

# Radiological report: expectations of clinicians

Nurullah Doğan, Zeynep Nigar Varlıbaş, Özge Petek Erpolat

## PURPOSE

Although there have been many publications on composing an accurate radiological report, they usually do not include an assessment of the clinicians' expectations from a radiological report. In this study, we aimed to assess the clinicians' expectations and preferences in terms of radiology report style and content.

## MATERIALS AND METHODS

A multiple-choice questionnaire, containing 19 questions, was formed. Two-hundreds clinicians, working either in a university hospital or a public hospital, were allocated into 4 groups which included equal number of clinicians from surgery and internal medicine departments. Questionnaire was applied to participants by face-to-face interview. Results were analyzed for each group using Pearson chi-square test.

## RESULTS

No statistically significant difference was found among four groups except for the 16<sup>th</sup> question which was about the image format pertaining to the report (CD/DVD or negative film). It has been determined that clinicians preferred detailed, standardized radiological reports with complete sections (i.e., clinical information, technique, findings, conclusion, recommendations).

## CONCLUSION

This study provided essential data for radiologists to write more effective reports.

*Key words:* • radiology • communication • standardization

**T**he radiological report is the most significant vehicle of communication between a radiologist and a clinician, but it is naturally a one-sided communication. For the most part, radiologists do not know how their reports are evaluated by clinicians. Furthermore, radiologists have individual and idiosyncratic ideas about composing reports that vary significantly. Ultimately, there is no consensus on the part of clinicians or radiologists about radiological reporting.

The aim of this study was to examine how clinicians evaluate radiological reports and determine what they expect from a radiologist. The ultimate goal was to contribute to the standardization of radiological reporting.

## Materials and methods

### Study group selection

This questionnaire-based study included specialists from surgery and internal medicine departments. Medical practitioners, residents, fellows, and basic scientists were excluded.

The study was conducted with two hundred doctors; 100 were randomly selected from public hospitals located in Bursa, Turkey (Çekirge Public Hospital, İnegöl Public Hospital and Ali Osman Sönmez Oncology Hospital), and the other 100 were selected from the Uludağ University School of Medicine Research Hospital. Equal numbers of specialists were selected from the surgery and internal medicine departments of public or university hospitals. Thus, four groups were constructed, each including 50 specialists from either university hospitals or public hospitals. The features of the participants, including gender, age, affiliations, and academic degrees are shown in Table 1, and the distribution of those features by medical department is shown in Table 2.

### Questionnaire

A 19-question multiple-choice questionnaire was prepared for the study. The questions were administered during a face-to-face interview conducted by radiology residents. The questions obtained were examined after classifying the answers according to their goals.

The answers to the first 17 questions are shown in Table 3. Answers to the last two questions were determined by giving sample reports to the participants and asking them to choose the most appropriate one (Samples 1 and 2 are shown in Tables 4 and 5, respectively). The results were assessed with the sample reports that the participants found to be sufficient and, comparing those results to the answers of other questions.

### Statistical analyses

Analyses were performed with SPSS software, version 11 (SPSS Inc., Chicago, USA). Results from the four groups were analyzed separately

From the Departments of Radiology (N.D. ✉ [drndogan@gmail.com](mailto:drndogan@gmail.com)), and Radiation Oncology (Ö.P.E.), Kütahya Evliya Çelebi Government Hospital, Kütahya, Turkey; the Department of Radiology (Z.N.V.), Uludağ University School of Medicine, Bursa, Turkey.

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**Table 1.** Participant demographics

	University hospital	Public hospital
Female	30	23
Male	70	77
Average age, range	44 (30–66)	45(29–62)
Professor	47	-
Associate professor	19	-
Assistant professor	14	-
Specialist	20	100

**Table 2.** Distribution of the participants by medical department

	University hospital	Public hospital
Cardiac and vascular surgery	3	3
Cardiology	1	1
Chest surgery	2	4
Dermatology	-	2
Emergency medicine	4	4
Gynecology	6	8
Infectious diseases	2	2
Internal medicine	12	14
Neurology	4	4
Neurosurgery	3	3
Ophthalmology	7	5
Orthopedics	1	2
Otorhinolaryngology	5	4
Pediatric surgery	5	2
Pediatrics	14	12
Physical therapy	5	5
Plastic surgery	2	1
Psychiatry	2	1
Pulmonary diseases	5	3
Radiation oncology	4	6
Sports medicine	1	-
Surgery	9	10
Urology	3	4

and compared using the Pearson chi-squared test. *P* values less than or equal to 0.05 were considered statistically significant.

