


RSSA-PATIENT PERCEPTION OF RADIOLOGISTS' ROLES IN MEDICAL CARE IN SAUDI ARABIA



Fadi A. Toonsi¹, Khadija Alaidarous¹ , Reem AlAhmadi¹, Wid Kattan² and Walid Asaad¹

¹Department of Radiology, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

²Department of Psychiatry, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia



ABSTRACT

Background

Published literature has shown that the nature of the duties of radiologists and the roles they play in the course of patients' medical care is usually not as clear to patients as the roles of clinicians. Even the nature of qualifications radiologists have is often ambiguous. Are they physicians? Technicians? or are they nurses who received additional training? The extent of this misunderstanding differs from country to country, and the first step in correcting any misconceptions is to understand its extent. The purpose of this study is to explore the gap in patients' understanding and perceptions about the roles of radiologists in their clinical care in Saudi Arabia.

Methods

This is a survey-based Cross-sectional study. It consists of 12 questions divided into 4 categories that assess patients' perceptions about the nature of work of radiologists, the role of the radiologists in their management plan, the type of duties radiologists play, and the nature of interaction between physicians and radiologists.

Results

Thirty eight percent of participants believed that radiologists are not true doctors, 70% disagreed that radiologists can prescribe medications to their patients, and 37% disagreed that radiologists can treat some cancers and internal bleeding. Participants with higher education were more oriented about the roles of radiologists in their management plans. Finally, 45% of participants reported that they do not have enough information about radiologists's roles in their management plans.

Conclusion

Patients' perception about the role of radiologists is incomplete and inaccurate. Better communication between radiologists and patients and patient education campaigns can improve these inaccuracies.

Published 15 December 2023

Corresponding Author

Khadija Alaidarous, Email:
kh.aidarous@gmail.com

Copyright: © 2023 The Author(s).

This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

eISSN: 1658-8959



1. INTRODUCTION

Radiology is an important field in medicine that is characterized by rapid development and advances [1] and radiologists play a significant role in the process of the diagnosis and the management of medical diseases. However, this role is not always well-recognized among patients [2, 3]. This ambiguity of the radiologists' role has its roots in the history of radiology. In a study done in 1956, a market survey by Eastman Kodak, the x-ray films manufacturer, found that less than 25% of patients understood the role of radiologists in their management plans [4][FT3]. This has not much improved over the years, as shown in 2008 by Kuhlman et al, who reported that only 40% of patients knew the role radiologists play in their management plan [5]. Previous studies described several factors that affect patients' understanding of radiologists' roles, including 1- decreased communication between patients and radiologists, 2- decreased patients' knowledge about the nature of the specialty of radiology and 3- the presence of clinicians who conduct or interpret imaging studies similar to what radiologists' do, such as performing ultrasound examinations and interpreting Computerized Tomography (CT) results. These factors confuse patients about the true role of radiologists and make them think that radiologists are not physicians [6]. Correcting such misconceptions is important, as it opens doors to direct patient-radiologist discussion, which can promote better patient understanding of their own imaging findings. In order to clarify this role, the American College of Radiology advised various efforts to increase patients' perception of radiologists and promote their understanding about their roles [7] However, the results of such efforts are still not up to what is hoped for [8].

It is important to understand the local extent of this problem in our country in order to help design educational programs that help solve the true underlying factors. We conducted this study for this reason. To the best of our knowledge, no previous studies investigated patients' perception of radiologists in the middle east and this study aims to fill this void.

2. METHODOLOGY

2.1 Study design and setting

This is a cross-sectional survey-based study that was designed to assess patients' knowledge about the role of radiologists and patients' readiness to communicate directly with their radiologists. The survey was created in Arabic and English, following principles of good practice for the Translation and Cultural Adaptation Process [9]. The study was conducted among patients of King Abdul-Aziz University Hospital (KAUH), Jeddah, Saudi Arabia.

2.2 Study participants

The target population were all patients aged 18 years and older who visited the radiology department and underwent a radiological examination between March 2021 and February 2022. The total number of participants who agreed to take the survey was 392 patients.

