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# Evaluation of the Impact of Artificial Intelligence on Clinical Practice of Radiology in Saudi Arabia

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**Background:** Artificial Intelligence (AI) is becoming integral to the health sector, particularly radiology, because it enhances diagnostic accuracy and optimizes patient care. This study aims to assess the awareness and acceptance of AI among radiology professionals in Saudi Arabia, identifying the educational and training needs to bridge knowledge gaps and enhance AI-related competencies.

**Methods:** This cross-sectional observational study surveyed radiology professionals across various hospitals in Saudi Arabia. Participants were recruited through multiple channels, including direct invitations, emails, social media, and professional societies. The survey comprised four sections: demographic details, perceptions of AI, knowledge about AI, and willingness to adopt AI in clinical practice.

**Results:** Out of 374 radiology professionals surveyed, 45.2% acknowledged AI's significant impact on their field. Approximately 44% showed enthusiasm for AI adoption. However, 58.6% reported limited AI knowledge and inadequate training, with 43.6% identifying skill development and the complexity of AI educational programs as major barriers to implementation.

**Conclusion:** While radiology professionals in Saudi Arabia are generally positive about integrating AI into clinical practice, significant gaps in knowledge and training need to be addressed. Tailored educational programs are essential to fully leverage AI's potential in improving medical imaging practices and patient care outcomes.

**Keywords:** artificial intelligence, perceptions, knowledge, radiologists, radiographers

## Introduction

As a critical component of the healthcare system, radiology has experienced significant advancements in the past decade. Among these advancements, artificial intelligence has emerged as a transformative technology with profound implications for the field.

Artificial intelligence encompasses the theory and development of computer systems capable of performing tasks that typically require human intelligence, such as visual perception, decision-making, speech recognition, and prediction. In radiology, AI has been applied to various imaging modalities, including CT, MRI, and mammography, enhancing image processing and diagnostic accuracy.[1–4]

AI tools are now widely used in clinical settings to improve workflows, detect pathologies, optimize radiation doses, and advance medical care. These tools can perform tasks with an accuracy comparable to human capabilities, thus supporting radiologists in their diagnostic and therapeutic roles.[2,5]

Several studies have demonstrated AI's potential in early diagnosis, progress monitoring, and treatment discovery in mental and physical health domains.[2] Machine learning, a subset of AI, leverages vast data to enhance its predictive and



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analytical capabilities. However, deploying machine learning systems can sometimes lead to biased or discriminatory outcomes.[5–7]

Despite the complexity of some radiologist tasks, AI applications can significantly alleviate routine and repetitive tasks, empowering radiologists to focus on more complex diagnostic challenges. Integrating AI with a robust informatics infrastructure can automate many administrative tasks, thus reducing common workflow barriers and freeing up valuable time for radiologists and support staff, enhancing their confidence and capabilities.[5,7–9]

AI's benefits also extend to radiographers, improving patient scanning, image acquisition, and processing. For instance, AI can enhance scan selection, patient screening, and scan protocol optimization, thus reducing unsuitable imaging cases and ensuring patient safety, making radiographers feel more secure and responsible.[10–12]

During image acquisition, AI-based systems improve patient positioning, reduce contrast agent doses, optimize acquisition times, and enhance image quality while minimizing radiation exposure. These systems also assist in advanced visualization, segmentation, quantification, and the generation of structured radiological reports, thereby improving efficiency and diagnostic accuracy.[13]

Moreover, AI plays a crucial role in radiology education by automating the classification and collection of clinical cases for training. It also contributes to patient safety and quality assurance by developing systems that ensure the excellence of radiological operations, making radiology professionals feel more productive and efficient in their work.[3,4,14]

While the literature highlights numerous advantages of AI, current forecasting models face limitations due to data scarcity and validation challenges. Thus, this study aims to evaluate the impact of artificial intelligence on radiology professionals in Saudi Arabia and advocate for changes in medical imaging curricula at educational institutions and professional organizations to better prepare radiology professionals for AI integration in their practices.

