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**Original Research Article**

# A cross-sectional study to assess the knowledge, attitude and practice of artificial intelligence in medical field among doctors in a tertiary care hospital

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## ABSTRACT

**Background:** Artificial intelligence (AI) has already been widely adopted in various fields which has accelerated its growth in the medical field as well. As AI becomes increasingly important in healthcare, it is essential to foster future healthcare professionals with the required skills and knowledge. Therefore, the primary objective of our study was to assess the knowledge, attitude, and practice related to AI in medicine among doctors in a tertiary care hospital.
**Methods:** A cross-sectional, observational and questionnaire-based study was conducted among doctors with their consent working in various departments of our hospital. A total of 17 questionnaire were included: 5 knowledge based, 7 attitude-based, 5 practices based. Statistical analysis was performed using SPSS software version 26.0. Descriptive analysis including frequency, percentages and central tendencies was calculated for each domain and were tabulated.
**Results:** A total of 135 doctors were enrolled in this study. Among which 87.4% of associate professors had wider knowledge about AI in medical filed. The attitude-based questionnaire followed a Likert scaling ranging from strongly agree to strongly disagree which revealed 70.1% of professors strongly agreed that AI is a much-needed tool in medical field and has positive impact on healthcare. The overall practice-based Likert scaling reflected that 69% of the professors often used AI in their medical field for treating patients and for conducting research.
**Conclusions:** AI in healthcare is still at a rudimentary level and more such research has to be conducted to pave a path for upskilling patient care.

**Keywords:** Artificial intelligence, Attitude, Knowledge, Medical field, Practice

## INTRODUCTION

The term artificial intelligence (AI) was coined by John McCarthy, who is considered the father of AI.[1] AI simulates human intellect by using data sources to make independent decisions or assist humans in making decisions.[2] AI is a comprehensive term encompassing the technology that enables computer hardware and software to mimic intelligent human behaviour and reach human-level performance.[2,3] AI technologies have been applied in many professions such as computer science, law and industrial manufacturing, which paved the way for rapid expansion in the medical field as well.[3] For instance, AI technologies have been applied in many professions such as computer science, law and industrial manufacturing, which paved the way for rapid expansion in the medical field as well.[3]

AI has been implemented in various healthcare sector for administration, diagnosis, treatment planning, medical education, medical record analysis, drug development, and triage assessment.[4] Also in oncology for cancer

grading and diagnosis, and endoscopes in gastroenterology to detect and diagnose pathological lesions. Machine learning (ML) and deep learning (DL), which are subtypes of AI has been used in cardiology to identify patients at risk of heart attack and in dermatology to diagnose skin lesions from clinical and dermoscopic images. AI has raised its standards among ophthalmologists for detecting diabetic retinopathy, age-related macular degeneration and retinopathy of prematurity (ROP). It has wide application in drug designing, medical education and training of health professional students.[5]

AI helps to decrease the errors due to traditional methods caused by medical burnout, the psychological impact of personal and professional workloads on doctors, leading to occasional inaccuracy of the diagnosis, prescription errors and improper record maintenance.[6]

AI helps in maintaining the transcribing notes, inputting and arranging patients' data onto portals such as electronic health record (EHR), which spares some time for busy doctors. It also helps in diagnosing patients remotely, enabling the expansion of medical services in rural areas, especially during a pandemic period like COVID-19.[6]

According to the WHO, by 2035, there will be a shortage of nearly 12.9 million health care workers worldwide. The influence of AI and machine learning in our society today is on the rise, but requires sound knowledge for effective application in healthcare. It is important that AI is taught to medical students and training programs for doctors, where making wrong decisions has grave consequences.[6,7]

Recognizing the growing importance of AI in its incorporation in medical education for equipping future healthcare professionals with the skills and knowledge necessary to navigate the rapidly developing fields.[7]

Hence, this study aimed to assess the knowledge, attitude and practice of AI in the medical field among doctors in a tertiary care hospital.

## METHODS

A cross-sectional questionnaire-based study was conducted among doctors in a tertiary care hospital located in the southern districts of Tamil Nadu for a duration of 6 months from April 2025 to September 2025. Ethical approval was obtained from the institutional ethics committee (ECE NO. 17/26thIEC/2025/ dated:11.04.2025). Informed consent was obtained from participants willing to enroll in the present study.