2.3 Data collection [10] [11]

Study data was collected by medical students who conducted individual interviews with each participant at the radiology department while waiting for imaging exams. The data was recorded on a Google Forms data sheet. The participants were asked to respond to twelve statements using a five-point scale, that reflected their perception of radiologists and the type of study they would undergo. Additionally, the participants were asked direct questions to determine if they felt they had sufficient knowledge about radiology and if they preferred receiving their radiology results from a radiologist or a referring physician. Demographic factors were also collected.

(The survey attached in appendix A).

3. ETHICAL APPROVAL

The objectives of the study were explained to participants, and a consent was obtained from all agreeing participants. The study was approved by the institutional Research Ethics Committee.

3.1 Statistical Analysis

Responses to study questions were collected on a five-point Likert scale ranging from 1 = Disagree entirely to 5 = Agree entirely. These responses were re-coded to one of three categories; Disagree (Disagree entirely or partially), Neutral (neutral responses) and Agree (Agree entirely or partially). Participants' answers were considered "concordant", or "discordant" depending on the response of the majority of participants as compared to authors' opinions -as physicians. ". Data was expressed as frequencies and percentages. Demographic differences in agreements were explored using a Chi-squared test. Statistical analysis was conducted using the Statistical Package for the Social Sciences (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp).

4. RESULTS

Demographic characteristics

There were 392 responses. Around half of the respondents were males. Fifty nine point four percent were 18 to less than 40 years old and a similar percent had a Bachelor degree. The most common recently performed imaging studies were X-rays (36.5%), ultrasound (20.7%) and computed tomography (14.5%). The remainder of the demographics are shown in Table 1.

Participants' responses to the survey questions

The responses to the twelve survey questions are depicted in Figure 1. The majority of respondents agreed partially or entirely that the radiologist has to perform the examination comprehensively as requested (85.2%) and that the radiologist is the individual who looks at the images and interpret them (78.8%). On the other hand, 61.2% of participants disagreed that the radiologist is entitled to prescribe medications.

Detailed participants' responses and authors' opinions are demonstrated in Table 2. For the question that asked whether the radiologist is a specialist who takes the pictures, the authors considered the partially agree, partially disagree, and neutral as correct answers since this depends on institutions and modalities.

Participants' answers were concordant with similar to the right answer in only three questions. These questions asked if the radiologist was the person who looks at and interprets the images, if he/she can advise the referring physician regarding the treatment, and if he/she is a nurse who had additional training.

Discordant answers included those with neutral and wrong responses, which are the remaining eight questions, including whether the radiologist should carry out the examination as requested, if he/she is entitled to conduct an additional examination that is different than requested, and if the radiologist is not a physician and is a technician, Also, if the referring physician is responsible for interpreting the radiological images, if some radiologists can treat patients with cancer or internal bleeding and if the radiologists can take samples of tissues for further examination, lastly if he/she is entitled to prescribe medications.

Table 1 Demographic characteristics of respondents

Parameter	Category	Frequency	Percentage
Age	< 18	11	2.8%
	18 to < 40	233	59.4%
	40 to < 60	124	31.6%
	60 or more	24	6.1%
Gender	Male	198	50.5%
	Female	194	49.5%
Education level	None	9	2.3%
	Primary	9	2.3%
	Middle school	22	5.6%
	High school	83	21.2%
	Bachelor	233	59.4%
	Post-graduate	36	9.2%
Last imaging study	Don't know	23	5.9%
	X-ray	143	36.5%
	CT scan	57	14.5%
	MRI	56	14.3%
	Ultrasound	81	20.7%
	Mammogram	18	4.6%
	Other	13	3.3%

