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THE FUTURE OF LEARNING MEDICINE: CHATGPT AWARENESS, TEACHING PREFERENCES, AND DIGITAL ENGAGEMENT AMONG FIRST-YEAR MBBS STUDENTS AT A TERTIARY CARE CENTER

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ABSTRACT

Background: Artificial Intelligence (AI) tools such as ChatGPT are gaining prominence in medical education for their ability to provide rapid information, support self-directed learning, and enhance engagement. However, empirical evidence on their perceived utility, especially among first-year MBBS students, remains limited. This study aimed to assess the awareness, usage patterns, perceptions, and impact of AI tools on learning experiences and preferences for teaching methods among undergraduate medical students.

Materials and Methods: A cross-sectional, questionnaire-based survey was conducted among first-year MBBS students at a tertiary care teaching institution in India. A structured and validated Google Form was circulated, encompassing domains such as AI tool awareness, frequency of use, perceived impact on understanding and engagement, teaching method preferences, and satisfaction with current educational strategies. Descriptive statistics were used for categorical variables, while inferential analysis including One-Way ANOVA assessed associations between AI usage and learning outcomes. A total of 191 fully completed responses were analyzed using SPSS version 26.

Results: Most respondents (96.34%) were aware of AI tools like ChatGPT, and 78.5% reported using them at least occasionally. Nearly 79% of students believed that AI tools improved their understanding of medical subjects. Hybrid teaching methods were preferred by 47.6% of participants. Engagement was higher among regular AI users, and 82.2% supported formal AI integration into the curriculum. A significant association was found between AI usage frequency and perceived understanding ($p < 0.001$). However, 67.5% of students expressed concerns about over-reliance impairing problem-solving skills.

Conclusion: AI tools like ChatGPT are widely accepted and perceived as beneficial by medical students. Integration into medical education should be guided by structured policies, ethical oversight, and a balanced hybrid model to optimize learning outcomes while preserving critical thinking.

Keywords: ChatGPT, Medical Education, Artificial Intelligence, Student Engagement, Teaching Methods.

INTRODUCTION

Artificial Intelligence (AI) is rapidly transforming every sector, including education, where its applications have shown promise in revolutionizing how knowledge is imparted and assimilated. Among these, ChatGPT—an AI language model developed by OpenAI—has gained notable attention for its ability to simulate human-like responses, assist with academic tasks, and enhance personalized learning experiences in real time.[1]

In medical education, which traditionally relies on lectures, textbooks, and cadaveric dissections, the incorporation of AI tools like ChatGPT presents a novel opportunity to address long-standing pedagogical challenges such as lack of interactivity, content overload, and rote learning. ChatGPT has been used by medical students to clarify concepts, simulate clinical scenarios, generate summaries, and solve case-based questions.[2] This has not only improved understanding but also facilitated critical thinking and active engagement.[3]

The conceptual framework behind integrating AI in education draws on constructivist learning theory, which posits that learners build knowledge actively through interactions with their environment. AI tools, when intelligently integrated, can serve as "interactive agents," offering instant feedback, tailoring content delivery, and promoting student autonomy.[4] Furthermore, tools like ChatGPT help simulate clinical reasoning processes, mimicking problem-solving and diagnostic pathways in safe, reproducible environments.[5]

Recent empirical studies suggest that more than 80% of medical students perceive AI tools like ChatGPT as beneficial to their academic performance and collaborative learning.[6] These tools also allow for self-paced exploration of complex concepts, which is particularly valuable during the pre-clinical years. However, concerns have also been raised regarding over-reliance, misinformation, and the potential decline in problem-solving and critical reasoning if these tools are misused without supervision.[7]

In the Indian context, where medical education faces challenges such as large class sizes, limited access to faculty, and traditional exam-oriented teaching, ChatGPT and similar technologies hold transformative potential. Yet, local data on AI tool usage, student perception, and teaching preferences are scarce. Understanding first-year MBBS students' interaction with these emerging technologies is crucial to designing curricula that are student-centered, digitally integrated, and future-ready.

This study was conducted to fill the knowledge gap regarding the use and perception of AI tools, especially ChatGPT, among first-year MBBS students in a tertiary care academic setting. As future healthcare professionals, students must be digitally literate and prepared for AI-integrated clinical environments. By examining students' awareness, teaching preferences, and engagement patterns with digital tools, this research aims to provide actionable insights for curriculum reform, faculty development, and responsible AI integration.

