# EXPLORING MEDICAL STUDENTS' USE OF ARTIFICIAL INTELLIGENCE (AI) ASSISTANTS: KNOWLEDGE, ATTITUDES, AND MOTIVATIONS.

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## ABSTRACT

**Background:** Artificial intelligence (AI) assistants are increasingly integrated into medical education, providing support for learning, research, and clinical reasoning. However, their adoption among medical students and the factors influencing their use remain underexplored. This study examines the knowledge, attitudes, and motivations behind AI assistant usage among medical students.

**Methods:** A cross-sectional descriptive study was conducted among 397 clinical medical students at the University of Nigeria Teaching Hospital, Ituku-Ozalla. Data were collected using a structured, self-administered questionnaire and analyzed with SPSS 21. Descriptive statistics summarized responses, while chi-square tests assessed associations between socio-demographic characteristics, knowledge, and attitudes toward AI assistants.

**Results:** A high level of familiarity with AI assistants was observed (98%), with ChatGPT being the most widely used (82.6%). Daily interaction with AI assistants was reported by 49% of respondents, with social media (42.8%) being the primary source of awareness. Most students perceived AI assistants as beneficial in medical education (51.7%) and efficiency-enhancing (42.3%). However, concerns about over-reliance on AI (39.2%), ethical issues (39.2%), and accuracy (40.8%) were notable. No significant associations were found between socio-demographic factors and knowledge or attitudes toward AI assistants.

**Discussion:** The study highlights the widespread acceptance of AI assistants among medical students, emphasizing their role in improving learning efficiency and access to information. However, concerns about accuracy, ethics, and critical thinking necessitate structured AI integration into medical education. Clear guidelines and AI literacy programs are recommended to ensure responsible and effective use of AI tools in medical training.

## INTRODUCTION

Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy[1,2]. Artificial intelligence (AI) is a general term that implies the use of a computer to model intelligent behavior with minimal human intervention. AI is generally accepted as having started with the invention of robots[2].

It has undoubtedly become an integral part of the modern society. Its application has sufficed in (but not limited to) the following areas, viz., medicine, finance, social media, agriculture, education, fraud prevention, navigation, transportation[3,4]. In medicine, AI can assist healthcare providers in diagnosing ailments, clinical reasoning, data analysis, and making informed clinical decisions[5,6]. Today, AI-based products extend beyond imaging and pathology-based diagnostic modalities to include various medical fields such as rheumatology, neurology, endocrinology, ophthalmology, orthopedicsand surgery[7,8,9,10,11].

AI Assistant also called AI Virtual Assistant, is a software powered by artificial intelligence (AI) that responds to inquiries in human-like languages in text or voice format[7]. It leverages natural language processing (NLP) to process, understand and generate responses to the system users in a conversational manner[7]. AI assistants could be chatbots, conversational agents or even AI virtual assistants which perform a variety of tasks across multiple devices and platforms.

Common virtual assistant technologies include: Siri, Cortana, Google assistant, Amazon's Alexa, Mycroft, ChatGPT etc[12,13,14].

The indispensability of AI assistants in medical education has become more evident in recent times since its advent. Hence, this study aims to explore the knowledge and attitude of medical students towards the use of artificial intelligence assistants and to identify the purpose for which medical students engage in AI assistants[15,16].

## METHODOLOGY

### Study area

The study was conducted in the University of Nigeria Teaching Hospital (UNTH) Ituku
Ozalla.

### Study design
This study was a cross-sectional descriptive study among clinical medical students of University of Nigeria Teaching Hospital, Ituku-Ozalla.

### Study population
The study involved undergraduate medical students across all medical classes of the University of Nigeria Enugu Campus. This includes 2nd, 3rd, 4th, 5th and 6th year medical students. Medical students in the above levels who do not consent to the study or were are too ill to participate in the study were excluded.

### Sample size determination
The sample size for the quantitative study was calculated using the Cochran's formula. The final sample size to be used was 397 participants.

### Sampling technique
In this study, a stratified random sampling technique was employed to ensure proportional representation of medical students across the different academic years.

### Study instruments
A self administered questionnaire developed for the purpose of this study was used. The items in the questionnaire was categorized into 6 including; socio-demographics data, knowledge and awareness of AI assistants, attitude towards AI assistants, challenges to the use of AI assistants, perceived benefits to the use of AI assistants, purpose and reasons for use of AI assistants.

### Ethical considerations
Ethical approval was gotten form the Health Research and Ethics Clearance Committee, University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu State. Informed consent was obtained from each participant prior to the recruitment of the study. Participation in this study was completely voluntary with verbal consent obtained from all participants, and an informed written consent form duly signed as it was attached to the questionnaire. Strict confidentiality of information provided as well as anonymity was assured. Participants were subject to any form of physical or psychological harm as a result of this research and were assured of their rights to withdraw from the study at any stage if desired.