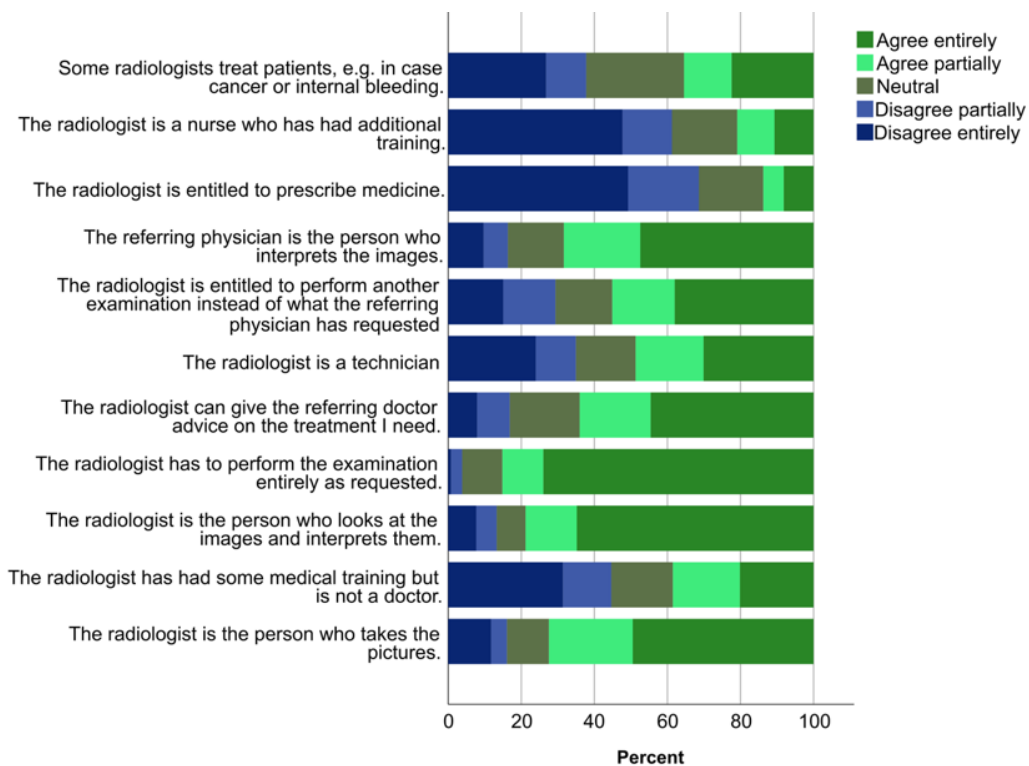


Figure 1 Participants' responses to twelve survey statements

Table 2 Participants' responses to the study questions and the relevant authors' judgements.

Questions	Agree entirely	Agree partially	Total agree	Neutral	Total disagree	Disagree partially	Disagree entirely	Correct answer as per authors' opinion	Concordance / discordance of the majority of answers
The radiologist is the person who takes the pictures.	194 (49.5)	90 (23.0)	284 (72.5)	45 (11.5)	63 (16.0)	17 (4.3)	46 (11.7)	Partially agree/ Partially disagree /Neutral	61.2% Discordant
The radiologist has had some medical training but is not a doctor.	79 (20.2)	72 (18.4)	151 (38.6)	66 (16.8)	175 (44.7)	52 (13.3)	123 (31.4)	Wrong	55.3 % Discordant
The radiologist is the person who looks at the images and interprets them.	254 (64.8)	55 (14.0)	309 (78.8)	31 (7.9)	52 (13.3)	22 (5.6)	30 (7.7)	Right	78.8% Concordant
The radiologist has to perform the examination entirely as requested.	290 (74.0)	44 (11.2)	334 (85.2)	43 (11.0)	15 (3.9)	12 (3.1)	3 (0.8)	Wrong	96.1% Discordant
+ The radiologist can give the referring doctor advice on the treatment I need.	175 (44.6)	76 (19.4)	251 (64.0)	75 (19.1)	66 (16.8)	35 (8.9)	31 (7.9)	Right	64.0% Concordant
The radiologist is a technician.	118 (30.1)	73 (18.6)	191 (48.7)	64 (16.3)	137 (35.0)	43 (11.0)	94 (24.0)	Wrong	65% Discordant
The radiologist is entitled to perform another examination instead of what the referring physician has requested.	149 (38.0)	67 (17.1)	216 (55.1)	61 (15.6)	115 (29.4)	56 (14.3)	59 (15.1)	Wrong	70.6% Discordant
The referring physician is the person who interprets the images. +	186 (47.4)	82 (20.9)	268 (68.3)	60 (15.3)	64 (16.3)	26 (6.6)	38 (9.7)	Wrong	83.7% Discordant
The radiologist is entitled to prescribe medicine.	32 (8.2)	22 (5.6)	54 (13.8)	69 (17.6)	269 (68.6)	76 (19.4)	193 (49.2)	Right	86.2% Discordant
The radiologist is a nurse who has had additional training.	42 (10.7)	40 (10.2)	82 (20.9)	70 (17.9)	240 (61.2)	53 (13.5)	187 (47.7)	Wrong	61.2% Concordant
Some radiologists treat patients, e.g., in case of cancer or internal bleeding.	88 (22.4)	51 (13.0)	139 (35.4)	105 (26.8)	148 (37.8)	43 (11.0)	105 (26.8)	Right	64.6% Discordant
The radiologist can take away pieces of tissue for further examination.	110 (28.1)	61 (15.6)	171 (43.7)	93 (23.7)	128 (32.7)	36 (9.2)	92 (23.5)	Right	56.4% Discordant