### *Inclusion criteria*

Age ≥18 years of both genders, doctors willing to participate and give informed consent

### *Exclusion criteria*

Not willing to participate and give informed consent.

### *Methodology*

A set of 17 online questionnaires (via Google forms) was used to obtain respondents socio-demographic information and self-administered close-ended structured questionnaires were developed which was used for collecting the data which included 5 knowledge based questionnaires which assessed their knowledge perception, education and their known facts towards AI in medical field, 7 attitude based questionnaires was about exploring perceptions, beliefs, opinion and feelings towards the use of AI in therapeutic applications and 5 Practice based questions was on current practices related to recommending or utilizing AI in clinical settings, their individual methods of practice. The questionnaire was validated by performing pilot testing in 20 participants. The reliability of the questionnaire was assessed by Cronbach's alpha (α=0.7) and was found to be reliable. Hence, the score was satisfactory, and the study was continued for a larger population.

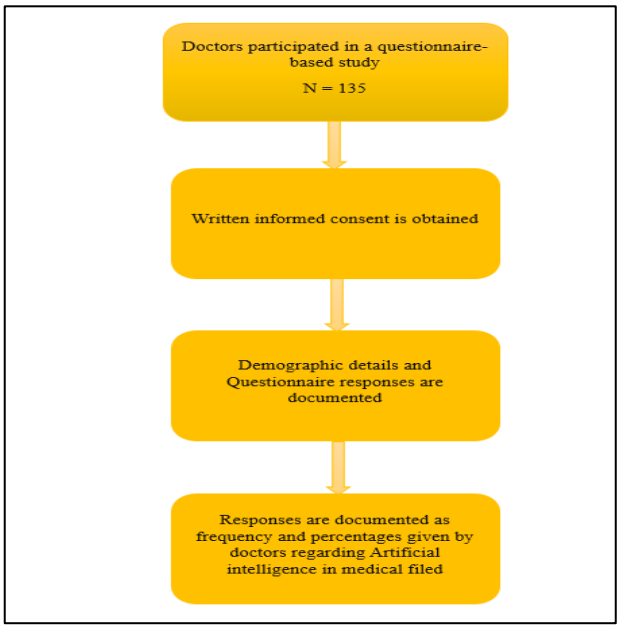


**Figure 1: Study flowchart.**

According to the random sampling method, using the complete enumeration technique for a target population of n=206 with a confidence level of 95%, a relative error of 5%, and a population proportion 50%, the sample size was 135. The data collected from the structured questionnaire were incorporated into MS Excel by awarding 1 point for each affirmative response (yes) and 0 points for a negative response (no) in the knowledge-based questionnaires. The attitude-based questionnaires followed the Likert scale, ranging from strongly agree to strongly disagree, and practice-based questionnaires Likert scaling ranged from all the time to never.

Statistical analysis was performed using SPSS software version 26.0. Descriptive analysis, including frequency, percentages and central tendencies, was calculated for each domain and was tabulated.

## RESULTS

A total of 135 doctors from a tertiary care hospital participated in this study. Among them, 50.4% were males and 49.6% were females (Figure 2). Among them, a maximum response of 43.7% were found between the age group of 28-37 year followed by 29.6% of responses between the age group of 38-47 years, with the mean age of 38.6±10.46 years (Table 1). In the present study, out of 135 doctors, 26.7% were assistant professors, 25.2% professors, 22.2% Senior residents, 15.6 post graduates from various departments and 10.4 % associate professors (Figure 3).

