



# Importance of Informing Patients in Medical Imaging; Radiographers' Opinion

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## Abstract

**Background:** Informing patients is one of the important tasks of radiographers that correct performance of this ultimately leads to greater efficiency of the diagnostic process, reduction of costs, greater satisfaction, relief of anxiety, and acceleration of the patient's recovery process.

**Objectives:** This study aimed to determine the views of radiographers regarding the importance of informing patients in various fields of medical imaging.

**Methods:** In this descriptive cross-sectional study, 112/120 (93%) radiographers working in university hospitals of the west of Iran were studied by random sampling method and voluntarily. Data were collected using a researcher-made questionnaire that contains 13 specific questions on a 5- options Likert scale. After confirming the validity of content and reliability by retesting ( $\alpha = 0.74$ ), data were collected and analyzed using SPSS software version 15.

**Results:** The knowledge of most radiographers regarding the importance of informing patients in the field of preparation before the examination (94.6%) and radiation protection (84.6%) was highly considered. 58% of radiographers considered informing on radiology equipment and examination procedure and 86.6% of radiographers considered informing on performing positions insignificant. The majority of radiographers considered informing patients in the field of preparation before the examination (80.4%), radiation protection (87.5%), and performing positions (95.5%) as their duty, while 40.1% of radiographers considered patient education about the equipment of radiology department and examination procedure is doctor's duty and a specialized matter.

**Conclusions:** Radiographers considered it important to inform patients about preparation before examination and radiation protection while patient educating about imaging equipment and how to perform the exam had no effect on the quality of the images produced. they stated informing patients about radiology equipment and examination procedure is the doctor's duty.

**Keywords:** Patient Education, Informing Patients, Radiology, Medical Imaging, Radiographers

## 1. Background

Protecting and informing patients is one of the most important duties of the medical staff (1). Patient education is a planned learning experience that uses a combination of methods such as teaching, counseling, and behavior modification techniques to influence the patient's knowledge and health behaviors (2). The philosophy of patient education is that the patient uses the information and skills learned for the intended purpose (3). Informing patients in the field of radiology to avoid repeated radiation to patients and because of the harmful effects of X-rays on the body is doubly important. Patient education is very effective in performing the best and standardized

radiographic examinations of patients. It should be noted that the correct performance of positioning increases the diagnostic value and better display of image details (4). On the other hand, informing patients in examination that requires special preparation, such as radiographs using contrast media, plays a vital and undeniable role that if not done properly, the radiographic image loses its diagnostic value and radiography only increase the dose received by the patients and personnel (5).

Providing educational and medical information to the patient relieves the patient's anxiety in the process of performing diagnostic examinations (6). In patients who don't have experience of radiographic examination, due

to their lack of knowledge of radiographic equipment and the examination procedure, they are anxious, which can lead to imaging in inappropriate respiratory phase or uncorrected position, blurred image due to patient movement, and Distortion of diagnostic information in medical images (7). On the other hand, informing on the dangers of ionizing radiation and how to protect against it for the patient and patient companions, whose presence is necessary during exposure, can show the need to use lead shields and stay as far away from the radiology tube as possible (8). Knowledge and information in this field leads to more accuracy of the patient and his companions for optimal cooperation in performing the examination and more observance of the principles of radiation protection by him (9).

Patient education increases patient satisfaction, which is one of the most important professional priorities in the field of medical centers (10). In imaging examinations, informing patients can reduce the possibility of repeating the examination that prevents the patient, the patient's companions, and staff from receiving additional radiation. This matter can also reduce diagnostic and treatment costs, which in the field of radiography is of great importance due to the high cost of medical imaging (11-13). In addition, any patient who is imaged using ionizing radiation must receive accurate and understandable information to decide on the need for the examination and know the consequences of their decision (14).

Although informing patients is part of the job of health care providers and has long been proven necessary in radiology centers, it is still a relatively new phenomenon in practice and is often incompletely performed (15). In the field of patient education, it is shown that the little information provided by the staff of medical and diagnostic centers is not fairly distributed, so that some patients, such as children and the elderly, receive less information than others (16). Knowing the radiographers' views on the importance of informing patients, which is one of the objectives of this study, can be the basis for any decision-making, planning, and action to improve patient education.

## 2. Objectives

This study aimed to determine the view of radiographers about the importance of informing patients in various fields of medical imaging in 2020.