### Data collection methods
Data was collected from participants by the researchers after the questionnaire was pretested among 20 randomly selected clinical medical students of the University of Nigeria Teaching Hospital to ensure that there were no ambiguous questions.

### Data analysis
The data collected was analyzed using the Statistical Package for Social Sciences (SPSS) 21. The study employed descriptive statistics, such as means and percentages, to summarize the socio-demographic characteristics of the participants. Quantitative data were presented using tables and bar charts for clear visualization. Descriptive measures including mean, frequency, percentage, proportion, and standard deviation were used to characterize the data.
The Chi-squared test was utilized to assess the significance of data comparisons, indicating significant associations between categorical variables.

## RESULTS
We had a 96.25% response rate as 385 of 400 questionnaires were filled and returned

**TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS (385)**

| Variable | Frequency (N=385) | Percentage (%) | Mean (SD) |
|---|---|---|---|
| **Age** | | | **21.78 (2.468)** |
| 18-20 | 126 | 32.7 | |
| 21-23 | 180 | 46.8 | |
| 24-26 | 60 | 15.6 | |
| >27 | 19 | 4.9 | |
| **Gender** | | | |
| Male | 204 | 53.0 | |
| Female | 181 | 47.0 | |
| **Ethnicity** | | | |
| Igbo | 351 | 91.2 | |
| Yoruba | 2 | 0.5 | |

| | | | |
|---|---|---|---|
| Hausa | 1 | 0.3 | |
| Others | 31 | 8.0 | |
| **Year of Study** | | | |
| 2nd Year | 93 | 24.0 | |
| 3rd Year | 100 | 26.0 | |
| 4th Year | 58 | 15.0 | |
| 5th Year | 50 | 13.0 | |
| 6th Year | 84 | 21.0 | |
| **Department** | | | |
| Medicine | 371 | 96.4 | |
| Dentistry | 14 | 3.6 | |
| **Marital status** | 376 | 97.7 | |
| Single | 8 | 2.0 | |
| Married | 1 | 0.3 | |
| Separated | 0 | 0 | |
| Divorced | 0 | 0 | |
| Widowed | | | |
| **Religion** | | | |
| Christianity | 378 | 98.2 | |
| Islam | 2 | 0.5 | |
| African Traditional Religion | 1 | 0.3 | |
| Others | 4 | 1.0 | |
| **In-School Place of Residence** | | | |
| Hostel | 237 | 61.6 | |
| Off-Campus | 148 | 38.4 | |

The table shows the baseline socio-demographic characteristics of our respondents. Most of our respondents were between the age range of 21-23 (46.8%), Male (53%), Igbo (91.2%),3rd Year (26%). Majority were single (97.7%),Christians (98.2%), department of Medicine & Surgery (96.4%) and reside in the hostel (61.6%).

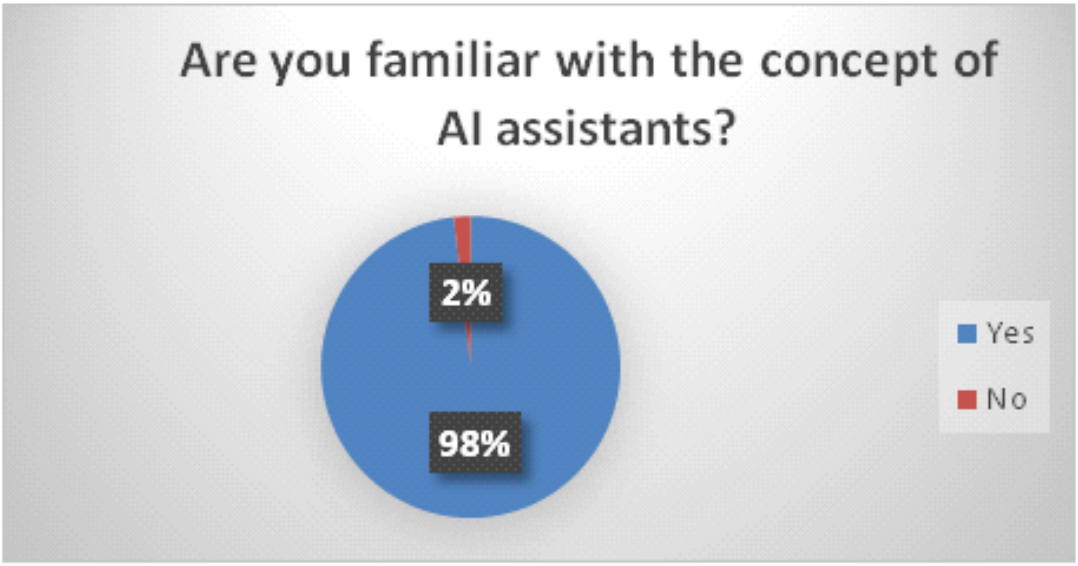
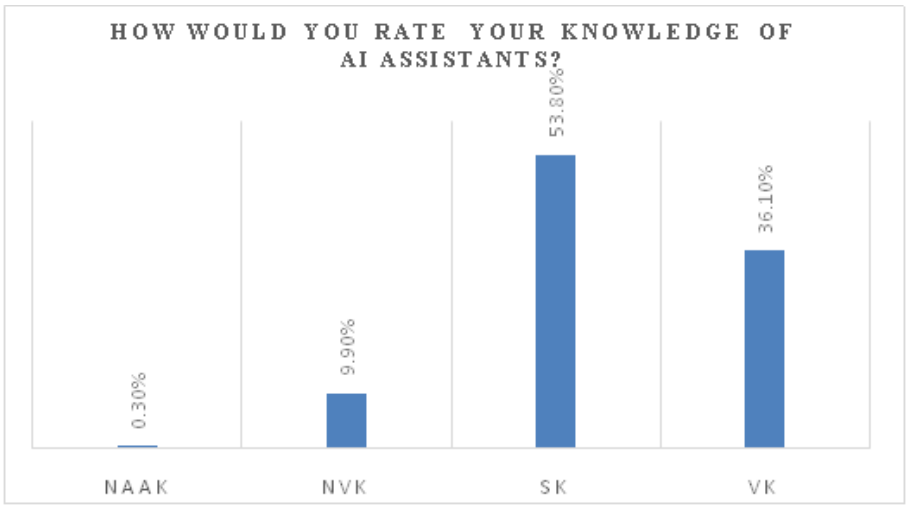



