

Perceptions and Attitudes of Medical Students about Artificial Intelligence in Healthcare: A Cross-Sectional Study in Dhaka, Bangladesh

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ABSTRACT

Background: We are getting many benefits by using artificial intelligence (AI) in our daily life. Adoption of this technology in the health sector is also increasing day to day. To have a reasonable knowledge about AI is a demand of time now a days. So, this study was designed to have an idea about the perception of some medical students of Dhaka, Bangladesh about AI in medical practice.

Materials and Methods: This descriptive cross-sectional study was conducted in June 2025 among 385 randomly selected medical students. Informed consent was obtained from all participants prior to data collection. Data were collected through face-to-face interviews using a structured, pretested questionnaire. Quality control measures were applied throughout the process, including checks for completeness and consistency of responses, to ensure data accuracy. Confidentiality of participant information was strictly maintained. Participants were informed of their right to withdraw themselves from the study at any time even without any reason. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0.

Result: Medical students were between 18 to 29 years of age, with a mean± SD age of 20.9 ± 1.1 years. Among them 239 (62.1%) were female. Around three-fourths 286(74.3%) were not familiar with machine learning and deep learning, while for 328(85.2%), social media is the source of information regarding AI; 31 (8.1%) strongly agreed and 114 (29.6%) agreed that some medical specialties may be replaced by AI. More than one-fourth 106 (27.5%) strongly agreed and 162 (42.1%) agreed that AI will play an important role in the healthcare system, while 357(92.7%) did not answer any AI-related question. Around two-thirds 228 (59.2%) agreed that AI has limitations. More than one-third 133 (34.5%) agreed and 159 (41.3%) partially agreed that there is privacy issues related to AI use, but a significant number 349 (90.6%) expressed interest in AI.

Conclusion: Social media was the main source of information about AI and the students recognized AI's potential role in replacing certain specialties and for shaping the future of healthcare, they emphasized the need for inclusion of a basic AI course in the curriculum. Though there is chance of cheating, limitations, and privacy issues, students expressed a strong interest in adopting AI in their future practice.

Keywords: Artificial intelligence, Medical students, Healthcare.

SZMCJ, Jan 2025; Vol.44(1): 10-15

INTRODUCTION

The term “artificial intelligence” (AI) was introduced by John McCarthy in 1956 at the Dartmouth Conference¹. The adoption of AI in the healthcare sector has expanded considerably due to the growing volume of data and enhanced processing capabilities². Healthcare professionals and informatics experts involved in designing AI applications must possess a solid grasp of the technology's basic principles to implement and assess AI-based recommendations appropriately³. With the development of AI, numerous

fields in the health sector, such as radiology, dermatology, medicine, pathology, and ophthalmology, have experienced significant impact⁴. Notably, around 41% of physicians express a mix of enthusiasm and concern regarding the opportunities that AI offers in healthcare⁵. AI has been incorporated into medical education, particularly through its application in case-based e-learning⁶. About 32.86% of hospitals in China have implemented at least one AI product, while AI technologies have been incorporated in all university hospitals⁷.

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Although AI offers many benefits, privacy concerns may deter individuals from sharing their information and accessing healthcare services, potentially limiting the broader adoption of AI in healthcare delivery⁸. AI is increasingly recognized as a transformative force in modern medicine, with the potential to influence clinical practice across nearly all disciplines and health care settings. Despite the promising role of machine learning in enhancing diverse aspects of patient care, its integration into routine practice remains limited. Key challenges and uncertainties persist regarding the adoption and implementation of these technologies within health care systems⁹. With the development of AI, there is also ongoing concern regarding the ethical issues related to AI¹⁰. However, evidence on this topic remains scarce in developing countries such as Bangladesh. And so, to evaluate medical students' perceptions about AI in order to guide the future development of the health care system, the present study was undertaken.

MATERIALS & METHODS

This descriptive cross-sectional study was conducted in the month June 2025, at Ashian Medical College and Popular Medical College in Dhaka, Bangladesh – the study sites were chosen conveniently. 102 of 195 students of Ashian Medical College and 283 of 546 students of Popular Medical College, was willing to participate our study – and so, the sample size was 385. Prior to data collection, informed written consent was obtained from each participant. Data were collected by the principal investigator using a pretested, interviewer-administered schedule through face-to-face interviews while ensuring privacy. The study was conducted by using a pre-tested semi-structured questionnaire with close-ended questions like “yes or no”, “agree or disagree” and liker-type scale. At the end of each interview, questionnaires were reviewed for completeness and cross-checked for accuracy, consistency, and discrepancies. Confidentiality of the collected data was strictly maintained, and participants were assured of their right to withdraw from the study at any stage without providing a reason. The procedure posed no physical, social, or psychological risks to participants. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics were presented as frequencies, percentages, means, and standard deviations according to the nature of the variables.

