

Use of Artificial Intelligence Among Medical Students in Tbilisi, Georgia: Perceived Advantages and Challenges

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Abstract

Artificial intelligence (AI) is becoming a more popular tool among medical students for learning, academic work, and clinical training. However, there is limited research on how students use AI, the benefits they perceive, the challenges they face, and the factors that influence support for formal AI integration into medical curricula. The purpose of this study was to evaluate AI usage patterns, perceived educational benefits, associated challenges, and predictors of support for formal AI curriculum integration among medical students in Tbilisi, Georgia.

A descriptive cross-sectional study was conducted with 202 medical students from various universities in Tbilisi, Georgia. Participants completed a structured online questionnaire with 31 closed-ended questions about demographics, AI use, benefits, challenges, ethical concerns, and perspectives on curricular integration. Descriptive statistics were used to describe participant characteristics, chi-square tests were used to investigate relationships between categorical factors, and binomial logistic regression was used to identify predictors of support for AI curriculum inclusion.

Early-year medical students were significantly more likely than senior students to report having started using AI tools in their first or second year ($P < 0.001$). Regular AI use was associated with improved self-reported academic performance ($P < 0.001$), exam preparation ($P < 0.001$), and study efficiency ($P < 0.001$). Despite widespread concerns about credibility and ethics, AI adoption remained high. Students who felt confident in their ability to use AI were more likely to support formal AI curriculum integration ($P < 0.001$). In multivariable analysis, confidence remained the only significant predictor (adjusted odds ratio (AOR) = 3.16, $P = 0.002$); perceived academic benefit was associated with support in unadjusted analysis but not after adjustment ($P = 0.053$).

Medical students perceived AI as a useful educational tool. Structured training on responsible and ethical AI use may maximize its benefits in medical education.

Categories: Medical Education, Public Health, Healthcare Technology

Keywords: artificial intelligence, curriculum, educational technology, medical education, medical students

Introduction

Artificial intelligence (AI) has swiftly progressed from an abstract idea to a revolutionary influence in healthcare, primarily altering how future physicians acquire, apply, and retain medical knowledge [1]. Building upon these broad shifts in healthcare, the impact of AI is particularly evident at the foundational level of medical training. For current medical students, the integration of AI is not a distant prospect but a present reality, characterized by a transition toward customized, data-driven learning [2]. The broad availability of large language models (LLMs) since late 2022 has fundamentally transformed the educational environment, leading to an increase in the use of tools such as ChatGPT for various academic tasks, including clarifying intricate ideas and producing research proposals [3].

The potential benefits of incorporating AI into the medical curriculum are considerable, particularly with respect to alleviating educational burden and improving student well-being. Emerging evidence suggests that AI tools can substantially reduce academic stress and improve daily efficiency by streamlining administrative tasks and providing immediate access to integrated information [4]. Moreover, AI-based platforms, such as virtual simulations and smart tutoring systems, provide interactive, safe settings where learners can enhance clinical skills and obtain instant feedback without putting patients at risk [5]. In the field of evaluation, AI has shown effectiveness in creating clinical scenarios and exam questions, thus aiding self-directed learning and formative assessment [6].

Despite these promising benefits, the rapid adoption of AI tools by students frequently outpaces their formal integration into medical curricula. Although numerous students claim to utilize AI for activities like

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grammar correction, assignment creation, and idea generation, a notable disconnect persists between actual application and technical comprehension [7]. Research indicates that while students often possess high confidence in critically appraising AI outputs, they frequently lack a deep technical grasp of how these algorithms function [8]. This disconnection poses important questions about information accuracy, since LLMs can create convincing yet factually inaccurate content, referred to as hallucinations [9]. Students are getting increasingly concerned that depending excessively on AI may impair their capacity to think critically and make reliable clinical decisions [10].

Alongside accuracy concerns, ethical issues have also emerged as a significant area of student apprehension, encompassing data privacy, algorithmic bias, and the potential erosion of humanistic values in medical practice [11]. Notwithstanding these concerns, the prevailing sentiment among medical trainees remains cautiously optimistic; students tend to regard AI as a collaborative tool rather than a replacement for clinical reasoning, though they consistently call for structured training to navigate this evolving landscape responsibly [12]. Notably, demographic factors may also shape AI adoption patterns, with some evidence suggesting that male students may exhibit greater familiarity with these tools than their female counterparts [13].

Despite the growing body of literature on AI use in medical education, studies from Georgia and the broader post-Soviet region remain scarce, and few have examined the specific predictors of student support for formal AI curriculum integration. The present study addresses both gaps.

Against this complex backdrop, the present study seeks to provide a detailed analysis of how these global trends manifest within a specific local context. We carried out an extensive survey of 202 medical students from universities in Tbilisi, Georgia, to assess the present state of AI incorporation. Utilizing a 31-item survey, we gathered information on demographic details, particular AI usage trends, perceived educational advantages, and the unique obstacles encountered by students. The present study therefore aims to evaluate AI usage patterns, perceived educational benefits, associated challenges, and predictors of support for formal AI curriculum integration among medical students in Tbilisi, Georgia, contributing to the growing evidence base needed to guide responsible AI incorporation into medical curricula [14].

Materials And Methods

This section outlines the research methodology employed in this study, detailing the study design, participant selection criteria, the survey instrument, and the statistical procedures utilized for data analysis.

Study design, population, and sample size

This descriptive cross-sectional study was conducted among medical students across various medical universities in Tbilisi, Georgia, to report AI usage among medical students. Data collection took place between May 8, 2025, and February 4, 2026. Responses accrued slowly, and the survey remained open until at least 200 responses had been obtained. A cross-sectional design was selected to gather quantitative data at the time of data collection to analyze patterns of students' AI usage, perceived benefits and challenges, and students' perspectives on the perceived gains from AI use in medical education.

The study population consisted of medical students across all years of study who agreed to participate and had access to digital devices. The survey link was circulated among medical students at medical universities in Tbilisi, and a voluntary response sampling approach was used: any eligible student who received the link could respond. The required sample size was calculated using the Cochran formula for estimating a population proportion:

$$n = \frac{Z^2 p(1-p)}{d^2}$$

where $Z = 1.96$ (95% confidence level), $P = 0.5$ (assumed population proportion), and $d = 0.05$ (margin of error). This yielded a required sample size of $n = (1.96)^2 \times 0.5(1 - 0.5)/(0.05)^2 = 384$ participants.

