



Original Research Article

KAP STUDY ON AI IN THE MEDICAL FIELD WITH SPECIAL FOCUS ON AI VS HUMAN DOCTOR

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ABSTRACT

Background: Artificial intelligence (AI) is swiftly changing healthcare; however, the effect of AI on healthcare is contingent on the knowledge, attitudes, and practices (KAP) of medical practitioners. We organized a cross-sectional KAP survey of medical students and doctors to understand their awareness and attitudes towards AI in the field of medicine, their perceptions about AI compared to human doctors. Previous research's have indicated a large level of awareness and little action among doctors and students.

Materials and Methods: A structured questionnaire was used to survey 178 medical students and 30 doctors in a tertiary care institute. Demographics, knowledge of AI (e.g. awareness and education), attitudes (e.g. confidence in AI applications, fears of replacement), practices (e.g. use of AI tools, training) were covered. Descriptive summarization of responses was done. Chi-square (significance at $p < 0.05$) was used to test categorical comparisons (students vs doctors).

Results: Nearly all participants had heard of AI: 99.4% of students and 100% of doctors reported awareness. However, formal AI education was low (18.2% of students vs 0% of doctors had AI in their curriculum). Around 86–87% in both groups knew of AI's use in medicine. Use of AI tools differed (33.3% of doctors vs 60.0% of students reported occasional or frequent use for study purposes). Positive attitudes were common: e.g. 93.8% of students agreed that AI is beneficial in medical education and 90% of doctors felt AI would benefit patients. In contrast, fewer believed AI could replace human doctors (23.3% of doctors, 39.7% of students). Notably, more doctors than students expressed ethical or privacy concerns (86.7% vs 38.4%, $p < 0.001$). Chi-square tests showed significant differences in key attitudes: doctors were significantly more likely to view AI as beneficial to patient care (90% vs 50.6%, $p < 0.001$) and to express privacy/ethical concerns (86.7% vs 38.4%, $p < 0.001$), while students were more optimistic about AI replacing traditional learning methods (39.7% vs 23.3%, $p < 0.001$).

Conclusion: Both medical students and physicians showed high awareness of AI and generally favorable attitudes toward its role in healthcare, but actual training and use remain limited. Students were enthusiastic about learning AI, whereas doctors emphasized potential ethical issues and the need for guided integration. Our findings underscore the need to incorporate AI education into medical training (as recommended in similar KAP studies) and to foster “human-AI” collaboration rather than see AI as a replacement for clinicians.

Keywords: Artificial intelligence; medical education; knowledge, attitudes, and practices (KAP); physicians; medical students; AI vs doctor; healthcare technology.

INTRODUCTION

Artificial intelligence (AI) is a term that is used to describe computer-based systems that can carry out tasks that would have been performed by a human being with human-like intelligence, i.e., image recognition, natural language understanding, and decision-making.^[1] Within the recent years, AI has demonstrated significant potential in healthcare: e.g., AI algorithms have the ability to diagnose diabetic retinopathy on retinal images and make radiological diagnoses more accurate.^[1] On a larger scale, the scholars believe that AI can support but not substitute doctors - complementing human intuition with machine accuracy.^[1,2] An example is that Topol has characterized a convergence of human and AI in medicine, where human clinicians can depend on AI as an effective decision-support tool.^[1] The WHO and other healthcare leaders also highlight the possibility of AI to improve health outcomes and contribute to universal access to health care, assuming that the issues of trust and equity have been resolved.^[1,3]

Yet, to make AI worthy of its benefits, doctors and medical students must be sufficiently AI-literate and have a moderate viewpoint. In different countries, knowledge-attitude-practice (KAP) surveys have reported awareness of AI amongst medical trainees to be generally high, although there is a lack of formal education and practical application. Indicatively, at a tertiary center in northern India, 88.5 percent of participants knew about AI and 81.6 percent of them understood its relevance in medicine with only 29.2 percent having formal AI training.^[4] Likewise, in Syria, 1,494 (approximately 70 percent of all) respondents were aware of AI conceptually, yet only 23.7 percent knew about its practical medical uses.^[5] Attitudes in most studies are favorable: most physicians, students, believe that AI will benefit healthcare, yet the ethical and patient-doctor relationship issues are widespread.^[6,7] Importantly, according to a large survey of French pediatricians, 86% of them were in favor of applying AI tools in practice, but 59% of them were afraid that their data would be at risk and 35% were afraid of human features of care.^[6]

