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ORIGINAL ARTICLE

Perception of Radiologists about Diagnostic Errors in Radiology in Yemen

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Abstract:

Background: Errors of diagnosis in Radiology are common, which affect patient's care and management. Several types of radiological errors such as misperception, miscommunication, and procedure misconduct have been reported highlighting the importance of Radiologists' awareness about their own errors. However, no data are available from Yemen. The aim of this study is to assess radiological errors in Yemen.

Method: A standard questionnaire of radiological errors was distributed conveniently to radiologists in the main public and private hospitals in Sana'a city, Yemen.

Results: Of 80 questionnaires distributed, 58 were returned back (the response rate was 72.5%). About 88% participants had diagnostic errors in 2013. The radiology errors were classified as under-call (false negative) (29.3%), communication errors (27.6%), overcall (false positive) (25.9%), procedural complication (24.1%) and interpretation errors (15.5%). Lack of previous studies and inadequate clinical information were mentioned as causes' errors (37.9% and 36.2%, respectively). Most radiologists (70.7%) did not keep record for their own errors, and only 24.1% of radiologists had errors meeting in their departments.

Conclusion: It has been concluded that errors in radiology are still a significant problem affecting patient safety. Collaborative efforts must be established to reduce diagnostic errors in radiology through organizing regular meetings to educate radiologists about such matter and create a good environment for learning and improvement rather than blaming and embarrassing.

Key words: Errors, Radiology, Yemen

1. Introduction

Diagnostic errors in radiology are common leading to an ultimate effect on patient care and management (1-3). It was estimated that the incidence of plain radiographs errors is 10-20% and it is higher in cross-sectional imaging (4). Radiological errors can be classified into errors due to misperception, miscommunication, and procedure misconduct (5). Health care providers are recommended to implement an effective system for detecting and preventing the radiology-related errors (1, 3, 6, 7).

Good reporting of radiological errors will improve the quality care and patient safety (4, 8). Regular meeting to discuss radiological errors is a significant tool to minimize the occurrence of the diagnostic errors in radiology, which should be conducted in the radiology department. In the meeting, radiologist will be exposed to errors made by their colleagues and will get more experience and enhance his practice (2, 4, 6, 9). Identifying and reducing the radiological errors will decrease the mortality, morbidity, and the cost of the healthcare services as well as the duration of the stay in the hospital (10).

Few studies were done to assess radiologists' perception about their own errors and how they deal with them (4, 9). However, no study has been conducted in Yemen. Thus, this study aimed to evaluate radiologists' perception about their own errors and to assess the existing system to record and report radiological errors in Yemen. The study may reduce the radiological diagnostic errors, improving the patient care and decreasing the healthcare cost.

2. Methods

Subjects

A cross-sectional study was conducted in seven public and private hospitals in Sana'a city, including UST Hospital, Saudi German Hospital, Althawrah Hospital, IbnSina Hospital, Sab'een Hospital, Police Hospital and Alkuwait Hospital. All radiology technicians, residents and consultants working in the hospitals were invited to participate based on voluntary bases. Informed consent was obtained from each one who agreed to participate after clear explanation of study's objectives. Study's protocol was approved by the ethical committee of faculty of medicine, university of science and technology, Yemen.

Questionnaire

A standard questionnaire of errors in radiology was disseminated conveniently to radiologists, consultants, residents, and technicians in Sana'a city, Yemen. The questionnaire contained participants' demographic characteristics, participants' perception of radiological diagnostic errors. It evaluates the frequency of errors, their causes and classification, experience of recording system and error meetings. Participants were interviewed by well-trained interviewers.

Statistical analysis

Data analysis was performed using Statistical package for Social Sciences (SPSS) software version 20. Frequencies of errors were calculated and data were presented in tables.

3. Results

Of 80 persons invited to participate, 58 were agreed to join the study (the response rate was 72.5%). Of them, 40 individuals were males (69%) and 18 were females (31%). The majority of participants were radiology technicians (53.4%),

followed by radiology consultants (37.9%). Most of the participants are working in the University of Science and Technology Hospital (USTH) and Saudi German Hospital (22.4% and 15.5%, respectively). Most of participants had experience more than 5 years (63.8%) (Table 1).

Table 1. Characteristic of study subjects (n = 58)

Variable		Frequency (%)
Gender	Male	40 (69.0)
	Female	18 (31)
Job type	Radiology Technician	31 (53.4)
	Radiology Resident	5 (8.6)
	Radiology Consultant	22 (37.9)
Hospital	UST Hospital	13 (22.4)
	Saudi German Hospital	9 (15.5)
	Althawrah Hospital	8 (13.8)
	IbnSina Hospital	7 (12.1)
	Sab'een Hospital	5 (8.6)
	Police Hospital	5 (8.6)
	Alkuwait Hospital	4 (6.9)
	Others	7 (12.1)
Radiology Experience	Less than 2 Years	7 (12.1)
	From 2 - 5 Years	14 (24.1)
	More than 5 Years	37 (63.8)

The study showed that about 88% of the participants made 1 - 10 diagnostic errors 2013. These errors were classified to under-call (false negative) (29.3%), communication errors (27.6%), overcall (false positive) (25.9%), procedural complication (24.1%) and interpretation errors (15.5%). The most common causes of errors as mentioned by participants were unavailability of previous studies (37.9%) and inadequate clinical information (36.2%). Unfortunately, majority of radiologists (70.7%) did not keep records for their own errors (Table 2). Only 24.1% of radiologists had errors meeting in their departments. These meetings were perceived either both educational and blameless (50%) or blameless but non-educational (Table 3).