As the study covered several universities in Tbilisi and recruitment was voluntary and online, the total number of eligible students was unknown, so the formula for a large population was used, and a finite-population correction could not be applied. The exact number of students who received the link could not be determined, so a response rate could not be calculated. A total of 202 students completed the survey, which was below the calculated target of 384. This reduces statistical power and precision; with 202 participants, the margin of error for a proportion of 50% is approximately $\pm 6.9\%$ rather than the planned $\pm 5\%$. All 202 responses were complete and included in the analysis.

Questionnaire development and data collection

The data were obtained using a structured, self-administered online questionnaire, which was created for this study using Google Forms. The questionnaire contained five sections.

Demographics: Year of Study, Gender, and Age Group

AI usage patterns: Frequency of AI tool usage, types of tools (e.g., ChatGPT, Bing Copilot), purposes of use (studying, writing assignments, clinical learning), introduction to AI (faculty vs. peers), and confidence in using AI.

Perceived benefits: Students’ perceptions of AI’s impact on academic performance, learning efficiency, understanding complex topics, exam preparation, writing quality, and clinical confidence.

Challenges and concerns: Issues such as inaccuracies in AI content, over-reliance, credibility concerns, ethical considerations, accessibility challenges, and potential effects on critical thinking, creativity, and peer influence.

Future use and support: Students’ views on integrating AI into the curriculum and its relevance for future medical practice.

All questions were closed-ended with predefined response options to facilitate quantitative analysis. The questionnaire was pretested with 10 students to assess clarity and applicability, and minor adjustments were made based on their feedback. As no substantive changes were made to the instrument following pretesting, responses from these 10 students were retained and included in the final analytic sample of 202. The questionnaire was not formally validated (e.g., through expert content validity assessment or reliability testing); it was developed by the research team and refined based on pretesting feedback only. This is acknowledged as a limitation of the study. The complete 31-item questionnaire used for data collection is provided in the Appendix. The structure and content of the questionnaire are summarized in Table 1.

Section	Content	Question type/scale	Purpose
Demographics	Year of study, gender, age group	Closed-ended (categorical)	To describe participant characteristics and allow stratified analysis
AI usage patterns	Frequency of AI tool usage, types of tools, purposes of use, source of introduction to AI, and confidence in using AI	Closed-ended (yes/no, categorical)	To assess students' usage patterns, familiarity with AI tools, and confidence in using them
Perceived benefits	Impact on academic performance, learning efficiency, understanding complex topics, exam preparation, writing quality, and clinical confidence	Closed-ended (yes/no)	To evaluate students' perceptions of AI's positive impact
Challenges and concerns	Inaccuracies, overreliance, credibility, ethical issues, accessibility, effects on critical thinking and creativity, and peer pressure	Closed-ended (yes/no)	To identify perceived limitations and concerns associated with AI use
Future use and support	Views on integrating AI into the curriculum and its relevance to future medical practice	Closed-ended (yes/no)	To gauge students' attitudes toward institutional adoption of AI

TABLE 1: Overview of questionnaire sections, question types, and purposes.

This table summarizes the five sections of the survey, the content covered in each section, the type of questions and response scales used, and the purpose of each section in the study.

To effectively reach the maximum number of students, the survey was delivered as a Google Forms link through various means, including university email, the official learning management system, and social media messaging platforms. Participation was entirely voluntary and anonymous, with electronic informed consent obtained at the beginning of the survey. All responses were securely stored and anonymized.

Statistical analysis

Jamovi (version 2.6.26) was used to extract, clean, and analyze the data. Categorical variables were summarized using counts and percentages, whereas continuous variables were expressed as means and standard deviations. Chi-square tests were used to investigate relationships between categorical variables (e.g., frequency of AI use and gender). For comparisons of regular and non-regular AI users, Fisher’s exact test was reported alongside the chi-square test, as some expected cell counts were below 5. Regarding the demographic comparisons, some cells (small age groups and few non-users) also had expected counts below 5, so those chi-square results should be interpreted cautiously. Effect sizes are reported as Cramér’s V. No

adjustment was made for multiple comparisons. Binomial logistic regression was used to examine associations between predictors (e.g., perceived academic benefits and AI usage) and binary outcomes (e.g., support for curriculum integration). In the multivariable model, perceived academic benefit, confidence in AI use, over-dependence, ethical concerns, and regular AI use were entered simultaneously. Confidence in AI use was included because it was strongly associated with support for curriculum integration in bivariate analysis. Odds ratios compare the “Yes” response with the “No” response for each predictor. Multicollinearity was assessed using variance inflation factors. Linear regression was not applied, as all outcomes were categorical. Incomplete or missing responses were excluded. Statistical significance was considered at $P < 0.05$.

Ethical considerations

The study protocol was reviewed and approved by the Biomedical Research Ethics Council, School of Health Sciences, University of Georgia, Tbilisi, Georgia (approval reference number 11-13483). All participants provided electronic informed consent. The questionnaire was anonymous, and no personal identifiers were collected. Data were stored securely and were available only to the research team. Participation was voluntary, and confidentiality was maintained throughout the research study. The datasets generated and analyzed during this study are available from the corresponding author on reasonable request.

Results

The following section presents the findings of the study. It begins with a descriptive overview of the participant demographics, followed by an inferential analysis examining AI usage patterns, perceived educational benefits, and associated challenges.

Descriptive and inferential analysis

Descriptive Analysis

A total of 202 participants were included in the study, with no missing data.

Participants' ages ranged from 20 years or younger to over 30 years. The largest group was aged 21-25 years ($n = 140$, 69.3%), followed by those aged 20 years or younger ($n = 51$, 25.2%). Only a small proportion were aged 26-30 years ($n = 9$, 4.5%) or over 30 years ($n = 2$, 1.0%). In summary, most respondents were young adults in their early twenties, which reflects the typical age range of medical students.