#### Research ethics compliance

This study was approved by the Uludağ University Medical Research Committee (decision number, 2008-12/30, June 10, 2008) and was conducted from July 1, 2008, to August 31, 2008. Informed consent was obtained from all participants.

#### Results

We first asked the clinicians questions about the sufficiency of the reports, and 60%, 29%, 4.5%, 3.5%, and 3% of the clinicians stated that 75%, 50%, <25%, 25%, and 100% of the radiologic reports were sufficient, respectively. When we examined the origins of the insufficient reports, those originating from universities were found to be rated sufficient more frequently (only 3.5% were rated insufficient). The results from all institutions (37%),

public hospitals (33.5%), and private imaging centers (26%) were similar, and no statistically significant difference was found.

When clinicians were asked their opinions about the sufficiency of the clinical information they provided, 53.5% rated their clinical information as sufficient, while 41.5% reported that they noted some clinical information, though it was short. Only 5% of clinicians admitted that they did not give any clinical information due to patient load. No clinicians indicated that providing information was unnecessary.

When asked about their reaction to receiving a long report, 46% of clinicians stated that they read the results, but only read the rest if they needed more information; 39% stated that they read the whole report. However, in response to the 18<sup>th</sup> question which was about radiology reports with different levels of detail (Table 4), 72% of the participants preferred detailed reports, 22.5% preferred reports without much detail, and 5.5% preferred a very short report. In response to the 19<sup>th</sup> question which was also about radiology reports with different levels of detail (Table 5), 64.5% of the participants preferred a standardized, detailed report, and 35.5% preferred a summarized report.

Questions five through twelve addressed the types of content that would be expected in a sufficient report. Most of the clinicians (92.5%) requested a detailed description of the features of the lesion. If there was more than one lesion, they (65%) requested a detailed description of each lesion. In addition, 56% of the clinicians requested lesion descriptions without radiological terminology (e.g., Westmark sign, hypointense on T1-weighted images, hyperintense on T2-weighted images). Instead, clinicians preferred that the features be indicated with terms that they were more familiar with (e.g., calcification, necrosis, hemorrhage). Only a subgroup of participants (30%) considered the use of radiological terms as necessary. Sixty-five percent of the participants thought that the lesions should be described in detail for examinations containing many similar lesions. Ninety-two percent of the clinicians believed that the anatomic localization of the lesion should be indicated in detail. Almost half of the clinicians (46.5%) requested reporting of pathologic lesions in an order that

