Original Article

Artificial Intelligence in Healthcare: A Prospective Cross-Sectional Study of Knowledge, Attitude, and Practice among Medical Faculties, Interns and MBBS Students

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Abstract

Background: Artificial Intelligence (AI) is increasingly transforming healthcare, offering applications in diagnostics, therapeutics, and decision support. However, AI literacy among medical stakeholders remains variable, and structured AI training is not yet integrated into the Indian medical curriculum. This study aimed to assess and compare the knowledge, attitudes, and practices (KAP) regarding AI among faculties, MBBS students, and interns in a tertiary medical institute in Chhattisgarh, India. **Material and Methods:** A cross-sectional analytical study was conducted between January and June 2025 among 300 participants (200 MBBS students, 50 interns, and 50 faculties). A pre-validated questionnaire assessed demographic details, knowledge (9 items), attitudes (7 items, 5-point Likert scale), and practices (6 items). Knowledge scores were analyzed using one-way ANOVA, while attitude and practice items were compared using Chi-square tests. A $p < 0.05$ was considered statistically significant. **Results:** Faculties demonstrated significantly higher mean knowledge scores (7.1 ± 1.6) compared to interns (5.6 ± 2.0) and students (4.2 ± 1.9) ($p < 0.001$). While only 20% of faculties and <16% of students/interns had received formal AI training, awareness of AI applications was reported by more than half of faculties and interns. Attitudes toward AI were broadly positive across groups, with most agreeing that AI improves health outcomes, reduces medical errors, and requires structured training in curricula. Ethical concerns, such as privacy and bias, were acknowledged by over 40% of respondents. Actual practice of AI remained modest, with no significant group differences. **Conclusion:** Faculties exhibited greater knowledge of AI compared to students and interns; however, attitudes were uniformly favorable. Limited practical use reflects gaps in formal exposure and training. Integrating structured AI education into undergraduate curricula and faculty development programs is essential to prepare future physicians for AI-enabled healthcare.

Keywords: Artificial intelligence, Medical education, Knowledge, Attitude, Practice, Faculty, Students, Interns.

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Introduction

Artificial intelligence (AI) is the term used to describe the use of computers and technology to simulate intelligent behaviour and critical thinking comparable to a human being. John McCarthy first described the term AI in 1956 as the software system that uses artificial intelligence—a program that assists in science and engineering of making intelligent machines.[1]

Artificial intelligence is a software system that attempts to simulate human intellect by using data sources to make independent decisions or assist humans in making decisions. It is a general term that includes machine learning, representation learning, deep learning, and natural language processing.[2]

Although artificial intelligence is often thought of as relating exclusively to computers or robots, its roots are found across multiple fields, including philosophy, psychology, linguistics, and statistics. Thus, artificial intelligence can look back to visionaries across those fields, such as Charles Babbage, Alan Turing, Claude Shannon, Richard Bellman, and Marvin Minsky, who helped to provide the foundation for many of the modern elements of artificial intelligence.[3]

Artificial intelligence has also been applied to various aspects of medicine, ranging from largely diagnostic applications in radiology and pathology to more therapeutic and interventional applications in cardiology and surgery. In April 2018, the U.S. Food and Drug Administration approved the first the diagnosis of diabetic retinopathy through the analysis of images of the fundus. As the development and application of artificial intelligence technologies in medicine continues to grow, it is important for all the undergraduate medical students to understand what these technologies are and how they can be leveraged to deliver safer, more efficient, more cost-effective

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care.[4-8]

The World Medical Association advocates for a change in medical curricula and educational opportunities for patients, physicians, medical students, health administrators, and other health care professionals to foster a better understanding of the numerous aspects of the healthcare AI, both positive and negative . Additionally, in 2019, the Standing Committee of European Doctors stressed the need to use AI systems in basic and continuing medical education. They recommended the need for AI systems to be integrated into medical education, residency training, and continuing medical education courses to increase awareness of the proper use of AI.[9,10]

The National Medical Commission (NMC) of India has emphasized the importance of competency-based medical education, but structured AI training is not yet part of the undergraduate medical curriculum.[11] This creates a gap between the growing demand for AI literacy in healthcare and the preparedness of medical graduates. Faculties members, who play a key role in curriculum delivery and clinical practice, must also remain updated to guide students effectively.[12]

Previous studies have assessed the awareness and attitudes of medical students toward AI, but few have compared Faculties, undergraduate students, and interns within the same institution.[13,14] Understanding these differences is crucial for designing targeted interventions, curriculum reforms, and Faculties development programs.

