

Unlocking AI's Potential In Medical Education: Perspectives From A Cross-Sectional Study At CMH Lahore

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<p>Keywords: Artificial intelligence, Medical Education, Undergraduate Students, Postgraduate Students, Pakistan</p>	<p>Abstract</p> <p>Introduction: AI involves computational systems to emulate intelligent behavior with minimal human intervention. Integrating AI into medical education is pivotal at this juncture. This study examines medical faculty perspectives on AI incorporation, focusing on their perceptions of AI's role in medical training and their understanding of fundamental AI concepts.</p> <p>Methodology: A quantitative exploratory approach was adopted from March to April 2023 involving forty medical faculty members from CMH LMC & IOD, teaching undergraduate and postgraduate students. The questionnaire, distributed via Google Forms, had a reliability of 0.729. Data were analyzed using IBM SPSS Version 26, employing descriptive statistical methods like frequencies, mean, standard deviation, percentages, and correlation.</p> <p>Results: Forty medical educators were questioned about AI. 67% AI would increase the effectiveness of healthcare. It's interesting to note that although 65% of educators said they knew enough about AI, 43.9% said they wouldn't be ready for AI in the future, and 61% said they would like to learn more. The survey found that while most people had a favorable opinion of AI, there were some reservations and a need for more research.</p> <p>Conclusion: This study in Lahore, explored medical educators' views on AI in healthcare. Educators showed optimism about AI's potential to enhance efficiency and support doctors. However, legal and ethical concerns surfaced, and educators were divided on their current AI knowledge. There was a notable demand for additional AI education.</p>
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Introduction:

Artificial intelligence is a concept that involves the use of computational systems to emulate intelligent behavior with minimal human intervention.¹ Concerns have been expressed by academic staff regarding the potential effects of AI on teaching methods and the ethical considerations of AI technology in the educational field. Now a days it is a big fear in medical educators that AI could replace them. It can reduce the patients and students' interaction and reduce the learning opportunities of students.² Data privacy and biases in AI algorithms that may affect academic results are the main ethical concerns. By Increasing the integration of AI in education, educationist could engage the students in brain storming, discussion, exploring more knowledge and in this way they can improve quality of education.³

Artificial intelligence integration with teaching, learning and assessment is important at this crucial moment in medical education. It is a high time to update the medical curricula and equip the physicians with knowledge, skills and abilities. Artificial intelligence enhances the speed, precision and effectiveness of existing teaching methodology. In this era some artificial intelligence tools are tailored specifically for higher education institutes. They are helpful to predict the progress of the patients. They are also adding opinion in clinical decision-making processes. With the integration of AI technology we can improve the patient outcomes, only trained AI medical professional use it correctly. Therefore, it is essentially important to the health care institutions to upgrade their curricula and include AI-related topics.⁴

From last few decades, mostly medical institutional curriculum based on knowledge, skill and attitude. They want to develop ethical reasoning and critical thinking skills.⁵ Now it is a high time to add application and understanding of AI in curriculum. Studies suggest use of AI will empower the future physicians they will always have a second opinion. Moreover, student will more engage and ready to deal and interpret different situations through scenario based smart learning.⁴

Medical educators' perspective is required, as AI integration in medical education is an unique challenge with guidelines. effective collaboration of medical experts, and AI developers is vital. many researches show positive attitude of educationists towards learning and practicing advanced AI-enabled tools in health care settings.^{5,7} in future it will ensuring the patient welfare and ethical values remain central to decision making. the aim of our study to find out the medical educationist perspective towards the use and incorporation in medical education. we will try to find out the two major components: firstly, how much they are understanding the fundamentals of AI and secondly, how the educationist perceives the concept of AI in medical training. we are trying to find AI applications perspective on its impact on medical education at a CMH LMC faculty.

Material and Method:

In December and January of 2023, a quantitative exploratory approach was carried out with forty medical faculty members of CMH Lahore Medical College & Institute of Dentistry who were involved in postgraduate trainee training and undergraduate medical student teaching in the medical college's attached hospital. A self-explanatory, verified questionnaire was employed.⁵ The reliability of the questionnaire is 0.729, very close to 1. The Google form was used to distribute the survey. Faculty members with at least five years of experience teaching and who are subject matter experts were sent a link to the questionnaire via WhatsApp. Before the study, an informed consent was also obtained.