## 3. Methods

In the present descriptive cross-sectional study, the views of 112 radiographers on the importance of informing patients in educational and medical hospitals in the west

of Iran in 2020 were studied by random sampling. In total, out of 120 distributed questionnaires, 112 (93%) answered the questionnaire completely. Participation of samples in this study was voluntary, anonymous questionnaires and the principle of confidentiality of information were observed.

The data collection tool was a researcher-made questionnaire that the validity of the questionnaire was assessed by content validity method. For this purpose, the questionnaire was provided to 5 faculty members in the field of radiology and after applying the necessary corrections according to the faculty member's opinion, the validity of its content was confirmed. The reliability of the questionnaire was proved by retesting. First, the questionnaire was completed by 10 selected radiographers from the target population and after 30 days, the same radiographers completed the questionnaire again and the data were collected and the results were compared using Cronbach's alpha test with 74% was confirmed.

Data were collected using a questionnaire that included two sections of demographic information and 13 specific questions. Demographic questions including age, gender, job interest, degree, workplace department, clinical experience, and shift work of radiographers. Specific questions including 13 specific questions in four aspects of the importance of informing patients about preparation before the examination, the importance of informing on the equipment of the radiology department and examination procedure, the importance of informing on radiation protection, the importance of informing on the performance of the position were collected with a 5-option Likert scale in 2020. After collecting the completed questionnaires, the data were entered into SPSS software version 15. For quantitative variables, mean and standard deviation, and qualitative variables, frequency tables were used. When our data follow a normal distribution, parametric tests such as one-sample t-test and analysis of variance otherwise nonparametric methods such as Mann-Whitney and Kruskal-Wallis are used to compare the groups.

## 4. Results

The mean age of radiographers was  $33.46 \pm 8.76$  years. The majority of radiographers were female (67%), average job interest (53.6%), bachelor's degree (88.4%), more than 10 years of work experience (42.9%), morning shift (42.9%), and worked in the radiography department (48%) (Table 1).

The results of correlation tests showed that there was a significant relationship between the variables of age, gender, clinical experience of radiographers with the variable of the importance of radiation protection informing patients ( $P$ -value < 0.05) (Table 2). There was a significant re-

**Table 1.** Demographic Characteristics of Study Participants

Characteristics	No. (%)
<b>Female gender</b>	75 (67)
<b>Clinical experience</b>	
≤ 5 years	64 (41.1)
Between 5 and 10 years	18 (16.1)
≥ 10 years	48 (42.9)
<b>Job interest</b>	
Much	41 (36.6)
Medium	60 (53.6)
Low	11 (9.8)
<b>Degree of education</b>	
Technician	8 (7.1)
Bachelor of science	99 (88.4)
Master of science	5 (4.5)
<b>Shift work</b>	
Morning	48 (42.9)
Evening	30 (26.8)
Night	34 (30.4)
<b>Workplace department</b>	
Radiography	55 (49.1)
CT Scan	33 (29.5)
MRI, angiography, and ...	24 (21.4)

relationship between the importance of informing patients on preparation before the examination and the degree of the radiographer ( $P$ -value < 0.05) and in the radiographers with the master's degree, the average score of the questionnaire was higher.

The results showed that in the field of informing patients for preparation before the examination, 106 (94.6%) of the radiographers considered it necessary to accurately perform the preparations before examination by the patient and were aware of its importance. 80.4% of radiographers (90) considered it their duty to provide information for patient preparation before the examination, such as information on how to use contrast media, the need to wear hospital clothes and remove metal objects, etc. The majority of participants (107 and 95.5%) providing information to the patient or the patient's companions about the elderly and children were considered important (Table 3).

(65 and 58%) of the radiographers considered providing information about the equipment of the radiology department and examination procedure unnecessary and insignificant. 40.1% of radiographers (45) considered educating the patient in this field as a specialty and duty of

the doctors. The majority of radiographers (82 and 73.2%) agreed that informing patients on radiology equipment and examination procedure would reduce patient anxiety. 84.8% of radiographers (95) believed that informing the patient about radiation protection will make the patient more accurate to perform techniques and it is important and the majority of them thought (98 and 87.5%) informing patients in this field is their duty. Only a small number of radiographers (12 and 10.7%) stated that education about radiation dangers causes the patient anxiety. 92% of radiographers (103) considered it necessary to inform patients and their companions about the necessity of using protective equipment such as lead shields. The majority of radiographers (97 and 86.6%) believed that informing patients about performing positions has no effect on the quality of images and is insignificant.