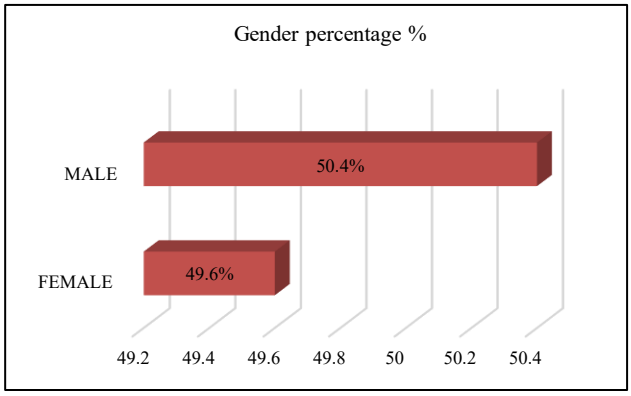


**Figure 2: Gender distribution of study participants.**

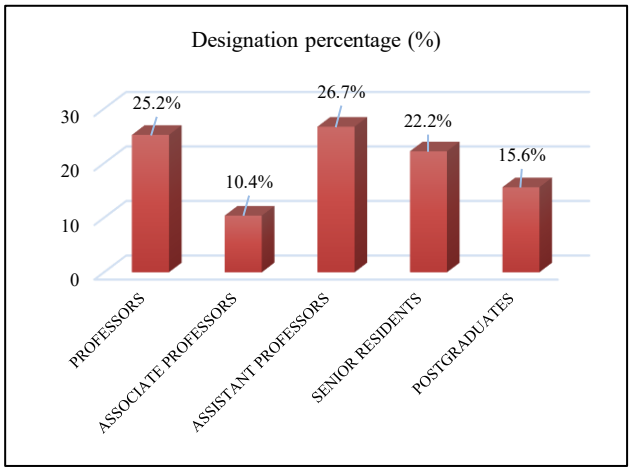


**Figure 3: Designation distribution of study participants.**

Knowledge-wise questionnaire-based response was recorded for 135 participants; among them, a higher number of assistant professors had an idea of AI in the medical field, followed by 93.3% of senior residents. A total of 85.7% of professors, associate professor and postgraduates knew how AI is implemented in their respective departments (Table 2). An open-ended knowledge-based questionnaire on AI tools was put forth which revealed that 37.2% of them use ChatGPT, followed by other tools such as Gemini (10.2%), perplexity (8.8%) and Meta AI (5.2%) in their respective medical fields (Figure 4).

**Table 1: Age distribution of study participants.**

| Age groups (years) | Frequency | Percentage |
|---|---|---|
| **18-27** | 13 | 9.6 |
| **28-37** | 59 | 43.7 |
| **38-47** | 40 | 29.6 |
| **48-57** | 13 | 9.6 |
| **58-67** | 9 | 6.7 |
| **68-77** | 1 | 0.7 |
| **Total** | 135 | 100 |

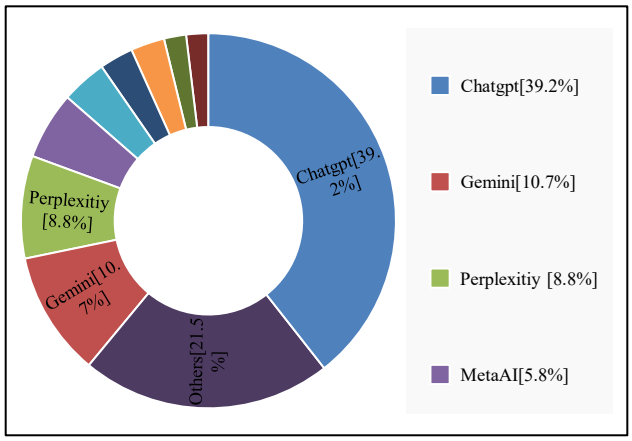


**Figure 4: Distribution of responses for various AI tools used by doctors in their respective field.**

Out of 7 questionnaires under the attitude domain, which followed a Likert scaling, 73.5% of professors strongly agreed that AI is a much-needed tool for medical field, followed by 46.6% of Senior residents. 61.7% of professors believed that AI has a positive impact on healthcare, and 64.7% strongly agreed that it improves patient care and treatment by reducing errors. However, 70.5% of professors and 27.7% of assistant professors believed that the lack of teaching centres and hands-on training limits the effective use of AI in their medical field (Table 3).

In practice-based response, 67.6 % of professors, 50% senior residents and 38% postgraduates often used AI to conduct their research and 67.6 % of professors and 33.3 % postgraduates use AI most of the time for updating their medical knowledge. 82.3% professors and 42.8% of postgraduates from various departments would like to work with AI in the future, most of the time (Table 4).