**Table 3.** The first seventeen questions of the questionnaire and their answer choices

<b>Question 1:</b>	If you generalize, what percentage of radiology reports are sufficient?
<b>Answers:</b>	a) 100% b) 75% c) 50% d) 25% e) <25%
<b>Question 2:</b>	For reports evaluated as insufficient, where did they originate from?
<b>Answers:</b>	a) University hospital b) Public hospital c) Private imaging center d) Equal among all of the institutions
<b>Question 3:</b>	Do you write clinical information when requesting a radiologic examination?
<b>Answers:</b>	a) I write detailed clinical information. b) I write clinical information in a few words (insufficient clinical information). c) I want to write, however, I do not have time because of a large patient load. d) It is not necessary to write. It is adequate to write a report that consists of the radiologist's findings only.
<b>Question 4:</b>	How do you react if you get a long (containing more than a page) report?
<b>Answers:</b>	a) I only read the conclusions. b) At first I read the conclusion; however, when necessary, I read the other parts. c) I only read the findings and conclusions. d) I read the whole report (clinical information, methods, findings, etc.).
<b>Question 5:</b>	How should the lesions be described in the results section?
<b>Answers:</b>	a) It should be written, respectively starting with the most important lesion (the report should be specific for each patient instead of a standard format). b) The pathologic lesions in the organs should be indicated at the related parts in the reports with standard formats (the pathologic findings should be emphasized by bold or italic typing).
<b>Question 6:</b>	Should all of the lesions be described in detail for the examinations containing many similar lesions? (e.g., many metastatic lesions in the liver)
<b>Answers:</b>	a) Yes. b) It is adequate to indicate the existence of other lesions after describing the biggest one.
<b>Question 7:</b>	Should the anatomic location of the lesion be indicated in detail?
<b>Answers:</b>	a) It is necessary. b) It is generally not necessary for this would extend the report.
<b>Question 8:</b>	Should the report include all of the anatomic structures one by one?
<b>Answers:</b>	a) Yes. b) It is adequate to indicate only the normal basic anatomic structures. c) It is unnecessary to indicate the normal anatomic structures. It is adequate to attach the sentence of "the other structures are normal" at the end of the pathologic findings.
<b>Question 9:</b>	Should the report include the anatomic structure measurements (dimensions, diameters, etc.) that have no pathologic significance?
<b>Answers:</b>	a) Yes, it should. b) It is adequate to only indicate the dimensions of basic anatomic structures (e.g., the dimension of the spleen). c) The clinical information and the dimensions of related anatomic structures should be indicated, even if they are in the normal range (e.g., the dimension of the liver for a patient with chronic hepatitis). d) It is not essential to indicate the dimensions of normal structures.
<b>Question 10:</b>	At the end of the report, is a recommendations section essential that includes methods which would contribute to the solution of the problem?
<b>Answers:</b>	a) No, the clinician is put in a difficult position if the patient reads this part. b) No, the clinician can decide what kind of examination he/she wants if necessary. c) a+b d) Yes, the recommendations are helpful for clinicians.
<b>Question 11:</b>	While indicating prediagnoses in reports, how do the terms of certainty and expressions of probability affect your management? (For example, in a patient with adrenal adenoma, expressions like, "the appearance corresponds to adenoma" or "the appearance may represent the adenoma" or "the lesion resembles adenoma but metastasis cannot be excluded".)
<b>Answers:</b>	a) Even if suspicious expressions are used, I accept the lesion as pathologic until it is confirmed. b) If the finding includes accuracy, I start the therapy. If it does not, I want an additional examination. c) I choose the treatment according to the patient's clinical findings.
<b>Question 12:</b>	Is it essential to use radiological terms in the report? (e.g., Westmark sign, hypointense on T1-weighted images, hyperintense on T2-weighted images)
<b>Answers:</b>	a) It is definitely necessary. b) It is sufficient to indicate the lesion (calcification, hemorrhage, necrosis) that can be interpretable by the clinician. c) It is sufficient to describe the location and features of the lesion.
<b>Question 13:</b>	What is your reaction to composing a report in Turkish terms instead of medical terminology?
<b>Answers:</b>	a) It is not necessary because patients read the reports. b) It is not necessary because everyone knows the universal medical terminology. c) a+b d) It is better to use Turkish terms as much as possible.
<b>Question 14:</b>	Should the location of the lesion be marked on the film?
<b>Answers:</b>	a) No, it is sufficient to indicate the anatomic location of the lesion in the report. b) It is sufficient to indicate the cross-sectional image number of the lesion in the report. c) The lesion should be marked (by arrow, etc.) on the images. d) It is better to both indicate the cross-sectional image number and mark the images.
<b>Question 15:</b>	How do you prefer to receive the report (from the patient, by courier, via e-mail or hospital information system)?
<b>Answers:</b>	a) It should be given to the patient. b) It should be given to the patient or a relative in a closed envelope. c) It should be given to the clinician via a courier. d) It should be sent to the clinician via e-mail or hospital information system.
<b>Question 16:</b>	How should the images be provided in addition the report (CD, DVD, negative film)?
<b>Answers:</b>	a) In CD or DVD format. b) Printing the full examination on negative films (not important to be economical). c) a+b (the most expensive preference). d) Only the pathologic lesions should be printed on the negative film. e) Presentation of the image is not important if the patient has a sufficient report.
<b>Question 17:</b>	Do you prefer to have a radiologist serve as a consultant before and after the examination, which is the case in some countries?
<b>Answers:</b>	a) There is no need for a consultation in order to decide on a further examination because I am already a specialist on my subject. b) I wish that I could regularly consult with a radiologist. c) It is not necessary. I rarely need to discuss the reports, and I can discuss them with my other specialist colleagues (not a radiologist). d) If I need a consult, I can call and ask my radiologist colleagues, so there is no need for an extra consultation.