# Materials and Methods

## Study Design and Sampling

A cross-sectional observational study was conducted among radiology professionals who work in hospitals in the Kingdom of Saudi Arabia. The sample size (n) was calculated using the formula for sample size with an infinite (unknown) population ($n = P\ (1\text{-}P)\ Z^2/\ d^2$) with a margin of error (d) of 0.05, Z value of 1.96 (for a 95% confidence interval), and a population proportion of 0.5. This calculation yielded a sample size of 385, the total number of the respondents was 374, representing 97.1% of the target sample size.

### Ethical Approval

The ethical approval was acquired from the Institutional Review Board (IRB) at Princess Nourah bint Abdulrahman University (PNU) (IRB Log Number: 23-0896) before participant data was collected in the Kingdom of Saudi Arabia. The research committee followed the methods used in the study, and the data was managed confidentially and used only for research purposes.

## Data Collection and Instruments

The survey questionnaire adapted from previous research papers and modified to fit the context of this study.[10,12] This questionnaire contains the participants demographic data, and multiple closed-end question to assess the awareness, acceptance, and challenges to implementation of AI among radiology professionals in Saudi Arabia. The survey questionnaire is drafted in an online Google survey questionnaire and before distribution, the questionnaire was piloted among 25 radiology professionals to evaluate comprehension and clarity of the questions in both domains rated by Likert scale. The reliability coefficient for the test (using Cronbach's alpha internal consistency coefficient) was 0.84, indicating acceptable of internal consistency. The online survey link was disseminated randomly via social media platforms. The data collection phase was initiated from May 2023 and extended to January 2024.

## Statistical Analysis

The data analysis was performed using SPSS version 27 (IBM, Armonk, NY, USA), Descriptive and inferential statistics were used, frequency and percentage were utilized to demonstrate categorical values such as demographics

characteristics, radiology professionals' sentiments towards AI, sources of AI learning among study participants, and challenges for the implementation of AI.

The study participants' knowledge, perceptions concerning AI and implementation in the practice were assessed using a set of twelve questions, with 6 questions allocated to each domain. The participants' responses for each question in both domains were rated on a Likert scale from 1 to 5, where 1 represented "strongly disagree" and 5 represented "strongly agree". The means and standard deviations were calculated for each question in the domains (Mean ± SD). One way-Anova was utilized to compare mean score of perception and knowledge with qualification degree of the participants, a P-value ≤0.01 and 0.05 considered statistically significant for differences.

# Results

## Demographic and General Information

Table 1 provides demographic and professional data of the respondents, predominantly working in hospitals. Most of them are aged between 26 and 30 years (40.1%), with more than half of them were females (52.1%). The majority have 1–5 years of professional experience (55.3%) and hold a B.Sc. degree (78.4%). Most of them were Radiographic Technologist (85.6%), with a small percentage working as Radiologists (11.7%) and Medical Physicists (2.7%).

**Table 1** Demographic and Professional Profile of Radiology Professionals in Saudi Arabia

| Variable | Frequency | Percent % |
|---|---|---|
| Age group | | |
| ≤25 | 90 | 24.1 |
| 26–30 | 150 | 40.1 |
| 31–40 | 101 | 27.0 |
| 41–49 | 23 | 6.1 |
| ≥ 50 | 10 | 2.7 |
| Gender | | |
| Male | 179 | 47.9 |
| Female | 195 | 52.1 |
| Experiences/years | | |
| <1 | 34 | 9.1 |
| 1–5 | 207 | 55.3 |
| 6–10 | 68 | 18.2 |
| >10 | 65 | 17.4 |
| Highest qualification attained | | |
| Diploma | 8 | 2.1 |
| B.Sc. | 294 | 78.4 |
| M.Sc. | 43 | 11.5 |
| Ph.D. | 30 | 8.0 |

(*Continued*)

**Table 1** (Continued).

| Variable | Frequency | Percent % |
|---|---|---|
| Current job | | |
| Radiographic Technologist | 311 | 85.6 |
| Radiologist | 44 | 11.7 |
| Medical physicist | 10 | 2.7 |
| Area of works | | |
| Hospital | 368 | 98.4 |
| Academic/Research Centers | 6 | 1.6 |