The majority of KAP studies (in the Middle East, Europe, India, etc.) have been conducted on both knowledge and opinions. There is very limited research that directly investigates AI expectations versus human physicians expectations. However, this AI vs human can be significant: it has been demonstrated that patients would prefer human doctors to AI, even in combination with AI.^[7] In a hypothetical experiment, the participants placed their trust in a human physician (with or without the assistance of AI) significantly higher than in an AI-only chatbot.^[7] Similarly, doctors stress that AI is not to substitute empathy or human judgment.^[2] It is important to understand these perceptions for the future and current doctors to responsibly integrate AI into medicine.

Medical students are essential to this assessment because they are the future healthcare professionals. Their exposure to AI in clinical and educational contexts provides important information on the general preparedness for AI adoption as well as the efficacy of present training initiatives. Medical education is quickly changing as a result of artificial intelligence (AI), which presents new chances to improve research, learning, and clinical judgment. Medical students can benefit from tools like ChatGPT, Google Gemini, and other large language models that facilitate content creation, information retrieval, and summarization.

Therefore, this research study is our attempt to evaluate the healthcare professionals' and medical students' understanding, attitudes, and practices about the integration of AI in the medical area.

Objectives

1. To determine the level of knowledge regarding AI in the medical field among healthcare workers and undergraduate students .
2. To evaluate the attitude of participants towards the advancement of AI in the medical field.
3. To assess the extent to which AI is being used for the treatment of patients .
4. To compare AI and human doctors and determine whether AI will completely replace doctors or will be used only as an aid for improving diagnostic and therapeutic outcomes.

MATERIALS AND METHODS

Study Setting: Study was conducted at Adesh Institute of Medical Sciences and Research, Bathinda, Punjab, India.

Study Design: This study was a cross-sectional, questionnaire-based Knowledge, Attitude, and Practice (KAP) study conducted at a single point in time among enrolled MBBS students and healthcare professionals. The design and reporting of the study followed standard guidelines for KAP surveys.

Study Duration: Data collection was carried out over a period of 2 weeks following IEC approval. Data analysis and report writing was done in additional 2 weeks.

Study Population: MBBS students (2nd year, 3rd year) who registered and gave informed consent. Doctors (Senior Residents and above) currently working at Institute who provided informed consent. 178 students and 30 doctors participated in the study.

Inclusion Criteria

- Doctors (Senior Residents and above) working in various departments of Institute who provided informed consent.
- MBBS students (2nd year, 3rd year) who provided informed consent.

Exclusion Criteria

- Participants who declined consent.
- Individuals who participated in the pilot study (pilot responses was excluded from final analysis).

- Incomplete questionnaires (>20% missing responses).

Sampling Technique: Convenience sampling was done

Data collection technique and Procedure: A structured questionnaire (English) was administered in person (paper/web form). The survey questionnaire was adapted from previous KAP studies and pilot-tested for clarity. It comprised of four sections: (A) Demographics (age, gender, year of study or speciality), (B) Knowledge (e.g., “Have you heard of AI?”, “Have you been taught about AI in college?”, “Do you know examples of AI applications in medicine?”), (C) Attitudes (agreement with statements on AI’s importance, usefulness, concerns about AI vs human roles), and (D) Practices (use of AI tools in study/work, attendance at AI courses). Attitude items used Likert-scale responses (Agree/Neutral/Disagree).

Data Analysis: Data was analysed using SPSS v25 software and MS Excel. We computed frequencies and percentages for each response. For comparisons

between students and doctors, we used chi-square on categorical responses. A p-value < 0.05 was considered statistically significant. Where appropriate, chi-square results (χ^2 and p) are reported. Continuous variables (if any) are summarized as mean \pm SD, though our data was principally categorical. We prepared tables for key results and bar charts to illustrate major findings.

Ethical Considerations: The study was started after getting approval from the Institutional Research and Ethics Committee. Confidentiality of the participants was maintained.