Results are expressed as frequency (percentage)

Gender- and educational-based differences in the agreement to the study questions

Gender-based differences revealed that significantly higher proportions of females agreed partially or entirely that the radiologist can take samples of tissues for additional examination (49.0% vs 38.4% of males, $p = 0.035$). For three statements, the proportions of participants with high educational levels (a bachelor's degree or higher) were significantly higher than those with lower degrees; these statements included that the radiologist is responsible for looking at the images and interpreting them (83.6% vs 68.3%, $p = 0.001$), some radiologists can treat patients (39.4% vs 26.8%, $p = 0.016$) and the radiologist can take tissue samples for further examination (48.0% vs 34.1%, $p = 0.011$). Conversely, significantly lower proportions of respondents with higher degrees agreed that the radiologist is not a physician (32.3% vs 52.0%, $p < 0.0001$), he/she is a technician (42.4% vs 62.6%, $p < 0.0001$) and the radiologist is a nurse who has had additional training (17.8% vs 27.6%, $p = 0.027$, Table 3).

Self-perceived assessment of participants' knowledge about radiology

In general, 70 participants (17.9%) indicated that they had enough information about radiology, whereas 143 participants (36.5%) provided neutral responses and 179 participants (45.7%) did not have enough information. Interestingly, 76 respondents (19.4%) preferred to know the results of their radiological examination from the radiologist. Of these respondents, the most common reasons for such a selection included that the radiologists are more knowledgeable about diagnosis (31.6%) and that they can get the results of their radiological outcomes rapidly (11.8%, Table 4). Additionally, 121 respondents (30.9%) declared that they prefer to get the results from the referring physician; of them, participants indicated that the referring physician knows the case well (14.0%) and he/she is more specialized than the radiologist (5.8%). Regarding the participants who preferred to get the results from both the radiologist and the referring physician ($n = 178$, 45.4%), the most common reason for their preference was to confirm the results (21.9%) and because they can collaborate with each other to interpret the findings (6.2%). Finally, only 4.3% of the respondents showed no difference in their preference between the radiologist and the referring physician.

5. DISCUSSION

The quality of healthcare was traditionally assessed by certain professional standards followed by every healthcare facility. However, over the last few years, the patient's perspective about the process of his treatment has been significantly recognized as one of the major indicators of the quality and effectiveness of the services presented [10]. The practice of radiology can also be considerably enhanced with the patient's empowerment, knowledge,

Table 3 Gender- and educational-based differences in the agreement to the study questions.