## Perception and Willingness to Implementation AI in the Practice Among the Study Participants

The study demonstrated that most radiography professionals (82.4%) agreed that AI plays a substantial role in practice, and (45.5%) expressed excitement about the technology, which produced high perceptions among the participants. In addition, 82.1% of the participants were ready to learn and apply AI. Table 2

**Table 2** Shows the Perception and Willingness to Implementation AI in the Practice Among the Study Participants

| Domains | | SDA | DA | NE | AG | SAG | Mean | σ |
|---|---|---|---|---|---|---|---|---|
| | | Frequency and % | | | | | | |
| Perception | Q1 | 6 (1.6%) | 7 (1.9%) | 53 (14.2%) | 139 (37.2%) | 169 (45.2%) | 4.22 | 0.874 |
| | Q2 | 6 (1.6%) | 10 (2.7%) | 37 (9.9%) | 147 (39.3%) | 174 (46.5%) | 4.26 | 0.865 |
| | Q3 | 43 (11.5%) | 95 (25.4%) | 104 (27.8%) | 72 (19.3%) | 60 (16.0%) | 3.03 | 1.246 |
| | Q4 | 27 (7.2%) | 66 (17.6%) | 106 (28.3%) | 108 (28.9%) | 67 (17.9%) | 3.33 | 1.17 |
| | Q5 | 31 (8.3%) | 70 (18.7%) | 119 (31.8%) | 92 (24.6%) | 62 (16.6%) | 3.22 | 1.175 |
| | Q6 | 8 (2.1%) | 17 (4.5%) | 42 (11.2%) | 105 (28.1%) | 202 (54%) | 4.27 | 0.977 |
| Knowledge | Q1 | 20 (5.3%) | 54 (14.4%) | 103 (27.5%) | 127 (34.0%) | 70 (18.7%) | 3.46 | 1.11 |
| | Q2 | 9 (2.4%) | 24 (6.4%) | 60 (16.0%) | 150 (40.1%) | 131 (35%) | 3.99 | 0.99 |
| | Q3 | 8 (2.1%) | 6 (1.6%) | 57 (15.2%) | 142 (38.0%) | 161 (43.0%) | 4.18 | 0.90 |
| | Q4 | 16 (4.3%) | 56 (15.0%) | 113 (30.2%) | 120 (32.1%) | 69 (18.4%) | 3.45 | 1.08 |
| | Q5 | 36 (9.6%) | 94 (25.1%) | 113 (30.2%) | 89 (23.8%) | 42 (11.2%) | 3.02 | 1.15 |
| | Q6 | 111 (29.7%) | 108 (28.9%) | 78 (20.9%) | 43 (11.5%) | 34 (9.1%) | 2.41 | 1.27 |

**Notes**: Weighted average (Domain 1 =3.72, Domain 2= 3.42). Domain 1 questions: AI will play an important role in the practice of radiology professions; Q2 AI will take place in many applications and image production such as quality control, dose selection and image interpretation; Q3 AI will threaten/disrupt the radiology professions' practice; Q4 AI will threaten/disrupt some radiology professions' career; Q5 AI has no limitations in my work; Q6 I am ready to learn and apply AI in my practice. Domain 2 questions: Q1 Radiology professions curriculum includes at least some basic Knowledge of AI; Q2 AI should be taught in the undergraduate programme; Q3 AI should be taught in the postgraduate programme; Q4 I have a basic understanding of AI (relevant to my field).; Q5 I have a working Knowledge of AI (relevant to my field); Q6 I have been trained and educated about the AI (relevant to my field).
**Abbreviations**: SAG, Strongly agree; AG, Agree; NE, Neutral; DA, Disagree; SDA, Strongly disagree.