Therefore, the present study was undertaken to assess and compare the knowledge, attitudes, and practices (KAP) regarding AI in medicine among Faculties, MBBS students, and interns in a tertiary medical teaching institute in India.

Materials and Methods

Study Design and Setting: A cross-sectional analytical study was conducted among Faculties members, undergraduate medical students, and interns in a tertiary medical teaching institute of Chhattisgarh, in India. The study aimed to assess and compare the knowledge, attitudes, and practices (KAP) related to Artificial Intelligence (AI) in medicine across the three groups.

Study Participants: Sample size estimation was performed for comparing proportions between Faculties, MBBS students, and Interns, assuming a two-sided significance level of 0.05 and 80% power. Based on feasibility and to allow detection of large differences (≈25 percentage points) between groups, the final sample size was set at 200 students, 50 Faculties, and 50 interns (total 300 participants)

Inclusion criteria were:

1. Willingness to participate
2. Availability during the survey period, and
3. Being a current Faculties, enrolled MBBS student, or intern at the institute. Participants who did not complete the questionnaire were excluded.

Study Tool: A pre-validated, structured questionnaire was used as the study instrument. It consisted of four sections:

1. Demographic Characteristics (age, gender, designation).
2. Knowledge of AI: Nine items assessing familiarity, training, and awareness of applications and concepts such as machine learning, deep learning, neural networks, and barriers to AI implementation. Each correct/positive response was scored as "1" and incorrect/negative as "0." Knowledge scores were computed, with higher scores indicating better knowledge.
3. Attitudes toward AI: Seven items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The maximum possible attitude score was 45, with higher scores reflecting more positive attitudes.
4. Practice of AI Use: Six items related to actual utilization of AI in education, research, and personal development.

The questionnaire was pilot-tested on 20 participants (excluded from the final study) for clarity and reliability. Necessary modifications were incorporated.

Data Collection: Data were collected over a period of 15th January 2025 to 30th June 2025, using self-administered questionnaires distributed physically and via online forms. Respondents were assured of confidentiality and anonymity.

Data were entered in Microsoft Excel and analyzed using PSPP (version 2.0.1)

Descriptive statistics (mean, standard deviation, frequency, and percentages) were used to summarize demographic variables and KAP responses.

- Knowledge scores were compared across groups using One-way ANOVA followed by post-hock analysis.
- Attitude and practice responses were compared using the Chi-square test (χ^2).
- A p-value <0.05 was considered statistically significant.

Results

A total of 300 participants were included in our study out of which, 200 were MBBS students from first to final year, 50 were interns and 50 were medical teaching Faculties.

Table 1: Demographic Characteristics

Variable	Faculties (n=50)	MBBS Students (n=200)	Interns (n=50)	Total (n=300)
Mean Age (years)	44.3 ± 8.8 years	20.1 ± 1.2	24.5 ± 0.9 years	—
Gender	Male: 28 (56%) Female: 22 (44%)	Male: 94 (47%) Female:106 (53%)	Male: 23 (46%) Female: 27 (54%)	—

Knowledge of Faculties, Interns and MBBS students about Artificial Intelligence(AI)

A significantly higher proportion of Faculties had good knowledge compared to students and interns.

Table 2: Shows the present Knowledge among Faculties, interns and MBBS students about AI.

S. No.	Item	Faculties (n=50) – Yes (%)	Students (n=200) – Yes (%)	Interns (n=50) – Yes (%)
1	Are you familiar with AI?	40 (80%)	120 (60%)	35 (70%)
2	Have you received any training in AI?	10 (20%)	15 (7.5%)	8 (16%)

3	Do you know any application of AI in your field of interest?	28 (56%)	80 (40%)	27 (54%)
4	Are you familiar with Neural Networking, Machine Learning, Deep Learning?	15 (30%)	35 (17.5%)	14 (28%)
5	Do you know that AI, ML, DL are being used in the medical field?	32 (64%)	100 (50%)	30 (60%)
6	I understand the barriers of applying AI in medicine	20 (40%)	45 (22.5%)	18 (36%)
7	Have you ever been taugh--t about AI in medical school?	5 (10%)	25 (12.5%)	8 (16%)
8	AI requires a lot of labelled data to learn	18 (36%)	60 (30%)	17 (34%)
9	Have you ever used AI to improve your knowledge?	12 (24%)	50 (25%)	15 (3

Table 3: Mean Knowledge Scores among Faculties, interns and MBBS students about AI.

