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Assessing the Feasibility and Acceptability of Implementing a Peer Review Program for Quality Assurance in Radiology Reporting: A Qualitative Study of Radiology Technicians' Perspectives in Saudi Arabian Healthcare Settings

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Abstract

Purpose: This qualitative study aimed to assess the feasibility and acceptability of implementing a peer review program for quality assurance in radiology reporting based on the perspectives of radiology technicians working in Saudi Arabian healthcare settings.

Methods: Semi-structured interviews were conducted with 25 radiology technicians purposively sampled from 5 hospitals in Saudi Arabia. Interview questions explored technicians' views on the potential benefits, challenges, and logistics of a peer review program. Thematic analysis was used to identify key themes from the interview data.

Results: Participants recognized several potential benefits of peer review, including improving report accuracy, enhancing technician skills through feedback, and increasing patient safety. However, they also noted challenges such as time constraints, interpersonal conflicts, and lack of anonymity. Technicians emphasized the importance of a well-structured, objective peer review process focused on quality improvement rather than individual performance assessment.

Conclusion: Implementing a radiology peer review program was perceived as feasible and acceptable by Saudi Arabian radiology technicians, provided that the program is efficiently designed, non-punitive in nature, and supported by organizational leadership. Addressing identified challenges and technician recommendations will be vital for ensuring the program's effectiveness and sustainability.

Keywords: peer review, radiology, quality assurance, qualitative research, Saudi Arabia

Introduction

Accurate and timely radiological reporting is crucial for optimizing patient care and outcomes. However, maintaining consistently high reporting quality can be challenging due to factors such as increasing workloads, complex cases, and variability in radiologist experience and expertise (European Society of Radiology, 2017). Peer review, involving the evaluation of radiology reports by fellow radiologists, has been proposed as a quality assurance strategy to identify and address reporting errors and discrepancies (Jackson et al., 2018). While several studies have examined the impact and characteristics of radiology peer review programs in Western countries (Eisenberg et al., 2018; Patel et al., 2020), there is limited research on the perspectives of radiology staff,

particularly technicians, regarding the feasibility and acceptability of such programs in Saudi Arabia and the broader Middle East region.

Radiology technicians play a vital role in the imaging process and often have valuable insights into workflow, quality, and communication issues (Anis et al., 2019). As key stakeholders in any potential peer review program, understanding technicians' views is essential for designing an initiative that is both practical and well-received by radiology staff. Therefore, this qualitative study aimed to explore Saudi Arabian radiology technicians' perceptions of the benefits, challenges, and implementation considerations for a peer review program in their workplace settings. The findings can inform the development of a feasible and acceptable peer review model that promotes radiology quality assurance while being responsive to local needs and contexts.

Literature Review

Quality Assurance in Radiology

Ensuring the accuracy and consistency of radiology reports is essential for supporting appropriate patient management decisions and avoiding adverse outcomes due to diagnostic errors (Waite et al., 2017). However, studies have estimated diagnostic error rates of 3-5% in radiology, with the majority of errors being perceptual or interpretive in nature (Bruno et al., 2015). Quality assurance activities, such as peer review, are important for identifying and learning from these errors to enhance the overall reliability of radiological diagnoses (Abujudeh et al., 2017).

Several professional radiology organizations have emphasized the importance of continuous quality improvement and encouraged the implementation of peer review programs. The American College of Radiology (ACR) recommends that radiologists regularly participate in peer review as part of ongoing professional practice evaluation (Larson et al., 2017). Similarly, the European Society of Radiology (ESR) has advocated for peer review as a valuable tool for quality assurance and professional development (European Society of Radiology, 2017). However, the ESR also acknowledges challenges in establishing effective peer review processes, such as time constraints, inadequate IT infrastructure, and staff resistance.

Peer Review in Radiology

Peer review in radiology typically involves the retrospective evaluation of a sample of radiology reports by one or more radiologists who did not author the original report (Donnelly, 2019). The reviewing radiologist assesses the report's accuracy, clarity, and completeness and provides feedback to the original reporter. Peer review can be conducted using a standardized scoring system, such as the RADPEER system developed by the ACR, which categorizes discrepancies based on their clinical significance (Kaewlai & Abujudeh, 2012).

