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A DESCRIPTIVE STUDY TO EVALUATE THE EFFECT OF ARTIFICIAL INTELLIGENCE IN RADIOLOGY

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Abstract : This study conducts a thorough investigation of artificial intelligence (AI) in radiology, taking into account a variety of definitions, historical foundations, and potential applications. It discusses subjects including computer-aided diagnosis, machine learning, natural language processing, image optimization, as well as the revolutionary impacts of AI on patient care and the radiology sector. The essay highlights the collaborative relationship between radiologists and AI algorithms in order to offer early reports, boost productivity, and support decision-making. In addition to highlighting AI's many benefits, the essay also discusses some of its disadvantages, such as algorithm brittleness, technical challenges, patient trust, and ethical concerns. This study was conducted in academics hospital in Delhi and (Gurugram) Haryana to assess residents, technologists, and trainees working in the radiology departments of various hospitals about their knowledge, awareness, practices, and understanding of artificial intelligence (AI) in radiology. In a survey research approach, a convenience sample of radiology residents, technologists, and trainees from selected hospitals was used. A questionnaire was circulated at random, and the answers were analyzed using percentage tables.150 questionnaires were distributed, and 120 responses were received in return. The findings of this study shed important light on the current level of artificial intelligence knowledge and awareness among radiology residents and technologists, highlighting the need for better education and procedures. It should be noted that AI is considered to be a powerful tool with the potential to improve radiologists' skills and patient outcomes, while also underscoring the necessity of responsible adoption and ongoing collaboration between human professions.

Keywords - Artificial intelligence, radiology, machine learning, computer-aided diagnosis, transformative impact.

I. INTRODUCTION

Artificial intelligence (AI), a branch of computer science, is concerned with creating algorithms that can solve problems without being explicitly programmed. In order to aid or replace humans in problem-solving, it entails mimicking intelligent behaviour in computers. AI has the power to fundamentally revolutionise radiology by improving patient care and changing how reports are read. The term "artificial intelligence"[1] refers to a wide range of different disciplines and techniques, including:

- Computer-Aided Diagnosis/Detection (Cad)
- Machine Learning
- Natural Language Processing Rule-Based Expert
- Systems Radiomics
- Reduction Of Noise (Noise Reduction) And Optimization Of Image Acquisition

Deep learning inside machine learning and other AI algorithms are capable of analysing enormous datasets, including those used in radiology, because to significant advancements in processing power and memory. Radiomics, rule-based expert systems, computer-aided diagnosis, machine learning, natural language processing, and image optimisation are just a few of the fields that this technology crosses.The phrase "artificial intelligence" was first used in 1956 during a research gathering at Dartmouth by mathematician John McCarthy[2]. Since then, academic study of AI has advanced and attracted attention. It is built on the

Turing test, which was developed by early pioneers like Alan Turing.[3]. There is a lot of promise for AI in radiology. AI algorithms that analyse medical images, identify anomalies, and find them are able to provide radiologists with preliminary evaluations.

They are also able to maintain accurate records of patient medical care. After passing the testing phase, AI is currently being implemented in the medical sector.[4]

AI and doctors working together will have a big impact on radiology. Radiologists can evaluate and enhance draught reports created by AI systems. Radiologists can be alerted to critical patients by quick identification of critical outcomes. By selecting tests based on its analysis and suggesting follow-ups based on protocol, AI can help organise the to-do list. This collaboration has the potential to boost output, accelerate the turnaround of reports, and address the lack of radiologists. However, there are several limitations to AI in radiology. At the moment, AI systems are powerful yet exposed because any image noise could reduce their accuracy. Technical issues arise when dealing with scans of poor quality or challenging patient settings. Getting patients to believe AI-generated reports for results that could be catastrophic is another difficulty. Additionally, the cost of insurance coverage for expensive AI-analysed investigations needs to be considered.[6] Both radiologists and AI programmers must adhere to their moral commitments and standards. Protecting individual privacy while utilising intelligent computers' capacity to assess patient scans and medical information must be balanced. With the patient's permission, waivers may permit third parties to review and add to health records.[7]