**Table 2: Positive responses of knowledge-based questionnaires regarding artificial intelligence.**

| Questionnaires | 'Yes' responses | | | | |
|---|---|---|---|---|---|
| | Professors N (%) | Associate professors N (%) | Assistant professors N (%) | Senior residents N (%) | Postgraduates N (%) |
| 1. Do you have any idea of AI in medical field? | 31 (91.1) | 13 (92.8) | 36 (100) | 28 (93.3) | 18 (85.7) |
| 2. Do you have any idea how AI is implemented in your medical field? | 29 (85.2) | 12 (85.7) | 29 (80.5) | 23 (76.6) | 18 (85.7) |
| 3. Do you think there will be any barrier by applying AI in your medical field? | 7 (20.5) | 12 (85.7) | 22 (61.1) | 14 (46.6) | 11 (52.3) |
| 4. Do you think AI will revolutionize medicine? | 33 (97.05) | 12 (85.7) | 35 (97.2) | 26 (86.6) | 18 (85.7) |

**Table 3: Responses of attitude-based questionnaires regarding AI in medical field.**

| Questionnaires | Responses | Professors N (%) | Associate professors N (%) | Assistant professors N (%) | Senior residents N (%) | Postgraduates N (%) |
|---|---|---|---|---|---|---|
| 5. I believe AI is much needed tool in medical field | Strongly agree | 25 (73.5) | 3 (21.4) | 10 (27.7) | 14 (46.6) | 6 (28.5) |
| | Agree | 9 (26.4) | 4 (28.5) | 15 (41.6) | 10 (33.3) | 6 (28.5) |
| | Neutral | - | 7 (50) | 11 (30.5) | 6 (20) | 8 (38.09) |
| | Disagree | - | - | - | - | 1 (4.7) |
| | Strongly disagree | - | - | - | - | - |
| 6. I believe AI will decrease the percentage of errors in the diagnosis | Strongly agree | 22 (64.70) | 3 (21.4) | 7 (19.4) | 3 (10) | 2 (9.5) |
| | Agree | 7 (20.5) | 6 (42.8) | 13 (36.1) | 11 (36.6) | 9 (42.8) |
| | Neutral | 5 (14.7) | 3 (21.4) | 12 (33.3) | 15 (50) | 4 (19.04) |
| | Disagree | - | 2 (14.2) | 4 (11.1) | 1 (3.3) | 6 (28.5) |
| | Strongly disagree | - | - | - | - | - |
| 7. I believe usage of AI has been increased since Covid-19 pandemic for treating patients | Strongly agree | 23 (67.6) | 3 (21.4) | 4 (11.1) | 4 (13.3) | 3 (14.2) |
| | Agree | 7 (20.5) | 5 (35.7) | 12 (33.3) | 21 (70) | 12 (57.1) |
| | Neutral | 2 (5.8) | 6 (42.8) | 15 (41.6) | 5 (16.6) | 2 (9.5) |
| | Disagree | 1 (2.9) | - | 5 (13.8) | - | 4 (19.04) |
| | Strongly disagree | 1 (2.9) | - | - | - | - |
| 8. I believe that use of AI will improve patient care and treatment | Strongly agree | 22 (64.70) | 2 (14.2) | 5 (13.8) | 2 (6.6) | 3 (14.2) |
| | Agree | 10 (29.4) | 8 (57.1) | 13 (36.1) | 21 (70) | 8 (38.09) |
| | Neutral | 2 (5.8) | 3 (21.4) | 18 (50) | 6 (20) | 6 (28.57) |
| | Disagree | - | 1 (7.1) | - | 1 (3.3) | 3 (14.2) |
| | Strongly disagree | - | - | - | - | 1 (4.7) |
| 9. I believe AI has positive impact on healthcare | Strongly agree | 21 (61.7) | 2 (14.2) | 6 (16.6) | 3 (10) | 5 (23.8) |
| | Agree | 12 (35.2) | 9 (64.2) | 17 (47.2) | 22 (73.3) | 6 (28.5) |
| | Neutral | 1 (2.9) | 2 (14.2) | 13 (36.1) | 5 (16.6) | 7 (33.3) |
| | Disagree | - | 1 (7.1) | - | - | 3 (14.2) |
| | Strongly disagree | - | - | - | - | - |
| 10. I believe AI would make clinician job easier | Strongly agree | 21 (61.7) | 3 (21.4) | 5 (13.8) | 3 (10) | 5 (23.8) |
| | Agree | 13 (38.2) | 8 (57.1) | 17 (47.2) | 23 (76.6) | 7 (33.3) |
| | Neutral | - | 2 (14.2) | 14 (38.8) | 4 (13.3) | 6 (28.5) |
| | Disagree | - | 1 (7.1) | - | - | 3 (14.2) |
| | Strongly disagree | - | - | - | - | - |
| 11. I believe lack of teaching centers and hands on application hinder the use of AI in medical field | Strongly agree | 24 (70.5) | 2 (14.2) | 10 (27.7) | 1 (3.3) | 5 (23.8) |
| | Agree | 9 (26.4) | 7 (50) | 14 (38.8) | 22 (73.3) | 13 (61.9) |
| | Neutral | - | 5 (35.7) | 10 (27.7) | 7 (23.3) | 1 (4.7) |
| | Disagree | 1 (2.9) | - | 2 (5.5) | - | 2 (9.5) |
| | Strongly disagree | - | - | - | - | - |