All six academic years were represented. The largest groups were in Year 5 ($n = 46$, 22.8%) and Year 1 ($n = 40$, 19.8%), with Years 2, 3, and 4 contributing similar numbers (13.4%-18.3%). The fewest participants were from Year 6 ($n = 21$, 10.4%). Overall, 89.6% of participants were in Years 1 through 5. This distribution shows that the study population was drawn broadly across the medical program, with strong representation from first- and fifth-year students.

The gender distribution was nearly balanced, with 113 females (55.9%) and 89 males (44.1%). This near-equal split indicates that the perspectives of both male and female students were well represented.

Demographic characteristics of the participants are summarized in Figures [1-3](#).

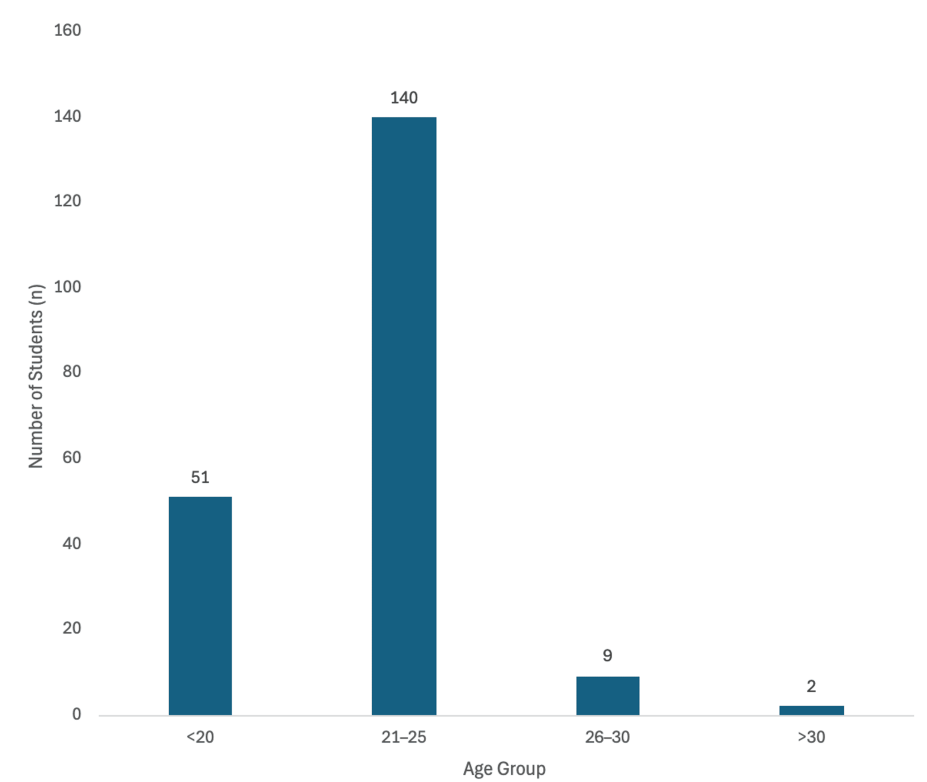


FIGURE 1: Distribution of AI usage among medical students by age group (n = 202).

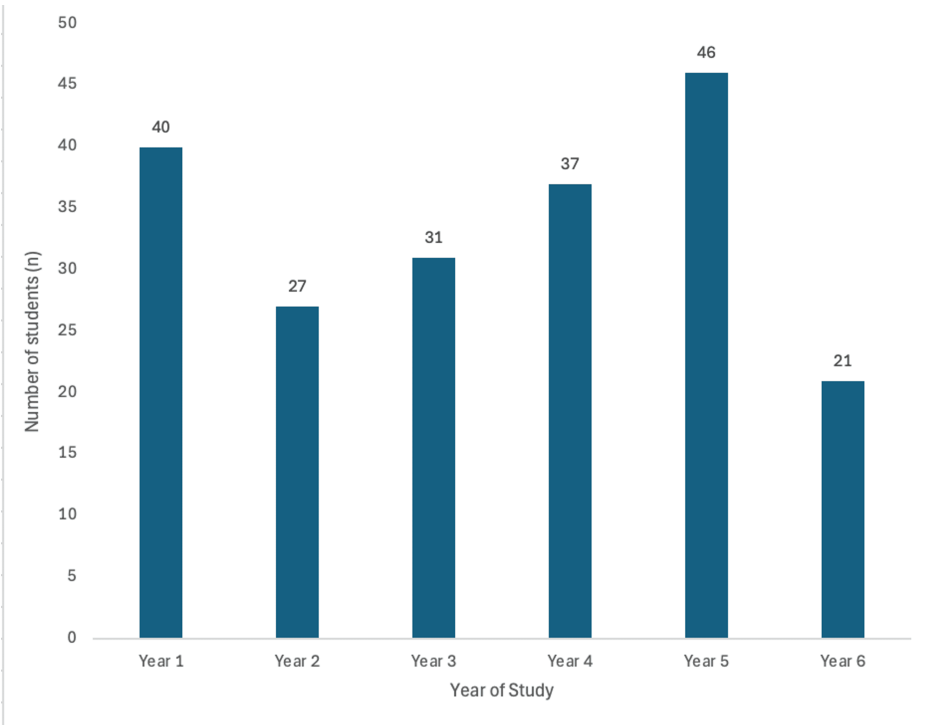


FIGURE 2: Distribution of AI usage among medical students by year of study (n = 202).