**Table 4.** Sample report given in the 18<sup>th</sup> question

**18<sup>th</sup> question:** If you assess the report samples below, drawn up for a chest radiograph, which level of content do you prefer?

**Clinical condition:** Status post operation due to gastric cancer, follow-up.

**Pathology:** There are nodules in the lungs, and both of the costodiaphragmatic sinuses are blunt.

**Answers:**

**a. Short report:**

There are nodules located diffusely in bilateral lung parenchyma. Given the patient is reported to have gastric cancer, this appearance is considered most likely to represent metastases. Both of the costodiaphragmatic sinuses are blunt. Other than this finding, the structures included in this radiograph are normal.

**b. Report with limited details:**

There is a total of 5 nodules. The largest one is 1.5 x 1 cm in size and is in the parenchyma of the left lung. Two nodules smaller than 1 cm are found in the parenchyma of the right lung. Given the patient is reported to have gastric cancer, these are considered most likely to represent metastases. Both of the costodiaphragmatic sinuses are blunt (?pleural fluid/adhesion). Soft tissues and bones in this radiograph are normal.

**c. Detailed report:**

**Clinical information:** Status post operation due to gastric cancer, follow-up.

**Findings:**

There is a nodule 1.5 x 1 cm in size in the lower zone of the left lung, and there is another nodule 1 x 1 cm in size at the upper zone of the left lung. There are also 3 nodules smaller than 1 cm near the nodule in the upper zone of the left lung, and there are 2 close nodular formations smaller than 1 cm in the lower zone of the right lung. Given the patient is reported to have gastric cancer, these are considered most likely to represent metastases. Further evaluation of the patient with thoracic computed tomography is recommended. Both of the costodiaphragmatic sinuses are blunt (?pleural fluid/adhesion). Both of the hiluses are normal. Mediastinal width and cardiothoracic ratio are normal. No major bony abnormality was detected in this roentgenogram. No mass lesion was found.

**Conclusion:** There are many nodular formations in the parenchyma of both lungs. The largest one is located at the lower zone of the left lung (metastasis?). Both of the costodiaphragmatic sinuses are blunt (?pleural fluid/adhesion). Further evaluation of the patient with thoracic computed tomography is recommended.

**Table 5.** Sample report given in the 19<sup>th</sup> question

**19<sup>th</sup> question:** If you assessed the report samples below, which were drawn up for lumbar magnetic resonance imaging, which report would you prefer with regards to content?

**Answers:**

**a. Summary report:**

T1-weighted sagittal, T2-weighted sagittal and axial, and T1-weighted sagittal and axial cross-sectional images after contrast administration were obtained from a 46-year-old female patient with a complaint of lumbago. Alignment and heights of the lumbar vertebrae are normal. Disk spaces and intensities are normal. There is a thickening of the L4-L5 and L5-S1 disks, and minimal protrusion at the central part of the L4-L5 disk. No compression of the nerve roots was found. After contrast agent administration, no pathologic enhancement was observed.

**b. Detailed report:**

**Clinical information:** A 46-year-old female patient has a complaint of lumbago extending to her right leg that increases with activity for 2 months.

**Technique:** T1-weighted and T2-weighted axial, and T1-weighted sagittal images have been obtained from T11 to S1. T1-weighted sagittal and axial images were again taken after IV administration of 0.5 mmol Gd-DTPA.

**Findings:**

Alignment and heights of the lumbar vertebrae and intervertebral disk spaces are normal. No pathological signal intensity change was observed.

Signal intensity of the medulla spinalis, and thecal sac extension are normal.

The conus medullaris ends in the normal location. No defective appearance was seen in the posterior spinal elements.