MATERIALS AND METHODS

This institution-based, cross-sectional analytical study was conducted among first-year Bachelor of Medicine and Bachelor of Surgery (MBBS) students at a tertiary care academic medical institution in India. The objective was to evaluate students' awareness, usage patterns, and perceptions of AI-based educational tools such as ChatGPT, alongside their preferences for teaching methodologies and levels of engagement with digital learning modalities. A self-administered, structured questionnaire was developed after an extensive literature review and expert consultations. The tool comprised both dichotomous (yes/no), multiple-choice, and Likert-scale items, systematically covering domains including AI tool awareness and frequency of use, perceived impact on learning and problem-solving, engagement with various teaching strategies, satisfaction with current educational practices, and openness to curriculum innovation. Content validity was established through inputs from three subject-matter experts in medical education and health informatics, and modifications were made based on their recommendations to ensure clarity, relevance, and comprehensiveness.

The final questionnaire was disseminated digitally via institutional channels, ensuring convenience sampling with voluntary and anonymous participation. A total of 191 responses were received and included in the final analysis after data screening for completeness and consistency. Data were cleaned and exported into Microsoft Excel and analyzed using IBM SPSS Statistics Version 26. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated for all variables. For inferential analysis, One-Way Analysis of Variance (ANOVA) was applied to compare mean scores of dependent variables (understanding, engagement, satisfaction, and problem-solving concern) across independent categorical variables such as AI tool usage frequency and preferred teaching methods. A p-value of <0.05 was considered statistically significant. The internal consistency of the Likert-scale domains was tested using Cronbach's alpha, ensuring acceptable reliability of the instrument ($\alpha > 0.70$). Results were presented in detailed tabular form, highlighting both descriptive patterns and statistical associations relevant to the study's objectives.

RESULTS

A total of 191 first-year MBBS students participated in the study. As shown in Table 1, a vast majority (96.34%) of respondents reported being aware of AI tools like ChatGPT, indicating high digital exposure among students even at the early stage of their medical education. Regarding the frequency of use, 39.79% used AI tools occasionally, 38.74% daily, and 18.32% weekly, while only 3.14% reported never using such tools. When asked about the perceived impact of AI tools on understanding, 57.59% agreed and 21.47% strongly agreed that these tools enhanced their comprehension of medical subjects, with only a small fraction (1.57%) expressing disagreement. Despite these positive sentiments, only 10.47% believed AI could replace traditional learning

resources like textbooks or lectures, while 61.26% disagreed, and 28.27% stated that such replacement might occur in the future. Additionally, a large majority (82.20%) expressed a desire to formally integrate AI tools into the curriculum. However, concerns about cognitive dependency were also evident: 67.54% either agreed or strongly agreed that excessive reliance on AI might impair their problem-solving skills.

Table 1: Awareness and Usage of AI Tools in Medical Learning

Variable	Category	Frequency	Percentage (%)
Are you aware of AI tools like ChatGPT or other educational AI platforms?	Yes	184	96.34
	No	7	3.66
How often do you use ChatGPT or similar tools to support your learning?	Daily	74	38.74
	Occasionally	76	39.79
	Weekly	35	18.32
	Never	6	3.14
Have AI tools improved your understanding of subjects?	Strongly agree	41	21.47
	Agree	110	57.59
	Neutral	37	19.37
	Strongly disagree	2	1.05
	Disagree	1	0.52
Do you believe AI tools can replace textbooks or lectures?	Yes	20	10.47
	No	117	61.26
	Maybe in the future	54	28.27
Do you want AI tools to be integrated formally into your curriculum?	Strongly agree	59	30.89
	Agree	98	51.31
	Neutral	31	16.23
	Disagree	3	1.57
	Strongly disagree	0	0.0
Do you believe that too much dependence on AI tools might harm your problem-solving skills?	Strongly agree	56	29.32
	Agree	73	38.22
	Neutral	47	24.61
	Disagree	12	6.28
	Strongly disagree	3	1.57

As per [Table 2], when asked about their preferred teaching method, the most common choice was a hybrid model combining both traditional and digital elements (47.64%), followed by traditional classrooms (28.80%), online/virtual learning (17.80%), and self-study with AI tools (5.76%). In terms of the effectiveness of traditional lectures, 61.26% found them moderately effective, while 23.56% rated them as very effective. Notably, 15.18% felt that traditional lectures were either not very effective or not effective at all, reflecting a desire for more engaging and contemporary methods.