**Table 4: Responses of practice-based questionnaires regarding AI in medical field.**

| Questionnaires | Responses | Professors N (%) | Associate professors N (%) | Assistant professors N (%) | Senior residents N (%) | Postgraduates N (%) |
|---|---|---|---|---|---|---|
| **12. Have you ever applied AI technology in your field of medicine?** | Never | 6 (17.6) | 7 (50) | 17 (47.2) | 4 (13.3) | 3 (14.28) |
| | Rarely | 3 (8.8) | 6 (42.8) | 5 (13.8) | 16 (53.3) | 4 (19.04) |
| | Often | 24 (70.5) | - | 11 (30.5) | 6 (20) | 11 (52.3) |
| | Most of the time | 1 (2.9) | 1 (7.1) | 3 (8.3) | 3 (10) | 3 (14.2) |
| | All the time | - | - | - | 1 (3.3) | - |
| **13. How frequently do you use AI to conduct your research?** | Never | 4 (11.7) | 7 (50) | 15 (41.6) | 4 (13.3) | 5 (23.8) |
| | Rarely | 3 (8.8) | 5 (35.7) | 3 (8.3) | 4 (13.3) | 5 (23.8) |
| | Often | 23 (67.6) | 1 (7.1) | 8 (22.2) | 15 (50) | 8 (38.09) |
| | Most of the time | 4 (11.7) | 1 (7.1) | 9 (25) | 4 (13.3) | 2 (9.5) |
| | All the time | - | - | 1 (2.7) | 3 (10) | 1 (4.7) |
| **14. How frequently do you use AI for updating your medical knowledge?** | Never | 2 (5.8) | 4 (28.5) | 11 (30.5) | - | 2 (9.5) |
| | Rarely | 5 (14.7) | 4 (28.5) | 4 (11.1) | 3 (10) | 1 (4.7) |
| | Often | 4 (11.7) | 4 (28.5) | 11 (30.5) | 19 (63.3) | 11 (52.3) |
| | Most of the time | 23 (67.6) | 1 (7.1) | 9 (25) | 6 (20) | 7 (33.3) |
| | All the time | - | 1 (7.1) | 1 (2.7) | 2 (6.6) | - |
| **15. Have you attended any workshops related to artificial intelligence?** | Never | 8 (23.5) | 6 (42.8) | 21 (58.3) | 12 (40) | 10 (47.6) |
| | Rarely | 23 (67.6) | 4 (42.8) | 8 (22.2) | 14 (46.6) | 6 (28.5) |
| | Often | 2 (5.8) | 4 (42.8) | 5 (13.8) | 3 (10) | 3 (14.2) |
| | Most of the time | 1 (2.9) | - | 1 (2.7) | 1 (3.3) | 2 (9.5) |
| | All the time | - | - | 1 (2.7) | - | - |
| **16. Would like to work with AI in future?** | Never | - | - | 7 (19.4) | - | 2 (9.5) |
| | Rarely | - | 7 (50) | 2 (5.5) | 1 (3.3) | 4 (19.04) |
| | Often | 6 (17.6) | 4 (28.5) | 8 (22.2) | 8 (26.6) | 6 (28.5) |
| | Most of the time | 28 (82.3) | 1 (7.1) | 14 (38.8) | 18 (60) | 9 (42.8) |
| | All the time | - | 2 (14.2) | 5 (13.8) | 3 (10) | - |

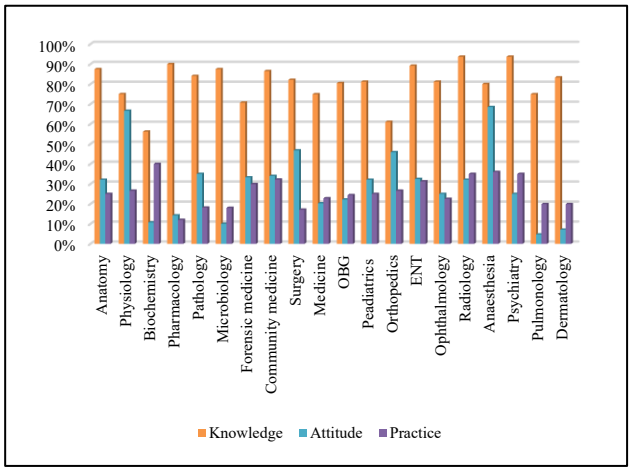


**Figure 5: Department-wise distribution of positive responses for knowledge, attitude and practice of AI in their respective field.**

