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Radiology Professionals' Knowledge, Attitude, Perception and Awareness of Artificial Intelligence in Medical Radiology and Imaging Technology

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ABSTRACT

Background: Artificial intelligence (AI) has rapidly emerged as a transformative force in the field of medical radiology and imaging technology. The advent of artificial intelligence (AI) has introduced transformative changes across various fields, including healthcare. Within medical radiology and imaging technology, AI has shown tremendous potential in enhancing diagnostic accuracy, improving workflow efficiency, and ultimately optimizing patient care. Advanced algorithms and machine learning models are increasingly being integrated into imaging modalities to aid in the detection, classification, and quantification of pathologies, offering a powerful adjunct to traditional radiological practices.

Despite these advancements, the integration of AI into clinical radiology is met with varied responses from radiology professionals. Knowledge about AI's capabilities, the extent of its application, and its implications for clinical practice vary widely among radiologists, radiographers, and radiology technologists. Attitudes toward AI range from enthusiastic acceptance to cautious skepticism, influenced by factors such as perceived job security, trust in technology, and the adequacy of training programs.

Radiologists, radiographers, and radiology technologists are at the forefront of utilizing imaging technologies for patient diagnosis and treatment planning. Their knowledge, attitude, perception, and awareness of AI are critical factors that influence the integration of these technologies into clinical practice. Despite the growing presence of AI in medical literature and its potential to revolutionize radiology, there is a wide variation in how these professionals perceive and engage with AI.

Method: A cross-sectional survey was conducted among radiologists, radiographers, and radiology technologists working in various healthcare settings. The survey included questions assessing demographic information, professional background, knowledge of AI applications in radiology, attitudes towards AI integration, perceived benefits and challenges, and overall awareness of AI advancements in the field.

Result: The preliminary analysis indicated that while a majority of radiology professionals recognize the potential benefits of AI in enhancing diagnostic accuracy and workflow efficiency, there is a significant variation in the level of knowledge and understanding of AI applications. Many professionals expressed concerns about the impact of AI on job security and the need for adequate training and education. The perception of AI was generally positive, with respondents acknowledging its role in improving patient outcomes and streamlining radiological procedures. However, there was a notable demand for more comprehensive educational programs to bridge the knowledge gap.

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Conclusion: The study underscores the importance of continuous education and training for radiology professionals to effectively integrate AI into clinical practice. Addressing the concerns related to job displacement and emphasizing the collaborative potential of AI can foster a more accepting and prepared workforce. Future initiatives should focus on developing targeted educational resources and workshops to enhance the proficiency and confidence of radiology professionals in utilizing AI technologies.

Keywords: *Artificial intelligence; radiology; imaging technology; knowledge; attitude; perception; awareness; education; professional development*

INTRODUCTION

Artificial intelligence (AI) has rapidly emerged as a transformative force in the field of medical radiology and imaging technology. Its applications span from automated image analysis and diagnostic support to predictive analytics and workflow optimization. The integration of AI in radiology promises to enhance diagnostic accuracy, increase efficiency, and ultimately improve patient outcomes. However, the successful adoption of AI technologies depends not only on technological advancements but also on the readiness and acceptance of radiology professionals.

Radiologists, radiographers, and radiology technologists are at the forefront of utilizing imaging technologies for patient diagnosis and treatment planning. Their knowledge, attitude, perception, and awareness of AI are critical factors that influence the integration of these technologies into clinical practice. Despite the growing presence of AI in medical literature and its potential to revolutionize radiology, there is a wide variation in how these professionals perceive and engage with AI.

Understanding the current state of knowledge, attitude, perception, and awareness among radiology professionals is essential for identifying gaps and developing effective strategies to facilitate AI adoption. Previous studies have highlighted both enthusiasm and skepticism within the radiology community, pointing to a need for comprehensive education and training programs tailored to the specific needs of these professionals.

This study aims to evaluate the knowledge, attitude, perception, and awareness of AI among radiology professionals. By examining these factors, we can better understand the challenges and opportunities that AI presents in the context of medical radiology and imaging technology. The findings will inform the development of targeted educational initiatives and support systems to enhance the proficiency and confidence of radiology professionals in leveraging AI for improved clinical outcomes.

METHODS

STUDY DESIGN: Cross-sectional survey

STUDY POPULATION: Radiology professionals, including radiologists, radiographers, and radiology technologists, students trainees working in various healthcare settings.

STUDY AREA: Stratified random sampling to ensure representation across different roles, years of experience, and geographic locations.

INCLUSION CRITERIA:
- Only radiology professionals who are willing to participate in the study would be selected.

EXCLUSION CRITERIA:
- Only radiology professionals who are not willing to participate in the study would be not selected.