RESULTS

Demographics: The student cohort (N=178) was 37% male and 63% female. They spanned 2nd and 3rd year students of MBBS. The doctor group (N=30) was 43.3% male and 56.7% female. Doctors came from diverse specialties (medicine, surgery, gynaecology, radiology, community medicine etc.).

Table 1: summarizes basic KAP responses.

| Variable | Students (n=178) | Doctors (n=30) |
|---|--|--|
| Gender | Male 37%; Female 63% | Male 43.3%; Female 56.7% |
| Heard of AI in medicine | Yes 99.4% (177/178); No 0.6% | Yes 100% (30/30) |
| AI taught in curriculum | Yes 18.2%; No 81.8% | (n/a) |
| Aware of AI applications in medicine | Yes 86.5%; No 13.5% | Yes 86.7% (26/30); No 13.3% |
| Used AI tools daily | (n/a) | Yes 33.3%; No 66.7% |
| AI improves diagnosis accuracy | (n/a) | Yes 80.0%; No 20.0% |
| AI beneficial to patients | Yes 50.6%; No 4.5%; Neutral 44.9% | Yes 90.0%; No 10.0% |
| Favour AI implementation in field | Yes 81.9%; No 18.1% | (not directly asked, see above) |
| Privacy/ethical concerns with AI | Yes 38.4%; No 18.6%; Neutral 43.0% | Yes 86.7%; No 6.7%; Neutral 6.7% |
| AI replacing physician preventive tasks | Agree 27.5%; Disagree 23.6%; Neutral 48.9% | Agree 46.7%; Disagree 23.3%; Neutral 30.0% |

[Table 1] Summary of selected KAP survey responses (students vs. doctors). Percentages may not sum to 100% due to rounding or multi-category responses. Doctors’ “practice” questions (e.g. use of AI tools) are contrasted with analogous student responses.

Knowledge and Training: Nearly all participants had heard of AI in medicine [Table 1]. However, formal training was limited. Only 18.2% of students reported AI content in their curriculum, and none of the doctors had formal AI coursework. A majority of both groups recognized specific AI applications: 86–87% knew AI was used in healthcare settings (e.g. image analysis, predictive analytics). Notably, 84.5% students in a recent study similarly reported using at least one AI tool in their studies, and 61.4% had good knowledge of AI tools. Our students’ self-reported knowledge was slightly higher (86.5% aware of AI uses), possibly reflecting broader online exposure. Only 9.0% of our students and 10% of doctors had attended any AI-related course or workshop. Most students (65.7%) knew AI is used for therapy and emotional support (e.g. mental health chatbots), whereas this was common knowledge for 53.3% of doctors. Students showed limited understanding of technical details: only 18.1% had heard of “machine

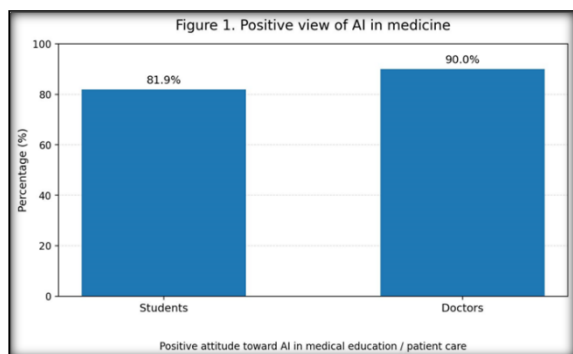
learning” or “neural networks”, indicating a basic-level AI literacy.

Attitudes Toward AI: Overall attitudes were positive but nuanced. Among students, large majorities agreed that AI is important: 65.7% agreed AI is essential in medicine and 77.5% were motivated to learn more about AI. In our doctors, 70.0% agreed that all physicians should undergo basic AI training. Most doctors (56.7%) felt AI could reduce physician workload, and 73.3% said AI aids early diagnosis and severity assessment.