## 5. Discussion

Based on the results of this study, the majority of radiographers considered it important to provide information to patients in the field of preparation before the examination and radiation protection and were highly aware of the importance of these two fields. Radiographers considered patient education in the field of radiology equipment and examination procedure and performing positions to be insignificant, and believed that informing in these fields did not affect image quality. Participants in this study believed that informing patients in the field of preparation before the examination, radiation protection, and positioning is the radiographer's job, but giving information about radiology equipment and examination procedure is the physician's duty and a specialized matter. In this study, 94.6% of radiographers are aware of the importance of informing patients in the field of preparations before the examination. In a study by Portelli et al., it was stated that 44% of radiographers are well aware of the importance of educating the patient in the field of preparation before the examination (17). Although compared to other studies, the level of knowledge of radiographers in this study is relatively good in two fields of the importance of informing patients about preparations before the examination and radiation protection, but due to the importance of the level of knowledge of radiographers in these fields and its impact on the quality of the resulting images, as well as the optimal protection of patients regarding the potential dangers of radiation, should raise this level of awareness through the periodic training of radiographers.

Most radiographers (80.4%) in this study believed that informing patients for preparation before the examination is the duty of radiographers, which is consistent with the description of organizational tasks of radiographers in

**Table 2.** Correlation Test Results Between Demographic Variables and Radiographers

	Informing Patients on Preparation Before the Examination	Informing Patients About the Radiology Equipment and Examination Procedure	Informing Patients About Radiation Protection	Informing Patients About Performing Positions	The Total Score of the Questionnaire
Age	0.06	0.03	0.39**	0.10	0.21
Gender	-0.07	-0.19*	-0.21*	0.09	0.04
Job interest	-0.14	-0.04	-0.06	0.05	-0.12
Degree of education	-0.06	0.07	-0.08	-0.04	-0.04
Clinical experience	0.07	0.008	0.37**	0.17	0.24**
Workplace department	0.13	0.22*	0.03	0.11	0.08
Shift work	0.13	-0.02	-0.03	-0.11	-0.04

**Table 3.** Participants' Response to the Questions About in Four Aspects of the Importance of Informing Patients About Preparation Before the Examination, the Importance of Informing on the Equipment of the Radiology Department and Examination Procedure, the Importance of Informing on Radiation Protection, the Importance of Informing on the Performance of the Position<sup>a</sup>

	Completely Agree	Agree	No Comments	Disagree	Completely Disagree
<b>Informing patients on preparation before the examination</b>					
Providing information for patient preparation is one of the tasks of radiographers.	34 (30.4)	56 (50)	5 (4.5)	16 (14.3)	1 (0.9)
Careful performance of preparations before examinations by the patient is essential.	42 (37.5)	64 (57.1)	2 (1.8)	3 (2.7)	1 (0.9)
Patient companion education is essential for the elderly and children.	55 (49.1)	52 (46.4)	2 (1.8)	1 (0.9)	2 (1.8)
<b>Informing patients about the radiology equipment and examination procedure</b>					
Informing patients about the radiology equipment and examination procedure by the radiographer is unnecessary and insignificant.	13 (11.6)	52 (46.4)	17 (15.2)	25 (22.3)	5 (4.5)
Informing patients is a specialized matter and part of the physician's duties.	8 (7.1)	37 (33)	18 (16.1)	38 (33.9)	11 (9.8)
Informing about radiology equipment and examination procedure reduces patient anxiety.	22 (19.6)	60 (53.6)	23 (20.5)	5 (4.5)	2 (1.8)
<b>Informing patients about radiation protection</b>					
Giving information about the dangers of radiation causes the patient to be more careful to perform techniques and is important.	31 (27.7)	64 (57.1)	5 (4.5)	10 (8.9)	2 (1.8)
The radiographer must provide the necessary information in the field of radiation protection.	41 (36.6)	57 (50.9)	7 (6.3)	5 (4.5)	2 (1.8)
Giving information about the dangers of radiation causes the patient anxiety.	11 (9.8)	1 (0.9)	16 (14.3)	76 (67.9)	8 (7.1)
Informing patients and their companions about the use of lead shields is essential.	46 (41.1)	57 (50.9)	5 (4.5)	3 (2.7)	1 (0.9)
<b>Informing patients about performing positions</b>					
Patient education in the field of performing positions does not affect image quality and is of little importance.	41 (36.6)	56 (50)	3 (2.7)	10 (8.9)	2 (1.8)
Informing patients in the field of performing positions is the task of the radiographer.	62 (55.4)	45 (40.1)	2 (1.8)	2 (1.8)	1 (0.9)
Position training is possible in all patients.	9 (8)	14 (12.5)	5 (4.5)	55 (49.1)	29 (25.9)

<sup>a</sup> Values are expressed as No. (%).