Table 2. Errors' frequency, classification, and causes

Variable	Frequency (%)
Keeping a personnel record for errors	
• Yes	17 (29.3)
• No	41 (70.7)
Number of errors made by participants in the last year	
• 1-10 errors	51 (87.9)
• 11-20 errors	2 (3.4)
• More than 20 errors	5 (8.6)
Classification of errors mentioned*	
• Overcall (false positive)	15 (25.9)
• Under-call (false negative)	17 (29.3)
• Interpretation errors	9 (15.5)
• Communication errors	16 (27.6)
• Procedural complication	14 (24.1)
Causes of errors mentioned*	
• Faulty of reasoning: The finding (lesion) was appreciated (known), but the wrong cause was written	5 (8.6)
• Lack of knowledge	14 (24.1)
• Under reading	11 (19.0)
• Poor communication	16 (27.6)
• Inexperience of staff	7 (12.1)
• Inadequate of facility	11 (19.0)
• Inadequate of clinical information	21 (36.2)
• Unavailability of previous studies	22 (37.9)

*The total of the answers are more than the sample size because participants can choose more than one answer

Table 3. Errors and their dealing (n = 58)

Variable	Frequency (%)
Having errors' meeting in the radiology department	
• Yes	14 (24.1)
• No	44 (75.9)
Attending 3 or more error meetings in the last year	
• Yes	13 (22.4)
• No	45 (77.6)
Describing the atmosphere of the errors meeting by participants *	
• Educational and blameless	6 (50)
• Educational but intense	1 (8.3)
• Blameless, but non-educational	3 (25)
• Uncomfortable with blame culture	2 (16.7)

*n= 14 patients who had meeting in their department, two participants did not answer the question

4. Discussion

The current study is an initial attempt to evaluate radiologists' perception of their own errors in Yemen. The study will help health system to build database on the diagnostic errors in radiology which has direct and indirect effect on patient safety. The study found that the most frequently errors run between one to ten errors. Similar findings have been reported from Karachi, Pakistan (9). Furthermore, Mankad and his colleagues reported that about 91% of radiologists made between one and 15 errors/year (4).

The present study showed that the under-call (false negative) had the higher frequency (29.3%). The predominance of under-call (false negative) which is also called perceptions errors has been previously reported from other countries (5, 9). In contrast, Mankad and his colleagues found that the majority of errors are due to overcall (false positive) (4). Under-call (false negative) interpretation of radiological findings is quite common which is due to wrong assessment of the abnormal findings. The underlying causes of such error are still debatable which may include biological, psychological and/or social factors (11).

This study found that unavailability of previous studies and inadequate of clinical information are the commonest causes of radiology errors. These findings could be due to masking the real findings by reading the previous report and clinical findings (12, 13). These results highlight the urgent need for establishing a good system for communication and recording in radiological practice (7). Unfortunately, majority of radiologists surveyed did not keep record for their own errors which are in agreement with previous study where only 20% of radiologists found to keep their own errors' record (4). Several possible reasons for the lack of errors' record have been reported including less awareness of radiologists to keep personal records, difficulty to define errors, absence of good quality system, moreover, and this process is quite tedious and time consuming (3, 4, 9).

The present study showed that most of radiology departments the surveyed do not organize radiology errors' meeting. Similar findings were reported by Saeed et al where 35% of radiologists only managed to attend errors' meetings. It is well known that establishing errors' meeting is an excellent opportunity for learning and quality improvement. It will create a comfortable environment to discuss error, its causes, methods of detection, and approaches of prevention (3, 4, 7, 9, 14).

Radiology workers who attended errors' meeting, in this study, perceived it in discrepancy manner. Some of them stated that it is educational and blameless and other perceived it as uncomfortable with blame culture. Many radiologists and other health care providers fear to attend errors' meeting which could be due to the approach of such meeting where it is a blameful with attributed to individual rather than healthcare system (4). Thus, it is highly recommended to make errors' meeting more effective by constructive criticism rather than blame culture and playing a role model by seniors to acknowledge their own mistakes and let others to learn from them (9, 15).

5. Conclusion

Radiology errors are still a significant problem affecting patient safety. Collaborative efforts must be established to educate radiologists about diagnostic errors in radiology and create a good environment for learning and improvement rather than blaming and embarrassing. This study has some limitations. They include small sample size

of participants and restrictions of study to Sana'a. Nevertheless, it will be the initial database for further studies in future to assess this issue.

Conflict of interest

The author declares that there is no conflict of interest.

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