Evaluation of Knowledge and Observance of Protection and Performance of Radiologists in Medical Imaging Centers of Cities of Saravan, Mirjaveh and Khash Hospitals

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Abstract

Background: Adherence to protection and technical principles in imaging centers reduces patient dose and improves image quality. This study examines the level of knowledge, attitude and performance of radiologists regarding the principles of radiation protection in medical imaging centers of hospitals.

Material and Methods: This is a descriptive-analytical study that was conducted among all radiologists working in radiology centers in three cities. The measuring tool was a questionnaire containing information about the level of knowledge, attitude and performance of radiologists regarding technical principles and radiation protection. The information of completed questionnaires was analyzed using SPSS software.

Results: All radiologists working in the imaging department, which included 61.29% of men (38 male) and 38.71% of women (24 female) in this study**.** The technical and protective performance scores of radiologists for factors such as gender, age and background of staff, employment status and education, but the effect of the factors was not significant with scores.

Conclusions: In order to obtain more favorable results for obtain better quality images, which plays an important role in diagnosis, as well as to reduce the dose of the patient it is necessary to continuously train, monitor and evaluate the technical and protection performance of personnel.

Keywords: Radiographs, Radiation Protection, Radiography Techniques.

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Background

One of the most important parts of the hospital is the radiology department that helps clinicians to recognize diseases. The basis of radiography is to create an appropriate diagnostic image and protect the patient against radiation.

Increasing use of X-ray imaging is the most common medical diagnostic method and critical decisions are made by radiography imaging. Unlike the benefits that these radiations have in medicine, the highest source of artificial radiation is also (1-5) Due to the fact that the effects of ionizing radiation in the future are determined, they must be used with caution and observance of the ALARA law to minimize unnecessary radiation to the patient and personnel (6,7). This responsibility is in the first stage is taken by radiology staff. A wide range of factors in radiography is under the control of the staff of the radiology department, while preserving the diagnostic value of the image, the patient's radiation can be minimized (8, 9).

The World Health Organization has developed guidelines for improving and protecting radiographs and has recommended that guidelines be followed. Excessive exposure can remain on genes, hematopoietic cells, and central nerves can leave on gene, hematopoietic cells, central nerves (10-14), and the whole body of serious negative effects (15).

By identifying the factors that unnecessarily increase the uptake of Pretora and then planning in radiography, they lead to a decrease in radiation absorption in individuals (16, 17), therefore, awareness, familiarity and application of these guidelines by radiation workers can play a role an

important part in the protection of radiation. If these people do not have the knowledge they need, then their health behavior is not right and may be harmful to themselves or to people who have to use radiation to diagnose or treat illness. Therefore, the awareness of these people is necessary and necessary, which guarantees the proper functioning of these employees. Examining research in this area, such as: Almen et al (2000) (18) and Muhogora et al. (2001) (19), also suggest that improving the quality of radiographic images requires knowledge of this manual and radiography. Is the basis. In this regard, Krutz (2000), Gogos (2003), Ononugbo (2017) and Almalki (2017) have done research. The results of both studies have shown that the training of technical and protective principles has improved the performance of radiographers in the imaging (20-23).

Other research has shown that radiologists need training and retraining workshops to increase their knowledge and awareness (24-27).

The European Union (EU) has developed a program called the EU Guidelines for Quality Imaging of Radiographic Images and has advised countries to follow its guidelines. Adherence to European guidelines in imaging has reduced the amount of absorbed dose, and radiography according to the EU guidelines has been a useful tool in increasing the quality of radiographic images (18, 19, 16 and 21).

The results of radiographic principles research confirmed the urgent need to teach the technical principles of radiography in radiography departments to prevent biological radiation damage (2, 19, 27 and 28).

The results of research conducted on first-year residents in the radiography department showed that the performance of students was poor, but after a month of training, the study showed that their performance in radiography has improved (29-32).

The radiology department plays a valuable role in the diagnosis of many diseases by providing appropriate quality images. A good image is obtained by applying the correct technical criteria and the appropriate condition of the patient. Finally, the performance of radiography personnel directly plays a major role in determining the quality of radiographs. Paying attention to the issue of radiation protection, availability of necessary equipment and continuous monitoring of how to use these devices and observing other safety points, have a major role in reducing the absorbed dose of patients (33-36).

OBJECTIVES

This study will be conducted to determine the protective and technical performance of radiologists and their knowledge and expertise in this field. The statistical population of the study includes all employees working in the radiography center of Khash, Saravan and Mirjaveh counties who will participate in this study. According to the results of this research, in order to raise awareness and improve staff performance, the current situation should be examined first for future decisions; Therefore, the present study was conducted to determine the performance and knowledge of radiography staff in relation to radiography principles and protection points.