On the axial cross-sections at the level of T11-L1, disk and neural foramina were normal. No compression was observed on bilateral nerve roots.

On the axial cross-sections at the level of L2-L3, disk and neural foramina were normal. No compression was observed on bilateral nerve roots.

On the axial cross-sections at the level of L3-L4, disk and neural foramina were normal. No compression was observed on bilateral nerve roots.

On the axial cross-sections at the level of L4-L5, there was minimal protrusion at the central basilar part of the thickened disk. Neural foramina were normal, and no compression was observed on bilateral nerve roots.

On the axial cross-sections at the level of L5-S1, thickening of the disc was observed. Neural foramina were normal, and no compression was observed on bilateral nerve roots.

On the post-contrast images, no pathological contrast enhancement was observed.

**Conclusion:** Thickening of the L4-L5 and L5-S1 disks with minimal protrusion on the central part of L4-L5 disk.

started with the most important lesion. Interestingly, 53.5% thought that there should be a printed report format, and the lesion should be defined there (in italics or bold) when describing the lesion structure and pathology. Although 37.5% of clinicians evaluated the description of basic anatomic structures as sufficient, 36% percent of clinicians asked for a description of all of the examined anatomical structures. Other clinicians (26.5%) evaluated the

description of normal anatomic structures as unnecessary, and 35% of the participants considered reporting of the normal results as unnecessary. Interestingly, 32% of the participants asked for the reporting of the anatomic structure, even if it was normal because they wanted the information to assist in the assessment of the clinical condition (e.g., sizes of the liver for a patient who is under follow up due to the diagnosis of hepatitis). In addition,

19.5% of the clinicians asked for the reporting of measures of basic anatomic structures (e.g., size of the spleen), and 13.5% of the subjects requested measurement results (e.g., size, diameter) of all of the anatomical structures, even if they were in the normal range.

In response to the 11<sup>th</sup> question which was about the certainty with which the radiologist reports an abnormal finding (Table 3), 56% of clinicians commented that they were sometimes

uncertain of the radiological diagnosis based on the clinical data they provided. The majority of clinicians (70.5%) thought that a recommendations section at the end of the report would be helpful. However, a recommendations section was not believed to be helpful by 29.5% of the clinicians: 9.5% expressed that "patients reading those recommendations put the clinicians in a tight spot", 8.5% stated that "the clinician will decide which examination he will request", and 11.5% suggested both of the causes.

Most of the clinicians who participated in our questionnaire (73%) opposed a report written using Turkish terms. The clinicians requested the use of universal medical terminology for the following reasons: 15% suggested that "patients read the report", 28.5% suggested that "everybody knows this universal medical terminology", and 29.5% put forward both of the reasons.

The 14<sup>th</sup> question addressed the marking of lesions, and 73% of the clinicians requested marking of the lesion. In answer to the question, 14% requested this as a cross-sectional image number of the lesion, 16.5% requested this as marking on the film, and 42.5% requested both.

When we asked the clinicians how they preferred to receive the report, we found that sending it with the patient or their relatives was sufficient with 85% of the clinicians. Only 27% requested the report in a closed envelope, 2% of the clinicians preferred receiving the report by courier, and 13% of the clinicians preferred receiving the report electronically (e.g., e-mail, hospital operating system).

With the questions so far, no statistically significant difference was found between clinicians at public or university hospitals. Interestingly, there was a significant difference between these two groups of clinicians ( $P = 0.005$ ) when they were asked about the examination imagery format attached to the report (16<sup>th</sup> question). The answers to the 16<sup>th</sup> question are shown in Table 6. Although 37% of clinicians at public hospitals preferred the examination to be printed on negative film, we found that clinicians working at a university hospital preferred a CD or DVD. Interestingly, only 18% of the clinicians working in public hospitals preferred a CD or DVD. When the answers to other options of both the groups were evaluated together,

we found that 13.5% of the clinicians marked the option "presentation of the image is not important if the patient has a sufficient report", and 10% of the clinicians marked the option "only the pathological lesions should be printed on a film". Furthermore, we did not find any differences between groups according to the classification of clinicians into their surgery or internal medicine department ( $P > 0.05$ ).