**FIGURE 1: Are you familiar with the concept of AI assistants?**
This figure shows that 98% of our respondents are familiar with the concept of AI assistants.




VK- Very Knowledgeable
SK- Somewhat Knowledgeable
NVK- Not Very Knowledgeable
NAAK- Not at all knowledgeable

**FIGURE 2: How would you rate your knowledge of AI assistants?**
This figure shows that majority of our respondents (53.8%) are somewhat knowledgeable of AI assistants.

**TABLE 2: KNOWLEDGE AND AWARENESS OF AI ASSISTANTS**

| Variable | Frequency (N=385) | Percentage (%) | Mean (SD) |
|---|---|---|---|
| **How often do you interact with AI assistants?** | | | |
| Daily | 189 | 49.0 | |
| Weekly | 108 | 28.0 | |
| Monthly | 20 | 5.1 | |
| Rarely | 65 | 16.9 | |
| Never | 3 | 8.0 | |
| **Which AI assistants are you familiar with?** | | | |
| ChatGPT | 318 | 82.6 | |
| Google Assistant | 200 | 51.9 | |
| Siri | 93 | 24.2 | |
| Alexa | 35 | 9.1 | |
| Meta AI | 259 | 67.3 | |
| Snapchat AI | 95 | 24.7 | |
| Others | 24 | 6.2 | |
| **How did you learn about AI assistants?** | | | |
| Social media | 263 | 42.8 | |
| Friends/peers | 184 | 30 | |
| Academic sources | 90 | 14.6 | |
| News/media | 62 | 10 | |
| Other | 16 | 2.6 | |

The table shows that most of our respondents interact daily with AI assistants (49.1%), are familiar with ChatGPT (82.6%) and learnt about AI assistants through social media (42.7%)

**TABLE 3: ATTITUDES AND PERCEPTION TOWARDS AI ASSISTANTS**

| Question | Strongly agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly disagree (%) |
|---|---|---|---|---|---|
| AI assistants are beneficial in medical education | 199 (51.7) | 154 (40) | 29 (7.5) | 2 (0.5) | 1 (0.3) |
| I am comfortable using AI assistants for academic or medical purposes | 147 (38.2) | 157 (40.8) | 69 (17.9) | 8 (2.1) | 4 (1) |
| AI assistants can improve medical students' efficiency | 150 (39) | 163 (42.3) | 55 (14.2) | 16 (4.2) | 1 (0.3) |
| AI can assist in learning complex | 168 (43.6) | 163 (42.3) | 38 (9.9) | 12 (3.1) | 4 (1) |
| AI will reduce the need for critical thinking in medical practice | 72 (18.7) | 134 (34.8) | 86 (22.3) | 66 (17.2) | 27 (7) |
| AI might compromise patient privacy and confidentiality | 56 (14.5) | 93 (24.2) | 117(30.4) | 85 (22.1) | 34 (8.8) |

This table shows that majority of our respondents agree that AI assistants are beneficial in medical education (51.7%), are comfortable using AI assistants for academic or medical purposes (40.8%), agree that AI assistants can improve medical students' efficiency (42.3%), can assist in learning complex medical concepts (43.6%) and will reduce the need for critical thinking in medical practice (34.8%).

