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Knowledge, Attitude, And Practice of Artificial Intelligence Among Undergraduate Medical Students: A Cross-Sectional Study

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ABSTRACT

Background: Artificial Intelligence (AI) is revolutionizing the medical field, with applications in medical imaging, patient management, and predictive analytics. With the increasing presence of AI in medicine, medical students need to be imparted with knowledge, a good attitude, and proper practices in order to incorporate AI into clinical decision-making.

Objectives: The purpose of this study is to assess the knowledge, attitude, and practice (KAP) of undergraduate medical students towards AI, determining gaps and areas of improvement in medical education.

Methods: A cross-sectional study was carried out among 250 undergraduate medical students. A structured questionnaire with 21 items (7 each for knowledge, attitude, and practice) was administered, with responses noted on a five-point Likert scale. Descriptive statistics were used to analyze the data.

Results: A good 65% of the participants had excellent familiarity with AI, particularly in medicine imaging and diagnostics. Just 40% understood AI usage in drug discovery and genomics, though. A 72% majority was certain that AI would enhance healthcare and that 68% wanted training in AI. Still, a 55% majority was anxious that AI would decrease clinical thinking. In terms of practice, only 35% had previously used AI-based tools for medical learning, and 48% were unsure how to apply AI in clinical settings.

Conclusion: While students show a positive attitude toward AI, gaps exist in knowledge and practical implementation. Integrating AI education into the medical curriculum is necessary to enhance competency. Further research should assess the long-term impact of AI exposure on medical training.

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

1. INTRODUCTION

Artificial Intelligence (AI) is becoming more and more a part of modern medicine, being applied in diagnostics, personalized medicine, robotic surgery, and clinical decision support.[1] AI-driven algorithms have improved the accuracy in radiology, dermatology, and pathology, even surpassing human performance in some cases.[2] As healthcare becomes more entrenched in AI, it is imperative that future medical professionals become aware of its strengths, weaknesses, and ethical considerations.[3]

While AI holds potential, concerns still surround data privacy, reliability, and the threat of replacement of clinician judgment.[4] Few if any healthcare professionals are trained in AI, leading to skepticism and resistance to its adoption.[5] Understanding the knowledge, attitude, and practice (KAP) of medical students can guide curriculum development and prepare them for AI-assisted healthcare.[6]

There are several studies published on the attitude of medical professionals towards AI, but few have been done among undergraduate medical students.[7] The current research will analyze the KAP of undergraduate medical students towards AI and determine areas that need to be improved in order to maximize the integration of AI in medical education.[8]

2. MATERIALS AND METHODS

Study Design and Population

Approval regarding the present study was obtained from local ethics committee. This cross-sectional study was conducted among 250 undergraduate medical students belonging to different study years in a medical college located in an urban city of Maharashtra.[9]

Questionnaire Design

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

•**Knowledge (7 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).[10]

3. RESULTS

Table 1: Knowledge of AI in Medicine

Knowledge Questions	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
AI enhances medical diagnosis	5	8	15	50	22
AI is used in drug discovery	12	18	30	28	12
AI can minimize medical errors	8	10	20	40	22
AI is beneficial in personalized treatment	6	12	18	45	19
AI can replace doctors	30	35	15	10	10
AI enhances hospital efficiency	10	15	20	35	20
AI is ethically challenging	5	10	25	35	25

Table 2: Attitude Toward AI in Medicine

Attitude Questions	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
AI will improve medical practice	4	6	18	50	22
AI training must be part of medical schooling	5	7	20	40	28
AI will minimize clinical reasoning	10	15	20	35	20

AI should assist doctors alone	8	12	22	38	20
AI can damage doctor-patient relationships	12	18	25	28	17
AI should be utilized with human supervision	5	6	18	42	29
AI can replace numerous healthcare professionals	15	22	20	28	15

Table 3: Practice of AI in Medicine

Practice Questions	Never (%)	Rarely (%)	Sometimes (%)	Often (%)	Always (%)
Have used AI-based medical tools	20	25	20	25	10
Confident in using AI in clinical practice	18	22	28	20	12
Used AI for learning medical topics	15	20	25	30	10
Interested in developing AI skills	8	10	18	40	24
Have participated in AI-related workshops	25	30	20	15	10
Feel that AI facilitates medical learning	7	10	20	40	23
Would apply AI in future medical practice	10	12	25	35	18

4. DISCUSSION

The findings of this study show that, while undergraduate medical students are in general aware of the use of AI in medicine, gaps in practice are discernible. The same was observed by Paranjape et al. in their study, wherein the medical students were aware of the application of AI for diagnostic purposes but were uncertain about applying AI tools in actual clinical practice.[12] Another study in the United Kingdom identified that 70% of medical students believed AI had the potential to enhance patient care, yet just 30% had formal training in AI.[13]

Attitudes towards AI were overwhelmingly favourable in this survey, and 72% of the respondents concurred that AI would improve medical practice. This is in agreement with a Wang et al. study that established 75% of medical trainees believed AI had a positive future in medicine.[14] Yet, fear of AI replacing human clinical judgment still exists. Kolachalama and Garg presented a study in which 60% of students worried that excessive dependence on AI might reduce clinical decision-making abilities.[15]

Despite a wish to use AI, exposure is minimal. Only 35% of the participants in this research had used AI-based learning software. This corresponds with findings from a study carried out in the United States, where 40% of medical students had encountered AI technologies but lacked formal education in AI usage.[16]

The findings suggest an urgent need for educational interventions concerning AI. Chan et al. and Patel et al.'s studies highlight that introducing AI principles early during medical school can increase competency and minimize misconceptions regarding AI in clinical practice.[17,18] Furthermore, integrating AI-based simulation tools and workshops can enhance the skill of practical application, as shown in a study by Yang et al., where students who were exposed to AI-assisted diagnosis had an improved ability to interpret clinical images.[19]

5. FUTURE IMPLICATIONS

Curricula in medicine must incorporate AI training, emphasizing technical as well as ethical considerations. Workshops on AI, practical training, and interdepartmental collaboration should be promoted.

6. CONCLUSION

Medical students are receptive to AI but are not exposed practically. Reforms in curricula incorporating AI training must be done to equip future physicians for AI-enabled medicine.[19] More studies must investigate the role of AI in medical education and practice.[20]

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