Despite the enormous potential of AI, radiologists will still be required. On the other hand, it will greatly enhance patient care. Radiologists can provide useful feedback to AI developers so that the technology can be used to its greatest potential. Improved communication with ordering physicians, quicker report turnaround, and thorough patient care management are just a few of the ways AI might benefit the radiology sector and its patients.[9] The rapidly evolving field of artificial intelligence may revolutionise radiology.[10] By applying powerful algorithms, AI can assist radiologists in analysing medical images, managing patient information, and providing more accurate diagnoses. Although there are challenges to be overcome, applying AI to radiology has the potential to greatly improve patient care and outcomes.[11]

II. REVIEW OF LITERATURE

Bhargavan-Chatfield M, Et Al. (2021). Artificial Intelligence in Radiology: Current Technology Concepts and Potential Implications for Practice. Radiology: Artificial Intelligence, 3(3): e210010.An overview of the many technologies and ideas currently being employed in radiology's usage of artificial intelligence is given in this article. It also talks about the possible effects on radiology practise, like increased productivity, accuracy, and workflow.

Gulshan V, et al. (2016). Development and Validation of a Deep Learning Algorithm for Detection of Diabetic Retinopathy in Retinal Fundus Photographs. JAMA, 316(22): 2402-2410. In their paper, the authors offer a deep learning technique that can successfully identify diabetic retinopathy in retinal fundus images. This study reveals how artificial intelligence could be used to automate the diagnosis of specific diseases, which could have a big impact on the area of radiology.

Erickson BJ, et al. (2017). Machine Learning for Medical Imaging. Radiographics, 37(2): 505-515. In this article, we talk about how radiology, among other medical imaging fields, has adopted machine learning techniques. It examines the application of machine learning algorithms for image analysis, classification, and decision support while highlighting both the advantages and drawbacks of such algorithms in clinical practise.

Choy G, et al. (2018). Current Applications and Future Impact of Machine Learning in Radiology. Radiology, 288(2): 318-328. The authors give a summary of the most recent uses of machine learning in radiology, such as picture segmentation, radiomics, and computer-aided diagnostics. They also talk about how machine learning may affect radiology in the future in terms of things like personalised treatment and workflow improvement.

Chartrand G, et al. (2017). Deep Learning: A Primer for Radiologists. Radiographics, 37(7): 2113-2131. This piece provides radiologists with a basic understanding of deep learning, a branch of machine learning that has shown considerable promise in the field of medical imaging. It introduces the fundamental ideas of deep learning and some of the potential uses it might have in radiology, such as picture interpretation and analysis.

Topol EJ. (2019). High-Performance Medicine: The Convergence of Human and Artificial Intelligence. Nature Medicine, 25(1): 44-56. The fusion of human and artificial intelligence in radiology is discussed in this review. It focuses on the requirement for cooperation between AI systems and healthcare practitioners as it examines the possible advantages and difficulties of incorporating artificial intelligence into clinical practise.

Thrall JH. (2018). Artificial Intelligence in Radiology: Are We Ready? Radiology, 286(2): 617-619. The author talks about how ready radiology is to include artificial intelligence. This opinion post emphasises how AI could improve radiology practise, but it also raises questions about matters like ethics, trust, and the requirement for radiologist input in the creation of AI algorithms.

Shah NH, et al. (2019). Opportunities for Artificial Intelligence in Advancing Precision Medicine. Nature Reviews Drug Discovery, 18(6): 387-405. The potential of artificial intelligence to advance precision medicine, which includes individualised

diagnosis and treatment, is examined in this article. It talks about how AI might be used in radiology, especially when it comes to utilising massive datasets and multi-modal imaging for better patient care.

III. AIM AND OBJECTIVES

3.1 To determine the level of knowledge and understanding among radiology residents and technologists about artificial intelligence in radiology.

3.2 To educate and spread awareness about artificial intelligence in radiology among radiology residents, technologists, and trainees.