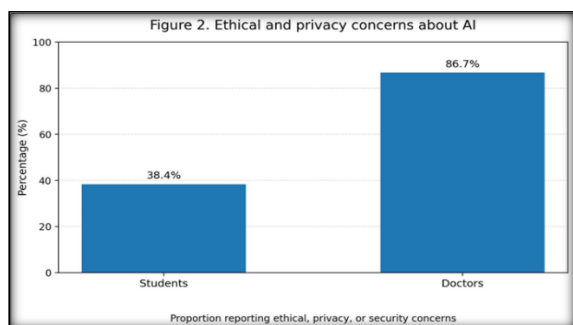
However, views diverged on AI vs human doctors. Only 23.3% of doctors agreed that “AI can replace human doctors and take away jobs” (76.7% disagreed), reflecting a prevailing confidence in the physician’s role. Students were more divided: 39.7% agreed that AI might replace traditional study methods, but 25.3% disagreed and 34.8% were neutral. Regarding patient care, 46.7% of doctors thought AI could replace doctors’ preventive-care recommendations (e.g. exercise/diet plans), whereas only 27.5% of students agreed with that. This suggests doctors may anticipate AI taking on routine preventive advice, while students are more skeptical. Concerns also differed. Only 10.0% of doctors believed AI could ever replace human empathy

(70.0% disagreed), whereas 60% of doctors did agree that patients might trust AI over them in some cases. In contrast, 38.4% of students reported privacy or security concerns with AI tools, far lower than the 86.7% of doctors who feared ethical risks ($p < 0.001$). In sum, doctors in our sample were more cautious about risks of AI (ethics, data security, trust) than students, who were generally more optimistic about AI's learning and patient-care benefits.

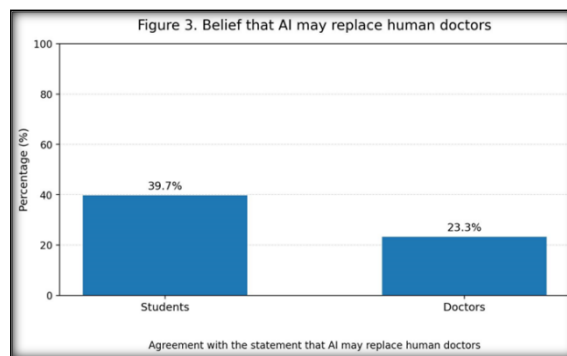
Practices: Use of AI in daily work and study was moderate. Among students, 40.7% said they “often” use AI-based apps (like chatbots or educational tools), 54.2% used them “occasionally”, and 5.1% “sometimes”; none reported “never” or “always.” Notably, 81.9% of students favored implementing more AI in medicine. Among doctors, 33.3% reported using some form of AI in their work. When asked if AI would aid patients and doctors, 50.6% of students agreed it would be beneficial to both, whereas 90.0% of doctors felt AI benefits patients (only 10.0% disagreed; Table 1). This difference was statistically significant ($\chi^2 = 14.66$, $p < 0.001$), indicating doctors were much more convinced of AI's practical value. Conversely, when asked if AI could replace physicians, fewer doctors than students agreed (23.3% vs 39.7%; $\chi^2 = 11.99$, $p = 0.0005$), suggesting students had somewhat more fear about obsolescence.



[Figure 1] Bar chart illustrates support for AI in medicine: 81.9% of students and 90.0% of doctors responded positively when asked if they favor AI implementation (students agreed vs doctors saying AI benefits patients).



[Figure 2] compares concerns: only 38.4% of students expressed privacy/ethical worries, versus 86.7% of doctors.



[Figure 3] shows beliefs about replacement: 39.7% of students vs 23.3% of doctors thought AI might replace doctors' roles in the future. These figures underscore the larger trend that doctors emphasize caution and human elements, while students emphasize opportunity and personal learning gain. Chi-square tests confirmed several significant group differences. As noted, doctors were significantly more likely to view AI as beneficial ($p < 0.001$) and to express ethical concerns ($p < 0.001$). Students were significantly more likely to endorse AI replacing traditional study methods ($p < 0.001$) and, to a lesser extent, AI replacing doctors ($p < 0.001$). There was no significant difference in basic AI awareness (almost 100% in both groups) or in favoring AI integration ($p > 0.4$). These results align with other KAP surveys: for example, one study found equally high awareness ($\approx 88\%$) among students and doctors, but large gaps in formal training.