METHOD OF DATA COLLECTION:

Online survey distributed via email, professional networks, and radiology associations. Follow-up reminders will be sent to increase response rates.

Data Collection Tool:
A structured questionnaire developed based on existing literature and expert input. The questionnaire includes sections on demographic information, professional background, knowledge of AI applications in radiology, attitudes towards AI integration, perceived benefits and challenges, and overall awareness of AI advancements in the field.

SAMPLING TECHNIQUE:

Preferred sampling technique.

SAMPLE SIZE:

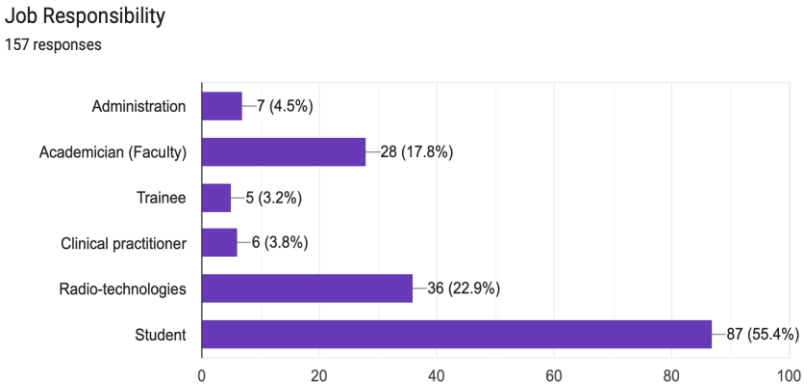
Total 157 number of radiology professionals took part in this study.

STATISTICAL ANALYSIS:

The data collected was compiled, tabulated, graphical, analyzed, and subjected to statistical tests. Analysis was done using Excel.

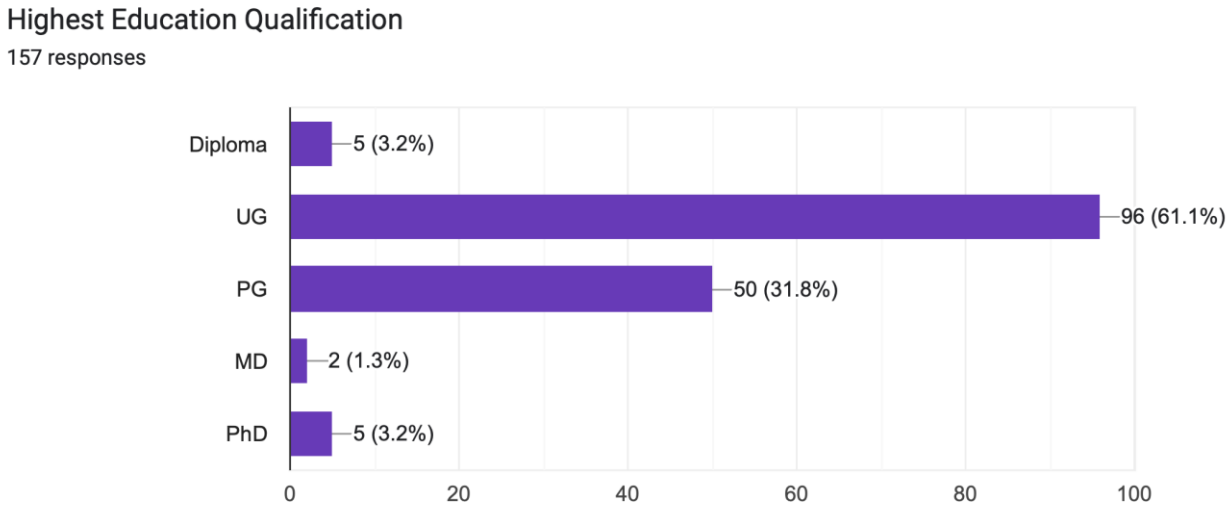
RESULTS

The survey results from 157 radiology professionals regarding their knowledge, attitude, perception, and awareness of artificial intelligence (AI) in medical radiology and imaging technology are presented below. Various radiology professionals have taken part in the online survey from various institutions, healthcare organisations as shown in the graph below:



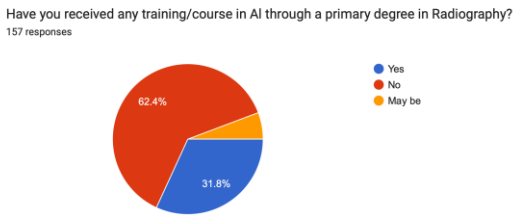
Graph1.1 Job responsibility of radiology professionals

The collect data on the educational qualifications of the radiology professionals. Assume the survey results categorize respondents into the following educational qualification levels:

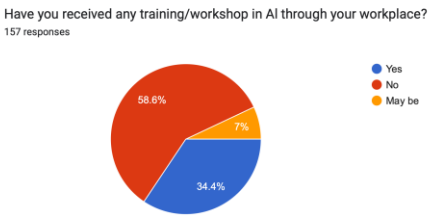


Graph1.2 education qualification of radiology professionals

The survey was well divided into knowledge, attitude, perception and awareness of artificial intelligence in medical radiology and imaging technology. In the knowledge section it has been found from the survey results that a very few radiology professionals have received any training/course in Al through a primary degree in radiography or from their place of work. The pie charts below:

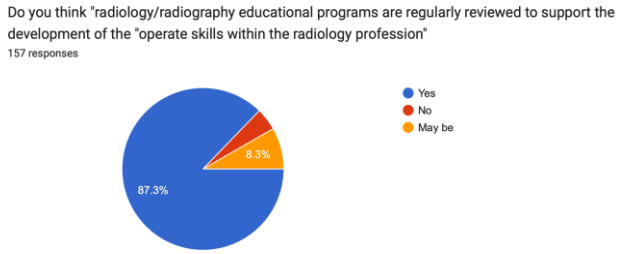


Graph1.3(a) training in Al



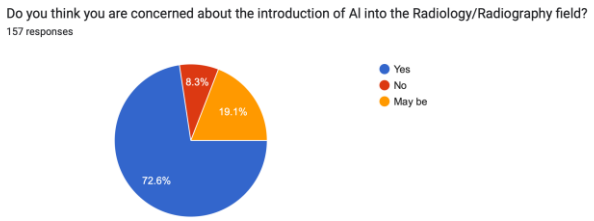
Graph1.3(b) training in Al

A great no percentage of professionals are be interested in taking a course based on Al training within the Radiology/Radio-technology sector also many think "radiology/radiography educational programs are regularly reviewed to support the development of the "operate skills within the radiology profession". As shown in the pie chart below:

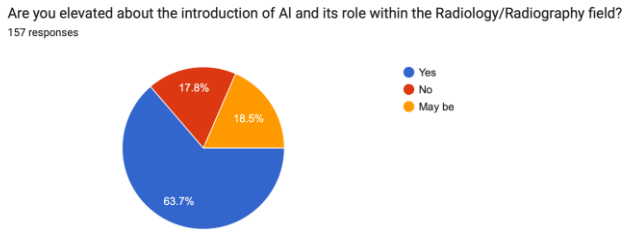


Graph1.4 interested in AI learning

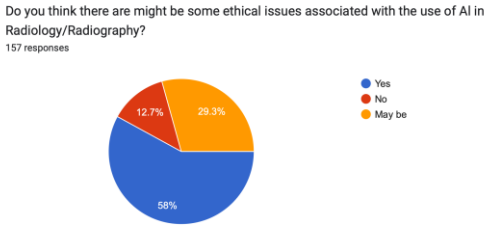
The attitude of radiology professionals is very positively concerned and elevated towards introduction of AI in radiology and healthcare sector. Many are concerned about the might be some ethical issues associated with the use of Al in Radiology but they are positive about the Al as is might going to improve the routine workload of Radiology professionals. As shown in the following pie charts below:



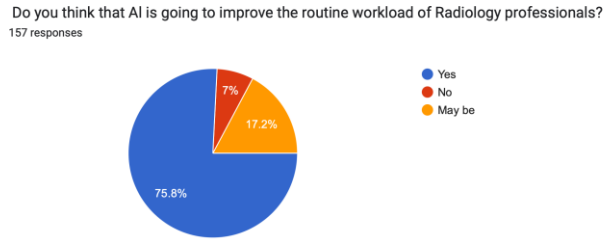
Graph1.5(a) attitude towards AI adaptation



Graph1.5(b) attitude towards AI adaptation

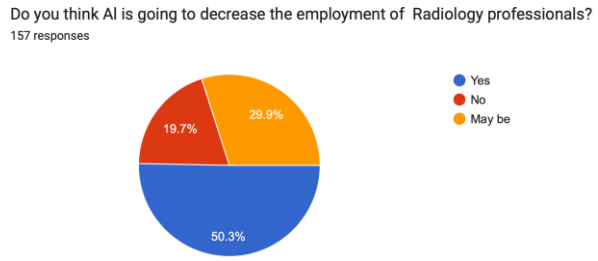


Graph1.5(c) attitude towards AI adaptation



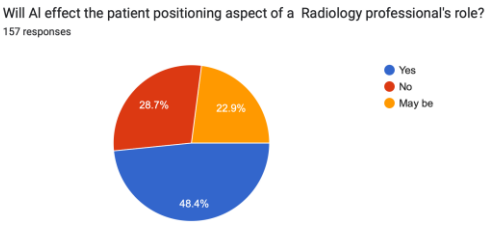
Graph1.5(d) attitude towards AI adaptation