Out of the 135 participants, department-wise distribution of positive responses for knowledge, attitude and practice of AI in the medical field among doctors was depicted. Among 20 departments psychiatry and radiology departments had the highest percentage of knowledge, with 93.7% respectively, followed by ENT (89.2%) and microbiology department (87.8%). The anesthesia department had the highest percentage among the attitude-based questionnaires with 68.5%, followed by physiology department (66.6%). And the practice-based questionnaires anesthesia department had the highest percentage with 36%, followed by radiology and psychiatry department with 35% each (Figure 5).

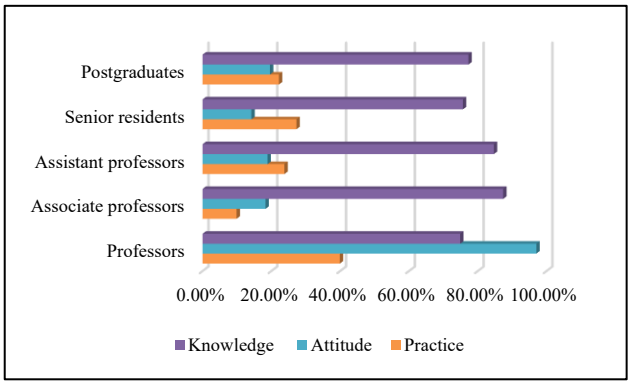


**Figure 6: Designation-wise distribution of positive responses for knowledge, attitude and practice of AI in their respective field.**

In this study, another association between designation-wise distribution of knowledge, attitude and practice of AI among doctors was analysed. Out of 135 participants, 14 associate professors had 87.4% of knowledge, which was remarked to be the highest among the other designation cadres, 97% professors had the maximum of positive attitude towards AI, and only 39.9% of them had an idea on the implementation of AI (Figure 6).

## DISCUSSION

The innovation of AI into various medical fields has received significant attention due to its potential to enhance the existing treatment modalities, diagnostic accuracy with less time consumption, optimized treatment plans and revolutionize educational and research fields.[1] This study aims to assess the knowledge, attitude and practice of AI in the medical field among doctors in a tertiary care hospital.

Out of the 135 respondents, 50.4% of them were male and 49.6% were female. Their findings were consistent with the study conducted by Sidhwani et al, which showed, 54.9% were male and 45.1% were female, with a mean age of 36.2 years, which was slightly in accordance with the present study.[2]

The mean age of participants in our study was 38.6 years, whereas the mean age in the study done by Sidhwani et at was 36.2 years.[3]

Out of the 135 participants, 43.7% of participants were between the age group of 28-37 years. Whereas in another study conducted by Swed et al 97.2% of the participants were between the age group of 21-30 years.[4]

In the present study, out of 135 participants, 25.2% were professors, 10.4% associate professors, 26.7% assistant professors, 22.2% senior residents and 15.6% postgraduates. In comparison to another study conducted by Swed et al, out of 1494 participants, 9.3% were professors, 9.1% associate professors, 9.8% assistant professors, 9.8% senior residents and 12.8% were postgraduates.[5]

### *Knowledge of artificial intelligence*

In the present study, 93.3% of respondents had a wider knowledge of AI, which was not in comparison with another study conducted by Daniel et al, which showed 87% of the respondents did not have knowledge about AI in the medical field.[6]

Out of 135 respondents, 82.2% of the doctors knew about the implementation of AI in the medical field, which was similar to the study conducted by Daniel et al, which showed 83% of responders also knew about the application of AI in the medical field.[6]

In the current study, there was an open-ended questionnaire on various AI tools used by doctors, of which 39.2% of responders use ChatGPT, followed by Gemini (10.7). In another study conducted by Pandya et al 67.2% of the participants used ChatGPT as the most popular choice of AI tool.[7] This difference is due to the difference in sample size, where Pandya et al had 290 participants, whereas this open-ended question was answered only by 102 responders out of 135.