Group	Mean ± SD	F-test (ANOVA)	p-value
Faculties (n=50)	7.1 ± 1.6	**F = 52.4**	***p < 0.001**
Students (n=200)	4.2 ± 1.9		
Interns (n=50)	5.6 ± 2.0		

*p-value<0.001 is significant
SD is Standard deviation

Table 4: Attitudes toward AI (Max = 45). Within-Group Analysis of Attitudes toward Artificial Intelligence (AI)

Attitude Item	Group	Strongly Disagree n (%)	Somewhat Disagree n (%)	Somewhat Agree n (%)	Agree n (%)	Strongly Agree n (%)	p-value
Willing to use AI in future medical decisions	Faculties (n=50)	2 (4%)	3 (6%)	3 (6%)	25 (50%)	17 (34%)	<0.001*
	Students (n=200)	10 (5%)	20 (10%)	40 (20%)	80 (40%)	50 (25%)	<0.001*
	Interns (n=50)	2 (4%)	3 (6%)	10 (20%)	22 (44%)	13 (26%)	0.001*
Need structured AI training in curriculum	Faculties (n=50)	1 (2%)	2 (4%)	4 (8%)	26 (52%)	17 (34%)	<0.001*
	Students (n=200)	8 (4%)	16 (8%)	30 (15%)	100 (50%)	46 (23%)	<0.001*
	Interns (n=50)	2 (4%)	3 (6%)	6 (12%)	26 (52%)	13 (26%)	<0.001*
Believe AI will improve health outcomes	Faculties	2 (4%)	3 (6%)	5 (10%)	25 (50%)	15 (30%)	<0.001*
	Students	12 (6%)	16 (8%)	32 (16%)	84 (42%)	56 (28%)	<0.001*
	Interns	2 (4%)	4 (8%)	9 (18%)	22 (44%)	13 (26%)	0.002*
AI raises ethical concerns	Faculties	5 (10%)	6 (12%)	10 (20%)	20 (40%)	9 (18%)	0.016*
	Students	20 (10%)	24 (12%)	36 (18%)	80 (40%)	40 (20%)	0.002*
	Interns	5 (10%)	6 (12%)	10 (20%)	19 (38%)	10 (20%)	0.046*
Fear AI may replace physicians	Faculties	6 (12%)	7 (14%)	12 (24%)	15 (30%)	10 (20%)	0.131
	Students	30 (15%)	36 (18%)	44 (22%)	60 (30%)	30 (15%)	0.142
	Interns	7 (14%)	10 (20%)	13 (26%)	15 (30%)	5 (10%)	0.214
Believe AI reduces medical errors	Faculties	2 (4%)	3 (6%)	7 (14%)	25 (50%)	13 (26%)	<0.001*
	Students	12 (6%)	16 (8%)	28 (14%)	100 (50%)	44 (22%)	<0.001*
	Interns	3 (6%)	5 (10%)	7 (14%)	25 (50%)	10 (20%)	0.004*
Believe AI reduces humanistic aspect of care	Faculties	8 (16%)	9 (18%)	15 (30%)	12 (24%)	6 (12%)	0.148
	Students	24 (12%)	30 (15%)	50 (25%)	60 (30%)	36 (18%)	0.001*
	Interns	7 (14%)	8 (16%)	12 (24%)	15 (30%)	8 (16%)	0.058

*P-values were calculated using the Chi-square test (χ^2), with a total degrees of freedom (df) = 4
P-value <0.001 is significant

Table 5: Comparison of attitude of Faculties, interns and MBBS students on AI

Attitude Item	p-value	Interpretation
Willing to use AI in future medical decisions	0.60	No significant difference between groups
Need structured AI training in curriculum	0.77	Similar across groups
Believe AI will improve health outcomes	0.66	No major group difference
AI raises ethical concerns (privacy, bias, consent)	0.88	Very similar distribution
Fear AI may replace physicians	0.96	No difference between groups
Believe AI reduces medical errors	0.82	Homogeneous responses
Believe AI reduces humanistic aspect of care	0.28	Slight variation, but not significant

*P-values were calculated using the Chi-square test (χ^2), with a total degrees of freedom (df) = 8
P-value <0.001 is significant

4. Practice of AI Use

Usage of AI was modest across groups, with Faculties and interns slightly higher than students.