Finally, we attempted to understand how much assistance the clinicians wanted to get from consultations with radiologists, and 75.5% percent of the clinicians indicated at least some level of assistance: 43.5% of the subjects answered "occasionally", and 32% of the subjects expressed that they would "regularly" consult radiologists. Conversely, 16.5% of the clinicians did not feel that they needed help from the radiologists and stated, "If I need to, I will call and ask my radiologist colleagues, so there is no need for an extra consultant". Another 4.5% of clinicians stated, "It is not required, I rarely need to discuss cases and I can always contact my other specialist colleagues when I do (not a radiologist)".

The answers to all of the questions according to the choices given are shown in Table 7.

## Discussion

The only communication vehicle between a radiologist and a clinician is a report, which is composed by the radiologist. A clinician only knows the radiologist by his/her reports, and the radiologist usually does not know the clinician who is receiving his/her report. Most radiologists do not know how their reports are evaluated or what is expected by clinicians in the radiological reports.

Although there are many reports about radiological examinations and the quality of reports (1–6), few studies have examined the clinicians' expectations of radiologists. Clinger et al. (7) were the first researchers to examine clinicians' expectations for radiological reports. In a study by McLoughlin et al. (4), they found that radiologists did not pay sufficient attention to the requests of the clinician who referred the patient.

In our study, we initially asked the clinicians some questions about the sufficiency of radiological reports. The reports of university origin were

deemed to be more sufficient (96.5%). The latter percentage was higher than the reports from public hospitals or private imaging centers. These findings may be the result of the high quality of examinations in the university hospital, which was reported in the study of Ozsunar et al. (2). In the Ozsunar et al. study, the examinations were categorized into three groups: university hospital, state hospital and private health center. These groups were compared for overall quality of examinations. There was no difference between the state hospitals and the private health centers. However, there were significant differences between the university and state hospitals ( $P = 0.03$ ) and the university and private health centers ( $P = 0.04$ ). They stated that quality control and standardization was becoming more important in radiological services. According to the Ozsunar et al. study, we believe that the high quality of the examinations was related to the sufficient reports.

The greatest request of radiologists to clinicians is that they include some clinical information; however, when this happens, the information is usually insufficient or it is not legible. The conditions that contain written clinical information on the request form, which is required for the diagnosis of the patient, are not common. According to our study, 53.5% of clinicians write sufficient clinical information, and 41.5% note only short amounts of clinical information. The description of clinical information is different for radiologists and clinicians.

One of the issues amongst radiologists pertains to what should be contained in the results section of the report. Some radiologists compose short reports by focusing on the pathological state while others draw up very detailed reports about every structure observed (sometimes about structures not observed as well). When we asked the clinicians how they react to a long report, 39% stated that they read the whole report. We decided to evaluate the answer to this question in combination with the answers to the last two (18<sup>th</sup> and 19<sup>th</sup>) questions of the questionnaire. In the 18<sup>th</sup> question, very short, not detailed and detailed types of reports were presented, and the participants were asked which one they preferred. Most of the participants (72%) preferred the detailed report. In

**Table 6.** The answers of the participants to the 16<sup>th</sup> question, according to the type of institution**Question 16:** How should the images be provided in addition the report (CD, DVD, negative film)?

- Answers:**
- a. In CD or DVD format.
  - b. Printing the full examination on negative films (not important to be economical).
  - c. a+b (the most expensive preference).
  - d. Only the pathologic lesions should be printed on the negative film.
  - e. Presentation of the image is not important if the patient has a sufficient report.

Answers	University hospital	Public hospital
a	52	18
b	20	37
c	15	11
d	3	17
e	10	17