3.3 This study makes the assumption that radiology technologists and residents may have worries or concerns about how artificial intelligence would affect their profession. This notion is supported by the scant literature on the subject and the contradictory findings of the studies that have been conducted.

IV. RESEARCH METHODOLOGY

4.1 Research approach: : Quantitative approach

4.2 Research design: : Cross sectional

4.3 Sample size : 150

4.4 *Sampling technique* : Convenience sampling technique

4.5 Statistical method : Descriptive statistical method

Sampling criteria

4.6 Inclusion criteria : residents, technologists and trainees working in the radiology department in the different hospitals of Delhi and (Gurugram) Haryana

4.7 Exclusion criteria : Technologists and trainees working in the radiology who were not willing to participate

V. METHOD

Among radiologists, radiology technologists, and trainees working in the radiology department of various hospitals in Delhi and (Gurugram) Haryana, a study titled "Your expectations about AI in radiology" was undertaken. The SUSHANT University's ethical committee gave the survey their blessing. A self-structured questionnaire with three sections of multiple-choice questions was given to the participants.

5.1 The first section asked about the participants' age, gender, subspecialty, working status, and type of institution. No personal identifying information was collected.

5.2 The second section had 15 multiple-choice questions about how participants felt or predicted the impact of AI applications in radiology in the next 5-10 years.

5.3 The third section included questions about participants' awareness of artificial intelligence and their habitual use of AI.

5.4 Participants were informed that their participation was voluntary, and their responses would be kept confidential.

VI. RESULTS AND DATA ANALYSIS

5.1 Results of Descriptive Statics of Study

Table 1 Distribution of Respondents According to Gender

S. No	Gender	Count	Percentage
1	**Male**	110	73.4%
2	**Female**	40	26.6%
Total		150	100%

The above table shows the gender distribution of the sample. It can be inferred that out pf the sample of 150 there are 110 males i.e. 73% and 40 females i.e. 26% .

Table 2 Distribution of Respondents According of Age (n=150)

S. No	Age	Count	Percentage
1	20-29	53	35.3%
2	30-39	70	46.6%
3	40-49	24	16.2%
4	50-59	2	1.3%
5	60-69	1	0.6%
Total		150	100%

The above table shows the Age distribution of the sample into 5 groups. It can be inferred that out pf the sample of 150 there are 0.6% were observed in age group 60-69, Age group 50-59 were 1.3 %, Age group 40-49 were 16.2%, Age group 20-29 were 35.3%, Age group of 30-39 were 46.6%.

.Table 3 Working place

S. No	Working place	Count	Percentage
1	HOSPITAL	105	70%
2	UNI/HOSPITAL	45	30%
Total		150	100%

The above table shows the workplace of participants of the sample. It can be inferred that out pf the sample of 150 there are 70% are working in Hospitals were as 30% of the respondents are working in UNI/Hospitals

Table 4 Marital status

S. No	Marital Status	Count	Percentage
1	Married	58	38.6%
2	Unmarried	92	61.3%
Total		150	100%

The above table shows the marital status of the sample. It can be inferred that out pf the sample of 150 there are 38.6% were married and 61.3% were unmarried

Table 5 Distribution of patients According to professional position/Designation

S.No	Designation	Count	Percentage
1	Trainee	64	42.6%
2	Radiology Resident	44	29.4%
3	Radiology technologist	42	28%
Total		150	100%

The above table shows the Distribution of patients According to professional position/Designation of the sample. It can be inferred that out pf the sample of 150 there are 42.6% were Trainee,29.4 % were Radiology residents and 28 % were Radiology Technologists

Table 6 Have you ever participated in any Artificial intelligence Based workshop?

S.No	Participated in any Artificial intelligence Based workshop	Count	Percentage
1	YES	25	16.6%
2	NO	125	83.4%
Total		150	100%

Out of 150 respondents,16.6% of respondents have participated in any AI based workshop while as 83.4 % of the respondents have not attended AI based workshop

Table 7 Which radiological subspecialties do you predict will be more impacted by AI in the following 5–10 years?