**TABLE 4: CHALLENGES TO THE USE OF AI ASSISTANTS**

| | Strongly agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly disagree (%) |
|---|---|---|---|---|---|
| Lack of access to reliable AI tools | 6 (1.6) | 181 (47) | 74 (19.2) | 31 (8.1) | 6 (1.6) |
| Ethical concerns | 62 (16.1) | 151 (39.2) | 101 (26.2) | 60 (15.6) | 11 (2.9) |
| Over-reliance on technology | 100 (26) | 151 (39.2) | 79 (20.5) | 40 (10.4) | 15 (3.9) |
| Inaccuracy of AI-generated information | 147 (38.2) | 157 (40.8) | 54 (14) | 22 (5.7) | 5 (1.3) |

This table shows that majority of our respondents agree that the challenge to using AI assistants is lack of access to reliable AI tools (47%), ethical concerns (39.2%), over-reliance on technology (39.2%) and accuracy of AI-generated information (40.8%).

**TABLE 5: PERCEIVED BENEFITS OF AI ASSISTANTS IN MEDICAL EDUCATION**

| Question | Strongly agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly disagree (%) |
|---|---|---|---|---|---|
| Improved access to information | 177 (46) | 183 (47.5) | 23 (6) | 2 (0.5) | 0 (0) |
| Enhanced learning support | 150 (39) | 200 (51.9) | 32 (8.3) | 3 (0.8) | 0 (0) |
| Time efficiency | 169 (43.9) | 185 (48.1) | 28 (7.3) | 3 (0.8) | 0 (0) |
| Improved understanding of complex topics | 173 (44.9) | 167 (43.4) | 34 (8.8) | 5 (1.3) | 6 (1.6) |

This table shows that majority of our respondents agreethat the following are the perceived benefits of AI assistant in medical education;improved access to information (47.5%), enhanced learning support (51.9%), time efficiency (48.1%) and improved understanding of complex topics (44.9%).

**TABLE 6A: PURPOSES AND REASONS FOR THE USE OF AI ASSISTANTS**

| Question | Yes (%) | No (%) |
|---|---|---|
| For which purposes do you use AI assistants? | 319(82.9) | 66 (17.1) |
| General Knowledge queries | 276(71.7) | 109(28.3) |
| Medical information and research | 180(46.8) | 205(53.2) |
| Academic writing support | 185(48.1) | 200(51.9) |
| Practice and study aids | 148(38.4) | 237(61.6) |
| Personal productivity | 14 (3.5) | 371(96.4) |
| **Which of the following AI assistant have you found helpful?** | | |
| ChatGPT | 296(76.9) | 89 (23.1) |
| Google Assistant | 162(42.1) | 223(57.9) |
| Siri | 54 (14) | 331 (86) |
| Alexa | 10 (2.6) | 375(97.4) |
| Meta AI | 205(53.2) | 108(46.8) |
| Snapchat AI | 59 (15.3) | 326(84.7) |
| Others | 17 (4.4) | 368(95.6) |
| **In which of the following areas have you found AI assistants helpful?** | | |
| Study aids | 298(77.4) | 87 (22.6) |
| Clinical knowledge enhancement | 187(48.6) | 198(51.4) |
| Academic writing and assignment | 193(50.1) | 192(49.9) |
| Time management and organization | 122(31.7) | 263(68.3) |
| **What is your primary motivation for using AI assistants in medical education?** | | |
| To enhance learning and understanding | 281(73.0) | 104 (27) |
| To save time | 199(51.7) | 183(48.3) |
| To access quick answers to complex questions | 228(59.2) | 157(40.8) |
| For practice and exam preparation | 144(37.4) | 241(62.6) |
| Others | 4 (1) | 381 (99) |
| Would you recommend AI assistants to your peers? | 370(96.1) | 15 (3.9) |

This table shows that majority of our respondents use AI assistants for the purpose of general knowledge queries (82.9%), found ChatGPT helpful (76.9%), found AI assistants helpful as study aids (77.4%), have enhancing learning and understanding as the primary motivation for using AI assistants in medical education (73%) and will recommend AI assistants to your peers (96.1%).

**TABLE 6B: PURPOSES AND REASONS FOR THE USE OF AI ASSISTANTS**

| Question | Frequency | Percentage (%) |
|---|---|---|
| **Do you believe the use of AI in medical education should be promoted?** | | |
| Yes | 253 | 65.7 |
| Neutral | 113 | 29.4 |
| No | 19 | 4.9 |

This table shows that majority of our respondents believe the use of AI in medical should be promoted (65.7%)