METHODS

In this study, all of 35 radiologists in the radiology department of Saravan, Mirjaveh and Khash hospitals who were working have been evaluated. In this descriptive-analytical study, a checklist whose reliability and validity was confirmed and including 29 questions in both technical and protective areas was used to collect information about personnel protection and technique. The results were analyzed using SPSS software.

For the evaluation of radiologists, a checklist was used which included 29 questions in the two areas of technical performance and protective performance. In this checklist, each performance was scored with zero or one point based on its performance. The total technical performance score was between zero and seventeen and the protective performance was between zero and twelve. The accuracy of this checklist has been verified by experts.

1. Validation Checklist

The questionnaire was completed by ten radiologists. The questionnaire was filled again unchanged after a month with the participation of the same 10 members of the paratroop and then analyzed by the relevant consultant and the alpha Cronbach has achieved 79%, which is confirmed in terms of reliability. The content validity of the Awareness Questionnaire was verified by three faculty members.

2. Get Ethical Approval

Since the checklists lack the names and personal information of individuals, there is no ethical prohibition. The names of the radiology staff involved in the confidentiality plan and their participation in the study was completely voluntary and free, so a code of ethics was undertaken to carry out the research.

3. Study Population (Entry and Exit Criteria Should be Mentioned)

Inclusion criteria: Radiologists working in radiology departments of Khash, Mirjaveh and Saravan cities

Exclusion criteria: reluctance of irradiated people working in hospitals in this study

4. Sample size and Calculation Method

All radiologists working in radiology departments of three cities of Khash, Saravan and Mirjaveh According to the

information of the people working in these departments, the sample size was more than 62 people.

5. Data Collection

The items in the checklist were viewed and recorded by a radiologist, in three different shifts. In order to measure the level of awareness of the workers' protective and technical principles, a questionnaire of 29 questions was developed in two areas and completed by the staff. Each questionnaire, if the answer was correct, scored one, and if the answer was incorrect, the score was zero; the total score of knowledge was between zero and 17+12 variables (technical performance score from zero to 17 and protective performance score from Zero to 12).

6. Statistical Analysis

Data are analyzed by SPSS software version 15 and descriptive statistics by Kolmogorov-Smirnov test, which shows the abnormality of data distribution, ie the distribution of an attribute in a sample (technical performance score from zero to 17 and protective performance score from Zero to 12) compares with the assumed distribution. Kolmogorov-Smirnov test showed that the data have a normal distribution, and it was possible to use parametric statistical tests for research.

The results were analyzed using SPSS software. The technical and protective performance scores (Mean and standard deviation) of radiologists for factors of gender, employment status and education based on the t-test and The technical and protective performance scores of radiologists for factors of age and background of staff based on the correlation test.

RESULTS

1. Score all of Radiologists

All of radiologists in the radiology department of Saravan hospital who were working have been evaluated. mean score in the technical area was 13.25±1.55, and protective area was 11.73±0.51. The highest and lowest percentages of correct response in protect were 97.1 % and 85.7%, respectively, and in techniques 100% and 31.4 %, respectively.

personnel of Mirjaveh hospital contributioned to this study. mean score in the technical area was 15.46±1.33, and protective area was 11.44±0.51. The highest and lowest percentages of correct response in protect were 100 % and 69.2 %, respectively, and in techniques 100% and 38.5%, respectively.

A total of 14 personnel of kash hospital contributioned to this study. mean score in the technical area was 12.71±1.48, and protective area was 8.85±1.51. The highest and lowest percentages of correct response in protect were 100 % and 24.3%, respectively, and in techniques 100% and 21.4%, respectively.

The results of this part are included in table number one.

Table 1: The technical and protective performance scores (Mean and standard deviation) of radiologists and highest and lowest percentage of correct responses.

city	Saravanand	Mirjaveh	Khash
mean score in the technical area(Average± Standard deviation)	13.25±1.55	15.46±1.33	12.71±1.48
mean score in the protective area (Average± Standard deviation)	11.73±0.51	11.44±0.51	8.85±1.51
highest and lowest percentage of correct responses in the technique part	100% 31.4 %	100% 38.5%,	100% 21.4%
highest and lowest percentage of correct responses in the protective part	97.1 % 85.7%	100 % 69.2 %	100 % 24.3%

2. Scores Result of Factors

The total population of radiologists in the three cities studied was 62 people.

All radiologists working in the imaging department of Saravan hospital, which included 51.43% of men (18 male) and 48.57% of women (17 female) in this study, participated in this study.

The technical and protective performance scores of radiologists for factors such as gender, age and background of staff, employment status and education are listed in two tables.

A total of 13 personnel of Mirjaveh hospital was male The results of the 3 factors of radiology staff including employment status, age and work experience.