Table 6: Practice of AI Use among Faculties, Interns and MBBS students.

Practice Item	Faculties (n=50)	Students (n=200)	Interns (n=50)	p-value
Using AI for teaching/learning/exams	23 (46%)	78 (39%)	22 (44%)	0.56
Using AI for assignments/projects	21 (42%)	112 (56%)	25 (50%)	0.10
Using AI for idea generation/research	19 (38%)	68 (34%)	24 (48%)	0.18

Using AI for career guidance	13 (26%)	48 (24%)	18 (36%)	0.17
Using AI for grammar/spelling checks	26 (52%)	126 (63%)	29 (58%)	0.28
Using AI for personality/skill development	9 (18%)	40 (20%)	11 (22%)	0.84

*P-values were calculated using the Chi-square test (χ^2), with a total degrees of freedom (df) = 2
P-value <0.001 is significant

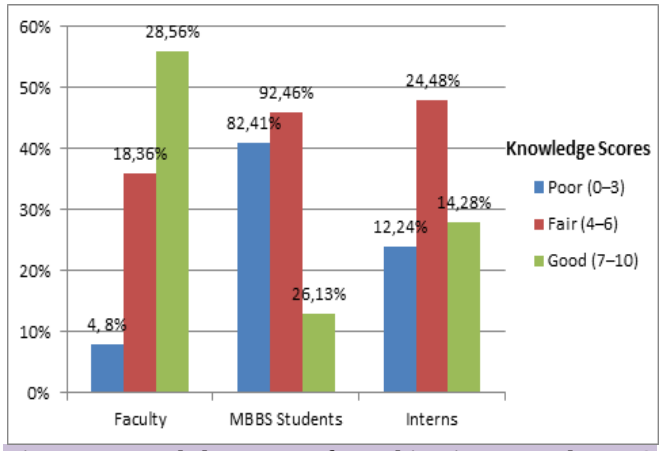

Figure 1: Knowledge scores of Faculties, interns and MBBS students about AI.

Discussion

The present study assessed and compared the knowledge, attitudes, and practices regarding Artificial Intelligence (AI) among Faculties, MBBS students, and interns in a tertiary medical teaching institute. Our findings reveal substantial differences in knowledge across groups, while attitudes toward AI were largely positive and comparable, and actual practice of AI tools remained modest.

Knowledge of AI: Faculties demonstrated significantly higher mean knowledge scores compared to students and interns. Nearly 80% of Faculties were familiar with AI, and more than half could identify applications in their field, while only 60% of students and 70% of interns reported familiarity. This aligns with earlier studies showing that medical educators and senior professionals tend to have greater exposure to emerging technologies compared to undergraduate learners.[13,14]

\However, structured AI training was reported by only 20% of Faculties and less than 10–16% of students and interns, highlighting the absence of formal inclusion of AI in the Indian medical curriculum.[12]

The knowledge gap among students underscores the urgent need to integrate AI literacy early into medical education. AI were broadly favorable across all groups. The majority of Faculties, students, and interns agreed t

Attitudes toward AI: Despite differences in knowledge, attitudes toward hat AI would improve health outcomes, reduce medical errors, and should be incorporated into structured training curricula. These findings echo prior surveys reporting optimistic attitudes among medical students internationally.[13,14]

Notably, more than 40% of respondents across groups acknowledged ethical concerns such as privacy, bias, and consent, consistent with the ethical debates described in the literature.[15,16]

Fear of replacement of physicians by AI was relatively low and not significantly different between groups, suggesting that respondents viewed AI as an adjunct rather than a threat to clinical practice.

Practice of AI use: In terms of practice, the use of AI was modest across all groups, with no significant differences between Faculties, students, and interns. AI was most frequently used for teaching, learning, and grammar/spelling checks, while applications such as career guidance or personality development were less common. This limited practical engagement likely reflects restricted awareness of specialized medical AI tools, as well as the lack of formal training platforms. Similar underutilization has been observed in prior studies from developing countries, where accessibility and institutional support remain barriers.[17,18]

Strengths and limitations: A strength of this study is the inclusion of three key stakeholders in medical education, Faculties, students, and interns allowing meaningful comparisons across levels of experience. The relatively large sample size (N = 300) provided adequate power to detect differences in knowledge. However, certain limitations should be acknowledged. First, the cross-sectional design precludes causal inference. Second, self-reported measures may be subject to response and social desirability bias. Finally, knowledge assessment was based on a structured questionnaire rather than performance-based testing, which could underestimate or overestimate actual competencies.