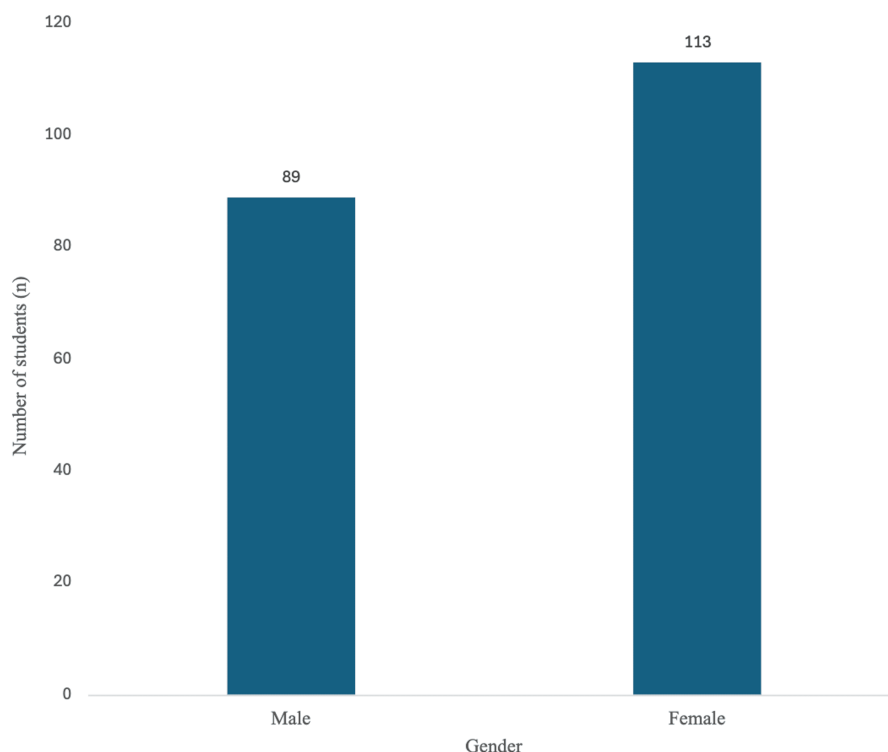


FIGURE 3: Distribution of AI usage among medical students by gender (n = 202).

Inferential analysis

Demographics and AI Usage

Building upon the demographic profile established above, inferential statistical analyses were conducted to identify significant patterns in AI adoption. Specifically, a chi-square test of independence was used to examine the association between year of study and early adoption of AI tools. A statistically significant association was observed, $\chi^2(5, N = 202) = 95.3, P < 0.001$, with a strong effect size (Cramér's $V = 0.687$). Early-year students were more likely to report having started using AI tools during their first or second year compared with students in later years. This suggests that newer students, who may have entered medical school during or after the wider availability of AI-based learning resources, were more inclined to integrate these tools into their academic practices.

The relationship between gender and AI usage was also examined using a chi-square test. No significant association was observed, $\chi^2(1, N = 202) = 0.505, P = 0.477$, with a negligible effect size (Cramér's $V = 0.050$). This indicates that AI adoption did not differ meaningfully between male and female students, suggesting that gender was not a factor in determining the use of AI tools.

Confidence in using AI tools was analyzed across different age groups using a contingency table and the chi-square test. For this study, *confidence in AI use* was defined as the self-reported ability of students to effectively integrate AI tools into their learning or academic work without requiring substantial external support. Reported confidence was relatively high across all groups: 37 of 51 students aged 20 or younger, 109 of 140 students aged 21–25, 6 of 9 students aged 26–30, and 1 of 2 students aged over 30 expressed confidence. Statistical testing showed no significant association, $\chi^2(3, N = 202) = 1.75, P = 0.626$, with a very small effect size (Cramér's $V = 0.093$). These results showed that age did not play a meaningful role in shaping students' confidence in their ability to use AI tools.

The results of these demographic and AI usage analyses are summarized in Table 2.

Factor	Outcome	Group	n/N (%)	χ^2	df	P-value	Cramér's V
Year of study	Early AI adoption	Year 1	34/40 (85.0%)	95.3	5	<0.001	0.687
		Year 2	25/27 (92.6%)				
		Year 3	19/31 (61.3%)				
		Year 4	8/37 (21.6%)				
		Year 5	7/46 (15.2%)				
		Year 6	0/21 (0.0%)				
Gender	AI usage	Male	84/89 (94.4%)	0.505	1	0.477	0.050
		Female	109/113 (96.5%)				
Age group	Confidence in AI use	<20	37/51 (72.5%)	1.75	3	0.626	0.093
		21-25	109/140 (77.9%)				
		26-30	6/9 (66.7%)				
		>30	1/2 (50.0%)				

TABLE 2: Associations of year of study, gender, and age group with early AI adoption, AI use, and confidence in AI use.

Values are presented as n/N (%), where n represents the number of participants reporting the specified AI-related outcome, and N represents the total number of participants in the corresponding demographic group. χ^2 = chi-square statistic; df = degrees of freedom; V = Cramér's V effect size; <20 = 20 years or younger. Some cells in the gender and age comparisons had expected counts below 5; chi-square results for these comparisons should be interpreted cautiously. All analyses included 202 participants (N = 202). Statistical significance was considered at P < 0.05.

AI usage and perceived benefits

Regular AI usage was significantly associated with students' perception of improved academic performance. Of the students reporting using AI at least once per week, 163 of 175 (93.1%) indicated that AI enhanced their academic performance, compared with 17 of 27 (63.0%) of those who did not use AI regularly. A chi-square test confirmed this association: $\chi^2(1, N = 202) = 22.0, P < 0.001$; Fisher's exact test, $P < 0.001$, with a moderate effect size (Cramér's $V = 0.330$). The results showed that students who consistently incorporated AI tools into their learning were more likely to view them as beneficial for their overall academic success.

Regular AI use was also strongly linked to students' perceptions of improved exam preparation. Among regular users, 167 of 175 (95.4%) reported that AI supported their exam preparation, compared with 15 of 27 (55.6%) of non-regular users. This association was statistically significant, $\chi^2(1, N = 202) = 41.7, P < 0.001$; Fisher's exact test, $P < 0.001$, with a moderate-to-strong effect size (Cramér's $V = 0.454$). In other words, frequent AI users were substantially more likely to believe that AI tools gave them an advantage when preparing for exams.

Similarly, regular AI use was significantly associated with perceived improvements in study efficiency. Among regular users, 163 of 175 (93.1%) reported that AI improved their study efficiency, compared with 18 of 27 (66.7%) non-regular users. This association was statistically significant ($\chi^2(1, N = 202) = 17.6, P < 0.001$; Fisher's exact test, $P < 0.001$), with a moderate effect size (Cramér's $V = 0.295$). These findings indicate that students who used AI tools regularly were more likely to perceive a positive impact on their study efficiency.

Associations between regular AI usage and perceived academic benefits are shown in Table 3.