S. No	Response Q1	Count	Percentage
1	A	49	32.6%
2	B	55	36.6%
3	C	29	19.3%
4	D	17	11.4%
Total		150	100%

Out of 150 responses,11.4% of the respondents think that breast will be more impacted, while as 32.6 % of the respondents think that cardiovascular will be more impacted, 36 % of the respondents think that Abdominal imaging will be more impacted and 19.3% of the respondents think that other than these imaging methods will be impacted in next 5-10 years

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Table 8 Which procedures do you anticipate will be the most significant fields of AI applications in the following 5–10 years?

S. No	Response Q2	Count	Percentage
1	A	39	26%
2	B	70	46.6%
3	C	28	18.6%
4	D	13	8.6%
Total		150	100%

Above table shows that out of 150 respondents 26% of respondents think that Radiography, Mammography Ultrasound, Angiography/Fluoroscopy will be most significant fields of AI applications in the following 5–10 years, while as 46.6% of respondents say that CT, MRI, PET/Nuclear, 18.6 % respondents think that Hybrid imaging, DXA and 8.6 % think that Other than these modalities.

Table 9 Which of the accompanying AI applications you believe are more significant as helps to radiological calling?

S. No	Response Q3	Count	Percentage
1	A	47	31.3%
2	B	55	36.6%
3	C	48	32%
4	D	0	0%
Total		150	100%

Total 150 respondents responded to this question out of which 31.3% believe that Imaging protocol optimization are more significant while as 36.6 % believe that Image post-processing are more significant and 32 % believe that Detection in asymptomatic subjects (screening), are more significant as helps to radiological calling,0 % thinks other than this.

Table 10 Do you anticipate an AI sway on expert radiologist's life regarding measure of occupation positions in the following 5–10 years?

S. No	Response Q4	Count	Percentage
1	A	38	25%
2	B	66	44%
3	C	26	17.3%
4	D	20	13.3%
Total		150	100%

Out of 150 responses 25% of respondents chooses No, 44 % chooses Yes, job positions will be reduced, while as 17.3% of respondents says Yes, job positions will Increase and 13 % of respondents thinks None ofthese statements.

Table 11 In the following 5–10 years, the utilization of AI-based applications will make radiologists' obligations?

S. No	Response Q5	Count	Percentage
1	A	40	26.6%
2	B	70	46%
3	C	11	7.3%
4	D	29	19.3%
Total		150	100%

Out of 150 respondents, 26.6% of respondents believe that AI-based applications will make radiologists' obligations More technical, 46% of respondents believe that it will be More clinical,7.3% believe that it will remain Unchanged and 19.3 % of respondents thinks that Other than these statements.

Table 12 Do you believe that, in the following 5–10 years, the utilization of AI-based applications will assist with announcing additionally assessments outside the field of sub-specialization?

S. No	Response Q6	Count	Percentage
1	**A**	36	24%
2	**B**	60	40%
3	**C**	40	26.6%
4	**D**	22	14.6%
Total		150	100%

Total respondents responded in this statement are 150, out of which 24 % stated that No, radiologists will be more focused on radiology subspecialties,40 % of respondents choose Yes, radiologists will be less focused on radiology subspecialties. While as 26.6% believes that the rate of dedication to subspecialties willremain unchanged and 14.6% other as their choice.

Table 13 Do you predict an AI sway on expert radiologist's life regarding absolute revealing remaining burden in the following 5–10 years?

S. No	Response Q7	Count	Percentage
1	**A**	24	16%
2	**B**	53	35.3%
3	**C**	40	26.6%
4	**D**	33	22%
Total		150	100%

Out of 150 responses 16 % of responses No AI sway on expert radiologist's life regarding absolute revealing remaining burden in the following 5–10 years,35.5 % stated that Yes, it will increase, 26.6%responses reveals Yes, it will be reduced and 22 % None as their option.

Table 14 In the following 5–10 years, who will assume the lawful liability of AI-framework yield?

