

Original Research Article

Impact of a structured AI awareness session on knowledge and attitude of undergraduate medical students in Maharashtra: an interventional study

Preeti Pawde¹, Prashant Solanke², Satishkumar Dhage^{2*}

¹Department of Anatomy, Dr. Ulhas Patil Medical College, Jalgaon, Maharashtra, India

²Department of Community Medicine, Dr. Ulhas Patil Medical College, Jalgaon, Maharashtra, India

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*Correspondence:

Dr. Satishkumar Dhage,

E-mail: drsatisdhage@gmail.com

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ABSTRACT

Background: Artificial intelligence (AI) is rapidly transforming healthcare, necessitating that future medical professionals possess adequate knowledge and a positive attitude towards its integration. This study aimed to assess the impact of a structured AI awareness session on the knowledge and attitude of first-year MBBS students in Maharashtra.

Methods: An interventional study was conducted on 600 first year MBBS students from six medical colleges in Maharashtra over a period of seven months. A pre-test/post-test design was employed. Participants completed a validated questionnaire assessing their knowledge and attitude towards AI in medicine before and after a standardized, structured AI awareness session. The difference in the means of pre-intervention scores and post-intervention scores were analyzed for statistical significance using 'paired t-test' ('p' value <0.05 considered significant).

Results: The mean pre-intervention knowledge score was 41.22±7.42 (out of 100), which significantly increased to 72.45±8.78 after the intervention ($t=-150.73$, $p<0.001$). Similarly, the mean pre-intervention attitude score was 3.10±0.40 (on a 5-point Likert scale), which significantly improved to 4.29±0.47 post-intervention ($t=-101.18$, $p<0.001$). Significant improvements were observed across all the participants of six medical colleges across Maharashtra.

Conclusions: The structured AI awareness session significantly improved both the knowledge and attitude of first-year MBBS students towards AI in medicine. These findings underscore the importance of integrating AI education into the undergraduate medical curriculum to prepare future doctors for the evolving healthcare landscape.

Keywords: Artificial intelligence, Medical education, Interventional study, Medical students, AI awareness

INTRODUCTION

The rapid advancements in artificial intelligence (AI) are poised to revolutionise various facets of healthcare, from diagnostics and treatment planning to drug discovery and personalised medicine.¹ As AI technologies become increasingly sophisticated and integrated into clinical practice, it is imperative that future medical professionals are well-equipped with the necessary understanding and a receptive mindset to leverage these tools effectively.² The

National Medical Commission (NMC) has emphasized the need for competency-based medical education, which includes preparing graduates for emerging technologies.³ Despite the growing importance of AI in healthcare, studies in India and globally have indicated a significant gap in the knowledge and understanding of AI among medical students.^{4,5} Many students report insufficient knowledge of AI applications and express concerns about its potential impact on their future careers.⁶ However, there is also a strong demand among medical students for

a structured AI training to be included in their undergraduate curricula.⁷

Maharashtra, being one of the largest and progressive states in India with numerous medical colleges, plays a crucial role in shaping the future healthcare workforce. Understanding the current level of AI awareness and the impact of educational interventions among medical undergraduates in this region is vital. This study aims to address this gap by evaluating the effectiveness of a structured AI awareness session on improving the knowledge and attitude of first-year MBBS students across the six administrative regions of Maharashtra.

METHODS

The institutional ethical committee's approval was obtained for this interventional study consisting of a pre-intervention assessment, intervention in the form of a standardized, structured AI awareness session and post-intervention assessment, conducted among undergraduate medical students in Maharashtra.

The study was conducted over a period of seven months, from 01 October 2025 to 30 April 2026, within selected medical colleges in Maharashtra. The first year MBBS undergraduate medical students, willing to participate in the study were eligible for inclusion in the study. Exclusion criteria included unwillingness to participate and failure to attend all sessions of training.

A purposive convenience sample consisting of 600 medical students in first year MBBS was used in this study. The reason for selecting the first year MBBS students was that these students would have just started with their medical undergraduate education and this type of training and assessment would benefit them in updating them with latest AI integration with medical education.