Outcome	Regular users, <i>n</i> (%)	Non-regular users, <i>n</i> (%)	χ^2	<i>P</i> (χ^2)	<i>P</i> (Fisher)	Effect size (<i>V</i>)
Academic performance	163/175 (93.1)	17/27 (63.0)	22.0	<0.001	<0.001	0.330
Exam preparation	167/175 (95.4)	15/27 (55.6)	41.7	<0.001	<0.001	0.454
Study efficiency	163/175 (93.1)	18/27 (66.7)	17.6	<0.001	<0.001	0.295

TABLE 3: Association between regular AI use and perceived academic outcomes among medical students (N = 202).

Values are presented as *n*/*N* (%). Regular users were defined as students who reported using AI tools at least once per week, while non-regular users used AI tools less frequently. The denominator was 175 regular users and 27 non-regular users for each outcome. The smallest expected cell count was below 5 for all three outcomes, so Fisher’s exact test was also computed. Cramér’s *V* was used as the effect-size measure. *P* < 0.05 was considered statistically significant.

AI usage and challenges

The relationship between students who use AI regularly and perceived dependency was examined. Among regular users, 76 of 175 (43.4%) reported feeling dependent on AI, compared with 6 of 27 (22.2%) of non-regular users. This difference was statistically significant, $\chi^2(1, N = 202) = 4.36, P = 0.037$, with a weak effect size (Cramér’s *V* = 0.147). Regular users were more likely to report a sense of dependency on AI tools, although this association was borderline (Fisher’s exact test, *P* = 0.056) and the effect size was weak.

The frequency of encountering inaccuracies in AI-generated content was also compared between regular and non-regular users. Among regular users, 143 of 175 (81.7%) reported encountering inaccuracies, compared with 21 of 27 (77.8%) non-regular users. This difference was not statistically significant ($\chi^2(1, N = 202) = 0.237, P = 0.626$), and the effect size was negligible (Cramér’s *V* = 0.034). These results indicate that reported encounters with AI inaccuracies were common in both groups, with no statistically significant association with usage frequency.

Credibility concerns were widespread among both groups of students. Among regular users, 137 of 175 (78.3%) expressed concerns, compared with 22 of 27 (81.5%) of non-regular users. The association was not statistically significant, $\chi^2(1, N = 202) = 0.143, P = 0.706$, with a negligible effect size (Cramér’s *V* = 0.027). These findings show that concern about the trustworthiness of AI tools was common regardless of usage frequency.

Ethical concerns were more prevalent among regular users (153 of 175; 87.4%) than non-regular users (19 of 27; 70.4%). This difference was statistically significant ($\chi^2(1, N = 202) = 5.38, P = 0.020$; Fisher’s exact test, *P* = 0.037), with a small effect size (Cramér’s *V* = 0.163). Regular users were more likely to report concern about the ethical risks of AI use, although most students in both groups did.

Associations between AI usage and perceived challenges are presented in Table 4.

Outcome	Regular users, <i>n</i> (%)	Non-regular users, <i>n</i> (%)	χ^2	<i>P</i> (χ^2)	<i>P</i> (Fisher)	Effect size (<i>V</i>)
Dependency on AI	76/175 (43.4)	6/27 (22.2)	4.36	0.037	0.056	0.147
Inaccuracy encountered	143/175 (81.7)	21/27 (77.8)	0.237	0.626	0.603	0.034
Credibility concerns	137/175 (78.3)	22/27 (81.5)	0.143	0.706	0.806	0.027
Ethical concerns	153/175 (87.4)	19/27 (70.4)	5.38	0.020	0.037	0.163

TABLE 4: Association between regular AI use and perceived challenges.

Regular users were defined as students using AI tools at least once per week; non-regular users were those using AI tools less than once per week. Values are presented as *n*/*N* (%), with 175 regular and 27 non-regular users for each outcome. Differences were tested with the chi-square (χ^2) test, with Fisher’s exact test shown for comparison. Fisher’s exact test was required for ethical concerns, where one expected cell count was below 5 (4.0). For the other outcomes, all expected cell counts were 5 or above. *V* = Cramér’s *V* (effect size). *P* < 0.05 was considered statistically significant.

Benefits and support for curriculum integration

Support for integrating AI into the medical curriculum was significantly associated with perceived academic benefits. Among students who believed AI improves academic performance, 130 of 180 (72.2%) supported curriculum integration, compared with 9 of 22 (40.9%) of those who did not perceive such benefits. This difference was statistically significant, $\chi^2(1, N = 202) = 8.96, P = 0.003$, with a small-to-moderate effect size (Cramér's $V = 0.211$). This indicates that students who view AI as academically useful are notably more likely to support its inclusion in the curriculum.

Confidence in AI use also played a role. Among confident users, 116 of 153 (75.8%) favored curriculum integration, compared with 23 of 49 (46.9%) of less confident users. This association was statistically significant, $\chi^2(1, N = 202) = 14.4, P < 0.001$, with a small-to-moderate effect size (Cramér's $V = 0.267$). These findings indicate that higher confidence in using AI is strongly linked with greater support for its integration into medical education.

The year of study was examined in relation to support for integrating AI into the medical curriculum. Overall support was high across all years, with Year 2 students (23/27, 85.2%) and Year 5 students (34/46, 73.9%) showing comparatively strong endorsement. However, the association between year of study and support for curriculum integration did not differ significantly across academic years ($\chi^2(5, N = 202) = 8.71, P = 0.121$; Cramér's $V = 0.208$). These findings suggest that differences in support across academic years were not statistically significant. The results of these chi-square analyses are summarized in Table 5.

Factor	Group	Support for AI integration, n/N (%)	χ^2	df	P-value	Cramér's V
Perceived academic benefits	Yes	130/180 (72.2%)	8.96	1	0.003	0.211
	No	9/22 (40.9%)				
Confidence in AI use	Yes	116/153 (75.8%)	14.4	1	<0.001	0.267
	No	23/49 (46.9%)				
Year of study	Year 1	22/40 (55.0%)	8.71	5	0.121	0.208
	Year 2	23/27 (85.2%)				
	Year 3	23/31 (74.2%)				
	Year 4	23/37 (62.2%)				
	Year 5	34/46 (73.9%)				
	Year 6	14/21 (66.7%)				

TABLE 5: Chi-square analysis of factors associated with support for AI integration into the medical curriculum.

