Section: Miscellaneous

Original Research Article

# KNOWLEDGE, ATTITUDE AND PRACTICE OF ARTIFICIAL INTELLIGENCE IN MEDICINE AMONGST TEACHING FACULTY IN A TERTIARY CARE CENTER IN BENGALURU NORTH

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ABSTRACT

**Background:** Artificial Intelligence (AI) has emerged as a key part of modern medicine and it is important that future medical professionals as well as their teaching faculty become aware of its strengths, weakness, and ethical considerations. This can transform patient care and improve outcomes. The purpose of this study was to determine the knowledge, attitude and practice of Artificial intelligence in Medicine amongst teaching faculty of a tertiary care centre.

**Materials and Methods:** A cross-sectional study was carried out among 67 teaching faculty. A structured questionnaire with 22 items (8 for knowledge; 7 each, for attitude & practice) was administered, with responses noted on a five-point Likert scale. Descriptive statistics were used to analyse data.

**Results:** Most (58%) of participants were aware of AI-powered decision-support systems used in hospitals, and its usefulness in medical diagnosis & drug discovery (71%) and in personalized treatment (54%). Almost all (85%) felt that AI is time saving & can support decision-making and AI would enhance clinical practice (70%), but 85% wanted training in AI. Almost half (53%) were anxious that AI can damage doctor-patient relationships; also, AI can replace numerous healthcare professionals as it can minimize medical errors. Only 46% had previously used AI-based tools and 25% were confident in using AI in clinical practice. Majority (80%) are planning to develop AI skills in Medicine, 69% showed interest in using AI in scientific writing & in facilitating medical learning; and 73% would apply AI in future medical practice.

**Conclusion:** While teaching faculty showed a positive attitude towards AI, gaps exist in knowledge and practical implementation. Integrating AI education into the medical curriculum & training through workshops is necessary to enhance competency. Further research should assess the long-term impact of AI exposure on medical training.

**Keywords:** Artificial Intelligence, Attitude, Knowledge, Practice, Teaching faculty.

## INTRODUCTION

Artificial Intelligence (AI) is a comprehensive term encompassing the technology that enables computer hardware and software to mimic intelligent human behavior and reach human-level performance.[1] AI through computer-aided programs simulates human intelligence processes.[2] The integration of AI in medicine and medical education has accelerated over the past decade, especially following COVID-19, as there was shift globally to online learning and conferences; thus increasing the role of clinicians, medical postgraduates and medical faculties in evolving AI technology.[3] AI has already been successfully integrated into various medical specialties, such as oncology, where it aids in the detection of cancers, ophthalmology for the diagnosis of retinal vascular diseases through fundus image learning, laboratory automation and even in optimizing waste management.[2]

AI is becoming more and more a part of modern medicine, being applied in diagnostics, personalized medicine, robotic surgery, and clinical decision support. AI-driven algorithms have improved the accuracy in radiology, dermatology, and pathology, even surpassing human performance in some cases. As healthcare becomes more entrenched in AI, it is imperative that future medical professionals become aware of its strengths, weaknesses, and ethical considerations.[4]

Integrating AI into healthcare can transform patient care and improve outcomes. AI-driven predictive analytics can significantly enhance the accuracy, efficiency, and cost-effectiveness of disease diagnosis and clinical testing.[3] Furthermore, AI can support population health management and the development of clinical guidelines, delivering real-time, precise information and optimizing medication choices.[5] New technologies often require time to become integrated into healthcare, and despite AI's promising potential, its adoption has been slower and more uneven than expected. Numerous visible and hidden barriers continue to impede its full incorporation into healthcare practices.[6]

In the AI era, it is essential to understand healthcare professional's perspectives on integrating AI into healthcare.[3] Additionally this research seeks to evaluate their knowledge, attitude towards AI and its practical applications in healthcare. By identifying areas where knowledge may be lacking or where barriers to AI adoption exist, the findings of this study could help guide educational programs and inform policy decisions, ultimately enhancing the responsible use of AI in healthcare delivery.

**Objective:** To determine the knowledge, attitude and practice of Artificial intelligence in Medicine amongst teaching faculty.

## MATERIALS AND METHODS

**Type of Study:** Cross sectional study

**Study population:** Teaching Faculty of different specialties working in a medical college in Bengaluru north.

**Method of Collection of Data:** The data was collected through validated questionnaire with responses noted on a five-point Likert scale.

**Questionnaire Design:**

A structured questionnaire consisting of 21 questions was developed, categorized as follows:

- Knowledge (8 items): Applications of AI, benefits, drawbacks, and ethical considerations.
- Attitude (7 items): Willingness to learn AI, trust in AI decision-making, and ethical concerns.
- Practice (7 items): Utilization of AI-based tools, integration of AI in learning, and everyday applications.

Responses were recorded on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). [7]

**Sampling technique:** Purposive sampling

**Inclusion Criteria**

All teaching faculty willing to participate by providing their informed consent.

**Exclusion Criteria**

Incomplete responses on the Google Forms questionnaire.

**Statistical Analysis:** Descriptive and analytical statistics was used to tabulate and analyze the data.

Prior approval was obtained from Institutional ethics committee.

