



Role of Radiologic Technologist Specialist in Plain Image Interpretation of Adults in the Middle East: A Radiologist's Perspective

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Abstract

Introduction: Radiologic technologists are medical professionals who perform diagnostic imaging tests such as X-rays, magnetic resonance imaging (MRI), and computed tomography (CT) scans. While image interpretation by radiologic technologists is recognized in some countries, such as the United Kingdom, it remains a controversial issue in the Middle East. This study evaluates the perceptions of radiologists in the Middle East regarding the plain image interpretation of adults by radiologic technologist specialists. **Methods:** This cross-sectional study employs a quantitative approach. A close-ended questionnaire was distributed to 103 radiologists from various hospitals in Saudi Arabia and Sudan. The data were analysed using the Statistical Package for Social Sciences (SPSS). **Results:** The results showed that 29 percent of participants recognized the role of Radiologic Technologist Specialists (RTS) in writing image reports, while 61 percent did not. Additionally, 38 percent believed that RTS image interpretation could help diagnose previously unreported radiographs. A total of 47 percent responded that allowing RTS to report images could reduce the workload and stress on radiologists, while 37 percent disagreed. Lastly, 43 percent believed that RTS image interpretation could be introduced in the Middle East in the future. **Conclusion:** The findings of this study suggest that combining image reporting with radiography improves patient care. The results also indicate that delegating image reporting to radiologic technologists may reduce the burden on medical practitioners. Further research is needed in the Middle East to explore and assess the factors related to implementing this practice.

Keywords: Image interpretation; Middle East; Radiologic Technologist; Radiologist

Introduction

The progressive technological world has transformed medical practices and paved a path for the advent of health care technology such as radiographic imagination (Woznitza, 2014). This technological intervention has given rise to the role of Radiologic technologists (RT), also referred to as Radiologic Technologist Specialists (RTS), who are required to conduct diagnostic imaging check-ups and administer the radiation treatments (Lim *et al.*, 2017). Since the imaging diagnostic examination has risen to 39.8 million, efforts are instigated in the form of various Radiologic Technology courses such as radiographic anatomy, equipment, positioning procedures of patients, radiation protection, patient care, and radiographic pathology for providing adequate care to the chronic disease patients (Strudwick & Taylor, 2017).

In the Middle East, the interpretation of images by radiologists remains unlicensed. It is worth noting that the Kingdom of Saudi Arabia (KSA) has specific limiting roles played by Sudanese healthcare professionals. A study conducted by Elkhadir and Saeed (2018) looked at the vital role of DRTS in KSA's image reports, but there are significant concerns about maintaining this essential role.

As the diagnostic imaging techniques are changing due to response to the variant social-political dynamics, the competence of the medical professionals is essential (Alaamer, 2012). Such as, Arab states require practicing RTS to hold BSc (Hons) in radiology technology. Similarly, the American Society of Radiologic Technologists (ASRT) for meeting the expanding role and healthcare needs also establishes the Radiologist Assistant role. Salih (2014) has also emphasized the expanding role of radiographers in developing and developed countries such as Kenya, Australia, South Africa, and more.

A study conducted by Wazgar *et al.* (2018) highlighted the impact of artificial intelligence in medical imaging. This cross-sectional study concluded that artificial intelligence was used shallowly in radiology. The effects perceived as having artificial intelligence on radiation workflows and occupations correlate with increased behavioural intent to use artificial intelligence. Therefore, raising awareness of the positive impact of artificial intelligence can improve its receptivity.

The literature analysis has highlighted that the initiation of the medical services in Arab began almost four decades ago, following which it has continued to progress (Woznitza, 2016). The progressive nature of the radiographic practice is evident from the expanding sub-specialization that which region offers to its learners. Since the discovery of X-rays, qualified radiographers have always remained in a contested environment concerning the image interpretation or reporting of radiographs (Elkhadir & Saeed, 2018). A thorough literature review of several published articles showed the importance of RTS engagement in image interpretation. For instance, the Prizewinner (1993) showed that European radiologists report only sixty percent during two working days. Similarly, several college documents have highlighted that a massive shortage of radiologists and the change in government policy have relaxed the RTS reporting (Royal College of Radiologists, 2000). Moreover, Hardy *et al.* (2016) have indicated that reporting of the radiographers improved as at present, these report accident and emergency (A & E) plain radiographs in 37/276 cases which previously was 4/ 333 (Sloane & Miller, 2017).

Andersson and Moreno Ourcilleon (2016) showed that Danish and Swedish Radiographers believed that reporting radiographers positively affect medical practices if they withhold proper education and have clearly defined responsibilities. One primary reason for implementing medical devices is the increase in chronic conditions, which are expected to reach 5 million in the preceding year (Dake, 2017).