But a mixed attitude is towards Al that it might going to decrease the employment of Radiology professionals. As shown in the following pie chart below:

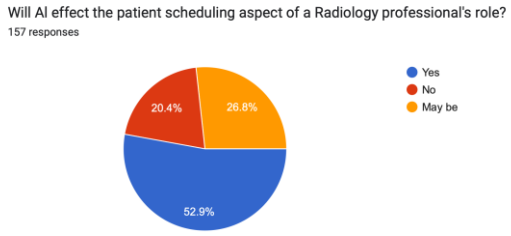


Graph1.5(e) attitude towards AI adaptation

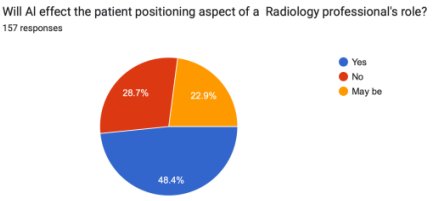
The perception of radiology professionals towards application of AI in terms of patients, role of radiographers and work flow also shows mixed graphs through the conducted survey as shown in the pie graphs below:



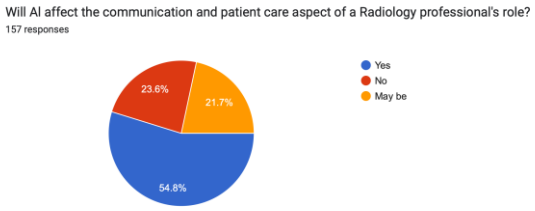
Graph1.6(a) perception towards AI adaptation



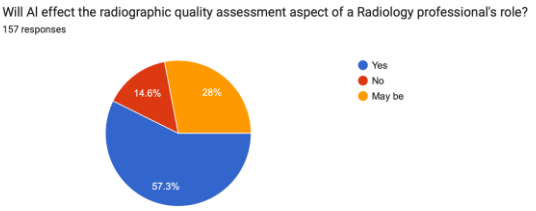
Graph1.6(b) perception towards AI adaptation



Graph1.6(c) perception towards AI adaptation

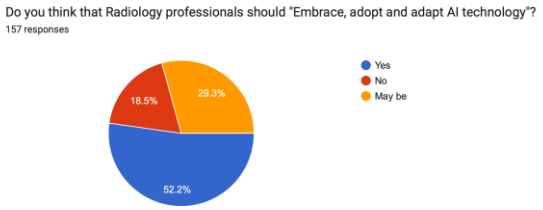


Graph1.6(d) perception towards AI adaptation

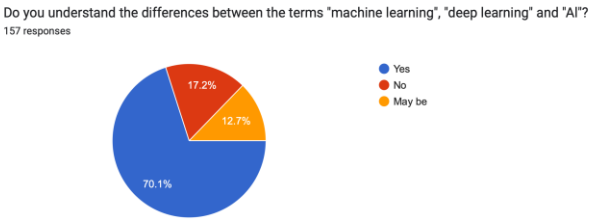


Graph1.6(e) perception towards AI adaptation

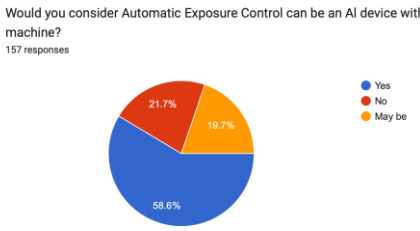
The radiology professionals somewhat have some awareness towards AI but are definitely keen to learn more about AI application in radiology and healthcare sector. as shown in the pie graphs below:



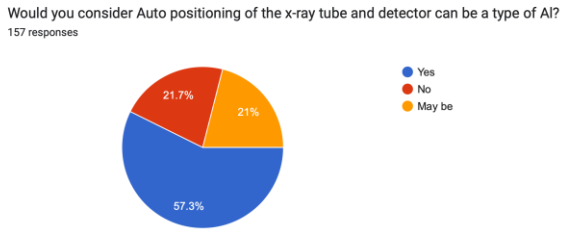
Graph1.7(a) awareness of AI application



Graph1.7(b) awareness of AI application



Graph1.7(c) awareness of AI application



Graph1.7(d) awareness of AI application

These results indicate a generally positive attitude towards AI and a high level of awareness among radiology professionals, but also highlight the need for further education and training to enhance knowledge levels.

CONCLUSION

he study underscores the importance of continuous education and training for radiology professionals to effectively integrate AI into clinical practice. Addressing the concerns related to job displacement and emphasizing the collaborative potential of AI can foster a more accepting and prepared workforce. Future initiatives should focus on developing targeted educational resources and workshops to enhance the proficiency and confidence of radiology professionals in utilizing AI technologies.

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