**TABLE 7: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE OF AI ASSISTANTS**

| Variable | Poor Attitude (%) | Moderate Attitude (%) | Good Attitude (%) | $X^2$ test | P value |
|---|---|---|---|---|---|
| **Age in years** | | | | **11.281** | **0.080** |
| 18-20 | 26 (20.6) | 78 (61.9) | 22 (17.5) | | |
| 21-23 | 41 (22.8) | 99 (55) | 40 (22.2) | | |
| 24-26 | 9 (15) | 43 (71.7) | 8 (13.3) | | |
| >27 | 3 (15.8) | 16 (84.2) | 0 (0) | | |
| **Gender** | | | | **4.946** | **0.084** |
| Male | 37 (18.1) | 122 (59.8) | 45 (22.1) | | |
| Female | 42 (23.2) | 114 (63) | 25 (13.8) | | |
| **Ethnicity** | | | | **7.569** | **0.271** |
| Igbo | 76 (21.7) | 209 (59.5) | 66 (18.8) | | |
| Yoruba | 0 (0) | 1 (50) | 1 (50) | | |
| Hausa | 0 (0) | 1 (100) | 0 (0) | | |
| Others | 3 (9.7) | 25 (80.6) | 3 (9.7) | | |
| **Year of Study** | | | | **6.164** | **0.629** |
| 2nd Year | 20 (21.5) | 56 (60.2) | 17 (18.3) | | |
| 3rd Year | 28 (28) | 56 (56) | 16 (16) | | |
| 4th Year | 10 (17.2) | 38 (65.6) | 10 (17.2) | | |
| 5th Year | 7 (14) | 33 (66) | 10 (20) | | |
| 6th Year | 14 (16.7) | 53 (63.1) | 17 (20.2) | | |
| **Department** | | | | **0.131** | **0.937** |
| Medicine | 76 (20.5) | 228 (61.5) | 67 (18.1) | | |
| Dentistry | 3 (21.4) | 8 (57.2) | 3 (21.4) | | |
| **Marital Status** | | | | **0.861** | **0.930** |
| Single | 77 (20.5) | 230 (61.2) | 69 (18.3) | | |

| | | | | | |
|---|---|---|---|---|---|
| Married | 2 (25) | 5 (62.5) | 1 (12.5) | | |
| Separated | 0 (0) | 1 (100) | 0 (0) | | |
| Divorced | 0 (0) | 0 (0) | 0 (0) | | |
| Widowed | 0 (0) | 0 (0) | 0 (0) | | |
| **Religion** | | | | **9.339** | **0.155** |
| Christianity | 79 (20.9) | 233 (61.6) | 66 (17.5) | | |
| Islam | 0 (0) | 1 (100) | 1 (0) | | |
| ATR | 0 (0) | 0 (0) | 0 (0) | | |
| Others | 0 (0) | 2 (50) | 2 (50) | | |
| **In-School Place of Res.** | | | | **3.162** | **0.206** |
| Hostel | 42 (17.7) | 152 (64.1) | 43 (18.2) | | |
| Off-Campus | 37 (25) | 84 (56.8) | 27 (18.2) | | |

This table shows that there is no significant association between age, gender, ethnicity, year of study, department, marital Status, religion, in-school place of residence and attitude towards AI assistants.

**TABLE 7: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC CHARACTERISTICS AND ATTITUDE TOWARDS AI ASSISTANTS**

| Variable | Poor Attitude (%) | Moderate Attitude (%) | Good Attitude (%) | $X^2$ test | P value |
|---|---|---|---|---|---|
| **Age in years** | | | | **6.701** | **0.349** |
| 18-20 | 2 (1.6) | 45 (35.7) | 79 (62.7) | | |
| 21-23 | 0 (0) | 74 (41.1) | 106 (58.9) | | |
| 24-26 | 2 (3.3) | 22 (36.7) | 36 (60) | | |
| >27 | 0 (0) | 6 (31.6) | 13 (68.4) | | |
| **Gender** | | | | **1.707** | **0.426** |
| Male | 3 (1.5) | 73 (35.8) | 128(62.7) | | |
| Female | 1 (0.6) | 74 (40.8) | 106 (58.6) | | |
| **Ethnicity** | | | | **3.338** | **0.765** |
| Igbo | 3 (0.9) | 137 (40) | 211 (60.1) | | |
| Yoruba | 0 (0) | 1 (50) | 1 (50) | | |
| Hausa | 0 (0) | 0 (0) | 1 (100) | | |
| Others | 1 (3.2) | 9 (30) | 21 (67.8) | | |
| **Year of Study** | | | | **3.527** | **0.897** |
| 2nd Year | 1 (1.1) | 31 (33.3) | 61 (65.6) | | |
| 3rd Year | 1 (1) | 42 (42) | 57 (57) | | |
| 4th Year | 1 (1.7) | 25 (43.1) | 32 (55.2) | | |
| 5th Year | 0 (0) | 20 (40) | 30 (60) | | |
| 6th Year | 1 (1.2) | 29 (34.5) | 54 (64.3) | | |