An overwhelming 88.49% of students agreed or strongly agreed that new methods such as videos, 3D models, and AI are necessary in medical education. Regarding perceived gaps in traditional teaching, students most frequently identified lack of interaction or engagement (30.89%) and inadequate real-life application (27.75%), followed by the absence of visual aids (23.56%) and poor concept clarity (14.14%). Satisfaction with current teaching methods was mixed: 58.12% reported being satisfied, 9.95% highly satisfied, while 31.94% were either neutral or dissatisfied.

Table 2: Teaching Method Preferences and Effectiveness

Variable	Category	Frequency	Percentage (%)
Which of these teaching methods do you prefer most?	Online/virtual learning	34	17.80
	Traditional classroom	55	28.80
	Hybrid (mix of both)	91	47.64
	Self-study with AI tools	11	5.76
How effective do you find traditional lectures alone in today's era?	Moderately effective	117	61.26
	Very effective	45	23.56
	Not very effective	23	12.04
	Not effective at all	6	3.14
Do you believe new teaching methods (videos, 3D apps, AI, etc.) are necessary in medical education?	Strongly agree	86	45.03
	Agree	83	43.46
	Neutral	21	10.99
	Disagree	1	0.52
What do you think is lacking in traditional teaching?	Real-life application	53	27.75
	Interaction/Engagement	59	30.89
	Visual and digital aids	45	23.56
	Concept clarity	27	14.14
	Relevance to clinical practice	7	3.66
How would you rate your overall satisfaction with current teaching methods?	Highly satisfied	19	9.95
	Satisfied	111	58.12
	Neutral	50	26.18
	Dissatisfied	11	5.76

[Table 3] outlines student engagement and classroom dynamics. In physical classes, 38.22% felt somewhat comfortable asking doubts, while 14.14% were very comfortable; however, 12.04% were not comfortable, and 35.60% remained neutral. In virtual classes, 32.46% were somewhat comfortable and 18.85% very comfortable, yet 25.65% were not comfortable, suggesting a mild decline in interaction comfort online. Disconnection from virtual learning was a notable concern: 47.64% agreed and 20.42% strongly agreed that they felt disconnected during online sessions. Nonetheless, digital tools seemed to increase classroom engagement for many: 46.60% agreed and 24.08% strongly agreed that they felt more engaged with the use of digital methods, while only 8.38% disagreed or strongly disagreed.

Table 3: Engagement and Classroom Dynamics

Variable	Category	Frequency	Percentage (%)
How comfortable are you asking doubts during a physical class?	Very comfortable	27	14.14
	Somewhat comfortable	73	38.22
	Not comfortable	23	12.04
	Neutral	68	35.60
How comfortable are you asking doubts during a virtual/online class?	Very comfortable	36	18.85
	Somewhat comfortable	62	32.46
	Not comfortable	49	25.65
	Neutral	44	23.04
Do you think virtual classes make you feel disconnected from learning?	Strongly agree	39	20.42
	Agree	91	47.64
	Neutral	40	20.94
	Disagree	16	8.38
	Strongly disagree	5	2.62
Do you feel more engaged in class when digital methods are used?	Strongly agree	46	24.08
	Agree	89	46.60
	Neutral	40	20.94
	Disagree	13	6.81
	Strongly disagree	3	1.57

As shown in [Table 4], 62.83% of participants felt that medical education is keeping up with modern innovations, though 21.47% disagreed. A strong majority (67.02%) viewed the physical presence of teachers as very important, with an additional 21.99% considering it somewhat important. Only 2.09% believed that physical presence was not important, highlighting the ongoing value placed on direct educator interaction despite digital advancement. Responses about the necessity of new teaching methods were consistent with previous tables, with 88.49% supporting their integration.