## RESULTS

A total of 67 teaching faculty participated in this study. 65.7% were females and 34.3% were males. Most of the participants were professors (38.8%), followed by assistant professors (24.3%) in their cadre. Source of information of AI in majority of participants was from internet (74.6%), followed by workshop/CME/conference (17.9%); remaining through family/friends (6%) and media. The results are tabulated as follows:

**Table 1: Knowledge of AI in medicine amongst teaching faculty**

| Knowledge | Strongly Disagree | % | Disagree | % | Neutral | % | Agree | % | Strongly agree | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Aware of AI-powered decision-support systems used in hospitals. | 1 | 1 | 5 | 7 | 22 | 33 | 34 | 51 | 5 | 7 |
| AI is useful in medical diagnosis & drug discovery | 0 | 0 | 7 | 10 | 12 | 18 | 39 | 58 | 9 | 13 |
| AI is beneficial in personalized treatment | 0 | 0 | 19 | 28 | 12 | 18 | 30 | 45 | 6 | 9 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AI is time saving & can support decision-making in evidence-based medicine by analyzing large volumes of medical literature | 0 | 0 | 5 | 7 | 5 | 7 | 37 | 55 | 20 | 30 |
| AI can minimize medical errors | 1 | 1 | 8 | 12 | 24 | 36 | 31 | 46 | 3 | 4 |
| Know about ethical guidelines concerning the utility of AI in healthcare system | 0 | 0 | 9 | 13 | 29 | 43 | 26 | 39 | 3 | 4 |
| AI has limitations & can produce biased results | 0 | 0 | 3 | 4 | 14 | 21 | 43 | 64 | 7 | 10 |
| Lack of adequate training & knowledge is a major barrier to adopting AI in medical practice | 2 | 3 | 0 | 0 | 8 | 12 | 39 | 58 | 18 | 27 |

**Table 2: Attitude of AI in medicine amongst teaching faculty**

| Attitude | Strongly Disagree | % | Disagree | % | Neutral | % | Agree | % | Strongly agree | % |
|---|---|---|---|---|---|---|---|---|---|---|
| AI will improve clinical practice | 2 | 3 | 7 | 10 | 11 | 16 | 44 | 66 | 3 | 4 |
| AI training must be part of medical schooling | 3 | 4 | 4 | 6 | 12 | 18 | 42 | 63 | 6 | 9 |
| AI will minimize clinical reasoning | 0 | 0 | 4 | 6 | 22 | 33 | 30 | 45 | 11 | 16 |
| AI should be used only as assistant to doctors not independently | 0 | 0 | 0 | 0 | 8 | 12 | 29 | 43 | 30 | 45 |
| AI can damage doctor-patient relationships | 4 | 6 | 10 | 15 | 17 | 25 | 31 | 46 | 5 | 7 |
| AI should be utilized with human supervision | 0 | 0 | 1 | 1 | 4 | 6 | 33 | 49 | 29 | 43 |
| AI can replace numerous healthcare professionals | 12 | 18 | 14 | 21 | 14 | 21 | 20 | 30 | 7 | 10 |

**Table 3: Practice of AI in medicine amongst teaching faculty**

| Practice | Strongly Disagree | % | Disagree | % | Neutral | % | Agree | % | Strongly agree | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Have used AI-based medical tools like chatboats/ robotics/ other generative AI software | 5 | 7 | 17 | 25 | 14 | 21 | 26 | 39 | 5 | 7 |
| Planning to develop AI skills | 1 | 1 | 4 | 6 | 9 | 13 | 40 | 60 | 13 | 19 |
| Have participated in AI-related workshops | 5 | 7 | 30 | 45 | 16 | 24 | 12 | 18 | 4 | 6 |
| Used AI for learning medical topics | 3 | 4 | 11 | 16 | 14 | 21 | 36 | 54 | 3 | 4 |
| Confident in using AI in clinical practice | 3 | 4 | 21 | 31 | 26 | 39 | 14 | 21 | 3 | 4 |
| Will use AI in scientific writing & to facilitate medical learning | 2 | 3 | 7 | 10 | 12 | 18 | 36 | 54 | 10 | 15 |
| Would apply AI in future medical practice | 2 | 3 | 6 | 9 | 10 | 15 | 43 | 64 | 6 | 9 |

## DISCUSSION

In our study, a total of 67 teaching faculty were included. Participants were predominantly females (65.7%) in our study. Female: male ratio was 1.91. Most of the participants were professors (38.8%), followed by assistant professors (24.3%) in their cadre. Source of information of Artificial Intelligence (AI) in majority of participants was from internet (74.6%), followed by workshop/CME/conference (17.9%).