Implications for medical education: findings underscore the necessity of incorporating structured AI training into the MBBS curriculum in India, in alignment with the competency-based framework advocated by the NMC. Faculties development programs are also crucial to ensure teachers remain updated and capable of guiding students in AI-related topics. Incorporating hands-on workshops, case studies, and exposure to AI applications in diagnostics and research could bridge the current knowledge-to-practice gap.

Conclusion

In conclusion, Faculties demonstrated significantly higher knowledge of AI compared to students and interns, although attitudes toward AI were positive across all groups. Actual practice of AI remained limited. To prepare future physicians for AI-enabled healthcare, structured training and curriculum integration are urgently required at the undergraduate and internship levels, supported by continuous Faculties development initiatives.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Amisha, Malik P, Pathania M, Rathaur VK. Overview of artificial intelligence in medicine. J Family Med Prim Care. 2019;8(23):28-31.
2. Hashimoto DA, Witkowski E, Gao L, Meireles O, Rosman G. Artificial Intelligence in Anesthesiology. Anesthesiology. 2020 February ; 132(2): 379-94
3. Buchanan BG. A (Very) Brief History of Artificial Intelligence. AI Magazine . 2005 Dec 15;26(4):53–3.
4. Thrall JH, Li X, Li Q, Cruz C, Do S, Dreyer K, Brink J: Artificial intelligence and machine learning in radiology: Opportunities, challenges, pitfalls, and criteria for success. J Am Coll Radiol 2018; 15(3 Pt B):504–8
5. Salto-Tellez M, Maxwell P, Hamilton P. Artificial intelligence-the third revolution in pathology. Histopathology. 2019 Jan 15;74(3):372–6.
6. Deo RC: Machine learning in medicine. Circulation 2015; 132:1920–30
7. Hashimoto DA, Rosman G, Rus D, Meireles OR: Artificial intelligence in surgery: Promises and perils. Ann Surg 2018; 268:70–6
8. Office of the Commissioner. FDA permits marketing of artificial intelligence-based device to detect certain diabetes-related eye problems [Internet]. 2019.[Accessed 10th January 2025] Available from: https://www.fda.gov/news-events/press-announcements/fda-permits-marketing-artificial-intelligence-based-device-detect-certain-diabetes-related-eye.
9. WMA - The World Medical Association-WMA Statement on Augmented Intelligence. in Medical Care [Internet]. [Accessed 10th January 2025]. https://www.wma.net/policies-post/wma-statement-on-augmented-intelligence-in-medical-care/.
10. Bisdas S, Topriceanu CC, Zakrzewska Z, Irimia AV, Shakallis L, Subhash J, et al. Artificial Intelligence in Medicine: A Multinational Multi-Center Survey on the Medical and Dental Students' Perception. Frontiers in Public Health . 2021 Dec;9:1–10.
11. National Medical Commission (NMC). Competency Based Undergraduate Curriculum for the Indian Medical Graduate. Vol. I–III. New Delhi: NMC; 2019.
12. Wani RJ, Patwardhan M. Artificial intelligence in medical education: Are we ready for it? Indian J Public Health. 2020;64(2):172–176.
13. Park SH, Do KH, Kim S, et al. What should medical students know about artificial intelligence in medicine? J Educ Eval Health Prof. 2019;16:18.]
14. Pinto Dos Santos D, Giese D, Brodehl S, et al. Medical students' attitude towards artificial intelligence: a multicentre survey. Eur Radiol. 2019;29(4):1640–1646.
15. Char DS, Shah NH, Magnus D. Implementing machine learning in health care—addressing ethical challenges. N Engl J Med. 2018;378(11):981-3.
16. Luxton DD. Ethical implications of artificial intelligence in health care. AMA J Ethics. 2014;16(5):409-15.
17. Topol EJ. High-performance medicine: the convergence of human and artificial intelligence. Nat Med. 2019;25(1):44-56.
18. Jiang F, Jiang Y, Zhi H, Dong Y, Li H, Ma S, et al. Artificial intelligence in healthcare: past, present and future. Stroke Vasc Neurol. 2017;2(4):230-43.