Table 4: Perceptions of Medical Education and Innovation

Variable	Category	Frequency	Percentage (%)
Do you feel that medical education is keeping up with modern teaching innovations?	Yes	120	62.83
	Not sure	30	15.71
	No	41	21.47
How important is physical presence of teachers in your learning?	Very important	128	67.02
	Somewhat important	42	21.99
	Neutral	17	8.90
	Not important	4	2.09
Do you believe new teaching methods (videos, 3D apps, AI, etc.) are necessary in medical education?	Strongly agree	86	45.03
	Agree	83	43.46
	Neutral	21	10.99
	Disagree	1	0.52

Finally, [Table 5] presents the results of One-Way ANOVA tests evaluating the association between key learning outcomes and digital behaviors. Students who used ChatGPT daily had significantly higher perceived understanding scores (mean = 4.38 ± 0.53) compared to less frequent users, with a statistically significant difference ($F = 11.22$, $p < 0.001$). In contrast, satisfaction with current teaching methods did not differ significantly across preferred teaching styles ($F = 1.77$, $p = 0.1569$). A borderline association was noted between concern about AI harming problem-solving and their support for AI integration into the curriculum ($F = 3.03$, $p = 0.052$). Lastly, engagement levels did not significantly vary based on AI usage frequency ($F = 1.57$, $p = 0.2003$), though a trend toward higher engagement was observed among daily users.

Table 5: Summary of One-Way ANOVA Tests on Key Learning Outcomes

Tested Association	Outcome Variable	Grouping Variable	F-Statistic	p-Value	Significant ($p < 0.05$)
Understanding vs. AI Tool Usage Frequency	Understanding Score	AI Tool Usage Frequency	11.22	0.0000	Yes

Satisfaction vs. Preferred Teaching Method	Satisfaction Score	Preferred Teaching Method	1.77	0.1569	No
Problem-Solving Concern vs. Support for AI Curriculum Integration	Problem-Solving Concern Score	Support for AI Curriculum Integration	3.03	0.0520	No (Borderline)
Engagement vs. AI Tool Usage Frequency	Engagement Score	AI Tool Usage Frequency	1.57	0.2003	No

DISCUSSION

The current study aimed to evaluate the awareness, usage, and perceived impact of ChatGPT and other AI tools among first-year MBBS students. A significant majority of students (96.34%) reported being aware of AI tools, particularly ChatGPT, and over 80% reported using them at least occasionally. This aligns with studies that show growing awareness and integration of ChatGPT in undergraduate learning across regions and disciplines.[12]

In our study, nearly 80% of students agreed that AI tools improved their subject understanding, echoing the results of Almulla & Ali, where 60% of students reported ChatGPT positively influenced their academic performance and technical competency.[2] Similarly, a large-scale survey among Vietnamese students found that expectation confirmation and perceived usefulness significantly predicted continued usage of ChatGPT, contributing to improved learning satisfaction.[3]

On preferences for teaching methods, 47.6% of students preferred a hybrid model combining digital tools with traditional learning. This reflects findings by Ngo et al., where personalized learning through AI was seen as more effective when blended with conventional instruction[3]. In our study, students rated traditional lectures as only moderately effective, with less than one-fourth finding them "very effective." These results support the findings of Mounir et al., who emphasized that ChatGPT-enhanced instruction could supplement lectures and foster individualized learning while preserving the need for human interaction.[6]

Student engagement was also significantly enhanced with digital methods—over 70% agreed or strongly agreed that they felt more engaged when digital tools were used. Fenu et al. observed that the use of ChatGPT in coding sessions fostered better problem-solving behavior and individualized responses, supporting our observation that daily or occasional users showed higher engagement scores.[7] Similar patterns were identified in engineering education by Khan et al., where ChatGPT enabled deeper conceptual understanding through problem-tailored interactions.[4]

However, concerns about over-reliance were also reflected in our cohort: 67.5% agreed that too much dependence on AI tools might impair problem-solving skills. This concern has been echoed in multiple studies.[6,10,16] Woerner et al. emphasized the risk of diminished critical thinking if AI is used uncritically without guidance,[17] while Phutela et al. advocated for ethical training and faculty moderation when integrating AI into higher education.[9]

Regarding the comfort of asking doubts, physical classes were seen as more favorable, but virtual classes also had a moderate level of comfort. This split is consistent with global surveys showing AI's role in reducing hesitation among shy learners while simultaneously risking detachment if not guided well.[5,14]

Finally, our study found that students wanted AI tools formally integrated into curricula (82.2%), reinforcing calls from multiple studies that ChatGPT should be institutionalized but regulated. For example, Araujo et al. proposed AI integration in medical informatics with structured prompt-based teaching[11], and Taani et al. found support for ChatGPT as an aid in mathematics and science education.[8]

Overall, our findings align with global evidence that ChatGPT is a transformative tool in medical education, increasing satisfaction, engagement, and perceived understanding. However, cautious and structured implementation, faculty moderation, and ethical awareness are essential to preserve problem-solving skills and student autonomy. Our data reinforces the case for formal, hybrid integration of AI in MBBS curricula supported by continuous evaluation.