S. No	Response Q8	Count	Percentage
1	**A**	60	40%
2	**B**	53	35.5%
3	**C**	21	14%
4	**D**	16	10.6%
Total		150	100%

Out of 150 responses 10.6% thinks Radiologists will assume the lawful liability of AI-framework Yield, 14 % chooses other physicians (e.g., clinicians asking for the imaging study),while as 35.5 % choosesDevelopers of AI applications and 40% thinks other than above mentioned options.

Table 15 In the following 5–10 years, will patients generally acknowledge a report from AI applications without management and endorsement by a doctor?

S. No	Response Q9	Count	Percentage
1	A	20	13.3%
2	B	70	46.6%
3	C	30	20%
4	D	30	20%
Total		150	100%

Out of 150 responses 13.3% of the participants think Yes, the patients will generally acknowledge a report from AI applications without management and endorsement by a doctor, 46.6 % stated No, while as 20% says that it is Difficult to estimate at present and 20 % says other than this mentioned option.

Table 16 How might be the connection between the radiologist and the quiet in light of AI presentation?

S. No	Response Q10	Count	Percentage
1	A	33	22%
2	B	44	29.3%
3	C	58	38.6%
4	D	15	10%
	Total	150	100%

Out of 150 responses 22% of participants says that it will be More impersonal, 29.3 % says that it will beMore interactive, while as 38.6 % says that it will remain unchanged and 10% says none.

Table 17 Do you think an artificial intelligence may impact on radiology technologists also?

S. No	Response Q11	Count	Percentage
1	A	36	24%
2	B	56	37.3%

3	**C**	30	20%
4	**D**	28	18.6%
Total		150	100%

Out of 150 participants 18.6% chooses No as artificial intelligence may not impact on radiology technologists, 20% says yes artificial intelligence may impact on radiology technologists also, while as 37.3% of participants says No, never, rest 24 % of the participants says its difficult to answer now.

Table 18 Should radiology technologists be educated on Artificial Intelligence?

S. No	**Response Q12**	**Count**	**Percentage**
1	**A**	105	70%
2	**B**	45	30%
Total		150	100%

Above mentioned graph shows that out of 150 participants 70 % of participants say Yes radiology technologists be educated on Artificial Intelligence while as 30 % of participants think that radiology technologists should not be educated on Artificial Intelligence.

Table 19 Are you Utilizing Artificial Intelligence Services in Your Clinical Practice?

S. No	**Response Q13**	**Count**	**Percentage**
1	**A**	24	16%
2	**B**	104	69.3%
3	**C**	21	14%
4	**D**	1	0.6%
Total		150	100%

150 participants responded this question out of which 16 % of participants say yes we are utilizing AI service in our clinical practice, 69.3% of participants chooses No we are not utilizing AI service and 14% of participants are planning to utilize.

Table 20 Do you believe artificial intelligence poses a threat to the radiologist's assistance Function?

S. No	**Response Q14**	**Count**	**Percentage**
1	**A**	87	58%
2	**B**	63	42%
Total		150	100%

Total no of participants answered this question are 150 out of which 58 % of participants believe that Yes artificial intelligence poses a threat to the radiologist's assistance Function, while as 42 % of participants believe that NO, artificial intelligence poses a threat to the radiologist's assistance Function.

Table 21 Are you involved in research projects on AI-based application development?

S. No	Response Q15	Count	Percentage
1	A	2	1.3%
2	B	60	40%
3	C	43	28.6%
4	D	45	30%
Total		150	100%

Out of 150 responses 1.3 % of participants says yes, testing, 40 % participants choose yes developing, while as 28.6% of participants chooses No, but planning to be involved and 30 % chooses No.

Table 22 If there is Artificial Intelligence course in your institute, do you want to join?

S. No	Response Q1	Count	Percentage
1	A	80	53.3%
2	B	50	33.3%
3	C	20	13.3%
4	D	0	0%
Total		150	100%

Out of 150 responses results reveal that 53.3 % of the participants are willing to join AI course if available, 33.3 % of participants chooses No, while as 13.3 % of participants are not interested to join this course.

Table 23 In your opinion, how much human radiologists' carrier will be impacted by Use of Artificial Intelligence?