### *Attitude of artificial intelligence*

In our present study, 42.9% of responders strongly agree that AI is a much needed tool in the medical field, whereas a study conducted by Ahmed et al, 27.4% of participants strongly agree and 47% agree for the same questionnaire.[8]

In this study, 42.2% of the doctors felt that the usage of AI has increased since covid-19 pandemic, which was inconsistent with the study conducted by Ahmed et al, where n=470, out of which 60.5% of doctors agreed that AI usage has increased following the pandemic.[9] This variation in the result between the two studies may be due to difference in sample size.

Out of the 135 participants, 61.4% of responders strongly feel that AI will decrease the percentage of medical errors in comparison to another study conducted by Suhail Hasan Serbaya et al, which showed 74.5% of the healthcare professionals agree to the same.[10]

In the current study, 25.1% of participants strongly feel that the application of AI improves patient care, which was not similar to another study conducted by Kazmi et al, which showed that only 5.9% of participants feel the same.[11]

In the present study, 31.1% of doctors feel there is a lack of training for AI, which was almost similar to another study conducted by Ahmed et al, which showed 32.3% of doctors feel there is a lack of training to implement AI.[12]

### *Practice of AI*

In the present study, only 8.8% of the doctors have applied AI technology in their field of medicine, which was not in accordance with another study conducted by Alabbad et al, which showed that 62.6% of doctors had applied AI technology in their field of medicine.[12]

In the present study, only 3.7% of doctors use AI to conduct research, whereas in another study conducted by Ahmed et al 66.6% of professors and postgraduates always use AI to conduct research.[12]

Out of 135 participants, 59.2% of the doctors would like to work with AI in future, which was not in accordance with another study conducted by Kumar et al, which

showed 80.3% of doctors would like to work with AI in future.[13]

The overall department-wise distribution of positive responses in knowledge, attitude and practice of AI in the medical field among doctors revealed that the knowledge of psychiatry and radiology departments ranked the highest among the 20 departments. In the attitude and practice-based questionnaires, the anesthesia department showed satisfactory response (Figure 5).

This data, which was obtained, is the first and unique outcome where no such studies had an association tabulation for reference. Hence, this study is distinct in depicting the association between each specialty and its positive results towards AI in the medical field.

Among the 135 participants designation-wise distribution of positive outcomes of knowledge, attitude and practice of AI in the medical field was depicted, which showed 85% of associates had a wider knowledge, 82% of professors had a positive attitude towards AI, and 35% of professors had an idea of application of AI in their respective field (Figure 6), which was similar to another study conducted by Kumar et al.[13]

The global AI in healthcare market is expected to reach $110.61 billion by 2030, growing from $21.66 billion at a compound annual growth rate (CAGR) of 38.6%. Over 340 FDA-approved AI tools are being used, especially for diagnosing stroke, brain tumours, and breast cancer. Hospitals in New Jersey lead the US in AI adoption, with 48.94% using AI.[14]

## CONCLUSION

Despite these advancements, the adoption of AI in the Indian medical field still lags behind. More such studies had to be conducted in order to bridge the gap, which will help in contributing to the advancement, implementation and wider integration of AI in the Indian medical field.

The present study highlights the knowledge, attitude and practice of AI in the medical field among doctors in a tertiary care hospital.

The study concluded that the majority of the doctors had wider knowledge about AI, and its implementation in their respective medical field of interest was above average. The overall attitude-based questionnaires implied towards AI that there will be improvement in patient care, followed by a decrease in the percentage of error in diagnosis, and it makes physicians' jobs easier. Despite the remarkable outcomes of knowledge and attitude-based questionnaires, the practice-based questions lacked positive outcomes due to inadequacy in the hands-on workshop for AI in the health care system, which could further be optimized for the betterment of patient care and well-being.

The results of this study will be used to develop a comprehensive AI workshop, hands-on practice and webinars, including customized training for each medical specialty, so that there will be a decreased percentage of error, eliminate medical burnout, reduces the cost and time for diagnosis.

Addressing this gap in medical education is crucial to ensure that future healthcare professionals are well equipped to navigate and leverage AI technologies in their clinical practice.

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*Ethical approval: The study was approved by the Institutional Ethics Committee R. No: 88/Est/2025 - Approval of projects/Prop. No. 17/26th IEC/2025/dated: 11.04.2025*

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