| | | | | | |
|---|---|---|---|---|---|
| **Department** | | | | **0.266** | **0.876** |
| Medicine | 4 (1.1) | 141 (38) | 226 (60.9) | | |
| Dentistry | 0 (0) | 6 (42.9) | 8 (57.1) | | |
| **MaritalStatus** | | | | **4.051** | **0.399** |
| Single | 4 (1.1) | 145 (38.6) | 227 (60.4) | | |
| Married | 0 (0) | 1 (12.5) | 7 (87.5) | | |
| Separated | 0 (0) | 1 (100) | 0 (0) | | |
| Divorced | 0 (0) | 0 (0) | 0 (0) | | |
| Widowed | 0 (0) | 0 (0) | 0 (0) | | |
| **Religion** | | | | **4.242** | **0.644** |
| Christianity | 4 (1.1) | 144 (38.1) | 230 (60.8) | | |
| Islam | 0 (0) | 0 (0) | 2 (100) | | |
| ATR | 0 (0) | 0 (0) | 1 (100) | | |
| Others | 0 (0) | 3 (75) | 1 (25) | | |
| **In-School Place of Res.** | | | | **1.838** | **0.399** |
| Hostel | 3 (1.3) | 96 (40.5) | 138 (58.2) | | |
| Off-Campus | 1 (0.7) | 51 (34.5) | 96 (64.8) | | |

This table shows that there is no significant association between age, gender, ethnicity, year of study, department, marital Status, religion, in-school place of residence and attitude towards AI assistants.

**TABLE 8: ASSOCIATION BETWEEN KNOWLEDGE AND ATTITUDE TOWARDS AI ASSISTANTS**

| Variable | Poor Attitude (%) | Moderate Attitude (%) | Good Attitude (%) | $X^2$ test | P value |
|---|---|---|---|---|---|
| | | | | **2.742** | **0.602** |
| **Poor knowledge** | 1 (1.2) | 33 (41.8) | 45 (57) | | |
| **Moderate knowledge** | 2 (0.9) | 93 (39.4) | 141 (59.7) | | |
| **Good knowledge** | 1 (1.4) | 21 (30) | 48 (68.6) | | |

This table shows that there is no significant association between knowledge and attitude towards to AI assistants

## DISCUSSION

The findings of this study indicate a high level of familiarity with AI assistants among medical students, with 98% of respondents reporting awareness. This aligns with previous studies that have documented increasing AI awareness among medical students and physicians, reflecting the growing integration of AI in medical education and practice[17-21]. ChatGPT was the most recognized AI tool (82.6%), which is consistent with findings from two similar studies that identified ChatGPT as the most widely used AI assistant in academic and professional settings[22,24]. Additionally, nearly half of the respondents (49%) reported daily interactions with AI assistants, and social media (42.8%) was the primary source of AI awareness. This is comparable to a prior research that highlights the role of digital platforms in disseminating AI-related knowledge[24].

Regarding attitudes towards AI assistants, most of the respondents perceived them as beneficial in medical education (51.7%), enhancing efficiency (42.3%), and aiding in the learning of complex concepts (43.6%). These positive perceptions align with studies facilitating knowledge acquisition and academic performance among medical students[23-26].

However, concerns about over-reliance on AI (39.2%) and potential threats to patient privacy (30.4%) were notable. Ethical concerns surrounding AI use in medicine have been well-documented in previous research, reinforcing the need for clear guidelines on responsible AI adoption[23,24]. Furthermore, 34.8% of respondents believed that AI might reduce the need for critical thinking, suggesting a cautious approach to its integration in medical education. Similar concerns have been raised in other studies, emphasizing the importance of fostering AI literacy while maintaining strong clinical reasoning skills[24].

The major challenge identified in this study included limited access to reliable AI tools (47%), ethical concerns (39.2%), and the inaccuracy of AI-generated information (40.8%). These findings are in line with studies that have highlighted the risks of biased and misleading AI-generated content[23]. However, unlike some previous research that identified unreliable internet connectivity as the primary limitation to AI adoption [24], our study found that tool reliability and ethical concerns were more pressing issues, this suggests that as AI becomes more integrated into medical education, students are shifting their concerns form accessibility to the quality and reliability of AI-generated information.

In terms of perceived benefits, the study reaffirmed AI assistants' positive impact on medical education, with respondents agreeing that AI assistants improves access to information (47.5%), enhances learning support (51.9%), and increases time efficiency (48.1%). These results are consistent with prior studies that have emphasized AI's role in streamlining learning and clinical decision-making[24,25.] The findings highlight the transformative potential of AI assistants in resource-limited settings, where access to comprehensive medical literature and expert guidance is often constrained.

Interestingly, no significant associations were found between demographic characteristics and knowledge or attitudes toward AI assistants. This contrasts with a previous study that reported a significant link between awareness of AI and its use in academic learning[24.] The lack of a clear association in our study suggests that AI familiarity is widespread across different student demographics, with usage patterns likely influenced more by personal preferences and learning styles than by socio-demographic factors.