S. No	Response Q2	Count	Percentage
1	A	25	16.6%
2	B	63	42%
3	C	40	26.6%
4	D	22	14.6%
Total		150	100%

Results reveal that 16.6% of the participants thinks that 0 %1 human radiologists' carrier will be impacted by Use of Artificial Intelligence,42% of participants think that 10 % of carrier will be impacted by the use of AI, while as 26.6 % of the participants thinks that 50 % of carrier will be impacted and 14.6 % of the participants thinks that 100 % of carrier will be impacted.

Table 24 Have you ever worked where Artificial Intelligence was prasticised?

S. No	Response Q3	Count	Percentage
1	A	26	17.3%
2	B	34	22.6%
3	C	48	32%
4	D	42	28%
Total		150	100%

Out of 150 responses 17.3 % of participants worked every time where Artificial Intelligence was plasticized, 22.6 % of participants said yes, mostly ,32 % participants said yes sometimes we worked their where AI was plasticized and 28% had never worked.

Table 25 Do you Think Artificial Intelligence Will Better Diagnose Then Human Radiologist?

S. No	Response Q4	Count	Percentage
1	A	29	19.3%
2	B	54	36%
3	C	20	13.3%
4	D	47	31.3%
Total		150	100%

19.3 % of participants think that yes mostly Artificial Intelligence Will Better Diagnose Then Human Radiologist,36 % of participants say No, 13.3 % of participants says No every time and 31.3 % of participants believe that May be Artificial Intelligence Will Better Diagnose Then Human Radiologist

Table 26 Do you Think People will accept the Diagnosis of Artificial Intelligence?

S. No	Response Q5	Count	Percentage
1	A	24	16%
2	B	51	34%
3	C	42	28%
4	D	33	22%

Total	150	100%

Results reveal that 16% of participants believe that yes every time People will accept the Diagnosis of Artificial Intelligence,34 % of participants believe that yes mostly People will accept the Diagnosis of Artificial Intelligence,28 % believe that yes sometimes People will accept the Diagnosis of Artificial. Intelligence and 22 % of participants believe that no never People will accept the Diagnosis of Artificial Intelligence.

Table 27 How happy would you be for AI to assess your scan without the help of a human doctor?

S. No	**Response Q6**	**Count**	**Percentage**
1	**A**	41	27.3%
2	**B**	68	45.3%
3	**C**	41	27.3%
4	**D**	0	0%
Total		150	100%

Out of 150 response 27.3% of participants are unhappy for AI to assess your scan without the help of a human doctor, 45.3 % of participants are happy that AI to assess your scan without the help of a human doctor, 27.3 % of participants are not sure

Table 28 If the AI was at least as accurate as a doctor, who would you prefer made the final diagnosis?

S. No	Response Q7	Count	Percentage
1	A	29	19.3%
2	B	60	40%
3	C	61	40.6%
4	D	0	0%
	Total	150	100%

Out of 150 responses 19.3% of participants thinks that Doctor alone, while as 40 % of participants believethat Doctor with AI and 40.6% of participants reveal that AI alone.

Table 29 Do you think that Artificial Intelligence Should be introduced in every Hospital for better Diagnosis?

S. No	**Response Q8**	**Count**	**Percentage**
1	**A**	19	12.6%
2	**B**	70	46.6%
3	**C**	31	20.6%

4	**D**	30	20%
Total		150	100%

Results reveal that out of 150 responses 12.6% of participants thinks that yes, every time Artificial Intelligence Should be introduced in every Hospital for better Diagnosis, 46.6% of participants believe that yes mostly that Artificial Intelligence Should be introduced in every Hospital for better Diagnosis, 20.6 % says yes sometimes and 20 % thinks no never Artificial Intelligence Should not be introduced in every Hospital for better Diagnosis