One medical college was randomly selected from each of the six revenue divisions of Maharashtra, ensuring representation from both rural and urban areas of Maharashtra. A total of 100 participants were enrolled from each selected medical college using systematic random sampling. Sociodemographic data of study participants was collected on a semi-structured questionnaire, based on Modified Kuppaswami scale 2019.

This was a quantitative, quasi-experimental interventional study employing a pre-test/post-test design to assess the change in knowledge and attitude towards AI in medicine among first-year MBBS students. The intervention consisted of a standardized, structured AI awareness session. The session was designed by a panel of experts in AI and medical education and delivered by trained facilitators. It covered fundamental concepts of AI, its applications in various medical specialties (e.g., radiology, pathology, internal medicine), its ethical

considerations, and future implications for healthcare. Each AI awareness session lasted for approximately 3 hours, including interactive discussions and case studies.

Data were collected using a self-administered, pre-validated questionnaire. The questionnaire comprised two main sections on AI in healthcare: Knowledge assessment and Attitude assessment. For Knowledge assessment, 25 multiple-choice questions (MCQs) were designed to assess basic AI concepts and their applications in medicine.

Each correct answer was awarded 4 marks, totalling a maximum score of 100. (e.g., What is Machine Learning? Which AI technique is commonly used in medical imaging analysis?). For Attitude assessment of the study participants, 10 statements rated on a 5-point Likert scale (1=Strongly disagree, 5=Strongly agree) were used to assess the students' attitudes towards AI in medicine (e.g., AI will improve diagnostic accuracy; AI will replace doctors; AI education should be part of the MBBS curriculum). The total attitude score ranged from 10 to 50.

The pre-validated questionnaire of this study was administered twice: once immediately before the AI awareness session (pre-test) and once immediately after the AI awareness session (post-test). Confidentiality and anonymity of participants were maintained throughout the study. The data was compiled and statistical analysis was done with SPSS 20.0 statistical software. The difference in the means of pre-intervention scores and post-intervention scores were analysed for statistical significance using 'paired t-test' ('p' value <0.05 considered significant).

RESULTS

A total of 600 first-year MBBS students in the age group of 17-21 years participated in this interventional study. Table 1 shows the socio-demographic characteristics of study subjects. Out of all participating medical students, 276 (46%) were male and 324 (54%) were female. A majority of participants in the study group belonged to Hindu religion (75.8%) and participating students were divided as per their socioeconomic class based on modified Kuppaswami scale, as shown in table 1. The mean pre-intervention knowledge score for all participants was 41.22±7.42 (out of 100). Following the structured AI awareness session, the mean post-intervention knowledge score of participants significantly increased to 72.45±8.78. The paired t-test revealed a statistically significant improvement in knowledge of study participants ($t=-150.73$, $p<0.001$). The mean pre-intervention attitude score for all participants was 3.10±0.40 (on a 5-point Likert scale). After the intervention, the mean post-intervention attitude score significantly improved to 4.29±0.47. The paired t-test indicated a statistically significant positive change in attitude ($t=-101.18$, $p<0.001$).

Table 1: Socio-demographic characteristics of study participants (n=600).

S. No.	Demographic variables	Total (N)	Percentage (%)
1.	Age (in years)		
	17-18	120	20
	18-19	210	35
	19-20	180	30
2.	20-21	90	15
	Gender		
	Male	276	46
3.	Female	324	54
	Type of medical college		
4.	Government	200	33.3
	Private	400	66.7
5.	Location of medical college		
	Urban	400	66.7
	Rural	200	33.3
6.	Religion		
	Hindu	455	75.8
	Muslim	55	9.2
	Others	90	15.0
7.	Socioeconomic status		
	Upper class	310	51.7
	Upper middle	137	22.9
	Lower middle	60	10.0
	Upper lower	47	7.9
8.	Lower class	46	7.5

Table 2: Comparison of pre- and post-intervention knowledge scores by region.