Item	Gender			Educational level		
	Male	Female	p	Low level	High level	p
The radiologist is the person who takes the pictures.	137(69.2)	147(75.8)	0.145	94(76.4)	190(70.6)	0.234
The radiologist has had some medical training but is not a doctor.	77 (38.9)	74(38.1)	0.880	64(52.0)	87(32.3)	< 0.0001
The radiologist is the person who looks at the images and interprets them.	154(77.8)	155(79.9)	0.608	84(68.3)	225(83.6)	0.001
The radiologist has to perform the examination entirely as requested.	164(82.8)	170(87.6)	0.181	104(84.6)	230(85.5)	0.806
The radiologist can give the referring doctor advice on the treatment I need.	121(61.1)	130(67.0)	0.224	77(62.6)	174(64.7)	0.690
The radiologist is a technician.	99(50.0)	92(47.4)	0.610	77(62.6)	114(42.4)	< 0.0001
The radiologist is entitled to perform another examination instead of what the referring physician has requested.	102(51.5)	114(58.8)	0.149	61(49.6)	155(57.6)	0.138
The referring physician is the person who interprets the images.	138(69.7)	130(67.0)	0.567	90(73.2)	178(66.2)	0.167
The radiologist is entitled to prescribe medicine.	26(13.1)	28(14.4)	0.708	17(13.8)	37(13.8)	0.986
The radiologist is a nurse who has had additional training.	41(20.7)	41(21.1)	0.917	34(27.6)	48(17.8)	0.027
Some radiologists treat patients, e.g. in case of cancer or internal bleeding.	74(37.4)	65(33.5)	0.423	33(26.8)	106(39.4)	0.016
The radiologist can take away pieces of tissue for further examination.	76(38.4)	95(49.0)	0.035	42(34.1)	129(48.0)	0.011

Data is expressed as frequency (percentage) of the responses provided as agreed entirely or partially. High levels of education were considered when a participant had obtained a Bachelor degree or higher.

Table 4 the reasons for which the respondents preferred to get the results from the radiologist.

Item	Frequency*	Percent
The radiologist is more knowledgeable about diagnosis	24	31.6
To get the result rapidly	9	11.8
Better experience	2	2.6
The radiologist is in contact with the case more than the treating physician	2	2.6
The radiologist is more specialized	2	2.6
A radiologist is better in interpreting the results	1	1.3
Both the radiologist and the referring physician have the same specialties	1	1.3
Don't know	1	1.3
I prefer to be checked by a single physician	1	1.3
No specific answer	1	1.3
The radiologist is better in interpreting the results	1	1.3
The radiologist will provide a relevant treatment	1	1.3
Non-available	30	39.5

*Based on the responses of 76 participants who preferred to get the results from the radiologist.

and attitudes towards their radiologist. In this study, we tried to assess the knowledge of the patients about the role of radiologist in their treatment plan. To facilitate the discussion of our findings, we will try to divide the major questions of the adopted survey into 4 basic categories, The nature of the radiologist. (Not a doctor, nurse, technician), The role of the radiologist in the treatment plan (Advise the physician, prescribe medications, or treat some disease e.g., Internal bleeding), The duties of the radiologist (Taking images, interpreting them, taking biopsies) and lastly, The interaction between the physician and the radiologists. (e.g., Performing another examination rather the physician requested).

The results of our study demonstrate a significant misconception in the patient's knowledge and attitude towards the role of radiologist in their management plan. We found that 38.6% of the patients believed that radiologists are not true doctors but only received some medical training. 48.7% of the participants believed that radiologists are technicians, and 20.9% believed that they are nurses who received additional training in radiology. These findings are consistent with a survey developed by O'Mahoney et al who found that 76% of the patients believed that breast radiologists were radiographers rather than true physicians [6]. Another study conducted by Miller et al identified that 27.7% (Out of 307 participants) believed that radiologists are not true physicians [3], Pahade et al also reported a significant number of participants (44%) who adopt the same opinion [11]. Bosmans et al discussed similar findings and reported that 33% of the patients thought that radiologists were not physicians but only received some medical training in radiology [8]. The previously mentioned findings demonstrate a considerable level of misconception about the background of radiologists and the role they play in their management plan. This can be explained by several factors including the little communication between the patients

and radiologists comparing to the physicians and the absence of the radiologists into the management's plans of the patients. Bosmans et al shed light on another reason that could explain these findings. They discussed the absence of radiologist as a character in most of the medical drama series e.g., "House, M.D", "Gray's Anatomy" or "ER". Instead, these series show physicians interpret or even perform the radiological procedure which in turn implants an insignificant role of the radiologists subconsciously [8].