Particularly for the developing countries in Arab, where an economic shift is taking place for shifting the reliance on oil to which healthcare serves as a possible alternative for investment, workforce development, and skill enhancement (Dake, 2017; Buskov *et al.*, 2013). This has fueled the country's efforts to expand medical education opportunities, notably in radiography and image processing (Dake, 2017). A study by Talab *et al.* (2016) revealed that assimilation of the imaging techniques with the specialist skilled radiographers increases the patient's expertise and allows for better patient care and improved financial savings. The reporting of the radiographer was found to assist physicians in image reviewing and diagnostics (Andersson & Moreno Ourcilleon, 2016). Similarly, Buskov *et al.* (2016) have reported that this also improves the care delivery by reducing the patients waiting time and sharing the radiologist's workload. Additionally, Field and Snaith (2016) have shown that the development of the radiographic role combined with the exponential advancement of the imaging services and reducing the number of radiographers enables the provision of the timely report, patient adequate care, and improved accountability and responsibility.

However, despite the established significance of the radiographic image, its interpretation and reporting are challenging for the practitioners (Elkhadir & Saeed, 2018). Such a red dot or triangle allows them to interpret, though issuing the reports remains troublesome for the regional radiologist (Andersson & Moreno Ourcilleon, 2016). Based on the stated points, the study aims to assess the role of RTS in

image interpretation for KSA and Sudan. It intends to exhibit the progressing activities and the potential contribution it makes.

Methodology

Study Design

This study uses a quantitative cross-sectional design, and the participants were selected from Saudi Arabia and Sudan. Furthermore, it reduces the prospects of biases related to the data collection, improving the transferability of the results.

Study Population and Sample

The study population consists of radiologists employed in the Kingdom of Saudi Arabia (KSA) and Sudan. The rationale is that these can provide adequate information essential for meeting the determined objectives and conducting sound research. It helps to disclose the radiologists' perception concerning the image interpretation for plain radiographs by RTS in Arab. A total of 103 participants were randomly recruited from both KSA and Sudan. The selection of the two regions is based on the fact that various expatriates move to KSA due to an increase in employment opportunities and developing infrastructure (Andersson & Moreno Ourcilleon, 2016). At the same time, Sudan was selected as it is the first country that introduces degree courses (bachelors, master's, and Ph.D.) for medical imaging technology (Salih, 2014). Besides, the researcher's residence in the two regions also promoted selecting the two areas enduring sound conduction of the study.

Data Collection

A close-ended questionnaire was used for collecting the data from various hospitals in Jeddah, KSA, in October 2016. The questionnaire was prepared using a 5-point Likert scale in which 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree. In contrast, the questionnaire in Sudan was distributed in July 2017 during the weekly meeting of radiologists in a medical center in Khartoum. The data was also collected by visiting a large number of radiologists in different hospitals and medical centers in the capital of Sudan, referred to as the triangular capital because it consists of three big cities (Khartoum, Omdurman, and Bahri). Since the questionnaire following an improvement in quality does not require ethical approval, no approval was acquired (Fletcher, 2015). However, the researcher obtained written consent from the participants after communicating the study scope, objective, confidentiality, and anonymity. The researcher also ensured that participants realized their right to withdraw at any point in the research.

Data Analysis

The collected data were analyzed using SPSS (Statistical Package for Social Sciences) in this study. The frequencies and percentages of the responses were computed to indicate the radiologist's perception of using the image processing.

Results

Table 1 demonstrates that among 103 participants, 36 were radiologists, 22 were radiology consultants, and 41 were radiology residents. It also shows that the occupational characteristics of 4 participants were unknown.

Table 1: Participants' Occupational Distribution

Category	Frequency	Percentage %
Radiologist	36	35%
Consultant	22	21%
Radiology Residence	41	40%
Unknown	4	4%
Total	103	100%

The second question assessed the radiologist's view on the role of RTS in writing image reports (Table 2), 28 percent of radiologists responded that RTS plays a role in writing image reports in the Arab world, whereas 59 percent were not aware of it and 13 percent were undecided about it.

Table 2: RTS Role in Image Reporting in the Arab World

Category	Frequency	Percentage %
Yes	29	28%
No	61	59%
Undecided	13	13%
Total	103	100%

The prospects of image reporting in RTS were also assessed through the questionnaire (Table 3), 43 percent of the radiologists agreed with it, while 36 percent disagreed. Moreover, the question was left unanswered by 21 percent of the sample.

Table 3: Possibility of RTS Role in Image Reporting in the Arab World

Category	Frequency	Percentage %
Agree	44	43%
Disagree	37	36%
Not answered	22	21%
Total	103	100%

Table 4 evaluates the radiologist's perspective on RTS's image interpretation in diagnosing unreported radiographs. The majority of responders (30%) expressed dissatisfaction with RTS's use of picture interpretation, while 28 percent agreed. 16.5 percent strongly disagree, 12 percent are undecided, and 9 percent strongly agree with its use. 4.5 percent of the people in the sample did not respond to the question.

Table 4: Efficiency of RTS Image Interpretation in Diagnosis of Unreported Radiographs

Category	Frequency	Percentage %
Undecided	12	12%
Agree	29	28%
Disagree	31	30%
Strongly Agree	9	9%
Strongly Disagree	17	16.5%
Not answered	5	4.5%
Total	103	100%

The impact of the RTS on the workload and stress was also examined in the paper. Table 5 shows the participants' responses, indicating that 37 percent agreed that it reduces the workload and pressure on the radiologist, while 21 percent disagreed. The remaining 14 percent strongly disagree, 13 percent were undecided, and 9 percent strongly agree. The question was unattended by 6 percent of the sample.