In knowledge about AI, most (58%) of participants were aware of AI-powered decision-support systems used in hospitals. Also, majority had opinion that AI is useful in medical diagnosis & drug discovery (71%) and beneficial in personalized treatment (54%). Similarly in a study by Paranjape et al,[8] participants were aware of the application of AI for diagnostic purposes. In our study, almost all (85%) felt that AI is time saving & can support decision-making in evidence-based medicine by analyzing large volumes of medical literature. Similarly in a study done by Paranjape et al,[8] it was emphasized that AI could help physicians by amalgamating large amounts of data and complementing their decision-making process to identify diagnosis and recommend treatments. Half of the participants believe that AI can minimize medical errors, whereas remaining half are of the opposite opinion. A recently launched AI system for autonomous detection of diabetic retinopathy carried medical malpractice and liability insurance.[9] Many were neutral (43%) about knowing the ethical guidelines concerning the utility of AI in healthcare system. Most (74%) of them are of the opinion that AI has limitations & can produce biased results. Majority (85%) thought that lack of adequate training & knowledge is a major barrier to adopting AI in medical practice.

In attitude about AI, most of them believed that AI will improve clinical practice (70%) & will minimize clinical reasoning (61%). Majority were of the opinion that AI should be used only as assistant to doctors not independently (88%) & should be utilized with human supervision (92%). In our study, 53% of participants in our study ascertained that AI can damage doctor-patient relationships. Whereas in a study by Mintz LJ et al,[10] it was highlighted that: when information processing is done mainly by computers, AI allows the physician to focus more on caring for and communicating with patients.

In our study, almost equal number of participants sensed that AI may as well as may not replace numerous healthcare professionals. In similar vein, in a study at Jordan by Al-Qerem W et al,[1] considerable number of participants expressed skepticism about the potential replacement of human teachers and the superior accuracy of clinical AI over physicians. These mixed attitudes may stem from concerns about the implications of AI on traditional medical education and practice, such as the fear of job displacement, the impact on the doctor-patient relationship, and concerns about patient safety. Additionally, cultural and contextual factors may contribute to these attitudes. This confusion amongst teaching faculty can be mitigated as in a study by de Leon J,[11] it was reiterated that computers will never substitute for self-reflective medical expert who is aware of the strengths and limitations of human beings and of an environment characterized by information overload. Furthermore in a study by Wartman SA et al,[12] communication and leadership skills as well as emotional intelligence will be more important than ever as AI-based systems will not be able to consider all the physical and emotional states of the patient. These traits are hard to master for computers and will characterize a great physician in the age of AI. According to 72% of participants in our study, AI training must be part of medical schooling. This is in agreement with a study done by Wang et al,[13] that established 75% of medical trainees believed AI had a positive future in medicine; and in a study by Al-Qerem W et al,[1] a substantial proportion endorsed the importance of health professions' acquiring foundational knowledge about AI.

In practice about AI, 58% had already used AI for learning medical topics; whereas equal number of participants (46%) have used AI-based medical tools like chatboats/ robotics/ other generative AI software. This corresponds with findings from a study carried out in the United States,[12] where 40% of participants had encountered AI technologies but lacked formal education in AI usage. In our study, only 24% had participated in AI-related workshops and only 25% of participants were confident in using AI in clinical practice. A study done by Yang et al,[14] showed that integrating AI-based simulation tools and workshops can enhance the skill of practical application, where students who were exposed to AI-assisted diagnosis had an improved ability to interpret clinical images. Majority (80%) are planning to develop AI skills in Medicine and 69% of teaching faculty showed interest in using AI in scientific writing & facilitate medical learning; and 73% admitted to apply AI in future medical practice. Studies done by Chan et al,[15] and Patel et al,[16] highlighted that introducing AI principles early during medical school can increase competency and minimize misconceptions regarding AI in clinical practice.

## CONCLUSION

Most (58%) of participants were aware of AI-powered decision-support systems used in hospitals, and usefulness of AI in medical diagnosis & drug discovery (71%) and in personalized treatment (54%). Almost all (85%) felt that AI is time saving & can support decision-making and AI would enhance clinical practice (70%), but 85% wanted training in AI. Almost half (53%) were anxious that AI can damage doctor-patient relationships, also AI can replace numerous healthcare professionals as it can minimize medical errors. In terms of practice, only 46% had previously used AI-based tools and only 25% were confident in using AI in clinical practice. Majority (80%) are planning to develop AI skills in Medicine, 69% of teaching faculty showed interest in using AI in scientific writing & facilitate medical learning; and 73% would apply AI in future medical practice.

Despite the majority (70-80%) of participant's wish to use AI, their practical exposure was minimal (24-25%). These findings suggest a potential gap between the rapid advancements in AI technology and its integration into medicine, alarming an urgent need for AI concerned educational interventions. AI training needs to be integrated across different aspects of the medicine curricula, emphasizing technical as well as ethical considerations. One of the most compelling arguments for the implementation of AI training in medicine is that, this training will augment existing clinical practice rather than replace existing clinical work. When faculty are trained to use AI tools through workshops on AI, practical training, and interdepartmental collaboration; focus will shift from acquiring basic knowledge on how to use the tool to a basic understanding of the underlying principles, thus equipping the faculty to teach future physicians for AI-enabled medicine.

Recommendations: More studies must investigate the role of AI in medical education and practice. AI training could be delivered via Continuing Medical Education (CME) programs and might need to be also taught by educators from outside the medical community. For example, a 2-credit CME course on AI and the Future of Clinical Practice can be delivered by a computational biologist and business economists.

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