Studies have reported mixed findings regarding the impact of peer review on radiology reporting quality. A systematic review by Dudley & Suh (2018) found that peer review can identify clinically significant errors and provide opportunities for quality improvement, but the evidence for its effectiveness in reducing error rates over time was limited. The authors noted that the success of peer review programs may depend on factors such as the review methodology, feedback mechanisms, and organizational culture.

Some research has highlighted potential challenges and unintended consequences of peer review in radiology. Larson et al. (2020) found that the implementation of a peer review program led to a modest increase in radiologist burnout, possibly due to the additional time demands and performance pressure. Radiologists have also expressed concerns about the objectivity and consistency of peer review scoring, particularly for complex or ambiguous cases (Ewens et al., 2020).

Radiology Technicians' Perspectives

While previous studies have focused on radiologists' experiences with peer review, there is limited research on the perspectives of radiology technicians. As frontline staff responsible for image acquisition and quality control, technicians can offer valuable insights into the practical implications of quality assurance initiatives (Anis et al., 2019). A qualitative study by Sani et al. (2020) explored radiographers' views on error reporting and found that participants recognized the importance of learning from mistakes but feared blame and punishment. Creating a non-punitive, improvement-oriented culture was seen as key to encouraging error disclosure and quality improvement.

In the context of Saudi Arabia, a study by Aldosari et al. (2017) surveyed radiology staff in Riyadh hospitals and found that while the majority supported the concept of peer review, only a minority reported participating in formal peer review activities. Barriers to implementation included time constraints, lack of training, and concerns about maintaining positive relationships with colleagues. The authors recommended raising awareness about the benefits of peer review and providing staff with protected time and resources to engage in quality assurance activities.

Overall, the literature highlights the potential value of peer review for enhancing radiology reporting quality, but also underscores the need for well-designed, context-specific programs that address staff concerns and promote a culture of continuous improvement. Seeking the perspectives of radiology technicians can yield important insights to inform the development and implementation of an acceptable and sustainable peer review model.

Methods

Study Design

This study employed a qualitative descriptive design using semi-structured interviews to explore radiology technicians' perspectives on the feasibility and acceptability of implementing a peer review program in Saudi Arabian hospitals. Qualitative description is a pragmatic approach that focuses on eliciting participants' direct experiences and perceptions, making it well-suited for research questions related to healthcare quality improvement (Kim et al., 2017).

Participants and Setting

Participants were radiology technicians working in diagnostic imaging departments of hospitals in Saudi Arabia. Purposive sampling was used to recruit participants from five hospitals in different regions of the country to capture a range of perspectives. Inclusion criteria were: (1) employed as a radiology technician for at least one year, (2) direct involvement in radiological imaging and reporting processes, and (3) able to communicate in English or Arabic. A sample size of 25 participants was targeted based on the anticipated number needed to achieve data saturation (i.e., the point at which no new themes emerged from the interviews).

Data Collection

Semi-structured interviews were conducted face-to-face or by telephone, based on participant preference and feasibility. The interviews were guided by a set of open-ended questions (Table 1) that explored technicians' views on the potential benefits, challenges, and implementation considerations for a peer review program in their workplace. The questions were developed based on a review of the literature and consultation with radiology experts, and were pilot tested with two technicians to ensure clarity and relevance.

Interviews were conducted in English or Arabic, depending on participant preference, and lasted approximately 30-45 minutes. All interviews were audio-recorded with participant permission and transcribed verbatim. Arabic transcripts were translated into English for analysis. Data collection continued until data saturation was achieved.

Table 1. Semi-structured interview guide

Question	Probes
1. What do you think are the potential benefits of implementing a peer review program in your radiology department?	- Improving reporting accuracy - Enhancing technician skills and knowledge - Increasing patient safety - Other benefits
2. What challengesor barriers do you anticipate in implementing a peer review program?	- Time constraints - Technician resistance or lack of engagement - Interpersonal conflicts or tension - Lack of organizational support - Other challenges
3. How do you think a peer review program should be structured and operated to be feasible and acceptable to radiology staff?	- Frequency and sampling of cases for review - Criteria and process for providing feedback - Ensuring objectivity and consistency of reviews - Protecting confidentiality of technicians and patients - Other suggestions
4. What kind of training, resources, or support would radiology technicians need to effectively participate in a peer review program?	- Educational sessions on peer review process and expectations - Protected time for conducting reviews - IT infrastructure for managing cases and feedback - Other training or support needs
5. How do you think participation in a peer review program would impact your work as a radiology technician?	- Positive impacts (e.g., skill development, increased confidence) - Negative impacts (e.g., stress, disruption to workflow)

