Section: Community Medicine

Original Research Article

IMPACT OF CHATGPT ON ACADEMIC AND PERSONAL DEVELOPMENT OF MEDICAL UNDERGRADUATES

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Received *: 08/12/2025*
Received in revised form *: 20/01/2026*
Accepted *: 07/02/2026*

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DOI: 10.70034/ijmedph.2026.1.585

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (1); 3419-3423

ABSTRACT

Background: Generative artificial intelligence (AI) tools such as ChatGPT are increasingly used by medical students for academic support and self-directed learning. Beyond academics, students also report using AI tools for communication practice, confidence building, and stress management. However, evidence regarding their combined influence on academic and personal development remains limited. The objective is to evaluate the impact of ChatGPT on academic development and to assess its influence on perceived personal development among undergraduate medical students.

Materials and Methods: A cross-sectional observational study was conducted from April to June 2025 among 200 undergraduate medical students at a medical college in Central India. Students with prior experience using ChatGPT or similar AI chatbots completed a structured questionnaire assessing demographic details, AI usage patterns, academic development, and perceived personal development using Likert-scale items. Academic and personal development scores were categorized into low, moderate, and high perceived impact. Data were analyzed using PSPP software with descriptive statistics and subgroup comparisons. A p-value <0.05 was considered statistically significant.

Results: The mean age of participants was 22.4 years, and 60% were female. Standard textbooks (61.5%) and AI tools (55.0%) were the most commonly used study resources. ChatGPT was the most frequently used AI tool (59.5%). Students reporting moderate frequency and session durations of 15–30 minutes showed higher academic success proportions compared to those with more frequent or prolonged use. High perceived personal development impact was reported by 72% of students, particularly in communication confidence, stress management, and motivation.

Conclusion: ChatGPT is perceived as a supportive supplementary tool for both academic learning and personal development among medical students. Balanced and guided use is essential to maximize benefits while preserving independent learning and academic integrity.

Keywords: ChatGPT; Medical education; Artificial intelligence; Academic performance; Personal development.

INTRODUCTION

Artificial intelligence (AI) has emerged as a transformative force across multiple sectors, including healthcare, research, and higher education.[1] The development of large language models (LLMs) such as ChatGPT has accelerated this transformation by enabling conversational interaction, contextual understanding, and rapid information synthesis.[2,3] These systems use transformer-based neural network architectures trained on extensive datasets, allowing them to generate coherent responses, summarise information, and assist with problem-solving tasks. Their

accessibility through web-based platforms has made them especially popular among students.

Medical education is traditionally built on structured lectures, textbooks, clinical exposure, and peer interaction. In recent years, digital resources such as online lectures, simulation platforms, and adaptive testing systems have complemented these methods. Generative AI represents the next phase of this digital evolution, offering an interactive learning assistant capable of addressing queries instantly, simplifying complex concepts, and providing customised explanations.[4-6] Medical students have increasingly begun using ChatGPT for revising topics, generating differential diagnoses, preparing for examinations, and improving academic writing.

Beyond academic applications, generative AI tools are also being used for broader developmental purposes. Students report using ChatGPT to rehearse presentations, practise communication skills, receive motivational support, and manage study schedules.[7,8] Medical training is often associated with high stress levels, heavy workloads, and performance pressure. Tools that provide immediate, non-judgemental feedback may influence students' confidence, communication ability, and stress management. However, the extent of this influence remains largely subjective and underexplored.

At the same time, concerns have been raised regarding excessive reliance on AI tools. Overdependence may reduce independent critical thinking, impair deep learning, and contribute to academic dishonesty if AI-generated responses are submitted as original work.[9,10] Institutions worldwide are therefore grappling with how to integrate AI responsibly into educational environments.

While many studies evaluate ChatGPT's performance in answering medical questions, fewer investigations explore how students perceive its broader academic and personal impact. Medical education requires not only knowledge acquisition but also communication competence, resilience, and professional development. Understanding how AI tools influence these domains is therefore essential. This study was undertaken to evaluate the perceived impact of ChatGPT on academic and personal development among undergraduate medical students.

MATERIALS AND METHODS

Study Design: Cross-sectional study.