## Radiology Professionals' Sentiments Towards AI

Figure 1 illustrates the sentiment of radiology professionals towards artificial intelligence. The largest group, 45.5%, is excited about AI, followed by those aware of its challenges, representing 19.8%. A similar proportion, 19.3%, are neutral, while the smallest group, 15.5%, is worried and overwhelmed by AI.

## Sources of AI Knowledge and Skill Development Among Radiology Professionals

Figure 2 illustrates the radiology professionals' AI knowledge and skill development sources. For knowledge of AI, more than half mentioned that they gained their knowledge through self-teaching method 54%, 22.5% gained knowledge through courses and training, and 23.5% have no knowledge or background about AI. In terms of skill development in AI, 35.8% have developed their skills through self-teaching, 27.5% through courses and training, and 36.6% posses no skills in AI.

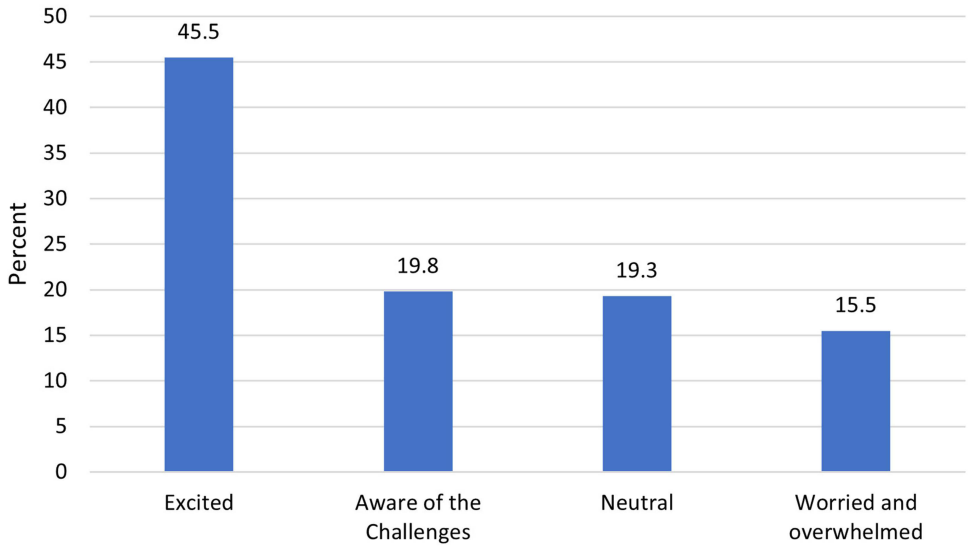


**Figure 1** Radiology Professionals' Sentiments Towards Artificial Intelligence.

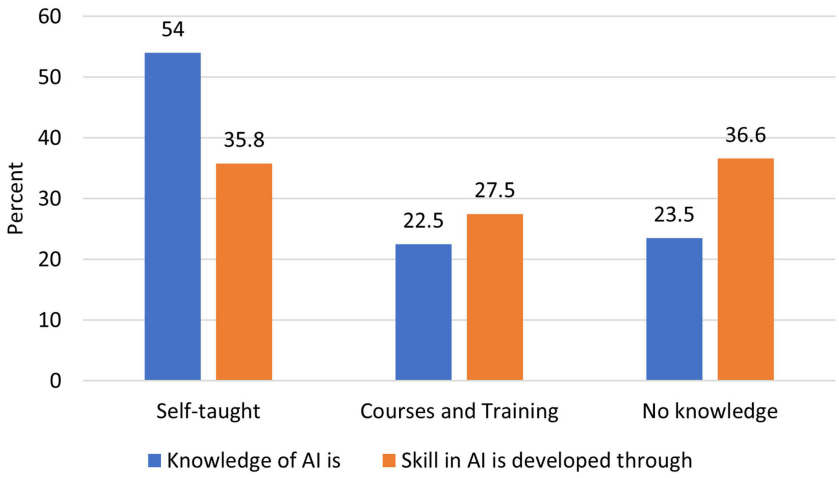


**Figure 2** Sources of AI Knowledge and Skill Development Among Radiology Professionals.

## Willingness and Challenges

Regarding the willingness to adopt AI in their practice, 34% of participants indicate that AI is included in their organization's plans. A small percentage, 12.8%, noted that AI plays a minor role in their current work, while 11% are in the beginning of implementing AI. Only 9.1% report that AI plays a significant part of their daily tasks, which is the same percentage as those who are not considering AI at all. Additionally, 24.1% of the respondents mentioned that they were unaware of any AI contributions to their work (Table 3).