Most respondents agreed that AI assistants are beneficial in medical education (51.7%), enhance efficiency (42.3%), and assist in learning complex concepts (43.6%). However, concerns about over-reliance on AI assistants (39.2%) and potential compromises in patient privacy (30.4%) indicate that while AI assistants are perceived as useful, ethical considerations remain. Similar concerns were also reported in similar studies.[23-26]. The perception that AI assistants might reduce the need for critical thinking (34.8%) also suggests a cautious approach to its use in medical education.

The most significant challenges identified included lack of access to reliable AI tools (47%), ethical concerns (39.2%), and the inaccuracy of AI-generated information (40.8%). Similar concerns were also reported in other studies[23]. However, this is different from a few other studies which reported unreliable connectivity as a major challenge to the use of AI assistants[24].These barriers highlight the need for improved AI integration strategies, emphasizing accuracy, accessibility, and ethical guidelines.

AI assistants were seen as improving access to information (47.5%), enhancing learning support (51.9%), and boosting time efficiency (48.1%). These findings underscore the transformative potential of AI in medical education, particularly in resource-limited settings where access to up-to-date information is crucial.

No significant associations were found between demographic characteristics acknowledge or attitudes toward AI assistants. Similarly, no significant association was observed between knowledge levels and attitudes. This suggests that AI familiarity and usage are widespread across different student groups, and perceptions of AI are not significantly influenced by demographic differences. However, this is different from other studies which reported a significant association between awareness of AI and the use of AI assistants in learning[24].

## CONCLUSION

The study highlights the widespread familiarity and use of AI assistants among medical students, with ChatGPT being the most commonly used tool. While AI is widely perceived as beneficial in enhancing learning efficiency, concerns regarding its accuracy, ethical implications, and potential impact on critical thinking remain.

The findings emphasize the need for structured AI integration in medical education, ensuring that AI tools complement rather than replace essential cognitive and ethical reasoning skills.

## RECOMMENDATIONS

To maximize the benefits of AI assistants in medical education while addressing the identified challenges, institutions should incorporate AI literacy programs into their curricula. This will enable students to critically evaluate AI-generated information and use these tools effectively. Additionally, there is a need for clear regulatory guidelines at both institutional and national levels to ensure ethical AI usage, particularly in fields like medicine where accuracy and confidentiality are crucial.

Furthermore, AI assistants should be positioned as supplementary learning aids rather than replacements for human decision-making and critical thinking skills. This can be achieved by encouraging students to verify AI-generated information against standard medical sources. By addressing these areas, AI assistants can be effectively integrated into medical education, enhancing learning while mitigating potential risks.

## REFERENCES


1. 1. INVESTOPEDIA [Internet]. Investopedia. 2019. Available from: https://www.investopedia.com

2. Hamet P, Tremblay J. Artificial intelligence in medicine. Metabolism. 2017 Apr;69S:S36-S40. Doi: 10.1016/j.metabol.201 7.01.011. Epub 2017 Jan 11. PMID: 28126242.

3. Agnieszka Jadwiga Wójcik-Czerniawska. The Role of Artificial Intelligence in Modern Finance and Sustainable Marketing. Advances in marketing, customer relationship management, and e-services book series. 2023 Jun 26;355–71.

4. NCAIR [Internet]. Nitda.gov.ng. 2024. Available from: https://ncair.nitda.gov.ng

5. Khosravi M, Zare Z, Mojtabaeian SM, Izadi R. Artificial Intelligence and Decision-Making in Healthcare: A Thematic Analysis of a Systematic Review of Reviews. Health Serv Res ManagEpidemiol. 2024 Mar 5;11:23333928241234863. Doi: 10.1177/23333928241234863. PMID: 38449840; PMCID: PMC10916499.

6. Alowais, S.A., Alghamdi, S.S., Alsuhebany, N. et al. Revolutionizing healthcare: the role of artificial intelligence in clinical practice. BMC Med Educ 23, 689 (2023). https://doi.org/10.1186/s12909-023-04698-z

7. MahdiZarei, HamidEftekhariMamaghani, Abbasi A, Hosseini MS. Application of artificial intelligence in medical education: A review of benefits, challenges, and solutions. MedicinaClínicaPráctica. 2024 Apr 1;7(2):100422–2.

8. Stafie CS, Sufaru IG, Ghiciuc CM, Stafie II, Sufaru EC, Solomon SM, Hancianu M. Exploring the Intersection of Artificial Intelligence and Clinical Healthcare: A Multidisciplinary Review. Diagnostics (Basel). 2023 Jun 7;13(12):1995. Doi: 10.3390/diagnostics13121995. PMID: 37370890; PMCID: PMC10297646.

9. Adham El Sherbini, Glicksberg BS, ChayakritKrittanawong. Artificial intelligence in primary care. Elsevier eBooks. 2024 Jan 1;1–13.

10. Adham El Sherbini, Glicksberg BS, ChayakritKrittanawong. Artificial intelligence in general internal medicine. Elsevier eBooks. 2023 Sep 15;15–24.