A total of 14 personnel in khash were 7 males (50%), 7 females (50%) The results of the 5 factors of radiology staff including gender, employment status, age, work experience and Education are listed in two tables.

Table 2: The technical and protective performance scores (Mean and standard deviation) of radiologists for factors of gender, employment status and education based on the t-test

Variable	Demographic characteristics	Average± Standard deviation in Saravan		Average± Standard deviation in Mirjaveh		Average± Standard deviation in Khash	
		technical	Protection	technical	Protection	technical	Protection
Gender	Male	12.77±1.35	13.74±1.64	-15.46±1.33	-11.44±0.51	12.71±1.49	9.28±2.05
	Female	11.61±0.60	11.87±0.34			12.71±1.60	8.42±0.53
Employment Status	Project	13.23±1.64	11.91±0.28	15.67±1.67	11.40±0.54	12.66±1.52	9.00±1.73
	Other	13.27±1.54	11.63±0.58	15.37±1.18	11.50±0.53	12.72±1.55	8.81±1.53
Education	Associate Degree	13.66±1.54	11.71±0.46	-15.46±1.33	-11.44±0.51	13±1.51	8.75±1.83
	Bachelor	12.89±1.55	11.73±0.56			12.33±1.50	9.00±1.09

Table 3: The technical and protective performance scores of radiologists for factors of age and background of staff based on the correlation test

Variable	The degree of relation in Saravan		The degree of relation in Mirjaveh		The degree of relation in kash	
	technical	protection	technical	protection	technical	protection
Age	0.166	- 0.26	-0.091	-0.248	-0.152	-0.196
work experience	0.15	-0.233	-0.221	- 0.49	-0.214	- 0.24

DISCUSSION

The results of this study, which were conducted to determine the knowledge and practice of personnel working in Saravan, Mirjaveh and Khash's radiology departments regarding protective and technical principles, indicate high level of knowledge of personnel in two areas of study.

Comparison of the average work experience of Saravan personnel was 10.97 years and the average age of Saravan personnel was 36.48 years.

Comparison of the average work experience of Mirjaveh personnel was 4.91 years and the average age of Mirjaveh personnel was 28.66 years.

Comparison of the average work experience of Khash personnel was 9.35 years and the average age of Khash personnel was 32.28 years.

As the age of the personnel increases, as a result, their work experience increases, which has led to the best protection score by Saravan Radiologists, but as can be seen in Table (1), the best technical performance score belongs to Mirjavah Radiologists, who have the least work experience. I should mention that Mirjavah Hospital Center is newly established.

In general, in Table (2) you can see that there is no significant relationship between the performance of radiologists and gender (Male, Female) factors and the type of employment (Project, Other) and degree (Associate Degree, Bachelor), and in most results of Table (3) there is a weak inverse relationship between staff performance and age factor and work experience. Of course, there is no statistical meaning.

Since all the personnel studied in the present project in Mirjah were male, it was not possible to investigate the effect of gender factor.

However, there was no significant difference in conservation performance, technical performance of men and women look like Tavakoli research and Tohidi research (33-34).

In this study, there was no significant relationship between male and female personnel in Khash and Saravan between the mean score of performance and gender.

In most results of cities, with increasing age and consequently higher work experience, there was no better, stronger and more direct relationship between age and work experience (Table 3), which is not compatible with Rahimi research (35).

Because in the personnel of Mirjaveh city, it is indicated that despite the young forces and the newly established center, the technical and protective performance of radiologists was satisfactory and even the average score of technical performance of Mirjaveh personnel was higher than the other two cities (Table 1).

Regarding the degree, according to this degree, all the staff of Mirjaveh city were bachelors and had obtained the best technical performance score, but no significant difference was found between the average performance score and the degree in the other two cities, while the Tohidi research showed It was that with increasing the level of degree, the performance score will be better (33) that in this study, the average performance score of Mirjaveh city experts was better.

The general results of this study, similar to the article evaluating the performance of radiologists in Zahedan and

Zabol hospitals in 2022 (33, 36), showed that the level of technical and protective performance of radiologists is acceptable.

1. Conclusions

Increasing use of X-ray imaging is the most common medical diagnostic method and critical decisions are made by radiography imaging

By identifying the factors that unnecessarily increase the uptake of Pretora and then following the protective instructions and applying the appropriate technical function in radiography, it is possible to reduce the absorption of radiation and make a better diagnosis in people.

The results of this study showed that the level of technical and protective performance of radiologists was acceptable. Since work with ionizing radiation is considered to be a serious and harmful activity to raise the awareness of radiation workers, it is better to hold a retraining course related to radiation protection.

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FOOTNOTES

Conflict of Interests: The authors declare no conflict of interests.

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