Study Area: Medical College of Central India.

Study Tools: Self-structured questionnaire covering demographics, study habits and AI usage patterns, Academic exam scores and Perception of Personality developments.

Study Duration: The study was conducted over a period of 3 months i.e. July 2025- September 2025

Study Population: Third-year MBBS students of the Medical College of Central India.

Sampling method: Complete enumeration.

Inclusion criteria:

All undergraduate medical students of third year of course, who consent to participate.

Exclusion criteria:

Students who are not in the third year of the course and/or were unwilling to participate in the study

Study Sample: 200 Students

Statistical Analysis: Data were collected from all participants, compiled, and processed using PSPP. Descriptive statistics summarized demographics, study habits, and AI usage. Comparative analysis was performed to assess differences in exam outcomes between AI users and nonusers

Review of Literature

The integration of artificial intelligence into education has evolved rapidly over the past decade. Early AI-based educational systems focused on adaptive tutoring and automated feedback mechanisms. Holmes et al,[11] highlighted that AI-driven educational tools can enhance learner engagement, provide personalised instruction, and support self-paced learning. Their work emphasized that AI has the potential to act as a cognitive assistant rather than merely a content delivery system.

With the emergence of large language models, attention has shifted toward generative AI systems such as ChatGPT. Vaswani et al,[2] introduced the transformer architecture that underpins modern language models, enabling contextual understanding and sequence prediction. Ouyang et al,[3] further advanced this technology through reinforcement learning from human feedback, improving the model's ability to generate relevant and instruction-following responses. These developments laid the foundation for AI tools that are now widely used in educational contexts.

Several studies have evaluated ChatGPT's academic performance in medical education. Kung et al,[4] assessed ChatGPT's performance on the United States Medical Licensing Examination (USMLE) and found that the model achieved passing-level scores without domain-specific training. However, the authors noted that while factual recall was strong, the AI struggled with complex reasoning and nuanced clinical judgement. Similarly, Gilson et al,[5] reported that ChatGPT demonstrated substantial medical knowledge across multiple examination-style questions but highlighted variability in reasoning depth.

Soulage et al,[12] examined ChatGPT's performance in a university-level medical physiology examination and found that the AI achieved scores comparable to or exceeding those of medical students in certain sections. Bharatha et al,[6] compared ChatGPT-4 with medical students across different levels of Bloom's taxonomy and observed that the AI performed particularly well in knowledge recall and comprehension tasks but was less reliable in higher-order analytical questions.

Rao et al,[13] explored ChatGPT's role as an adjunct in medical education and suggested that it may serve as a supplementary learning tool, particularly for

clarifying concepts and generating practice questions. However, they emphasized that AI cannot replace clinical training or experiential learning. Bubeck et al,[14] investigated advanced capabilities of GPT-4 and reported that while the system demonstrated impressive general reasoning, it still lacked true contextual understanding and domain-specific judgement.

From a learning theory perspective, Kirschner and van Merriënboer,[15] cautioned that overreliance on automated tools may reduce deep cognitive processing. Their work on educational myths emphasized that learners do not always choose strategies that optimise long-term retention, suggesting that AI-generated summaries might encourage superficial learning if used excessively.

Beyond academic performance, emerging research has begun exploring AI's perceived influence on personal development. Chan and Hu,[7] reported that students viewed generative AI tools as helpful for communication rehearsal and idea organisation. Dahri et al,[8] found that students perceived ChatGPT as beneficial for academic confidence and career readiness, although they noted that outcomes were subjective and varied widely among users.

Ethical considerations are increasingly prominent in the literature. Cotton et al,[9] discussed challenges to academic integrity posed by AI-generated content and stressed the importance of clear institutional policies. Thomas and Aldridge,[10] highlighted concerns about AI-written assignments being difficult to detect, reinforcing the need for ethical guidelines and AI literacy training.

Finally, Shanafelt et al,[16] examined stress and burnout in medical professionals, underscoring the importance of coping mechanisms and supportive environments. Although their study did not focus on AI, it provides context for understanding why students may seek tools that offer reassurance or stress management support.