We also found that, almost 70% of the participants disagree that radiologists can prescribe medications to their patients. However, 64% of the participants agreed that the radiologist can give some advice to the treating physician about the possible management plan of the patient. Another interesting finding was that 35% of the patients agreed that radiologists can treat some cases of cancers and internal bleeding while 37% did not agree. These findings strongly showed that people have a confusing idea about the diagnostic and interventional roles of radiology in their management plan. However, most of them agreed that radiologists cannot prescribe medications to them. These findings were consistent with Grant et al who reported that 38% of the patients believed that radiologists have no role in their treatment plan [12]. O'Mahoney et al also reported similar results among 40% of the participants [6].

Several initiatives were performed in order to increase the perception of radiologists' role among patients and common people. In 2008, the American College of Radiology started the "Face of radiology Campaign" via focus-groups, in-depth interviews, and telephone-based surveys to enhance the public understanding of the role of radiologists [7]. The European Society of Radiology (ESR) has also developed a Patient Advisory Group for Medical Imaging (PAGMI) which is an initiative that brings public population, professional radiologists together in order to discuss the advances in the field of medical radiology and enhance the perspectives of the public and patients about the effective role of radiologist at their management plan [13].

While identifying the tasks of the radiologists, the participants' answers varied from one question to another. However, the majority of them agreed on each task. For example, 72% of the participants agreed that radiologists are the ones who take images, interpret them (78%), take biopsies for further investigations (43%). These findings are also another example of the unclear role of the radiologists for the patients. The majority of the participants believed that radiologists could take images and interpret them which is usually a well-recognized task for the radiologist. However, while considering some unique tasks like taking biopsies (Interventional tasks), people get confused and below half of them (43%) believed that radiologist can do such job. These findings were consistent with Bosmans et al also who reported that only 15% of the participants who agreed that radiologists can take biopsies for further investigations while 80% believed that radiologists are the ones who take

images and interpret them. On the other hand, Miller et al reported that only 20% of the participants believed that radiologists could interpret images instead of only taking them. The last three questions that assess the physician-radiologist partnership, indicate a higher superiority of the physician than the radiologist in the perspective of patients. The majority of the patients reported that the radiologist has to perform the examination exactly as requested (85%), do no further examinations rather than the physician asked (29%), and the physician himself is the one who interprets the findings in the images. (68%). These findings were consistent with Bossman's et al who reported similar results at the same questions with a percentage of 86%, 45%, and 60%, respectively. These results indicate a significant misunderstanding of the role of radiologist in the management plans of the patients and shows that normal populations consider the physician as the only partner in their management regimen with a trivial or almost no role to the other doctors. Even the main tasks specific for radiologists (Like interpreting the images) are considered to be a physician's job from the patients' point of view. Another reason for such beliefs is the modern trends of physicians who perform x-rays or Pelvi-abdominal ultrasounds in their clinics which enforces the concept that the physician performs everything considering the management plan of the patient. However, non-trained physicians can lead to misdiagnosis of a critical condition and lead to fatal complications for the patients [14].

Our results confirm the significant effect of education on the perspective of the participants towards the radiologist' role in their management plan. We found a significant difference between participants who had higher education regarding the role of the radiologists at looking and interpreting the images (83%), treating patients (39%), and taking further samples and biopsies (48%), and finally a low proportion of them who think that radiologists are not doctors (32%). These results were also consistent with Bosaman's et al who reported similar results regarding the effect of the level of education on the perception of people about the role of radiologists [8].

Finally, the majority of the participants in our study reported that they do not have enough information about radiology (45%) which explains the obvious misunderstanding in their results. In addition, most of the previously mentioned results were reported in 2015 [8] and 2013 [15]. Yet we reported similar results in 2022. This indicates that patients are still not aware of the role of the radiologists in the diagnosis and the management of the diseases. More campaigns need to be conducted to illuminate the patients and common people about the importance of radiologists in medicine. Interestingly, Mohan et al showed the importance of patients' illumination and the effect on their knowledge. They reported that patients' understanding was significantly increased upon meeting with a senior consultant who met them and explained the importance of radiologists in their diagnosis and management plan [16].