Values are presented as n/N (%), where n represents the number of students supporting AI integration, and N represents the total number of students in each comparison group. χ^2 = chi-square statistic; df = degrees of freedom; P = P-value; V = Cramér's V (effect size). All analyses included 202 participants (N = 202). Statistical significance was considered at P < 0.05.

A binomial logistic regression analysis was performed to assess whether perceived academic benefits, confidence in AI use, concern about excessive reliance, ethical concerns, and regular AI use were associated with students' support for incorporating AI into the medical curriculum. The model was statistically significant ($\chi^2(5, N = 202) = 19.8, P = 0.001$) but accounted for a modest portion of the variance (Nagelkerke $R^2 = 0.131$).

Of the five factors examined, only confidence in AI use was significantly associated with support for curriculum integration: confident students had approximately three times the odds of supporting integration (adjusted odds ratio (AOR) = 3.16, 95% CI = 1.51-6.62, P = 0.002). Perceived academic benefit was significantly associated with support in the unadjusted analysis (OR = 3.76, 95% CI = 1.51-9.33, P = 0.004) but not after adjustment (AOR = 2.83, 95% CI = 0.99-8.15, P = 0.053). Concerns about becoming excessively reliant on AI (P = 0.214), ethical concerns (P = 0.991), and regular AI use (P = 0.169) were not significantly associated with support. The CIs were wide, indicating imprecise estimates, likely because some comparison groups were small. The full results are shown in Table 6. Variance inflation factors for all predictors were below 1.3, indicating no problematic collinearity.

Predictor	Unadjusted OR (95% CI)	P	AOR (95% CI)	P
Perceived academic benefit	3.76 (1.51-9.33)	0.004	2.83 (0.99-8.15)	0.053
Confidence in AI use	3.54 (1.81-6.94)	<0.001	3.16 (1.51-6.62)	0.002
Over-dependence	1.56 (0.84-2.91)	0.159	1.52 (0.79-2.94)	0.214
Ethical concerns	1.12 (0.49-2.56)	0.783	1.01 (0.41-2.47)	0.991
Regular AI use	1.12 (0.47-2.65)	0.796	0.48 (0.16-1.37)	0.169

TABLE 6: Unadjusted and adjusted logistic regression analyses examining factors associated with AI inclusion in the curriculum.

The outcome was support for AI curriculum integration (Yes vs. No), and the model estimated the odds of answering “Yes.” Perceived academic benefit, confidence in AI use, over-dependence, ethical concerns, and regular AI use were entered as binary categorical predictors, with “No” as the reference category for each. ORs and AORs therefore represent the odds of supporting curriculum integration among students answering “Yes” to the predictor compared with those answering “No.” Unadjusted ORs were obtained from separate bivariate logistic regression analyses, and AORs from a multivariable model including all five predictors simultaneously. The analytical sample consisted of 202 participants. The overall model was statistically significant ($\chi^2(5) = 19.8, P = 0.001$), with a McFadden R^2 of 0.079, a Nagelkerke R^2 of 0.131, a deviance of 231, and an AIC of 243. Statistical significance was considered at $P < 0.05$.

OR, odds ratio; AOR, adjusted odds ratio; CI, confidence interval; AIC, Akaike information criterion

Discussion

The primary objective of this study was to evaluate AI usage patterns, perceived educational benefits, associated challenges, and predictors of support for formal AI curriculum integration among medical students in Tbilisi, Georgia. In alignment with this objective, the results indicate that early-year students were significantly more likely to report having started using AI tools in their first or second year, which may partly reflect when AI tools became widely available. This finding is consistent with Elhassan et al., who found that junior medical students were more likely to adopt AI than seniors [13].

Confidence in using AI technologies was associated with support for curriculum integration (75.8% of confident students vs. 46.9% of less confident students). Students who reported higher levels of confidence were more likely to support the formal integration of AI, suggesting that self-efficacy may be relevant to attitudes toward AI in medical education. Laupichler et al. observed similar findings, revealing that students’ AI literacy and confidence were associated with their involvement and perceived effectiveness of AI-assisted learning [8].

Consistent use of AI tools was also associated with improved perceptions of academic success and exam preparation. Students who utilized AI tools regularly were more likely to report perceived improvements in their academic work. Intervention studies, such as that of Fazlollahi et al., have found that AI-assisted tutoring can increase learning performance in simulated clinical tasks [5]; however, our cross-sectional data capture perceptions only and cannot provide evidence for improved performance. Regular AI use was also statistically associated with a greater sense of dependency (43.4% vs. 22.2%; $P = 0.037$; Fisher’s exact test, $P = 0.056$), but the association was borderline, and the effect size was weak (Cramér’s $V = 0.147$), so it should be interpreted cautiously.

Despite the apparent benefits, trustworthiness and ethical issues were shared by all student groups. Regardless of their confidence or frequency of use, the majority of students were skeptical of the accuracy and reliability of AI-generated material. These concerns are consistent with those raised by Hallquist et al., who found that ethical and dependability concerns remain important hurdles to AI adoption in medical education [15]. Interestingly, while ethical concerns were higher among regular users (87.4% vs. 70.4%), the effect size was small, which may imply that experience with AI raises awareness of ethical difficulties without discouraging use.

Students’ perceptions of academic benefits were associated with their support for incorporating AI into the medical curriculum. Students who believed AI improved learning outcomes were substantially more likely to support the formal integration of AI learning methods. This is consistent with Li and Qin, who underlined that perceived utility is a crucial factor of students’ support for AI-focused curriculum components [2]. Confident AI users were more inclined to advocate for curriculum inclusion, suggesting that self-efficacy may be relevant to attitudes toward educational innovation. However, in the multivariable model, this association did not remain significant after adjustment for confidence and other predictors (AOR = 2.83, $P = 0.053$), suggesting that the relationship between perceived benefit and curricular support may be partially explained by confidence in AI use.