DISCUSSION

Our study reveals a generally high level of AI awareness among both medical students and doctors, consistent with global findings.^[4,8] Almost everyone had “heard of AI”, reflecting its penetration into media and education. However, formal education on AI was scarce, indicating a curricular gap. This mirrors other studies: for example, the Syrian study found that even though 70% had heard of AI, only 23.7% knew its medical applications,^[5] and most had never received structured AI training. Similarly, in rural Andhra, only $\sim 61\%$ of students had good AI knowledge, despite heavy use of AI tools.^[8] We observed that while students reported frequent use of AI apps (mostly for study aids), doctors' clinical use of AI remained limited. This is important: actual practice lags behind interest, a pattern seen elsewhere.^[4,8] To bridge this, many authors advocate integrating AI modules into the curriculum.^[5,8] Attitudes in our cohort were largely favorable. Over 80% of students and 90% of doctors believed in AI's benefits [Table 1]. This echoes the strong positive attitudes reported in literature: in Syria, 87.4% of respondents favored AI inclusion in medicine,^[5] and in Saudi Arabia, 93.8% of students had positive attitudes.^[8] Our students showed enthusiasm to learn (77.5% motivated), consistent with the high proportions in other student surveys. Likewise, a

study of French pediatricians found 86% in favor of using AI in healthcare,^[6] and 66% of US physicians now report using AI in practice.^[2]

However, underlying concerns emerged. Most doctors (86.7%) worry about ethical/privacy issues with AI, a much higher rate than students. This may reflect doctors' experience with patient data and medico-legal implications. In comparative studies, experienced clinicians often voice more skepticism. For example, Perrier et al. reported that 59% of French pediatricians saw data security as a threat, and 35% feared loss of human touch.^[6] We similarly found that while doctors recognized AI's diagnostic support (80% agreed AI improves accuracy), they also valued the human element: 70% disagreed that AI could replicate empathy, and 76.7% believed human doctors would remain irreplaceable. Conversely, students were somewhat more willing to entertain AI substitution in routine tasks (e.g. 39.7% agreed AI might replace traditional learning; 27.5% thought AI could handle preventive counseling).

Interestingly, despite their differences, both groups agreed that AI should assist rather than supersede doctors. Only 23.3% of doctors and 39.7% of students agreed with the statement "AI will replace physicians" [Table 1]. Even the more supportive fraction of students was in the minority. This aligns with psychological studies: most patients and providers intuitively prefer the "human-in-the-loop" model.^[2,7] In one experiment (n=1,183), participants trusted an AI-only consultation least and preferred human-doctor interactions.^[7] Physicians echo this: AMA leadership states AI will not replace doctors, but expects that non-AI-using physicians may fall behind.^[2] Our findings fit this narrative: doctors did not feel threatened wholesale by AI, yet wanted proper integration and training (70% agreed all physicians should learn AI basics).

The differences between students and doctors suggest generational and experiential divides. Students, who have grown up with technology, view AI as a helpful study aid and appear less cynical about it, while doctors, trained in an era of limited AI, are more cautious. Both perspectives are valuable. For curriculum developers, the takeaway is to build on students' enthusiasm by offering structured AI education (as has been done in some programs). For health administrators, the doctors' caution highlights the need to address ethical guidelines and maintain human empathy in implementation.

Limitations

Our study has its own limitations. It is a single-institution sample (n=208 total) and may not generalize nationally. The doctor sample was smaller (n=30) with diverse specialties; numbers in subgroups (e.g. surgeons vs physicians) were too small for separate analysis. The questionnaire was self-reported and subject to response biases (students might have overstated knowledge). We did not verify practice usage of specific AI tools beyond survey report. Despite these limitations, our data

complement larger multi-center KAP surveys and show similar trends, lending validity to our conclusions.

CONCLUSION

This KAP survey found that Indian medical students and doctors share high awareness and largely positive attitudes toward AI in healthcare, yet actual training and use remain limited. Students were eager to learn and adopt AI tools in education, while doctors emphasized the need for careful oversight and upholding ethical standards. A minority in both groups sees AI as a potential doctor-replacer, but most envision an AI-assisted future rather than AI-alone care. To harness AI's benefits, medical education should formally include AI topics (data science, ethics, and tool usage). Simultaneously, clinicians should be supported to integrate AI into practice responsibly. Ultimately, a balanced 'Human – AI collaboration' model is essential to ensure optimal patient care while preserving the core human elements of medical practice.

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