Region	Pre-knowledge (mean±SD)	Post-knowledge (mean±SD)	P value
Amravati	42.00±7.45	72.80±9.04	<0.001
Chhatrapati Sambhajnagar	42.11±7.14	72.72±9.20	<0.001
Konkan	41.92±6.94	72.09±8.34	<0.001
Nagpur	41.21±7.72	71.68±8.47	<0.001
Nashik	44.04±7.73	74.31±9.05	<0.001
Pune	41.06±7.52	70.80±8.36	<0.001
Overall	41.22±7.42	72.45±8.78	<0.001

Table 3: Comparison of pre- and post-intervention attitude scores by region.

Region	Pre-attitude (mean±SD)	Post-attitude (mean±SD)	P value
Amravati	3.10±0.40	4.31±0.46	<0.001
Chhatrapati Sambhajnagar	3.11±0.40	4.29±0.51	<0.001
Konkan	3.11±0.42	4.31±0.49	<0.001
Nagpur	3.06±0.43	4.23±0.49	<0.001
Nashik	3.16±0.35	4.36±0.43	<0.001
Pune	3.10±0.43	4.27±0.48	<0.001
Overall	3.10±0.40	4.29±0.47	<0.001

DISCUSSION

This interventional study demonstrates a significant positive impact of a structured AI awareness session on both the knowledge and attitude of first-year MBBS students in Maharashtra. The substantial increase in knowledge scores post-intervention aligns with the findings from similar studies that highlight the effectiveness of targeted educational programs in improving understanding of AI among medical students.^{8,9}

The systematic review of research studies conducted by Gupta S et al, have shown that there is a high level of AI awareness, but the formal knowledge level about AI is low among Indian medical students.⁹ The findings of this study regarding AI awareness among medical students are similar to other studies as 80.1% of our study participants have shown basic awareness about AI. In a study conducted by Swarnalata Garapati et al, in Andhra Pradesh, 85.5% of the medical students knew about AI whereas 54.1% did not know the application of AI in medicine.¹⁰

A study conducted by Sharma et al, in year 2023 reported that 80.7% of 730 pan India medical college respondents have heard about the AI whereas Rani et al, reported that 86.95% of 299 participants know how to use AI.^{11,12} This 'awareness' means basic functional knowledge of LLMs like ChatGPT rather than complex technical concepts like machine learning algorithms.

The study conducted in year 2023 by Sharma et al, has reported that 53.6% of medical students have limited knowledge of AI application in the field of medicine.¹¹ Similar findings were also reported by Sharma et al in a study conducted in a year 2025 who found that the participants had varying knowledge about the advantages of using AI in healthcare.¹³ The study conducted by Dhurandhar D et al, on medical students in central India indicate that respondents possess a moderate level of understanding regarding AI concepts and applications in the medical field.¹⁴

The observed positive shift in attitude towards AI is equally important. Initially, medical students often harbour anxieties or misconceptions about AI, particularly regarding job displacement or the dehumanization of medicine.^{6,15} Our intervention, by providing a balanced perspective on AI's role as a supportive tool rather than a replacement for human clinicians, appears to have fostered a more positive and receptive attitude.

This is consistent with research suggesting that early exposure and education can mitigate negative perceptions and promote acceptance of new technologies in healthcare.¹⁶ The consistency of significant improvements across all six administrative regions of Maharashtra

underscores the generalisability of these findings within the state of Maharashtra. This suggests that a standardized AI awareness module can be effectively implemented across diverse medical colleges, irrespective of their geographical location or specific institutional characteristics. The demand for AI education among medical students is high, and our study provides empirical evidence supporting the efficacy of such interventions with regard to integration of AI in medical education.⁷

Limitations

This study was conducted on first-year MBBS students, and the findings may not be directly generalisable to students in higher academic years or practicing clinicians. The study relied on self-reported data of the first-year medical students for their attitude assessment, which might be subject to social desirability bias. Furthermore, the long-term retention of knowledge and attitude changes was not assessed in this study, warranting future longitudinal studies on the same topic.

CONCLUSION

The structured AI awareness session proved to be highly effective in significantly enhancing the knowledge and fostering a positive attitude towards AI among first-year MBBS students across Maharashtra. These results strongly advocate for the formal integration of AI education into the undergraduate medical curriculum. Such initiatives are vital to prepare future medical professionals to confidently and competently navigate the evolving landscape of AI-driven healthcare, ultimately benefiting patient care and public health.

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