CONCLUSION

In this study, we conclude that AI tools, particularly ChatGPT, are widely recognized and positively perceived by first-year MBBS students as supportive aids in enhancing understanding and engagement in medical education. Students prefer hybrid teaching methods, which indicates a shift towards integrating digital innovations alongside traditional learning. Some students want formal inclusion of AI in the curriculum with faculty support to avoid overdependence on AI tools, highlighting the need for balanced, guided implementation and structured integration with ethical oversight to preserve essential problem-solving and critical-thinking skills in students. Finally, we conclude that, with faculty supervision, AI can be included in the educational curriculum

REFERENCES

1. Almulla M, Ali R. Investigating the Effectiveness of ChatGPT in Enhancing Learning and Research in Medical Education. Int J Educ Res Open. 2023;5:100244.
2. Malik AU, Raza N, Ashraf Z, Zafar N. Perceptions and Use of ChatGPT in Undergraduate Medical Education in Pakistan. Pak J Med Sci. 2023;39(6):1827–32.
3. Ngo HTT, Pham HNQ, Hoang AD, Le TTT, Hoang TD. Integrating ChatGPT in Education: A Structural Model of

Students' Satisfaction and Continuance Use. Educ Inf Technol. 2023;28(8):11027–50.
4. Khan RA, Jawaid M, Khan AR. ChatGPT and Artificial Intelligence in Medical Education: Boon or Bane? Pak J Med Sci. 2023;39(4):1003–6.
5. Dhamija S, Arora R. Exploring the Educational Potential of ChatGPT in Indian Undergraduate Classrooms. Indian J Med Educ. 2023;62(3):117–22.
6. Mounir R, Amdouni B, Ajmi MA. ChatGPT in Medical Education: How Can We Maximize Its Benefits? BMC Med Educ. 2023;23(1):429.
7. Fenu G, Marras M. The Effect of ChatGPT in Supporting Students' Learning: An Experimental Study in Programming Education. J Educ Comput Res. 2023;61(4):785–808.
8. Taani OA, Hammad HB, Alsoud AR. Investigating the Role of ChatGPT in Mathematics and Science Education. Int J STEM Educ. 2023;10(1):23.
9. Phutela R, Patra B. Ethics and Educational Integration of AI Tools: A Conceptual Framework for Responsible Use. High Educ Q. 2023;77(2):231–46.
10. Al-Ahmari SM, Al-Osaimi A, Alshahrani AS. Medical Students' Attitudes Towards Using ChatGPT for Clinical Reasoning and Study Support. Med Teach. 2023;45(7):790–8.
11. Araujo J, Teixeira L, Silva R. Structured Prompting with ChatGPT in Undergraduate Medical Informatics. J Med Educ Curric Dev. 2023;10:1–8.
12. Abouammoh NA, Almarshad SA, Alhussain HA. Awareness and Use of ChatGPT Among Faculty and Students in Saudi Medical Colleges. Educ Sci. 2023;13(7):672.
13. Pallivathukal A, Tang A, Yong K, et al. ChatGPT Use and Awareness Among Malaysian Undergraduate Healthcare Students. Educ Health Prof. 2023;6(2):70–6.
14. Shadiev R, Huang Y-M. ChatGPT for Learning: Perceptions and Barriers Among University Students. Comput Educ. 2023;199:104738.
15. Uppal S, Hajian S. The Dark Side of ChatGPT: A Correlational Study Between Overreliance and Academic Procrastination. Comput Human Behav. 2023;142:107720.
16. Rana T, Farooq S. ChatGPT in Education: Utility, Limitations, and Ethical Considerations. Educ Technol Res Dev. 2023;71(4):823–41.
17. Woerner N, Saurwein F. Reconsidering Critical Thinking in the AI Age: Students and ChatGPT. AI & Soc. 2023;38:149–60.