11. Raghavan L, Cheng CY, Wong TY. Artificial intelligence in ophthalmology II: glaucoma. Elsevier eBooks. 2023 Sep 15;113–7.

12. Hoy MB. Alexa, Siri, Cortana, and More: An Introduction to Voice Assistants. Med Ref Serv Q. 2018 Jan-Mar;37(1):81-88. Doi: 10.1080/02763869.2018.1404391. PMID: 29327988.

13. Nobles AL, Leas EC, Caputi TL, Zhu SH, Strathdee SA, Ayers JW. Responses to addiction help-seeking from Alexa, Siri, Google Assistant, Cortana, and Bixby intelligent virtual assistants. NPJ Digit Med. 2020 Jan 29;3:11. Doi: 10.1038/s41746-019-0215-9. PMID: 32025572; PMCID: PMC6989668.

14. Yang S, Lee J, Sezgin E, Bridge J, Lin S. Clinical Advice by Voice Assistants on Postpartum Depression: Cross-Sectional Investigation Using Apple Siri, Amazon Alexa, Google Assistant, and Microsoft Cortana. JMIR

2021 Jan 11;9(1):e24045. Doi: 10.2196/24045. PMID: 33427680; PMCID: PMC7834933.

15. Chan KS, Zary N. Applications and Challenges of Implementing Artificial Intelligence in Medical Education: Integrative Review. JMIR Med Educ. 2019 Jun 15;5(1):e13930. Doi: 10.2196/13930. PMID: 31199295; PMCID: PMC6598417.

16. Sun L, Yin C, Xu Q, Zhao W. Artificial intelligence for healthcare and medical education: a systematic review. Am J Transl Res. 2023 Jul 15;15(7):4820-4828. PMID: 37560249; PMCID: PMC10408516.

17. Mohammad Muzaffar Mir, Mir G, Nadeem Tufail Raina, Mir S, Mir S, ElhadiMiskeen, et al. Application of Artificial Intelligence in Medical Education: Current Scenario and future Perspectives. PubMed [Internet]. 2023 Jul 1;11(3):133–40. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10352669/

18. MahdiZarei, HamidEftekhariMamaghani, Abbasi A, Hosseini MS. Application of artificial intelligence in medical education: A review of benefits, challenges, and solutions. MedicinaClínicaPráctica. 2024 Apr 1;7(2):100422–2.

19. Chan KS, Zary N. Applications and Challenges of Implementing Artificial Intelligence in Medical Education: Integrative Review. JMIR Medical Education [Internet]. 2019 Jun 15 [cited 2019 Nov 13];5(1):e13930. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6598417/

20. Sapci AH, Sapci HA. Artificial Intelligence Education and Tools for Medical and Health Informatics Students: Systematic Review. JMIR Medical Education. 2020 Jun 30;6(1):e19285.

21. Varma J, Fernando S, Boon Ping Ting, ShahrukhAamir, Rajesh Sivaprakasam. The Global Use of Artificial Intelligence in the Undergraduate Medical Curriculum: A Systematic Review.Cureus. 2023 May 30.21. Narayanan S, Ramakrishnan R, Durairaj E, Das A, Narayanan S, Ramakrishnan R, et al.

22. Ankamah S, Gyesi K, Amponsah V. Awareness, knowledge, and attitude towards artificial intelligence: Perspective of medical students in Ghana. Information Development. 2024 Sep 17;

23. Jackson P, GayathriPonathSukumaran, Babu C, M. Christa Tony, DeenStephano Jack, Reshma VR, et al. Artificial intelligence in medical education – perception among medical students. BMC Medical Education. 2024 Jul 27;24(1).

24. Wobo KN, Nnamani IO, Alinnor EA, Gabriel-Job N, Paul N. Medical students' perception of the use of artificial intelligence in medical education. International Journal of Research in Medical Sciences [Internet]. 2024 Dec 31 [cited 2025 Jan 28];13(1):82–9. Available from: https://www.msjonline.org/index.php/ijrms/article/view/14539?utm_source=perplexity

25. Hadithy ZAA, Lawati AA, Al-Zadjali R, Sinawi HA, Hadithy ZAA, Lawati AA, et al. Knowledge, Attitudes, and Perceptions of Artificial Intelligence in Healthcare Among Medical Students at Sultan Qaboos University. Cureus [Internet]. 2023 Sep 8;15(9). Available from: https://www.cureus.com/articles/181065-knowledge-attitudes-and-perceptions-of-artificial-intelligence-in-healthcare-among-medical-students-at-sultan-qaboos-university#

26. Moldt JA, Festl-Wietek T, MadanyMamlouk A, Nieselt K, Fuhl W, Herrmann-Werner A. Chatbots for future docs: exploring medical students' attitudes and knowledge towards artificial intelligence and medical chatbots. Medical Education Online. 2023 Feb 28;28(1).