VII. DISCUSSION

Medical image analysis has been greatly enhanced because to deep learning and other AI techniques. They are capable of providing quantitative analyses and automatically spotting complex patterns in the images. This increases the precision with which medical experts in radiology may detect and monitor problems.Clinicians used to have to visually inspect medical images in order to diagnose and understand diseases. AI-based methods, on the other hand, can assess the images and reach objective conclusions. This improves the consistency and accuracy of radiological assessments when paired with medical discretion. AI in medical imaging seeks to improve the efficiency of radiology. Radiologists gain from it since it lessens their workload and provides them with pre-screened images and specific features. By doing this, errors and the need for manual labour are reduced.There are two main types of AI approaches in radiology. The first type uses pre-defined features that are derived from mathematical equations and then incorporated into machine learning models. Despite the fact that these features are helpful, they rely on expert discretion and may not always be the best option. The second type, deep learning, has generated a lot of interest. It lets algorithms to automatically learn characteristics from the data itself without the need for pre-defined features. By quantifying tissue qualities, this data-driven approach can improve patient care and diagnosis. Human operations like image segmentation become less necessary as a result of deep learning. If given enough training data, deep learning systems can automatically identify problem areas in photographs without human interaction. To find out more about how artificial intelligence is affecting radiology, the current descriptive study was done among radiology residents, radiology technicians, and trainees working in the radiology department. This examination was carried out by the radio diagnostic and imaging departments of various hospitals in Delhi and (Gurugram) Haryana. A self-structured questionnaire with 29 questions was given to the participants. In total, 150 participants participated in this study. This descriptive study involved 150 participants, 42% of whom were trainees, 29% of whom were radiology residents, and 28% of whom were radiological technologists employed in academic or non-academic hospitals. Respondents to the poll practised a variety of subspecialties. None of the possible answers was picked.The provided data presents the responses of 150 participants regarding various aspects related to artificial intelligence (AI) in radiology.

Let's discuss some key findings from the data:

1. Participant Demographics: The data indicates that 73.4% of the respondents were male, while 26.6% were female. In terms of age distribution, the majority of participants fell into the age groups of 30-39 (46.6%) and 20-29 (35.3%).

2. Attendance in AI Workshops: Only 16.6% of the respondents had participated in AI-based workshops, while the majority (83.4%) had not attended such workshops.

3. Impact on Imaging Modalities: When asked about the impact of AI in the next 5-10 years, the respondents believed that cardiovascular imaging (32.6%) and abdominal imaging (36%) would be more impacted. Additionally, 26% of respondents believed that radiography, mammography, ultrasound, and angiography/fluoroscopy would be the most significant fields of AI applications.

4. Significance of AI Applications: The participants identified various areas where AI would have significant implications. The responses indicated that imaging protocol optimization (31.3%), image post-processing (36.6%), and detection in asymptomatic subjects (32%) were considered the most significant applications of AI.

5. Job Positions: A significant portion of respondents (44%) believed that job positions would be reduced due to AI, while 17.3% thought job positions would increase, and 13% did not choose either option.

6. Impact on Radiologists' Obligations: Participants had different perspectives on the impact of AI on radiologists' obligations. The largest percentage (46%) believed that radiologists' obligations would become more clinical, while 26.6% believed they would become more technical.

7. Focus on Radiology Subspecialties: In response to whether radiologists' focus on subspecialties would change, 40% of respondents believed that radiologists would be less focused on radiology subspecialties, while 26.6% thought the dedication to subspecialties would remain unchanged.

8. Acceptance of AI Reports: A considerable portion of participants (35.5%) believed that AI-based reports would increase, while 22% believed they would decrease. However, 16% did not expect any impact, and 26.6% had other opinions.

9. Liability and Trust: When asked about liability for AI systems, 35.5% of participants chose developers of AI applications, while 40% chose other options. Regarding patient acceptance of AI reports, 46.6% believed that patients would not generally acknowledge a report from AI applications without management and endorsement by a doctor.

10. Interaction with AI: Participants had varying opinions on the nature of interaction with AI in radiology. While 29.3% believed it would be more interactive, 38.6% thought it would remain unchanged, and 22% did not choose any option.