Collectively, the literature suggests that ChatGPT and similar AI tools possess strong potential as supplementary educational resources, particularly for knowledge reinforcement and communication rehearsal. However, limitations in reasoning, risks of overdependence, and ethical concerns necessitate structured integration into medical education. Further research is needed to understand how students perceive AI's influence on both academic performance and personal development, which forms the basis of the present study.

RESULTS

Table 1: Demographic Characteristics of Study Participants (N = 200)

Variable	Category	Number (n)	Percentage (%)
Gender	Female	120	60.0
	Male	80	40.0
Age (years)	20	13	6.5
	21	40	20.0
	22	56	28.0
	23	47	23.5
	24	30	15.0
	25	10	5.0
	26	4	2.0

[Table 1] shows that the study population had a higher proportion of female students (60%) compared to males (40%) with a total number of 200 participants in the study. Age distribution based on available responses indicates that most participants were between 21 and 24 years, with the mean age of 22.44 ± 1.37 years representing the typical age range of undergraduate medical training.

Table 2: Study Resources Used by Students (Multiple Responses Allowed)

Study Resource	Students Using (n)	Percentage (%)
Standard textbooks	123	61.5
AI tools	110	55.0
Self-prepared notes	98	49.0
Lecture notes	90	45.0
Lecture videos	89	44.5
Classroom lectures	69	34.5
Practicals/museum study	50	25.0
Notes from seniors	39	19.5
Group discussions	38	19.0
Coaching notes	27	13.5
MCQ banks	23	11.5

[Table 2] shows that standard textbooks were the most commonly used resource (61.5%), followed by AI tools (55%) and self-prepared notes (49%). Digital resources such as lecture videos and lecture notes were also widely used. Traditional collaborative learning approaches, including group discussions and notes from seniors, were less frequently reported. This indicates that AI tools are used as a supplement rather than a replacement for conventional study methods.

Table 3: Patterns of AI Use and Academic Outcome (n = 200)

Variable	Category	Students (n)	Pass n (%)	Fail n (%)
AI Tool Used	ChatGPT	119	100 (84.0%)	19 (16.0%)
	Google Gemini	73	62 (84.9%)	11 (15.1%)
	Meta AI (WhatsApp)	63	51 (81.0%)	12 (19.0%)
	Snapchat AI	9	8 (88.9%)	1 (11.1%)
	Perplexity AI	9	8 (88.9%)	1 (11.1%)
	Microsoft Copilot	3	3 (100.0%)	0 (0%)
	NotebookLM	2	2 (100.0%)	0 (0%)
	Grok AI (X)	4	4 (100.0%)	0 (0%)
Frequency of AI Use	Occasional	17	16 (94.1%)	1 (5.9%)
	<1 time per week	43	42 (97.7%)	1 (2.3%)
	1–3 times per week	37	32 (86.5%)	5 (13.5%)
	4–6 times per week	45	29 (64.4%)	16 (35.6%)
	Multiple times per day	14	8 (57.1%)	6 (42.9%)
Duration per Session	5–15 minutes	77	68 (88.3%)	9 (11.7%)
	15–30 minutes	56	55 (98.2%)	1 (1.8%)
	More than 30 minutes	17	5 (29.4%)	12 (70.6%)

[Table 3] shows that ChatGPT was the most commonly used AI tool (n = 119), with an 84.0% pass rate. Similar pass proportions were observed among users of Google Gemini (84.9%) and Meta AI (81.0%). Smaller groups using Snapchat AI and Perplexity AI also demonstrated high pass rates, while all users of Microsoft Copilot, NotebookLM, and Grok AI passed, though these groups were very small.

Academic success was higher among students who used AI less frequently. Those using AI occasionally or less than once per week showed pass rates above 94%, whereas students using AI multiple times per day had a lower pass rate (57.1%). A similar pattern was seen with duration of use: students using AI for 15–30 minutes per session had the highest pass rate (98.2%), while those using it for more than 30 minutes had a much lower pass rate (29.4%). These findings suggest that moderate and focused AI use may be more beneficial than prolonged reliance.