RESULTS

A total of 385 medical students from 1st year to 5th year including some irregular students participated in the

study – and so, the respondents were between 18 to 29 years of age, with a mean±SD age of 20.9±1.1 years.

The majority 247(64.2%) were between 18–24 years. Of the participants, 239 (62.1%) were female and 146 (39.9%) were male. Most 332(86.2%) respondents were Muslim. With respect to academic year, 83 (21.6%) were in the 1st year, 68 (17.7%) in the 2nd year, 126 (32.7%) in the 3rd year, 59 (15.3%) in the 4th year, and 49 (12.7%) in the 5th year. All respondents reported daily internet use. Regarding knowledge of artificial intelligence (AI) 286 (74.3%) students were not familiar with machine learning and deep learning, while 99 (25.7%) reported awareness of these concepts. Social media was the most common source 328(85.2%) of information about AI, followed by traditional media for 21(5.5%) and 36(9.3%) had the information from other sources.

About 31 (8.1%) students strongly agreed and 114 (29.6%) agreed that some medical specialties may be replaced by AI, whereas 78 (20.3%) were undecided, 127 (32.9%) disagreed & 35(9.1%) strongly disagreed. (Figure-1)

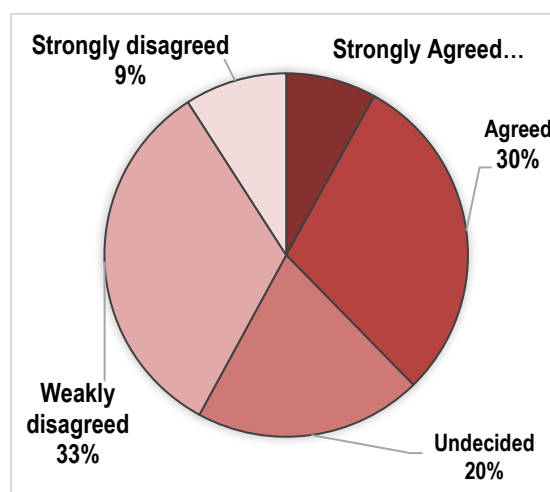
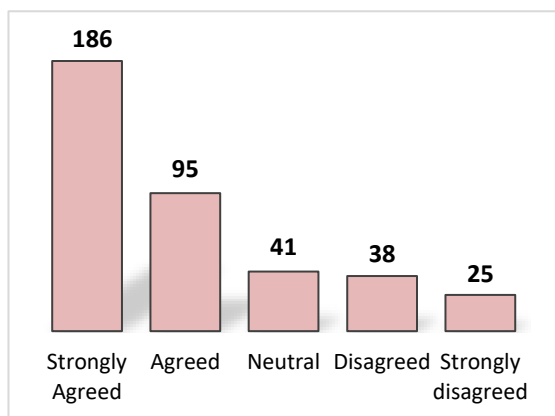


Figure 1: Respondents' Perceptions on the Likelihood of Medical Specialties Being Replaced by AI in the Near Future.

Of the medical students, 106 (27.5%) strongly agreed and 162 (42.1%) agreed that AI will play an important role in the healthcare system in the near future, while 97 (25.2%) were neutral, 12 (3.1%) disagreed, and 8 (2.1%) strongly disagreed.

Of the medical students, 186 (48.3%) strongly agreed and 95 (24.7%) agreed that their curriculum should

include at least one basic AI learning course, while 41 (10.6%) had no opinion, 38 (9.8%) disagreed, and 25 (6.6%) strongly disagreed. (Figure-2)



(Numbers on the top of column indicates frequency ‘n’)

Figure 2: Respondents’ Opinions on Introducing at Least One Basic AI Learning Course in the Medical Curriculum.

Regarding non-specialized healthcare professions, 76 (19.7%) strongly disagreed and 59 (15.3%) disagreed that their profession would be replaced by AI, while 126 (32.7%) were neutral, 85 (22.1%) agreed, and 39 (10.2%) strongly agreed.