Table 4 outlines the perceived challenges that radiology professionals encounter when adopting AI. A total of 22.2% of respondents recognize skill development as the most significant obstacle. Additionally, 21.4% mention the difficulty to find quality education and training courses on AI as one barriers. Challenges related to implementing AI in clinical settings are noted by 17.6% of participants, which is the same percentage that reports a lack of knowledge as a barrier. Furthermore, 11% find it challenging to educate and train existing staff on AI technologies, and 10.2% believe that the gap in AI knowledge and skills begins at the university level, where graduates do not receive adequate training in AI.

Table 5 outlines the various applications of AI within radiology organizations, as reported by the participants. The most prevalent use of AI is in quality control, followed by post -processing of images, image evaluation, dose management, assisted image interpretation and for teaching and communication 29.1%, 19.5%. 16.3%, 14.4%, 13.1% and 7.5%, respectively.

Tables 6 and 7 explore the relationship between radiology professionals' qualifications and their perceptions and knowledge of AI, which was assessed using 6 question for each domains and rated using 5-point likert scale strongly disagree to strongly agree (1–5 points).

**Table 3** Current and Planned Integration of AI in Radiology Work Practices

| In Work, AI is | Frequency | Percent |
|---|---|---|
| It is plan | 127 | 34 |
| A small part | 48 | 12.8 |
| We are beginner | 41 | 11 |
| A big part of what we do | 34 | 9.1 |
| We are not looking at or planning for | 34 | 9.1 |
| I have no idea | 90 | 24.1 |

**Table 4** Challenges in Implementing AI in Radiology Work Environments

| What are the Biggest Challenges for AI Implementation in Your Work | Frequency | Percent |
|---|---|---|
| The skills development | 83 | 22.2 |
| It is hard to find good education and training courses in AI | 80 | 21.4 |
| It is hard to implement AI in the work and practice | 66 | 17.6 |
| Knowledge | 66 | 17.6 |
| It is hard to educate and train the current staff in AI technology | 41 | 11 |
| Graduates are not learning AI knowledge and skills at the university | 38 | 10.2 |

**Table 5** Applications of AI in Radiology Organizational Practices

| Application of AI in Organizations | Frequency | Percent |
|---|---|---|
| Quality control | 109 | 29.1 |
| Image post-processing | 73 | 19.5 |
| Image evaluation | 61 | 16.3 |
| Dose management | 54 | 14.4 |
| Image interpretation | 49 | 13.1 |
| Teaching and Communication | 28 | 7.5 |

**Table 6** Relationship Between Qualifications and Perceptions Score of AI in Radiology

| Qualification | Perception Questions | | | | | |
|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 |
| | Mean Score ± Std. Dev | | | | | |
| Diploma | 3.88±.641 | 3.75±1.035 | 3.13±.991 | 3.38±1.061 | 3.13±.835 | 3.87±.641 |
| B.Sc. | 4.20±.892 | 4.25±.871 | 3.08±1.244 | 3.36±1.164 | 3.23±1.173 | 4.23±1.016 |
| M.Sc. | 4.51±.668 | 4.53±.592 | 3.00±1.272 | 3.35±1.173 | 3.58±1.118 | 4.58±.731 |
| Ph.D. | 4.17±0.950 | 4.80±3.377 | 2.53±1.224 | 2.93±1.230 | 2.70±1.208 | 4.40±0.894 |
| P-values | 0.272 | 0.005 | 0.037 | 0.105 | 0.282 | 0.042 |

**Notes**: Question in domain: Q1 AI will play an important role in the practice of radiology professions; Q2 AI will take place in many applications and image production such as quality control, dose selection and image interpretation; Q3 AI will threaten/disrupt the radiology professions' practice; Q4 AI will threaten/disrupt some radiology professions' career; Q5 AI has no limitations in my work; Q6 I am ready to learn and apply AI in my practice.