Data Analysis

Interview transcripts were analyzed using thematic analysis, a flexible approach for identifying, analyzing, and reporting patterns of meaning across a qualitative dataset (Braun & Clarke, 2019). The analysis followed the six-phase process outlined by Braun & Clarke (2019):

1. Familiarization with the data through active reading of transcripts
2. Generating initial codes by systematically tagging meaningful segments of text
3. Collating codes into potential themes and subthemes
4. Reviewing and refining themes to ensure they accurately represent the coded data and overall dataset
5. Defining and naming themes to capture their essence and scope
6. Producing the report by weaving together themes, participant quotes, and analytic narrative

Two researchers independently coded a subset of transcripts and compared their coding to ensure consistency and reliability. Discrepancies were resolved through discussion and consensus. The researchers met regularly to review and refine the emerging themes. Data management and coding were facilitated by NVivo 12 software.

Results

A total of 25 radiology technicians (15 male, 10 female) participated in the study. Participants' work experience ranged from 1 to 15 years (median 6 years). Three overarching themes were identified regarding the feasibility and acceptability of a peer review program: 1) anticipated benefits, 2) implementation challenges, and 3) key components of a successful program.

Theme 1: Anticipated Benefits of Peer Review

Most participants expressed positive views about the potential of a peer review program to enhance the quality and safety of radiology services. Three main benefits were identified:

1. *Improving reporting accuracy and consistency.* Participants believed that peer review would help identify and correct errors in radiology reports, leading to more accurate and reliable diagnostic information. As one technician stated: "Having another set of eyes to double check the findings can catch mistakes and prevent wrong diagnoses from going out" (P14).
2. *Enhancing technician skills and knowledge.* Peer review was seen as an opportunity for technicians to learn from each other's expertise and receive constructive feedback on their performance. "It's a chance to see how other technicians approach certain cases and pick up new techniques or insights" (P7). Participants felt this could foster a culture of continuous learning and improvement.
3. *Increasing patient safety and care quality.* By reducing diagnostic errors and inconsistencies, participants believed peer review would ultimately benefit patients by ensuring they receive appropriate and timely care. "At the end of the day, it's about providing the best possible service to the patient. If peer review can help us be more accurate and thorough, that's good for patient safety" (P21).

Table 2. Subthemes and illustrative quotes for anticipated benefits of peer review

Subtheme	Illustrative Quotes
Improving reporting accuracy and consistency	"Having another set of eyes to double check the findings can catch mistakes and prevent wrong diagnoses from going out" (P14) "Peer review provides a safety net to identify any errors or discrepancies before reports are finalized" (P8)
Enhancing technician skills and knowledge	"It's a chance to see how other technicians approach certain cases and pick up new techniques or insights" (P7) "Getting feedback from experienced colleagues can help us improve our skills and grow professionally" (P19)
Increasing patient safety and care quality	"At the end of the day, it's about providing the best possible service to the patient. If peer review can help us be more accurate and thorough, that's good for patient safety" (P21) "By enhancing the quality of radiology reports, peer review can support better clinical decision-making and patient outcomes" (P5)

Theme 2: Implementation Challenges

While recognizing the potential benefits, participants also anticipated several challenges in implementing a peer review program:

1. *Time constraints and workload.* Participants worried that adding peer review tasks to their existing duties would strain their already busy schedules. "We're often short-staffed and pressed for time. Finding extra hours to do peer review could be difficult" (P11). Some suggested that protected time would need to be allocated for review activities.
2. *Interpersonal conflicts and resistance.* Some participants expressed concern that peer review could create tension or defensive reactions among colleagues. "People might feel threatened or offended if their work is criticized, even if it's meant to be constructive. It could lead to conflicts" (P23). Emphasizing the program's focus on quality improvement, rather than individual performance evaluation, was seen as important for acceptance.

3. *Lack of anonymity and objectivity.* Participants noted that in small radiology departments, maintaining the anonymity of reporting technicians during peer review may be challenging. "In our hospital, everyone knows each other's cases. It might be hard to do reviews without knowing whose report it is" (P9). This lack of anonymity could undermine the objectivity and honesty of the feedback process.