Table-I: Respondents’ Opinions on Replacement of Non-Specialized Healthcare Professions by AI

Opinion	Frequency (%)
Strongly disagreed	76 (19.7)
Disagreed	59 (15.3)
Neutral	126 (32.7)
Agreed	85 (22.1)
Strongly agreed	39 (10.2)
Total	385 (100)

Most respondents 357(92.7%) had not attended any AI-related course, and only 28 (7.3%) had received some form of training. The current study revealed that 159 (41.3%) students believed AI could help students to cheat, 38 (9.9%) disagreed, while 188 (48.8%) were uncertain. Of the medical students, 228 (59.2%) agreed

that AI has limitations, 31 (8.1%) disagreed, and 126 (32.7%) reported being unaware of them. Around 133 (34.5%) agreed that there is privacy issues related to AI use, 159 (41.3%) partially agreed, 62 (16.1%) partially disagreed, and 31 (8.1%) completely disagreed with the statement. Around 349 (90.6%) medical students expressed interest in using AI for their future studies, while only 36 (9.4%) were not interested.

Of the study respondents, 206 (53.5%) intended to learn AI after completion of their medical graduation, 115 (29.9%) were neutral, and 64 (16.6%) reported they would not acquire AI knowledge after graduation.

DISCUSSION

In the present study, respondents were aged between 18 and 29 years, with a mean age of 20.9 ± 1.1 years. Though the age range of regular session medical students of Bangladesh is about 18–24 years (64.2%), a few irregular students have made the age range 18 - 29 years – all of them belong to young adult or adult population. This finding aligns with the results of Kalaimani G. *et al.*, who reported that approximately 82.5% of their participants were aged 18–25 years, suggesting a similar age distribution among young adults in comparable settings¹¹. In the current study, among the medical students, 239 (62.1%) were female and 146 (37.9%) were male, indicating a higher proportion of female participants. This is comparable to the findings of Haleem S. *et al.*, who reported 54.9% female and 45.1% male participants, suggesting a similar gender distribution in medical student populations¹². In the present study, out of 385 medical students, a large majority, 332 (86.2%), identified as Muslim. This finding is broadly consistent with the results of Iktidar MA *et al.*, who reported that 87.47% of their study participants were Muslim, indicating a similar religious distribution among medical students in comparable settings¹³. In fact, this reflects the population pattern of Bangladesh in respect to religion – as per the census of 2022 about 91% of our population is Muslim. Regarding academic year distribution, 83 (21.6%) students were in the 1st year, 68 (17.7%) in the 2nd year, 126 (32.7%) in the 3rd year, 59 (15.3%) in the 4th year, and 49 (12.7%) in the 5th year. This pattern is somewhat comparable to the findings of Pallivathukul RG *et al.*, who reported 34.8% in 1st year, 17.8% in 2nd year, 16.7% in 3rd year, 13.8% in 4th year, and 16.9% in 5th year, suggesting variability in year-wise enrollment but a general representation across all academic levels¹⁴.

All respondents in the current study (100%) reported daily use of the internet, reflecting consistent access and

reliance on digital technology. This finding differs from Aggarwal R., who observed that only 73.8% of participants used the internet daily, while 10.3% used it less often, 7.1% had no internet access, and 8.8% did not respond, highlighting differences in internet accessibility and usage across study populations¹⁵. In the current study, approximately three-fourths of medical students, 286 (74.3%), were not familiar with machine learning and deep learning, while only 99 (25.7%) reported knowledge of these AI subtypes. This is broadly comparable to the findings of Swed S. et al., who observed that 65.3% of respondents lacked knowledge about these concepts, whereas 34.7% were aware of them, indicating a generally low awareness of AI-related technologies among medical students¹⁶. In the present study, the majority of respondents, 328 (85.2%), reported learning about AI through social media, while only 21 (5.5%) cited traditional media, and 36 (9.3%) mentioned other sources. This contrasts with the findings of Alsobhi M. et al., where information about AI was obtained from a more diverse range of sources, including social media (43.2%), traditional media (15.8%), colleagues or friends (30.6%), class lectures (25.2%), articles or journals (36%), workshops (13.9%), workplace (11.7%), web-based courses (9.1%), and 11.4% had no prior information. The difference suggests that social media plays a particularly dominant role in informing medical students about AI in the current study population¹⁷. In the present study, 31 (8.1%) respondents strongly agreed that certain medical specialties may be replaced by AI, 114 (29.6%) agreed, 78 (20.3%) were neutral, 127 (32.9%) disagreed, and 35 (9.1%) strongly disagreed. These findings are broadly in line with a recent study among Malaysian medical students, which reported that 12.62% strongly agreed, 47.18% agreed, 15.61% were neutral, 17.61% disagreed, and 6.98% strongly disagreed with the statement. This comparison indicates a similar perception among medical students regarding the potential impact of AI on medical specialties, although there is some variation in the degree of agreement¹⁸. In the current study, 106 (27.5%) medical students strongly agreed that AI will play an important role in the healthcare system in the near future, 162 (42.1%) agreed, 97 (25.2%) were neutral, 12 (3.1%) disagreed, and 8 (2.1%) strongly disagreed. These findings are comparable to those reported by Tung AYZ et al., who found that 32.22% strongly agreed, 55.14% agreed, 7.97% were neutral, 1.66% disagreed, and 2.99% strongly disagreed. This suggests a generally positive perception among medical students regarding the future role of AI in healthcare, with slight variations in the degree of agreement across different populations¹⁸.