Table 5: RTS Image Interpretation Reduces Workload and Stress

Category	Frequency	Percentage %
Undecided	13	13%
Agree	38	37%
Disagree	22	21%
Strongly Agree	9	9%
Strongly Disagree	15	14%
Not answered	6	6%
Total	103	100%

Table 6 shows that 34 percent agreed that image interpretation by RTS could be introduced in the Middle East in the future. Its use, in the end, was strongly agreed upon by 8 percent strongly agree,

while no response was received from 6 percent. However, 19 percent remained undecided, 17 percent disagreed, and 16 percent strongly disagreed.

Table 6: RTS Image Interpretation Initiation in the Middle East in the Future

Category	Frequency	Percentage %
Undecided	20	19%
Agree	35	34%
Disagree	18	17%
Strongly Agree	8	8%
Strongly Disagree	16	16%
Not answered	6	6%
Total	103	100%

Discussion

The radiology committee worldwide is facing tremendous changes, starting from the patient numbers, which are increasing every year along with aging and chronic disease. In addition to the low rate of available radiologists all over the hospitals and the availability of radiologists only in metropolises areas. One of the available solutions is to activate the radiographer's role in imaging reporting (Mollura *et al.*, 2013; Pepe *et al.*, 2023). This new role will be attempted under adequate training and basic knowledge of specific subjects such as Pathology, Radiographic Pathology, image interpretation, and all of the necessary background knowledge. Thus, it aids in providing meaningful information to radiologists in areas around the globe (Dako, Omofoye & Scheel, 2024).

For this study, a questionnaire approach was used to obtain and collect the data from some radiologists in the Middle East to measure their acceptance of expanding some limitations to the current radiographs position. The results primarily reported that image interpretation by the RTS would improve after their adequate training. This is in line with the outcomes of Chartrand *et al.* (2017), which measured the quality of radiographers' interpretation after receiving proper training. Given this, the practice and movement of the radiographers have shown marked improvement in reporting by well-trained radiographers. Moreover, Faggioni *et al.* (2017), indicating the comparison of the radiographers with the junior doctor or radiology residents, also demonstrated that junior doctors could learn from the knowledge and experiences of a well-qualified radiographer (Patyal, Patyal & Pandey, 2023).

A recent study by Van de Venter, Du Rand and Grobler (2017) on the radiographic images of trauma-related patients corroborates the present study findings. The study findings reveal that the combination of image reporting and radiography improves the care of the patients. The fusion of the radiographer can immensely contribute to effective care delivery of the patients. The radiographer's knowledge can facilitate care by highlighting new techniques and examinations. Moreover, Advanced Practice Advisory Panel in 2002 advised and recommended that the title of "radiologist assistant" should be involved in the radiology community. It is suggested to help meet the healthcare demands of the patients and issues of workforce shortage (Work, 2002; Waite, Scott & Colombo, 2021).

The study's outcomes also show that the burden of the medical practitioners reduces due to image reporting of the radiographers. This is consistent with the interview results of (Van de Venter, Du Rand & Grobler, 2017), which stated that these practices make both the parties jointly responsible for the care, improve teamwork, and reduce workload burden. Overall, the results revealed that Arab radiologists are willing to allow competent radiographers to enhance their competence by undergoing more training and development courses. Moreover, the radiologist's perception shows that if the radiologist takes the lead in mentoring and supervising the radiographers, a trust integrated relationship can be developed to leverage the radiologist's role in the radiographs (Kelly, 2012; Harthoorn *et al.*, 2024).

Limitations

To gather and measure the connected elements of the specified criteria, more research on the Middle East is required. However, the study's results were determined to be limited due to the small sample

size and regional constraints. As a result, further investigations should be undertaken to increase the generalizability of the research and, as a result, the study's scope. The data gathered would aid in the development of a high-quality program in the Middle East to introduce the new job of RTS, which would be suitable for both radiologists and radiographers.

Conclusion

The study looked at the radiologist's point of view on the function of radiologic technologist specialists in simple image interpretation in Middle East countries. The outcomes reveal that its function is seen as promising in the future, emphasizing the need for more excellent training and practice for radiographers since it increases their competency and allows them to grow in their professions. Furthermore, the findings show a severe shortage of radiologists in the Middle East, with even simple radiographic images failing to find a qualified health professional for interpretation. As a result, radiologic technologists trained under the supervision of radiologists may be able to help reduce this gap. As a result, several Middle East radiologists are now more inclined to try the idea of allowing good radiographers to advance further in their education. Furthermore, the report advises that research output in interventional radiology be increased by combining efforts from several Middle East countries. It also promotes the formation of partnerships between government agencies, university researchers, and medical experts.

Conflict of Interest

The authors declare no conflict of interest.

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