11. Impact on Radiology Technologists: A significant number of participants (70%) believed that radiology technologists should be educated on artificial intelligence, while 18.6% thought AI may not impact radiology technologists.

12. Utilization of AI Services: Only 16% of participants reported utilizing AI services in their clinical practice, while 69.3% stated they were not currently using AI services but were open to utilizing them in the future.

13. Threat to Radiologist's Assistance Function: The responses were divided, with 58% of participants perceiving AI as a threat to the radiologist's assistance function, while 42% did not view it as a threat.

14. Interest in AI Courses: A majority of participants (53.3%) expressed interest in joining an AI course if available, while 33.3% were not interested in joining, and 13.3% had no interest in the course.

15. Impact on Radiologist's Career: Participants had different expectations regarding the impact of AI on a radiologist's career. While 26.6% believed that 50% of the career would be impacted, 14.6% believed it would be 100%, and 42% thought only 10% would be impacted.

16. Experience with AI Implementation: The participants' experiences with AI implementation varied. Some had never worked with AI (28%), while others had worked where AI was utilized, either sometimes (32%) or most of the time (22.6%).

17. Patient Acceptance of AI Diagnosis: Participants' opinions on patient acceptance of AI diagnosis were divided, with 34% believing that people would accept the diagnosis of AI mostly, and 28% believing it would only happen sometimes.

18. Role of AI in Diagnostic Process: Participants had different perspectives on the role of AI in the diagnostic process. While 40.6% believed that a doctor with AI would be the preferred option, 19.3% chose a doctor alone, and 40% had other opinions.

19. Introduction of AI in Hospitals: A majority of participants (59.2%) believed that AI should be introduced in every hospital for better diagnosis, while 20.6% thought it should only be introduced sometimes, and 20% believed it should not be introduced.

The current descriptive study was conducted among radiology residents, radiology technicians, and trainees employed in the radiology department to learn more about how artificial intelligence is changing radiology. The radio diagnostic and imaging departments of various hospitals in DELHI and (GURUGRAM) HARYANA performed this examination. The participants were given a self-structured questionnaire with 29 items. This study included 150 individuals in total. 150 people participated in this descriptive study, of whom 42% were trainees, 29% were radiology residents, and 28% worked as radiological technologists in university or non-academic hospitals. The survey's participants worked in a range of subspecialties. None of the potential solutions was chosen.

VIII. CONCLUSION

In conclusion, the study's participants had positive opinions overall regarding the employment of AI software in radiology. They were aware that AI may improve patient care and refocus radiology on the needs of the patient. However, it became clear that radiology technicians, residents, and other field trainees are not fully aware of how quickly and significantly AI may change radiology. This explains why some respondents expressed scepticism about the role that radiology experts could play in addressing the effects of AI and creating AI systems. It's critical to keep in mind that there are still many ethical and legal issues surrounding the use of AI in radiology that demand attention. The direction radiology takes will depend on the decisions and actions we take today and in the foreseeable future. We have the chance to fully take advantage of what AI can do for radiology and the professionals that work in the field. The influence of AI on radiography is expected to be greater than on any other area of medicine. In a manner similar to how Roentgen's discovery of X-rays changed the medical field, it may change how radiology is practised.The opportunity exists for radiology residents and technologists to set the example for accepting and responding to this impending change. It's expected to encounter some resistance and uncertainty, just as pilots were first wary of autopilot technology in the early days of automatic flying. However, because radiography has always been at the cutting edge of technological advancements, radiologists are used to overcoming these challenges. To be prepared for this change, modern radiology residents, techs, and trainees must have a fundamental understanding of machine learning and deep learning systems. They should be aware of the drawbacks of these systems as well as the characteristics of the training datasets. Although they shouldn't be expected to be specialists in all facets of AI deployment, they should be able to understand the technical lingo used by data scientists and other professionals. The opportunity for radiography to embrace and utilise AI has here. There are several solutions available to improve diagnosis accuracy, improve patient care, and expedite processes. Addressing the ethical, legal, and practical concerns around the use of AI is essential to ensuring that technology is deployed in the field in an ethical and efficient manner.

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