In conclusion, our study confirms a lack of understanding on the real role of radiologists in the treatment plan of every patient. Further studies need to be performed to investigate the same problem, discuss the results, and compare them with ours. However, the study designs and the objectives need to be modified as we already concluded a lack of knowledge among the normal population. The next studies need to assess the effect of delivering the knowledge about the radiology among the normal population (via initiatives and campaigns) on their level of awareness about radiology.

ACKNOWLEDGMENTS

The authors thank Jan ML Bosmans, the corresponding Author of Are patients ready for communication with radiologists? Paper [8] to allow us to adapt the questionnaire.

We thank the following medical students for their assistance in interviewing the patients; Hassan Gabbani , Abdulaziz Almaleky, Abdulziz Balto, Abdulla Jan, Abdullah Sufta, Najd Aljuaid, Omar Babkair & Turki Azhar.

APPENDIX A

Patient Perception of Radiologists' Roles in Medical Care in Saudi Arabia

- Age
 - Gender : Female , Male
 - Education level: Never attended school, primary school, Middle school, High school, Bachelor, higher education.
 - Last imaging study you have undergone: X-ray , CT scan , Ultrasound , Mammogram, MRI, something else , I don't know
- Kindly, Answer the next statements according to the following options:
 (Agree entirely , Agree partially, Neutral/I don't know, Disagree partially , Disagree entirely)
- The radiologist is the person who takes the pictures.
 - The radiologist has had some medical training but is not a doctor.
 - The radiologist is the person who looks at the images and interprets them.
 - The radiologist has to perform the examination entirely as requested.
 - The radiologist can give the referring doctor advice on the treatment I need.
 - The radiologist is a technician.
 - The radiologist is entitled to perform another examination instead of what the referring physician has requested.
 - The referring physician is the person who interprets the images.
 - The radiologist is entitled to prescribe medicine.
 - The radiologist is a nurse who has had additional training.
 - Some radiologists treat patients, e.g. in case of cancer or internal bleeding.
 - The radiologist can take away pieces of tissue for further examination.
- Do you believe you have enough information about radiology as specialty?
 - Do you prefer to know the results of your examination from the radiologist or the referring doctor? Radiologist, Referring doctor , both or no difference and why?

معرفة المرضى لدور طبيب الأشعة في الرعاية الصحية في الملك العربية السعودية

- العمر:
 الجنس: ذكر أنثى
 آخر درجة أكاديمية: لا يوجد , ابتدائي, متوسط , ثانوي, بكالوريوس, دراسات عليا.
 آخر فحص خضعت إليه: أشعة سينية (x-ray), أشعة مقطعية (CT scan) , أشعة تلفزيونية/ الموجات فوق صوتية (Ultrasound) , تصوير الرنين المغناطيسي (MRI). أشعة تصوير الثدي (Mammogram). غير ذلك , لا أعلم
 الرجاء الإجابة على الأسئلة أدناه وفقا للخيارات التالية: أوافق تمامًا , أوافق جزئيًا , محايد , أعارض جزئيًا , أعارض تمامًا.
 طبيب الأشعة هو الذي يلتقط صور الأشعة.
 تلقى طبيب الأشعة بعض التدريب الطبي ولكنه ليس طبيبًا.
 طبيب الأشعة هو الذي ينظر إلى صور الأشعة ويفسرها.
 يجب على طبيب الأشعة أن يقوم بإجراء الفحص تمامًا على النحو المطلوب.
 يمكن لطبيب الأشعة إعطاء المشورة للطبيب المحيل (الذي طلب الأشعة) بشأن العلاج الذي يحتاجه.
 يُعد طبيب الأشعة فني.
 من صلاحيات طبيب الأشعة إجراء دراسة إشعاعية مختلفة من التي طلبت منه (صور أشعة مختلفة)
 الطبيب المحيل (الذي طلب الأشعة) هو الذي يفسر صور الأشعة
 وصف الأدوية هو من صلاحيات طبيب الأشعة.
 طبيب الأشعة هو ممرض تلقى تدريبًا إضافيًا.
 يعالج بعض أطباء الأشعة المرضى , كما في حالات السرطان أو النزيف الداخلي.
 يمكن لطبيب الأشعة أخذ عينات من أنسجة الجسم (خزعات) للفحص الإضافي.
 هل تعتقد أن لديك معلومات كافية عن تخصص طب الأشعة ؟ نعم , لا , محايد
 هل تفضل معرفة نتيجة أشعته من طبيب الأشعة أو من الطبيب المحيل (الذي طلب الأشعة)؟
 من طبيب الأشعة , من الطبيب المحيل (الذي طلب الأشعة) , كلاهما , لا فرق
 ما سبب اختيارك للسؤال السابق؟

REFERENCES

- [1] The future role of radiology in healthcare. Insights Imaging. 2010;1(1):2–11.