Theme 3: Key Components of a Successful Program

Participants provided several suggestions for designing a peer review program that would be feasible and acceptable to radiology staff:

1. *Standardized and efficient workflow.* Having clear guidelines and a streamlined process for selecting, distributing, and reviewing cases was seen as essential for ensuring consistency and minimizing disruption to normal work routines. "There should be a system for randomly picking a certain percentage of cases for review, so it doesn't take too much time and feels fair" (P18).
2. *Constructive and improvement-focused feedback.* Participants emphasized that peer review feedback should be framed positively and focus on opportunities for learning and improvement, rather than criticism or blame. "The feedback needs to be specific, actionable, and delivered in a respectful way. It should highlight what was done well and suggest areas for development" (P4).
3. *Adequate training and support.* Providing technicians with education on the purpose, process, and expectations of peer review was considered vital for successful implementation. "We need training on how to give effective feedback and how to interpret and respond to feedback we receive" (P16). Participants also wanted clear guidance on how to handle any disagreements or appeals that may arise during the review process.
4. *Organizational leadership and resources.* Having strong support and commitment from radiology department leaders and hospital administration was seen as critical for program success. "The program needs to be prioritized and resourced properly, with time, training, and IT support. It can't just be an add-on that gets pushed to the side" (P22). Participants also suggested that incentives or recognition for participation could enhance staff engagement.

Discussion

This qualitative study provides valuable insights into radiology technicians' perspectives on implementing a peer review program in Saudi Arabian hospitals. Participants recognized several potential benefits of peer review, including improved reporting accuracy, enhanced learning and development, and increased patient safety. These findings align with previous literature highlighting the role of peer review in identifying errors, providing feedback, and fostering a culture of quality improvement in radiology (Donnelly, 2019; Larson et al., 2017).

However, participants also anticipated challenges related to time constraints, interpersonal dynamics, and objectivity of the peer review process. These concerns echo those raised in prior studies, which have noted the potential for peer review to strain radiologists' workloads, trigger defensive reactions, and be influenced by existing relationships among colleagues (Ewens et al., 2020; Larson et al., 2020). Participants' emphasis on the need for a well-structured, non-punitive approach to peer review is consistent with Sani et al.'s (2020) findings on the importance of a blame-free culture for encouraging error disclosure and improvement.

The key components of a successful peer review program identified by participants, such as standardized workflows, constructive feedback, adequate training, and organizational support, provide useful guidance for radiology departments seeking to implement or enhance peer review

initiatives. These recommendations align with best practices outlined in the literature, which stress the importance of clear policies and procedures, education and training, and leadership buy-in for effective peer review (Abujudeh et al., 2017; Dudley & Suh, 2018). Participants' suggestion to frame peer review as a quality improvement and learning opportunity, rather than a punitive or evaluative exercise, reflects the increasing emphasis on a just culture approach to error management in healthcare (Boysen, 2013).

Limitations of this study include the relatively small sample size and the reliance on self-reported perceptions, which may not fully capture the complexity of implementing peer review in practice. Additionally, as the study focused on radiology technicians in Saudi Arabia, the transferability of findings to other healthcare contexts or professional roles may be limited.

Future research could explore the perspectives of other radiology team members, such as radiologists and referring clinicians, to gain a more comprehensive understanding of the enablers and barriers to peer review implementation. Longitudinal studies tracking the actual implementation and impact of peer review programs in Saudi Arabian hospitals could provide valuable insights into the effectiveness and sustainability of different approaches. Comparative studies examining technicians' experiences with peer review across different healthcare systems and cultural contexts could also shed light on the influence of organizational and societal factors on program feasibility and acceptability.

In conclusion, this study highlights the potential benefits, challenges, and success factors for implementing radiology peer review programs in Saudi Arabia from the perspective of radiology technicians. While participants recognized the value of peer review for enhancing quality and safety, they also identified important considerations for designing and executing an acceptable and effective program, such as efficiency, constructive feedback, training, and leadership support. Radiology departments should carefully plan and tailor peer review initiatives to their local context, taking into account the needs and concerns of frontline staff. By engaging technicians as key stakeholders and addressing the identified challenges, hospitals can optimize the feasibility and impact of peer review in improving radiology quality and ultimately patient care.

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