**Table 7** Correlation of Radiology Professionals' Qualifications with Score of AI Knowledge

| Qualification | Knowledge Questions | | | | | |
|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 |
| | Mean Score ± Std. Dev | | | | | |
| Diploma | 3.75±1.03 | 3.75±1.03 | 3.88±.99 | 3.38±0.91 | 3.63±.91 | 2.88±1.45 |
| B.Sc. | 3.44±1.11 | 3.97±1.01 | 4.17±0.91 | 3.39±1.11 | 2.98±1.17 | 2.38±1.27 |
| M.Sc. | 3.65±1.17 | 4.19±.88 | 4.30±.88 | 3.72±0.98 | 3.09±1.08 | 2.60±1.17 |
| Ph.D. | 3.33±1.061 | 3.97±0.964 | 4.20±0.714 | 3.77±0.858 | 3.13±1.008 | 2.40±1.329 |
| P-values | 0.886 | 0.455 | 0.424 | 0.019 | 0.709 | 0.814 |

**Notes**: Question in domain: Q1 Radiology professions curriculum includes at least some basic Knowledge of AI; Q2 AI should be taught in the undergraduate programme; Q3 AI should be taught in the postgraduate programme; Q4 I have a basic understanding of AI (relevant to my field); Q5 I have a working Knowledge of AI (relevant to my field); Q6 I have been trained and educated about the AI (relevant to my field).

In Table 6, mean scores vary with qualification levels, but no significant correlation is found between the mean score of perception concerning adoption of AI in radiology practice in Q1, Q3, Q5, Q6 (P>0.05). Notably, Ph.D. and Master's degree holders generally have higher perception scores concerning readiness to apply of AI in their practice, and they have knowledge of several applications of AI in radiology practice such as quality control. Table 7 shows similar

variability in knowledge scores across six questions with qualifications. Again, no consistent significant correlation is observed, with p-values except for Q4 exceeding 0.05.

## Discussion

Artificial intelligence (AI) has played a significant role in medical imaging, with its application increasing daily to assist radiology professionals in their tasks. Therefore, to successfully implement and integrate AI into radiology practice, the challenges faced by radiology professionals must be addressed. This study assessed Saudi Arabian radiology professionals' awareness, acceptability, and desire to use artificial intelligence (AI) in their work, furthermore, identified the difficulties and challenges to knowledge and implement AI in daily practice, to identify areas that require further education and training to bridge the knowledge gaps and improve AI-related competencies.

The study demonstrated that most radiography professionals (82.4%) agreed that AI plays a substantial role in practice, and (45.5%) expressed excitement about the technology, which produced high perceptions among the participants. In addition, 82.1% of the participants were ready to learn and apply AI. It appears that the awareness of AI's potential does not align with the expectations of its role. In contrast, Botwe et al mentioned that (80.8%) of Ghana radiographers are interested in using AI in their careers, despite (64.2%) being apprehensive about implementing AI in medical imaging.[15] The findings suggest that there is a growing acceptance and readiness among radiology professionals to apply AI in their practice. This is consistent with previous studies that found a positive attitude towards AI adoption in the medical field, particularly in the radiology. For instance, a study conducted by Strohm et al who mentioned that the radiologists were generally approved of the potential benefit of AI to improve diagnostic accuracy and reduce workload.[16]

In this study, it was found that mean score of the study participants concerning that the AI potentially posing a threat to the practice of radiology, disrupting careers were less than average mean score (35.3% and 46.8% agree that respectively), a study conducted among physicians in Korea reported that only 35% of participants thought their jobs could be replaced by AI, a study among community pharmacists in Saudi Arabia revealed 25.6% of participants believing that AI would eventually replace healthcare professionals,[17,18] Similarly, a study conducting in UK involving healthcare workers found that only 28% were concerned about AI replacing their jobs.[19] In contrast, another study conduction in Saudi Arabia among healthcare workers found that the healthcare workers holding a positive awareness and attitude towards AI, furthermore most of them expressed concerns about the potential implications of AI replacing their jobs.[20,21]