Statistical analysis:

Data were entered in Microsoft Excel and analyzed using IBM SPSS Version 26 for Windows, Armonk, NY. Data analysis included frequencies, Mean, Standard deviation, Percentages, and correlation for quantitative data descriptive studies.

Ethical clearance was obtained from the L-OIC Standing Committee for Scientific Research CMH LMC &IOD. (approval number 901/ERC/CMH/LMC)

Table 1: Reliability Statistics	
Cronbach's Alpha	N of Items
.729	10

Result:

All 40 people who clicked on the link to our survey consented to take part in the study conducted by medical educators in CMH LMC & IOD in Lahore, Pakistan explored their perceptions of Artificial Intelligence (AI) in healthcare. Educators were generally positive about AI, with over two-thirds believing it would improve healthcare efficiency. However, concerns existed regarding potential legal and ethical issues arising from AI use. Nearly half the educators acknowledged that AI would significantly impact the medical profession, and a strong majority

supported AI as a second opinion tool for physicians. Interestingly, despite 65% of educators rating their AI knowledge positively, a significant portion expressed a desire for further education.

	Statistics					
N = 40	Completely disagree	Disagree	Neutral	Agree	Strongly agree	Std. Deviation
General attitude toward AI	9 (22%)	18 (3.9%)	11 (26.8%)	1 (2.68%)	1 (2.35%)	.903
AI in healthcare: efficiency boost in next decade?	8 (19.5%)	26 (63.4%)	6 (14.6%)	-	--	.597
AI in medicine: Boon with legal and ethical brakes	7 (17.5%)	24 (60%)	7 (17.5%)	2 (5%)	--	.744
AI in medicine: AI as a physician's sidekick, not a replacement	4 (10%)	19 (47.5%)	14 (35%)	3 (7.5%)	--	.778
AI as a second opinion for doctors is promising but with limitations	2 (5%)	24 (60%)	8 (20%)	4 (10%)	2 (5%)	.934
AI in medicine: Must-have for competitive doctors	8 (20%)	22 (55%)	8 (20%)	2 (5%)	--	.778
Ready to leverage AI as a future physician	7 (17.5%)	18 (45%)	14 (35%)	1 (2.5%)	--	.768
AI in medicine: Need more training	12 (30%)	25 (62.5%)	2 (5%)	1 (2.5%)	--	.648
AI in medicine training? Sign me up!	3 (7.5%)	166 (40%)	12 (30%)	9 (22.5%)	--	.917
Rate yourself general knowledge of artificial intelligence (AI)?	20 (65%)	14 (35%)	--	--	--	.83

Table 2: Attitude of Medical Educationists towards Artificial Intelligence (AI)

The table 2 results show that medical educators have a generally positive perception of artificial intelligence (AI) in medicine. The mean score for general attitude towards AI is 2.17 on a 5-point scale, with a higher score indicating a more positive perception. Educators believe AI will have a positive impact on efficiency (mean score 2.20) and that AI software can be valuable as a second opinion for physicians (mean score 2.43). There is also some concern about the legal and ethical implications of AI in medicine (mean score 1.80). Educators are divided on whether their current knowledge is sufficient to work with AI in the future (43.9% felt prepared, 34.1% felt unprepared), and a significant number of educators (61%) expressed interest in receiving more education on AI in medicine.

Variables	Variables									
	General attitude toward AI	AI in healthc are: efficie ncy boost in next decade ?	AI in medicine: Boon with legal and ethical brakes	AI in medicine: AI as a physician's sidekick, not a replaceme nt	AI as a second opinion for doctors is promising but with limitation s	AI in medicin e: Must- have for competi tive doctors	Ready to leverag e AI as a future physici an	AI in medic ine: Need more trainin g	AI in medic ine trainin g? Sign me up!	Rate yourself general knowled ge of artificial intelligen ce (AI)?
General attitude toward AI	1	.540**	.126	.226	.198	.340*	.312	.499**	.040	.032
		.000	.439	.160	.221	.032	.050	.001	.809	.843
AI in healthcare: efficiency boost in next decade?	**	1	.242	.210	.046	.121	.305	.371*	.204	.151
			.132	.194	.778	.455	.056	.018	.207	.352
AI in medicine: Boon with legal and ethical brakes			1	.018	-.258	.071	-.220	.043	-.214	.185
				.914	.108	.664	.173	.795	.184	.252
AI in medicine: AI as a physician's sidekick, not a replacement				1	.388*	.186	.318*	.213	.439**	.096
					.013	.249	.046	.186	.005	.558
AI as a second opinion for doctors is promising but with limitations					1	.459**	.483**	.296	.464**	.057
						.003	.002	.063	.003	.728
AI in medicine: Must-have for competitive doctors						1	.262	.396*	.083	.177
							.102	.011	.612	.273
Ready to leverage AI as a future physician							1	.556**	.507**	.059
								.000	.001	.719
AI in medicine: Need more training								1	.362*	.147
									.022	.364
AI in medicine training? Sign me up!									1	-.026
										.873
Rate yourself general knowledge of artificial										1

intelligence
(AI)?