Table 4: Perceived Personal Development Impact (n = 200)

Domain	High n (%)	Moderate n (%)	Low n (%)
Communication confidence	144 (72.0)	42 (21.0)	14 (7.0)
Stress management	146 (73.0)	38 (19.0)	16 (8.0)
Motivation & discipline	150 (75.0)	36 (18.0)	14 (7.0)
Overall	144 (72.0)	40 (20.0)	16 (8.0)

[Table 4] shows that a majority of students reported high perceived impact in communication confidence (72%), stress management (73%), and motivation and self-discipline (75%). Overall, 72% of participants reported a high perceived personal development impact, indicating that students believe AI tools contribute positively to non-academic aspects of their growth.

DISCUSSION

This study examined medical students' perceptions of ChatGPT use in relation to academic and personal development. The findings indicate that AI tools are widely used as supplementary learning resources, with ChatGPT being the most frequently used platform.

The results demonstrate that students who used AI tools in moderation—particularly those using them occasionally or for limited durations—showed higher academic success proportions. This pattern is consistent with earlier studies by Kung et al,[4] and Soulage et al,[12] which showed that ChatGPT performs well in knowledge-based tasks and can support learning when used as a supplementary aid. Similarly, Bharatha et al,[6] reported that AI tools are most reliable in areas of factual recall and concept clarification, supporting the idea that moderate use for revision and understanding may enhance performance.

In contrast, students reporting very frequent use (multiple times per day) or prolonged session durations (>30 minutes) had comparatively lower pass proportions. This finding aligns with educational theory discussed by Kirschner and van Merriënboer,[15] who cautioned that overreliance on automated tools may reduce deep cognitive processing and independent problem-solving. Excessive dependence on AI-generated explanations may lead to passive learning rather than active engagement, which is crucial in medical education.

The perceived personal development benefits observed in this study also align with emerging literature. Chan and Hu,[7] described how students use generative AI tools to practise explanations and improve clarity of communication. Dahri et al,[8] reported that students perceived AI as contributing to confidence and preparedness. In the present study, many students reported improvements in communication confidence, stress management, and motivation, suggesting that AI tools may provide a supportive environment for rehearsal and self-directed encouragement. However, these benefits are based on self-perception and should complement—

not replace—human mentorship and peer interaction, as emphasized by Shanafelt et al,[16] in discussions on coping and resilience.

Ethical considerations remain important. Cotton et al,[9] and Thomas and Aldridge,[10] highlighted the risks of academic misconduct associated with AI-generated content. The pattern observed in this study—where moderate use appears beneficial but excessive use may be counterproductive—underscores the need for institutional guidelines promoting balanced and responsible AI integration.

Overall, the findings suggest that ChatGPT can be a valuable adjunct in medical education when used judiciously. Moderate, focused use appears to support academic learning and perceived personal development, while excessive reliance may be associated with less favourable outcomes. Structured guidance and AI literacy training are therefore essential to ensure that AI tools enhance rather than hinder medical education.

CONCLUSION

The present study highlights that ChatGPT and similar AI tools have become important supplementary resources in medical education, with more than half of the students incorporating them into their learning practices. While traditional resources such as standard textbooks remain central, AI tools are increasingly being used to enhance understanding, clarify concepts, and support revision. The findings demonstrate that moderate and purposeful use of ChatGPT is associated with better academic outcomes, whereas excessive or prolonged use may be counterproductive. This suggests that AI tools are most effective when used as an aid to reinforce learning rather than as a primary source of information. Overreliance may limit critical thinking and deep learning, which are essential competencies in medical training.

In addition to academic benefits, a significant proportion of students reported positive perceived effects on personal development, particularly in communication confidence, stress management, and motivation. These findings indicate that ChatGPT may serve as a supportive, low-pressure tool for self-expression, rehearsal, and emotional reassurance, complementing traditional educational and mentoring systems.

Overall, ChatGPT holds considerable potential as a valuable adjunct in medical education. However, its benefits depend on responsible and balanced usage. There is a clear need for institutional guidelines, AI literacy training, and ethical frameworks to ensure that students use such tools effectively without compromising academic integrity or independent learning.

In conclusion, ChatGPT can enhance both academic and personal development among medical undergraduates when used judiciously, but it should complement—not replace—conventional learning methods and human interaction.

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