Most of the study participants recognized the importance of integrating AI into both undergraduate and postgraduate radiology programs. A previous survey yielded similar results and mentioned that adding information on AI's relevance to the medical curriculum would be beneficial and indicating that incorporating AI literacy into medical education would be advantageous.[22,23]

The study finding reflects that there is a perceived gap in practical AI skills and the participant feeling of insufficient knowledge, skills and training of AI, study conducted by Alsultan in radiographic technologists and radiologists and found that only half of the respondents aware of practical knowledge concerning AI, therefore additional training is required to enhance practical skill of AI.[24] Abuzaid et al assess the radiographers (radiographic technologists) and radiologist willingness to accept the integration of AI in radiology practice and observed a significant lack of knowledge and appreciation of the integration of AI into radiology practice, despite the noted excitement surrounding AI implementation in radiology practice.[10]

Moreover, this study highlighted several challenges and gaps in AI adoption. A minority (9.1%) reported that AI constitutes a significant part of their practice, indicating that widespread integration of AI in healthcare settings may still be at a nascent stage for most radiology professionals. As well as (24.1%) of the respondents were unaware of AI implementation within their organizations underscores the need for increased awareness and education regarding AI technologies among healthcare providers. (34%) of the participants, noted that AI is a part of their organization's plans, and (12.8%) of them mention that the AI poses a small part of their existing practice. Overall, these findings underscore the fluctuating degrees of AI adoption and knowledge within healthcare governments, it was necessary for health care organization to actively incorporating AI into their plans and practices. Addressing problems relating to awareness, education, and integration will be critical for supporting broad and effective use of AI in healthcare settings. This study

discovered that various challenges, such as a lack of knowledge and skills connected to AI, only 20.6% mentioned that they received training on AI relative to their field. Coakley S et al in the study conducted in European radiographers (Radiographic technologists) mention only 8% of the study participants received training, demonstrating a severe lack of education regardless the excitement about the advancement of AI.[25] Abuzaid et al consistent to this study and found that radiographers face challenges in attaining AI-related education and training, and they reported a lack of education courses to facilitate AI use.[10] In Saudi Arabia, similar to our findings, Qurashi et al noted that a majority of the radiology personnels (83%) claimed to be familiar with machine learning and AI concepts. However, only a minority (18%) had practical acquaintance to or experience with AI, citing a lack of formal training in the curriculum.[26] Tajaldeen et al found a significant deficiency of knowledge about AI in residency programme and radiology departments.[27] Khafaji et al mention that 42% of the participants reported being familiar with AI in medical imaging. However, only 6.5% of the participants taken courses in artificial intelligence (AI) and machine learning (ML), and a mere 4% had actual experience in working with AI technologies.[28] Mirza et al found that radiology residents have limited exposure to AI, which is connected to insufficient knowledge and potentially lower acceptance of AI within the field of radiology. It is noted that less than 8% of radiology residents are actively practicing AI at their institutions, conversely, a majority of participants have expressed a keen interest in learning more about AI.[29] Alelyani et al mention that 61% of the participants were aware of AI in medical imaging; on the other hand, only 24% had previous or ongoing research activity on AI application in radiology.[30] As a result, it is critical for healthcare organizations to find a way to increase educational opportunities for healthcare personnel to bridge the gap between comprehending the value of AI and the practical skills required to apply it effectively in radiological practice.