In the multivariable logistic regression, confidence in using AI was the only factor significantly associated with support for curriculum integration. Perceived academic benefit, which was significant in the unadjusted analysis, did not remain significant after adjustment (AOR = 2.83, 95% CI = 0.99–8.15, $P = 0.053$). Because confidence and perceived benefit may be related, their associations with support may overlap. Concern about over-reliance, ethical concerns, and regular AI use were not significantly associated with support. The estimates were imprecise, as shown by the wide confidence intervals, and the model explained a modest share of the variance (Nagelkerke $R^2 = 0.131$), so the findings should be interpreted cautiously.

Overall, these findings suggest that educators seeking to include AI in the curriculum may wish to build students' confidence through hands-on experience, communicate its perceived learning benefits, and address ethical and credibility concerns through structured training. Future research should look at the long-term effects of AI integration on academic performance and professional competencies, as well as faculty opinions on curriculum design.

The study's limitations include its cross-sectional design, which makes it impossible to conclude causality, and its dependence on self-reported data, which could be skewed by social desirability. Additionally, as participation was voluntary and online, respondents may differ systematically from non-respondents, introducing potential selection bias. The observed associations may also work in the opposite direction, as students who find AI useful may be more likely to use it regularly. Furthermore, although the study included students from various medical schools in Tbilisi, Georgia, differences in curriculum and institutional resources may limit the findings' applicability. The university of each respondent was not recorded, so differences between institutions could not be examined. Additionally, the sample size of 202 was smaller than the calculated target of 384, which reduces the precision of the estimates, as reflected in the wide confidence intervals. Most questionnaire items were dichotomous (Yes/No), which is a simple measure of complex perceptions, and the main finding rests on a single Yes/No question; future studies should consider using rating scales. Some comparisons involved small groups, as only 27 students did not use AI regularly, and some demographic comparisons involved sparse cells, so chi-square estimates for them may be imprecise. In addition, multiple tests were performed without adjustment, so results close to the significance threshold should be interpreted with caution. The study also measured perceptions rather than actual academic performance. The study was not designed around a formal theoretical framework, such as a technology acceptance model, which future studies could use to anchor their hypotheses. Finally, the questionnaire was not formally validated before use, which may affect the reliability of the findings.

Conclusions

This study demonstrates that medical students' perceptions of AI tools are mostly associated with their level of confidence in utilizing them and the benefits they perceive for their learning. Students in the early years of medical school were more likely to report having started using AI in their first or second year, and regular users were more likely to report that AI supported their academic performance, exam preparation, and study efficiency. Conversely, many students expressed worries about the accuracy, credibility, and ethical usage of AI, emphasizing the importance of clear direction and sufficient training.

Students' support for integrating AI into the curriculum was associated mainly with their confidence in using AI tools and, in unadjusted analyses, with the benefits they perceived, rather than with how frequently they used the tools or their concerns about overreliance. These findings suggest that medical educators may wish to provide hands-on, structured training to build students' confidence, communicate the perceived learning benefits, and address ethical concerns and the limitations of AI-generated information. Such training could help teach students to critically evaluate AI-generated responses and verify their accuracy against reliable sources. Future research could investigate how AI affects students over time, including its impact on academic performance, clinical skills, professional competence, and how faculty perceive its position in the curriculum.

Appendices

Appendix: Complete study questionnaire

Questionnaire: Use of Artificial Intelligence Among Medical Students in Tbilisi, Georgia: Perceived Advantages and Challenges

Participant Introduction

Dear Student,

We are conducting a research study titled "Impact of AI Usage on Medical Students at Georgia Medical College: A Study of Advantages and Challenges." This study aims to explore how medical students use artificial intelligence (AI) tools in academic and clinical training, the benefits they gain, and the challenges they face.

Participation is voluntary and anonymous. Your input will support better integration of AI into medical

education.

Thank you for your time.

Note: this is the title shown to participants when the questionnaire was administered. The study title was subsequently revised to “Use of Artificial Intelligence Among Medical Students in Tbilisi, Georgia: Perceived Advantages and Challenges” and the study setting was multi-center, covering universities in Tbilisi, Georgia.

Demographic Information

1. What is your year of study?

- ☐ Year 1
- ☐ Year 2
- ☐ Year 3
- ☐ Year 4
- ☐ Year 5

☐ Year 6

2. Gender:

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to say

3. Age Group:

- ☐ <20
- ☐ 21-25
- ☐ 26-30
- ☐ >30

Note: the response option “<20” was intended to mean 20 years or younger.