**Table 7.** The percentages of answers to all questions according to the choices given

Choices	Questions																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
a	3	3.5	53.5	4	46.5	65	92.5	36	13.5	9.5	28.5	30.5	15	27	58	35	3.5	5.5	35.5
b	60	33.5	41.5	46	53.5	35	-	37.5	19.5	8.5	15.5	56	28.5	14	27	28.5	32	22.5	64.5
c	29	26	5	11			7.5	26.5	32	11.5	56	13.5	29.5	16.5	2	13	43.5	72	
d	3.5	37	-	39					35	70.5			27	42.5	13	10	16.5		
e	4.5															13.5	4.5		

the 19<sup>th</sup> question, two report examples for the same patient were presented; one was in short form, and the other was a standardized, detailed report. Almost 65% of the clinicians preferred the standardized, detailed report. In both of these questions, pathology was indicated in the same manner. The only difference was the addition of the normal structures to the report or a change in the presentation of the report, which included sections for clinical information, methods, findings and conclusion. When the report was evaluated with the results of the three questions, we found that clinicians preferred standardized, detailed reports regardless of whether they read the whole report. In a study by Naik et al. (8) that examined 25 radiologists and 95 clinicians, six different report samples with three clinical scenarios were formed similarly to our 18<sup>th</sup> and 19<sup>th</sup> questions, and participants were asked which report they preferred. This study also found that most of the participants preferred standardized, detailed reports.

A series of questions was designed to understand what qualified as a sufficient report. Most of the clinicians

requested a detailed description about all of the features of each lesion regardless of the number of lesions. In addition, most of the clinicians requested lesion descriptions that indicated the features that could be commented on by clinicians (e.g., calcification, necrosis, hemorrhage) rather than the use of radiologic terminology. However, this request was for a diagnosis that is more appropriately made by a pathologist, though it was still expected from the radiologist.

Furthermore, there was no consensus amongst the clinicians about the format of the report. Similarly, there was no consensus about reporting the results of normal measures. In a study by Naik et al. (8), the authors were not sure about the examination of the organ if it was not noted in the report. However, in the same study, most of the participants preferred standardized, printed reports, which did not agree with the present findings. In another study, Gagliardi (3) emphasized the significance of standardized reports. Similarly, in an evaluation performed on 104 clinicians, Lafortune et al. (9) concluded that "radiological reports should be explicit, should give direct

answers to clinical questions requested and should contain findings and conclusion sections".

When the clinicians were asked how they interpreted an uncertain finding in the radiologist's report, 28% stated that they considered all uncertain sentences as positive for pathology. This finding is very interesting and must be taken seriously. Interpreting all uncertain sentences as positive for pathology will affect the treatment of the patient, and mistakes that are made in the comments of suspected lesions may have serious consequences. Only 15.5% of the subjects stated that they might request additional examinations due to uncertain expressions. Interestingly, in situations where the conclusion is not definitive but there is suspicion of a positive pathology, a recommendation of additional examinations would be an integral part of the report. Similar to the findings in the Lafortune et al. study (9), which found that the radiological report should contain conclusion and recommendation sections, the present study found that a recommendations section was requested by the majority of the clinicians.

Reporting in Turkish terms has been an issue in radiological reports in Turkey for years. Recently, a number of reviews (10–13) have recommended the use of Turkish terms in radiological reports, which is in opposition to our study. Indeed, the present study found that most clinicians do not want the patients to read the reports, and they stated that the use of universal medical terms between medical doctors supported better communication.

We also determined that opinions on issues such as marking a lesion on the film and transporting the report to the clinician in a way that does not allow the patient to see the content of the report (e.g., by courier) were widely accepted by radiologists but not agreed upon by clinicians. We determined that clinicians expected sections of the reports to be complete and expected a section describing recommendations. Additionally, most of the clinicians stated that they wanted to communicate with radiologists via consultation before and after the radiologic examination.

Limitations of our study included the general limitations of studies based on questionnaires. A primary limitation is that this was a sampling study conducted only around Bursa, Turkey. Therefore, we cannot claim that it rep-

resents all of the clinicians around the whole country or world. Additionally, the experimental groups were heterogeneous groups containing many specialties. Different results would likely be obtained if the questionnaire were used in a larger, more homogenous group (e.g., neurologists, surgeons). The present study also contained some subjectivity, which is a common feature of studies based on questionnaires. The accuracy of the answers is only possible if the subjects answer honestly. This accuracy, however, cannot be tested objectively with a questionnaire method.

We believe that the present study provided essential data for radiologists to write more effective reports. If this questionnaire was modified and applied to a larger, more homogenous group, it would be possible to test our results and obtain new data.

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