Among the medical students, 186 (48.3%) strongly agreed that their curriculum should include at least one basic AI learning course, 95 (24.7%) agreed, 41 (10.6%) had no opinion, 38 (9.8%) disagreed, and only 25 (6.6%) strongly disagreed. Similar findings were reported by Abuzaid MM et al., where 28% of respondents strongly agreed, 47% agreed, 18% were neutral, 5% disagreed, and 2% strongly disagreed that the curriculum should include at least some basic knowledge of AI¹⁹. Among the respondents, 357 (92.7%) had not attended any online or offline course on AI, while only 28 (7.3%) had received some form of AI training. This is consistent with the findings of Al-Qerem W et al., who reported that the majority (69.7%) had not attended any online or offline AI courses, whereas 30.3% had participated in such training²⁰. The majority of respondents, 238 (61.8%), were excited about AI, 91 (23.6%) were aware of the challenges associated with the technology, while 56 (14.6%) were worried about its impact. Similarly, a study by Hamd ZY et al., found that 56.7% of respondents were excited about AI, 35.8% were aware of its challenges, and 7.5% were concerned about its potential impact²¹. Concerning ethical concerns, 159 (41.3%) of students believed that AI could help students cheat, 38 (9.9%) disagreed, and 188 (48.8%) were uncertain. A study conducted in Jordan reported similar trends, with 58.1% of students perceiving AI as a tool that could facilitate cheating, 22.1% opposing this view, and 26.2% being unsure²². Among the medical students, 228 (59.2%) agreed that AI has limitations, 31 (8.1%) disagreed, and 126 (32.7%) were not aware of them. A recent study by Serbaya SH et al., reported similar findings, with 77.0% of participants recognizing the limitations of AI, 15.6% disagreeing, and 25.6% uncertain²³. Regarding privacy concerns related to AI, 133 (34.5%) of respondents completely agreed that such issues exist, 159 (41.3%) partially agreed, 62 (16.1%) partially disagreed, and 31 (8.1%) completely disagreed. These findings align with the study by Elnaggar M et al., which reported that 29.4% of participants completely agreed, 45.2% partially agreed, 17.3% partially disagreed, and 8.1% completely disagreed about AI-related privacy issues²⁴. A majority of medical students, 349 (90.6%), expressed interest in using AI for their future studies, while only 36 (9.4%) were not interested. Similarly, a study by Weidener L et al., reported that 76.9% of participants were interested in using AI applications as part of their medical education, whereas 23.1% were not²⁵. Regarding non-specialized healthcare professions, 76 (19.7%) of respondents strongly disagreed that their profession could be replaced by AI, 59 (15.3%) disagreed, 126 (32.7%) were neutral, 85 (22.1%) agreed, and 39 (10.2%)

strongly agreed. These findings are supported by Hasan HE et al., who reported that 5.4% of participants strongly disagreed, 23.1% disagreed, 32% were neutral, 28.6% agreed, and 11% strongly agreed that AI could replace their profession²⁶. Among the study respondents, 206 (53.5%) intended to learn AI after completing their medical degree, 115 (29.9%) were neutral, and 64 (16.6%) did not plan to acquire AI-related knowledge by the end of their studies. This is consistent with the findings of Tung AY *et al.*, who reported that 6.31% of participants strongly agreed, 38.21% agreed, 20.93% neither agreed nor disagreed, 25.58% disagreed, and 8.97% strongly disagreed with the statement at the end of their medical degree, they would possess the knowledge needed to work with AI in routine clinical practice¹⁸.

Conclusion

Social media was the main source of AI information and the students recognized AI's potential role in replacing certain specialties and for shaping the future of healthcare, they emphasized the need for inclusion of a basic AI course in the curriculum. Though there is chance of cheating, limitations, and privacy issues, students expressed a strong interest in adopting AI in their future practice.

Limitation of the study

In respect to realizing a technical aspect like AI and its implementation in medical practice, maturity of knowledge at the age of 18 is not the same as that of 24. While analyzing the data, we had to ignore this matter.

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