Section A: AI Usage Patterns

4. Have you used AI tools in your medical studies?

- ☐ Yes
- ☐ No

5. Do you use AI tools regularly (at least once a week)?

- ☐ Yes
- ☐ No

6. Do you use ChatGPT, Bing Copilot, or other AI-based educational tools?

- ☐ Yes
- ☐ No

7. Have you used AI tools for studying, writing assignments, or clinical learning?

- ☐ Yes
- ☐ No

8. Did you start using AI tools in your first or second year?

- ☐ Yes
- ☐ No

9. Were you introduced to AI tools by faculty or peers?

- ☒ Yes
- ☒ No

10. Do you use AI tools both during lectures and outside of class?

- ☒ Yes
- ☒ No

11. Are you confident in using AI tools for academic purposes?

- ☒ Yes
- ☒ No

Section B: Perceived Benefits

12. Do you believe AI tools improve your academic performance?

- ☒ Yes
- ☒ No

13. Do AI tools help you understand complex topics better?

- ☒ Yes
- ☒ No

14. Do AI tools support your self-directed learning?

- ☒ Yes
- ☒ No

15. Do AI tools improve your studying efficiency?

- ☒ Yes
- ☒ No

16. Do AI tools help you prepare better for exams?

- ☒ Yes
- ☒ No

17. Do AI tools improve the quality of your writing and communication?

- ☒ Yes
- ☒ No

18. Do AI tools increase your confidence during clinical discussions?

- ☒ Yes
- ☒ No

Section C: Challenges and Concerns

19. Have you encountered inaccurate information when using AI tools?

- ☒ Yes
- ☒ No

20. Do you feel that you depend too much on AI tools?

- ☒ Yes
- ☒ No

21. Are you concerned about the credibility of AI-generated information?

- ☒ Yes

☒ No

22. Do you think AI usage could create ethical problems such as plagiarism?

☒ Yes

☒ No

23. Have you ever faced difficulties accessing AI tools?

☒ Yes

☒ No

24. Are you confident in verifying AI-generated content for accuracy?

☒ Yes

☒ No

25. Do you think AI usage affects your clinical reasoning or critical thinking?

☒ Positively

☒ Negatively

☒ No effect

☒ Not sure

26. Have you ever submitted AI-generated content without reviewing or editing it?

☒ Yes

☒ No

27. Are you worried that AI usage might reduce your creativity or original thinking?

☒ Yes

☒ No

28. Do you feel peer pressure to use AI tools?

☒ Yes

☒ No

Section D: Future Use and Support

29. Should AI tools be officially integrated into the medical school curriculum?

☒ Yes

☒ No

30. Would you feel more motivated to use AI tools if recommended by professors?

☒ Yes

☒ No

31. Do you believe AI will be essential for the future of medical practice?

☒ Yes

☒ No

Thank you for your participation!

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Saraha M. Ansari, Abdullah F. Banafa, Vikram Sehgal

Acquisition, analysis, or interpretation of data: Saraha M. Ansari, Abdullah F. Banafa

Drafting of the manuscript: Saraha M. Ansari, Abdullah F. Banafa

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Supervision: Vikram Sehgal

Disclosures

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References

1. Sriram A, Ramachandran K, Krishnamoorthy S: Artificial intelligence in medical education: transforming learning and practice. *Cureus*. 2025, 17:e80852. [10.7759/cureus.80852](https://doi.org/10.7759/cureus.80852)
2. Li Q, Qin Y: AI in medical education: medical student perception, curriculum recommendations and design suggestions. *BMC Med Educ*. 2023, 23:852. [10.1186/s12909-023-04700-8](https://doi.org/10.1186/s12909-023-04700-8)
3. Simoni J, Urtubia-Fernandez J, Mengual E, et al.: Artificial intelligence in undergraduate medical education: an updated scoping review. *BMC Med Educ*. 2025, 25:1609. [10.1186/s12909-025-08188-2](https://doi.org/10.1186/s12909-025-08188-2)
4. Elrefaei E, El-Deep OS, Ragab S, et al.: Exploring the effect of using artificial intelligence tools on preclinical medical students' workload and well-being: a cross-sectional study. *J Health Prof Educ Innov*. 2025, 2:11-21. [10.21608/jhpei.2025.347543.1040](https://doi.org/10.21608/jhpei.2025.347543.1040)
5. Fazlollahi AM, Bakhaidar M, Alsayegh A, et al.: Effect of artificial intelligence tutoring vs expert instruction on learning simulated surgical skills among medical students: a randomized clinical trial. *JAMA Netw Open*. 2022, 5:e2149008. [10.1001/jamanetworkopen.2021.49008](https://doi.org/10.1001/jamanetworkopen.2021.49008)
6. Sridharan K, Sequeira RP: Artificial intelligence and medical education: application in classroom instruction and student assessment using a pharmacology & therapeutics case study. *BMC Med Educ*. 2024, 24:431. [10.1186/s12909-024-05365-7](https://doi.org/10.1186/s12909-024-05365-7)
7. Ghanem OA, Hagag AM, Kormod ME, et al.: Medical students' knowledge, attitudes, and practices toward generative artificial intelligence in Egypt 2024: a cross-sectional study. *BMC Med Educ*. 2025, 25:790. [10.1186/s12909-025-07329-x](https://doi.org/10.1186/s12909-025-07329-x)
8. Laupichler MC, Aster A, Meyerheim M, Raupach T, Mergen M: Medical students' AI literacy and attitudes towards AI: a cross-sectional two-center study using pre-validated assessment instruments. *BMC Med Educ*. 2024, 24:401. [10.1186/s12909-024-05400-7](https://doi.org/10.1186/s12909-024-05400-7)
9. Younis HA, Eisa TA, Nasser M, et al.: A systematic review and meta-analysis of artificial intelligence tools in medicine and healthcare: applications, considerations, limitations, motivation and challenges. *Diagnostics (Basel)*. 2024, 14:109. [10.3390/diagnostics14010109](https://doi.org/10.3390/diagnostics14010109)
10. Seneviratne T, Kodikara K, Abeykoon I, Palpola W: Perception of medical undergraduates on artificial intelligence in medical education: qualitative exploration. *JMIR Med Educ*. 2025, 11:e73798. [10.2196/73798](https://doi.org/10.2196/73798)
11. Civaner MM, Uncu Y, Bulut F, Chalil EG, Tatli A: Artificial intelligence in medical education: a cross-sectional needs assessment. *BMC Med Educ*. 2022, 22:772. [10.1186/s12909-022-03852-3](https://doi.org/10.1186/s12909-022-03852-3)
12. Amiri H, Peiravi S, Rezazadeh Shojae SS, et al.: Medical, dental, and nursing students' attitudes and knowledge towards artificial intelligence: a systematic review and meta-analysis. *BMC Med Educ*. 2024, 24:412. [10.1186/s12909-024-05406-1](https://doi.org/10.1186/s12909-024-05406-1)
13. Elhassan SE, Sajid MR, Syed AM, Fathima SA, Khan BS, Tamim H: Assessing familiarity, usage patterns, and attitudes of medical students toward ChatGPT and other chat-based AI apps in medical education: cross-sectional questionnaire study. *JMIR Med Educ*. 2025, 11:e63065. [10.2196/63065](https://doi.org/10.2196/63065)
14. Mir MM, Mir GM, Raina NT, et al.: Application of artificial intelligence in medical education: current scenario and future perspectives. *J Adv Med Educ Prof*. 2023, 11:133-40. [10.30476/JAMP.2023.98655.1803](https://doi.org/10.30476/JAMP.2023.98655.1803)
15. Hallquist E, Gupta I, Montalbano M, Loukas M: Applications of artificial intelligence in medical education: a systematic review. *Cureus*. 2025, 17:e79878. [10.7759/cureus.79878](https://doi.org/10.7759/cureus.79878)