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 3: Correlation Matrix Perceptions of Medical educationist Towards Artificial Intelligence (AI)

The table 3 shows correlations between medical educators' survey responses on Artificial Intelligence (AI) in healthcare. Educators with a positive attitude towards AI tend to believe in its ability to improve healthcare efficiency and see value in AI as a second opinion tool. Additionally, educators' desire for further AI education is linked to their perception of AI's impact on the medical profession and their future work with AI. Interestingly, the presence of curricular events on AI in medicine shows no significant correlation with most other variables. **Discussion:**

Like many other developing countries, Pakistan's healthcare system encounters various challenges. Insufficient trained workforce, limited resources, unequal distribution of healthcare facilities, and restricted healthcare accessibility. Despite these obstacles, the nation has made notable advancements in healthcare indicators and has integrated computer technology into its healthcare infrastructure. The most hospitals utilizing electronic databases for patient care management and maintaining electronic medical records.⁶ This study examines the potential advantages of Artificial Intelligence (AI) in Lahore, Pakistan, and presents the perspectives of medical educators towards AI.

Positive Perception of AI: Educators' positive perception of AI is closely associated with their confidence in AI's capacity to enhance healthcare efficiency. Its utility as a supplementary diagnostic tool.

The educators recognize that artificial intelligence (AI) has the potential to improve patient outcomes and enhance medical education. They emphasize the need for ongoing study and supervision to maximize AI's benefits while minimizing any potential risks.⁷ AI proponents believe the technology can improve healthcare delivery by helping doctors retrieve information, improving diagnostic accuracy, and reducing mistakes.⁸ Educators have also become more excited by AI, as recent landmark works have highlighted the power of AI to enhance assessment, and make educational processes such as admissions and selection more efficient.⁹

Concerns and Knowledge Gaps: There is a slight positive link between instructors' general AI proficiency and their concerns about the ethical and legal ramifications of using AI in the classroom. Medical education specialists in Pakistan have expressed concerns regarding ethical quandaries arising from the integration of AI in healthcare. They have focused on issues that compromise academic integrity, such as plagiarism, and privacy and confidentiality.¹⁰ According to our research, medical professionals and students in Pakistan lack structured AI training and education in the healthcare sector. This implies that educators who have a deeper understanding of AI are more aware of potential obstacles and emphasize the need for customized educational initiatives.⁸

Desire for Further Education: There is a strong positive correlation between educators' propensity toward further AI education and their comprehension of AI's influence on the medical sector as well as their future engagement with AI.¹¹ Pakistan's medical education specialists have expressed their desire for more in-depth training and education on artificial intelligence in the healthcare industry. They recognize how important it is to keep up with technology and think that having a solid grasp of AI will enable them to effectively incorporate AI into their teaching strategies and clinical procedures.¹² Overall, medical educators in Pakistan have a positive view of AI, realizing its potential to improve patient outcomes and increase healthcare efficiency.

Limited Correlation with Curricular Events: The existence of curricular activities centered on AI in medicine does not exhibit a noteworthy correlation with the majority of other factors. This implies that the inclusion of AI-related subjects in medical education curricula might not substantially influence educators' understanding, perspectives, or attitudes towards AI.¹³ To sum up, medical education experts generally hold a positive outlook on

AI in healthcare and acknowledge its potential advantages.¹⁴ Nonetheless, there exists a requirement for tailored education and training concerning AI in healthcare to tackle apprehensions, bridge knowledge disparities, and seamlessly integrate AI into medical education.

Overall, the results suggest that medical educators play a crucial role in shaping the future healthcare workforce. These findings suggest a need to equip educators with the knowledge and skills necessary to prepare future physicians for a healthcare landscape increasingly influenced by AI. Investigate how AI can be integrated into medical education curriculums. Explore educators' specific concerns regarding the legal and ethical implications of AI in medicine.¹⁵ Conduct research in other geographical locations to understand global trends in medical educator perceptions of AI.

