dentists towards radiation, emphasized that trainees had the highest attitude and that continuous education is very important to prevent the harmful effects of radiation and that radiation protection protocols should be strictly followed. Based on this result, although it was expected that there would be a significant difference in the attitudes of 0-3 year employees compared to the attitudes of other employees, no such result was obtained.

Based on this, as Palacı (2008) stated in his study, it can be evaluated as the inadequacy of the training on radiation and protection in the associate degree program of health personnel. In recent years, it has been understood that the harmful and beneficial effects of radiation on health should be focused more on the harmful and beneficial effects of radiation on health with the health problems arising because of uncontrolled excessive use of radiation emitting devices and radiological tests and TAEK regulations. In this context, it is recommended to implement a program that will provide more learning about radiation and its effects on living beings in associate and undergraduate health education programs. Jonassen et al. (2007) stated in their study, that increasing nuclear and radiological studies, especially in the field of medicine, create a need for conscious healthcare personnel. It is of great importance for employees to develop positive attitudes in the field of nuclear medicine and radiology for the health of both society and the employees themselves.

Many studies conducted abroad show that healthcare professionals have largely failed to develop a positive attitude about the negative effects of radiation on health (Kam, 2005; Güdük et al., 2018; Ulutaşdemir et al., 2015). Jonassen et al. (2007), his study, prepared training programs to train radiation protection personnel and offered suggestions such as in-service training and awareness-raising activities (brochures, information booklets, directional signs, etc.) to raise the awareness of working personnel.

It shows that the attitudes of healthcare professionals working in all hospitals in Turkey towards radiation are similar. Employees' attitudes and behaviors towards radiation, hospitals' attitudes towards radiation, facilities provided by the hospital, in-service training offered by the management, etc. It

parallels. The fact that there is no difference in sensitivity to radiation between employees in private and public health institutions in Turkey is due to the attitudes of hospital management about radiation, the opportunities they provide, the in-service training they offer, etc. It also proves that the sensitivity of healthcare professionals to the effects of radiation on human health is parallel.

Considering the comments and thoughts of the employees, the positive attitude of the hospital management towards radiation also positively affects the attitudes of the employees. The attitude of public hospitals, university hospitals, and private hospital management about radiation (the importance and place of radiation in health, its effects on human health, the precautions to be taken, and what to do afterward) affects the employees. It is expected that healthcare professionals' development of positive attitudes on these issues will have a positive impact on public health. In society, healthcare workers who apply RTNT are most exposed to the negative effects of radiation (Parlar, 2008; Ekici et al., 2017). The implementation of risky interventions, especially in areas where RTNT is applied and in operating theatres, brings health risks for employees in terms of exposure to waste gases, radiation, and biological agents. For this reason, health institutions and organizations should take all precautions for the health of health workers.

According to the data obtained from the scale, the fact that 33% of the hospitals do not take sufficient precautions against the harmful effects of radiation may be the underlying reason why the affective and behavioral attitudes of healthcare workers towards radiation do not reach the expected level. If we consider that attitudes are the hidden guiding force behind behaviors, the fact that hospital administrations do not take adequate precautions for the health of employees shows that the attitude of the administration on this issue is weak (Baysal & Tekarslan, 1996). The fact that the institution does not prioritize the health of the employees sufficiently causes the health employees to put the health issue in the second plan both for themselves and for the patient.

Ulutaşdemir et al. (2015), measured the attitudes of healthcare workers towards radiation-emitting devices in Malatya and found that healthcare workers were largely inadequate in the use of protective clothing by both themselves and patients. On the other hand, in this study, although 87% of healthcare workers in Turkey stated that they take precautions, it is understood that they do not protect themselves sufficiently when their explanations are evaluated. On the other hand, the reasons for not taking precautions by employees who do not develop adequate attitudes are that the equipment is heavy and difficult to use. Although the old-generation lead aprons, gloves, and thyroid protectors are heavy and impractical, the new-generation protective equipment is quite light and does not pose an obstacle to the employee during use. Although the employees talk about the difficulty of using the equipment, the reason for this negligence is the insensitivity of the employees about health. Because the latent power that directs every behavior of an individual is attitude (Baysal & Tekarslan, 1996). For this reason, informing and raising awareness of employees about radiation and its effects will lead to the development of positive attitudes. When the explanations made by the employees about why they did not take precautions are analyzed in the findings section; it is understood that the protective equipment of the hospital is inadequate.

All health institutions are inspected following the "Directive on the Procedures and Principles Regarding the Inspection of Private Health Institutions and Organizations by Provincial Health Directorates" put into force with the Approval of the Authority dated 05/08/2014 and numbered 1449 (TAEK, 2004). Based on the answers obtained as a result of the analysis, the issue of lack of protective equipment in hospitals should be examined and the reason for the answers given about the inadequacy of hospital facilities despite the inspections should be investigated to prevent unnecessary radiation to which employees and patients will be exposed. The low sensitivity of hospital management to the health of both patients and employees is an indication that the health of society is seriously jeopardized. In addition, when other responses to this question are analyzed, it is stated that unnecessary tests requested for the patient are not prevented in hospitals and this situation puts the patient's health at risk. If there is no follow-up of the disease in the process, the radiological tests requested repeatedly do not provide any benefit to the doctor in the treatment process, and both the patient and the employee are exposed to unnecessary radiation which causes unnecessary density in the hospital.