Iran. However, the results of other studies in this field have shown that radiographers believe that informing patients to make the necessary preparations before the examination is the duty of radiologists (17-19). The difference in radiographers' views in this regard can be due to the description of different organizational tasks of radiographers and the lack of the same instructions for educating patients in medical imaging centers in the target communities.

In this study, most radiographers (95.5%) believed that in addition to the patient himself, informing the patient's companions about the elderly and children is essential. This finding is consistent with the results of another study in which 98.2% of radiographers considered training in this field necessary (17). Also, other studies emphasize the importance of giving information in this field (20, 21). Undoubtedly, radiographers in communicating with elderly patients and children with the help of their companions can lead to more effective training and should be followed seriously by radiographers. 58% of radiographers of the present study considered it unnecessary to inform patients about radiology equipment and examination procedure. The findings of a study in this field differ from this study and in that 85% of radiographers are aware of the importance of informing patients about radiology equipment and examination procedure (17). 40.1% of radiographers in this study believe that informing in the field of equipment and examination procedure is the duty of a physician, which is different from the results of the study of Steves and Dowd (21). Because radiographers spend more time with patients and due to access to equipment, they can show the equipment to the patient during the informing, patient informing in this regard by radiographers can be more effective. In the present study, 73.2% of radiographers believed that informing patients on radiology equipment and examination procedure would reduce patients' anxiety, although informing was considered the duty of physicians. In other studies, patient education has been cited as a factor in reducing patient anxiety during the examination (21-23).

84.8% of radiographers in this study were aware of the importance of informing patients in the field of radiation protection, which is consistent with the results of another study in which 60% of radiologists agreed with the importance of this field (17). Most radiographers (87.5%) of this study believed that informing patients about radiation protection is the responsibility of radiographers and 75% of radiographers believed that education in this area would not play a role in increasing patients' anxiety during imaging examinations. In Friedrich-Nel's study, 83% of radiographers believed that informing in this field was the responsibility of radiographers (18). Although in Newman's and Ukkola et al.'s studies, 95% of radiographers be-

lieved that giving information to patients in this field was the physician's responsibility and 46% of radiographers in another study believed that informing patients about radiation dangers made patients anxious (24, 25). Undoubtedly, proper informing in the field of radiation dangers and protection, as well as the practical application of radiation protection principles by radiographers will increase trust and reduce patients' anxiety, as well as increase patients' cooperation during radiology examinations and according to the job description of radiographers should be given serious attention.

86.6% of the radiographers in this study believed that informing patients about performing positions had no effect on image quality and was insignificant. An article on the importance of this field from the point of view of radiographers was not found according to the researches. In the present study, 95.5% of radiographers believed that giving information to patients about the performing positions is the duty of radiographers, which is consistent with the results of other studies in this field (21, 26). But in another study, 44.3% of radiographers believed that informing patients about performing positions was the radiographer's job (18). The results of the present study showed that 75% of radiographers did not consider it possible to teach positions in all patients, which is consistent with the results of another study in this field (23).

### 5.1. Study Limitations

The use of a researcher-made questionnaire to collect data and the lack of a comprehensive and standard questionnaire in the field of the importance of informing patients in medical imaging and lack of online access to radiographs and the need for face-to-face referral to hospitals in the Corona pandemic are some of the limitations of this study.

### 5.2. Conclusions

Based on the findings of this study, radiographers considered it important to provide information to the patient in the field of preparation before examination and radiation protection while they considered informing patients about radiology equipment and examination procedure and performing the positions insignificant and believed that informing in these fields don't affect the image quality. Participants in this study believed that educating the patient in the fields of preparation before the examination, radiation protection, and positioning is the radiographer's job, but informing about radiology equipment and examination procedure is physician duty and a specialized matter. Due to the high importance of patient education in medical imaging centers by providing retraining courses,

providing the necessary educational facilities, and incentives for radiographers, the attitude will be raised to a completely desirable level. Lack of specific instructions in the field of patient education in medical imaging centers may be a factor in the lack of proper performance of informing patients in medical imaging.

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## Footnotes

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