- [2] Makanjee CR, Bergh AM, Hoffmann WA. Healthcare provider and patient perspectives on diagnostic imaging investigations. *African J Prim Heal Care Fam Med.* 2015;7(1):1–10.
- [3] Miller P, Gunderman R, Lightburn J, Miller D. Enhancing Patients' Experiences in Radiology. Through Patient-Radiologist Interaction. *Acad Radiol.* 2013;20(6):778–81. doi:<http://dx.doi.org/10.1016/j.acra.2012.12.015>.
- [4] Linton OW. American Registry of Radiologic Technology. *Acad Radiol.* 2008;15(9):1211.
- [5] Kuhlman M, Meyer M, Krupinski EA. Direct reporting of results to patients: the future of radiology? *Acad Radiol [Internet].* 2012;19(6):646–50. Available from: <https://pubmed.ncbi.nlm.nih.gov/22578223/>.
- [6] O'mahony N, Mccarthy E, Mcdermott R, Keeffe O, S. Who's the doctor? Patients' perceptions of the role of the breast radiologist: A lesson for all radiologists. *Br J Radiol.* 2012;.
- [7] Neiman HL. Face of Radiology campaign. *Academic radiology.* 2009;16(5):517–520. doi:<https://doi.org/10.1016/j.acra.2009.02.003>.
- [8] Bosmans J, Dhondt M, Smits L, Bruno MA, Parizel PM, Gemmel P. Are patients ready for communication with radiologists? Results of the R2P2 survey. *Acta radiol.* 2016;57(9):1089–98.
- [9] Wild D, Grove A, Martin M et al. Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health.* 2005;8(2):94–104. doi:[10.1111/j.1524-4733.2005.04054.x](https://doi.org/10.1111/j.1524-4733.2005.04054.x).
- [10] Yeddula VR. DigitalCommons @ University of Nebraska - Lincoln Healthcare Quality : Waiting Room Issues Healthcare Quality : Waiting Room Issues By Presented to the Faculty of Major : Industrial and Management Systems Engineering Lincoln , Nebraska; 2012.
- [11] Pahade J, Couto C, Davis RB, Patel P, Siewert B, Rosen MP. Reviewing imaging examination results with a radiologist immediately after study completion: Patient preferences and assessment of feasibility in an academic department. *Am J Roentgenol.* 2012;.
- [12] Grant L, Griffin N, Mcdonald S, Vargas H, Hampson F, Sinnatamby R. The role of a consultant radiologist - Are patients still in the dark? *Eur Radiol.* 2009;.

- [13] European Society of Radiology (ESR). The ESR Patient Advisory Group (ESR-PAG). Insights Imaging. 2015;.
- [14] Madrigano RR, Abrão KC, Puchnick A, Regacini R. Evaluation of non-radiologist physicians' knowledge on aspects related to ionizing radiation in imaging. 2014;47:210–6. Available from: <http://europepmc.org/abstract/med/25741087>.
- [15] Hammond NA, Lostumbo A, Adam SZ, Remer EM, Nikolaidis P, Yaghmai V et al. Imaging of adrenal and renal hemorrhage [Internet]. Vol. 40. Abdominal Imaging. 2015;Springer New York LLC; 2015 [cited 2021 Apr 4]. p. 2747–60. Available from: <https://pubmed.ncbi.nlm.nih.gov/26036792/>.
- [16] Mohan SK, Hudgins PA, Patel MR, Stapleton J, Duszak R, Aiken AH. Making time for patients: Positive impact of direct patient reporting. Am J Roentgenol. 2018;210(1):W12–7.