It is clear from the answers given to the second question in the findings section that the excessive density in radiology areas in hospitals causes the employees to become desensitized to radiation and not to take necessary precautions. To prevent this situation, it should be ensured that the hospital management decides within the hospital to carry out examinations and treatment procedures in a way to keeps the radiation to which the patient and the employee will be exposed at the most optimal level. Some of the healthcare workers who stated that the hospital management did not take precautions for the health of the patient stated that revolving capital and earnings were prioritized in hospitals as the reason as listed in the findings. When the answers are analyzed, it is seen that these answers are mostly given by nurses and technicians. Health managers should consider this situation and examine the necessity of the shots and this will prevent radiation exposure as a result of unnecessary shots.

The interpretation of health workers that 52% of the retests performed in hospitals are unnecessary shows how important a risk this situation is for patient health. When the answers given by the employees regarding the question are analyzed, it is seen that many healthcare professionals believe that the reason for requesting retests is that there is no standard in the imaging quality of the hospitals and that the imaging and test results from other hospitals are not clear. Implementing a standard for imaging devices by switching to a common software in hospitals can prevent this situation. In a similar study conducted by Ulutaşdemir et al. (2015), it was suggested that device maintenance and calibration should be performed and technicians and doctors should work meticulously to prevent retesting.

As a result of the study, it was concluded that the meticulousness and knowledge of the employees in the imaging department also affect the quality of shooting. If a professional's ignorance about radiation is taken into consideration, it is clear that radiation will become quite dangerous (Prabhat et al., 2011). If we explain this situation with an example, the radiation caused by a chest CT scan is equal to 3 years of environmental radiation. With the translation of medical terms into terms used daily by the public, the dangerous consequences of medical radiation have become clearer and will become more meaningful for both patients and professionals (Cohen & Lee, 1979). In addition, in the performance-based system, the health of the patient and the employee is put in the second plan and financial gain is prioritized. This situation is contrary to the main purpose of health institutions, which is to "protect and improve the physical and mental health of individuals". Re-testing of the patient is a situation that is suitable for abuse, as stated by the employees.

The health of the patient is largely left to the initiative of the employee. Considering the health of patients, it is essential to ensure standardization in devices and hospitals. One of the most important measures to be taken on the subject is to make a regulation that will prevent the financial anxiety and expectation of gain caused by the performance-based system in hospitals. If there is poor quality and negligence of the employee, it can be repeated, but in all other cases, consultation work should be carried out, financial concerns should be put aside and only the health of the patient should be considered. Again, in line with the answers given by healthcare professionals, it was clearly stated that communication between clinicians and radiologists would minimize the radiation exposure of the patient. An arrangement should be made in health institutions to increase the communication and coordination between radiologists and doctors. This coordination will prevent unnecessary radiation to which both patients and employees will be exposed and will reduce the patient density in hospitals.

Healthcare professionals say that the patient should be informed about retesting, but some of them do not provide information. This shows that although their cognitive and affective attitudes about this situation are high, their behavioral attitudes are low. The main reason for this situation is the negative reaction of the patient. Community pressure negatively affects the work of health workers.

Developing and implementing a training program that will increase the level of knowledge and improve the attitudes of society on this subject is important for public health. The dangerous consequences of medical radiation can be made clearer and more meaningful for both patients and professionals by translating medical terms into terms used daily by the public, especially for patients to better understand the harmful effects of radiation. Another popular way of explaining the dangers caused by radiation is to translate radiation into years of loss of life. For example, explanations such as "A cigarette can cause a person to lose 10 minutes of life, while a chest X-ray can cause a person to

lose 3 minutes of life" will allow patients to better understand the seriousness of the situation (Cohen & Lee, 1979).

Lack of knowledge of healthcare professionals and ignorance of society about radiation and its effects on health cause the lack of the necessary cognitive attitude about radiation. Lack of cognitive attitude also negatively affects affective and behavioral attitude. Informing society about radiation and improving their positive attitudes on this issue will also prevent patient-induced RTNT pressure on hospital staff. The miscommunication of the employees in the hospital causes patients to be exposed to unnecessary radiation. Although the employees are aware of this situation, they do not take necessary precautions due to miscommunication. This situation again causes low behavioral attitudes of the employees although their affective attitudes are high.

SUGGESTIONS

As a result, the situations that prevent the positive development of behavioral attitudes of health workers and our suggestions for eliminating these situations are as follows;

• Eliminating the lack of knowledge of employees,

• Organizing the workload of employees according to certain standards,

• Elimination of communication breakdown between employees,

• Prioritizing public health over financial concerns in hospitals,

• Lack of common software that can be used by the staff of all hospitals in Turkey, where the information history of patients can be viewed and communication can be ensured,

• It is necessary to ensure a certain standard for the image quality of the imaging devices used.

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