Limitation

The study was limited by its small sample size and population in only one site. Follow-up studies based on larger and more heterogeneous samples are justified.

Conclusion

Medical educators are an integral part of the future healthcare workforce. These findings suggest a need for well-trained educators with the knowledge and skills necessary to prepare future physicians for a healthcare landscape increasingly influenced by AI.

Future Research

- Investigate how AI can be integrated into medical education curriculums.
- Explore educators' specific concerns regarding the legal and ethical implications of AI in medicine.
- Conduct research in other geographical locations to understand global trends in medical educator perceptions of AI.

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References:

1. Pedro AR, Dias MB, Laranjo L, Cunha AS, Cordeiro J V. Artificial intelligence in medicine: A comprehensive survey of medical doctor's perspectives in Portugal. PLoS One [Internet]. 2023 Sep 1 [cited 2025 May 28];18(9 September). Available from: <https://doi.org/10.1371/journal.pone.0290613>
2. Chen M, Zhang B, Cai Z, Seery S, Gonzalez MJ, Ali NM, et al. Acceptance of clinical artificial intelligence among physicians and medical students: A systematic review with cross-sectional survey. Front Med (Lausanne). 2022 Aug 31;9.
3. Grunhut J, Marques O, Wyatt ATM. Needs, Challenges, and Applications of Artificial Intelligence in Medical Education Curriculum. JMIR Med Educ. 2022 Apr 1;8(2).
4. Mosch L, Agha-Mir-Salim L, Sarica MM, Balzer F, Poncette AS. Artificial Intelligence in Undergraduate Medical Education. In: Studies in Health Technology and Informatics. IOS Press BV; 2022. p. 821–2.
5. Busch F, Hoffmann L, Truhn D, Ortiz-Prado E, Makowski MR, Bressem KK, et al. Medical students' perceptions towards artificial intelligence in education and practice: A multinational, multicenter cross-sectional study. BMC Med Educ [Internet]. 2023 Dec;1–48. Available from: <https://doi.org/10.1101/2023.12.09.23299744>
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 Dec 1;24(1).
7. Jha N, Shankar PR, Al-Betar MA, Mukhia R, Hada K, Palaian S. Undergraduate Medical Students' and Interns' Knowledge and Perception of Artificial Intelligence in Medicine. Adv Med Educ Pract [Internet]. 2022 [cited 2025 May 28];13:927–37. Available from: 10.2147/AMEP.S368519

8. Habib MM, Hoodbhoy Z, Siddiqui MAR. Knowledge, attitudes, and perceptions of healthcare students and professionals on the use of artificial intelligence in healthcare. *MedRxiv*. 2024 Jan;(1).
9. Hallquist E, Gupta I, Montalbano M, Loukas M. Applications of Artificial Intelligence in Medical Education: A Systematic Review. *Cureus* [Internet]. 2025 Mar;17(3):e79878. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/40034416>
10. Memon SS, Murad S, Shah SAR, Iqbal Z, Saeed R, Abid J. Perception about Artificial Intelligence in Medical Education. *Pakistan Journal of Medical and Health Sciences*. 2021 Apr 28;17(3):419–20.
11. Salih SM. Perceptions of Faculty and Students About Use of Artificial Intelligence in Medical Education: A Qualitative Study. *Cureus*. 2024 Apr 4;
12. Jackson P GPSBC. Artificial_Intelligence_in_Medical_Education- _Perc. Res Sq [Internet]. 2024 Jan 11 [cited 2024 May 13];1–15. Available from: <https://doi.org/10.21203/rs.3.rs-3833999/v1>
13. Hammad Jaber Amin M. Knowledge, attitude, and practice of artificial intelligence among medical students in Sudan: A cross-sectional study. *Annals of Medicine & Surgery* [Internet]. 2024 Apr 24; Available from: <https://journals.lww.com/10.1097/MS9.0000000000002070>
14. Gillissen A, Kochanek T, Zupanic M, Ehlers J. Medical Students' Perceptions towards Digitization and Artificial Intelligence: A Mixed-Methods Study. *Healthcare (Switzerland)*. 2022 Apr 1;10(4).
15. Buabbas AJ, Miskin B, Alnaqi AA, Ayed AK, Shehab AA, Syed-Abdul S, et al. Investigating Students' Perceptions towards Artificial Intelligence in Medical Education. *Healthcare (Switzerland)*. 2023 May 1;11(9).