There are several applications of AI within radiology department, as reported by the respondent, the highest percentage mention that AI was used for quality control (29.1%), followed by post-processing of images (19.5%), image evaluation (16.3%), dose management (14.4%), AI-assisted image interpretation (13.1%), and teaching and communication (7.5%). These findings are in concordance with Botwe et al who mention that 82.8% of radiographers feel AI would be an assistive tool to ease their workload. In another study, MRI technologists expected that AI could improve MRI protocol selection (91.8%), decrease the scan time (65.3%), and improve image post-processing (79.5%).[12,15] In Australia, radiographic technologists and radiographers are identifying important applications of artificial intelligence to help perform repetitive tasks, perform some complex tasks, and improve the quality of medical imaging results.[31]

There are significant differences among participants with different qualifications regarding their readiness to learn about and use AI in their practices. In particular, individuals with M.Sc. and Ph.D. degrees show a greater willingness to engage with AI than those with diplomas and B.Sc. degrees. They also have higher mean scores in their awareness of AI applications in areas such as quality control, dose selection, and image interpretation. Moreover, individuals with M.Sc. and Ph.D. degrees exhibited significantly higher average scores in their understanding of fundamental AI concepts pertinent to their fields.

The outcomes of this study reinforced the premise that AI is seen as an asset in radiology, with radiology experts showing a willingness to collaborate with AI tools. However, better educational opportunities are needed to close the gap between comprehending the usefulness of AI and the actual skills required to use it effectively in radiological practice. Future research is needed to investigate the barriers to AI implementation in practice in greater depth, as well as to evaluate the effectiveness of various educational strategies in improving radiology professionals' AI competencies, and to determine the most effective techniques for incorporating AI into radiology practice, as well as the impact of such techniques on the adoption and use.

To further harness the potential of Artificial Intelligence (AI) in medical imaging and address the identified challenges, it is recommended to incorporate AI education and training within the curriculum of educational institutions and professional organizations catering to radiology professionals. This initiative aims to elevate the awareness and proficiency of AI in medical imaging practices, facilitating its effective implementation and contributing to enhanced patient care outcomes.

## Study Limitation

This study was limited by its relatively small and geographically confined sample of radiology professionals in Saudi Arabia, which may affect the generalizability of the findings. The self-reported data collected through questionnaires could be subject to biases such as social desirability or recall bias, impacting the accuracy of the responses. Additionally, the cross-sectional design captures perceptions and knowledge at a single point, without accounting for changes over time.

### Recommendation

To further harness the potential of Artificial Intelligence (AI) in medical imaging and address the identified challenges, it is recommended to incorporate AI education and training within the curriculum of educational institutions and professional organizations catering to radiology professionals. This initiative aims to elevate the awareness and proficiency of AI in medical imaging practices, facilitating its effective implementation and contributing to enhanced patient care outcomes.

### Future Research Directions

Future research should include longitudinal studies to track changes in AI awareness and acceptance over time, expanded geographical studies to enhance generalizability, and investigations into the impact of targeted AI training programs. Additionally, exploring AI adoption in other medical specialties, conducting case studies of successful AI implementation, examining the direct impact of AI on patient outcomes, and addressing the ethical and legal implications of AI use in radiology are essential. These directions will provide comprehensive insights and guide effective AI integration in healthcare.

## Conclusions

Given AI's significant and growing role in medical imaging, evaluating the perceptions, knowledge, and willingness to accept AI implementation among radiology professionals is crucial. Our study revealed that while participants generally understand AI and its relevance to their field, many lack adequate training and education. This knowledge gap poses a substantial barrier to effective AI integration. To address these challenges, it is essential to develop targeted educational programs and training courses that enhance AI competencies among radiology professionals. By improving AI literacy and skills, radiology can fully leverage AI's potential, leading to better diagnostic accuracy, optimized workflows, and ultimately enhanced patient care.

Take-home Message: To maximize the benefits of AI in radiology, it is imperative to invest in comprehensive training and educational initiatives that equip professionals with the necessary skills and knowledge to implement AI technologies in their clinical practices effectively.

## Institutional Review Board Statement

The ethical approval was acquired from the Institutional Review Board (IRB) at Princess Nourah bint Abdulrahman University (PNU) (IRB Log Number: 23-0896) before participant data is collected in the Kingdom of Saudi Arabia.

## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

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## Disclosure

The authors report no conflicts of interest in this work.

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