ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDE AND PERCEPTION OF MEDICAL STUDENTS AND HEALTHCARE PROFESSIONALS TOWARDS ARTIFICIAL INTELLIGENCE (AI): A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: To determine the knowledge, attitude, and perception of medical students and healthcare professionals about Artificial Intelligence (AI), and identify likely barriers in its acceptance for successful use in healthcare.

Study Design: Cross-sectional study.

Place and Duration of Study: CMH Kharian Medical College and Combined Military Hospital (CMH), Kharian, 03 months (March to June 2025).

Methodology: This study was carried out among medical students and healthcare workers, using a structured interview form. This instrument evaluated the participants' understanding of AI, attitudes toward integration of the same into clinical practice, and perceived benefits and limitations as well as its ethical implications. Statistical analysis was performed using SPSS-27.

Results: A total of 384 participants, of whom 382 answered (99.48%) the questionnaire. Overall, 17.3% of healthcare professionals and 8.8% medical students had formal training on AI (P=0.020). The statistical difference in awareness for use of AI was higher ($p < 0.05$). Overall, 60% of respondents were hopeful about the future role of AI in healthcare. Concerns about accuracy and reliability of AI in diagnosis was the most common worry among professionals (34.69%) closely followed by students (32.7%).

Conclusion: Although healthcare professionals and medical students had positive attitudes toward AI, their relatively low level of knowledge underlines the importance of education in this area. Inclusion of AI-related content into medical curriculum can improve future healthcare enterprises with AI as a dominant feature.

Key words: *Artificial Intelligence, AI, Healthcare Professionals, Medical Students, Knowledge, Attitude and Perception, Medical Education.*

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INTRODUCTION

The medical care landscape is being transformed by digital revolution. There is a vast potential in digital healthcare; it may also enhance the quality of medical care. Machine learning, mobile apps, wearables, sensors, and telemedicine have the potential to improve the conventional medical model of clinical history, examination, differential diagnosis, and treatment[1]. Medical Artificial Intelligence (AI) comprises using the ability of computers and other technology to aggregate data, input into machines and systems, as well as process that data and analyse it for particular characteristics in the way a human being might draw out conclusions from various stimuli. Artificial Intelligence will revolutionize medical practice. There are a few radiologists who feel that increasing use of AI in radiology could negatively impact their jobs in the near future[2]. Artificial intelligence is being applied in different healthcare systems for rapid progress. Healthcare is also where AI has the greatest power to transform how diagnosis, treatment and prognosis are handled for patients. Adequate knowledge of the significance and use of AI in healthcare can be quite beneficial. ChatGPT and other AI applications enable medical students to advance their knowledge and clinical skills.

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Beyond that, it is fast access and a time saver. AI-empowered tools in clinical practice can have a positive impact on healthcare professionals. Artificial Intelligence can manage different activities in healthcare; however, it will pose multiple challenges for practitioners and have a significant effect on the profession (healthcare) at large[3].

The knowledge, attitude, and perception of healthcare providers on AI represent a principal factor in its acceptance and efficient use. There could be some hiccups with these AI-based systems because of privacy and data security. It follows, hence, that the confidentiality of medical records should be preserved as AI is introduced because health data and records are sensitive[4]. In addition, patient consent has been another daunting challenge regarding private data since the integration of AI into healthcare may contribute to broad access to patients' information without their agreement. One of the many fears is that humankind can be substituted by AI in looking after people. It can lead to dehumanization in medicine. The use of AI can present serious privacy problems. It can affect a patient's autonomy. Although AI is crucial and advantageous in the healthcare field, it also has its limitations. AI-generated data can be biased. Dependence on data quality exists. Biased and nonsensical queries can result from poor data quality. It can increase healthcare costs. Beyond that, there is no established regulatory framework that guides the creation and implementation of AI for healthcare. There are several challenges that make it difficult for AI to be adopted into the healthcare industry. There are a number of obstacles to this, such as unawareness, lack of expert knowledge or training, financial issues, and interest[5].

Healthcare workers' knowledge, attitudes, and perceptions of AI have been the subject of numerous studies; as a result, education and training about AI are required to fill the knowledge gap. Nonetheless, these surveys found other differences in the knowledge about, attitude towards, and perception of AI among healthcare professionals according to specific characteristics like type of profession and experience or exposure to AI[6,7]. The purpose of this study was to assess medical students' and healthcare professionals' knowledge, attitude, and perception of AI. Moreover, it determined the factors affecting the adoption and effective utilization of AI tools and the barriers in their integration in medical care. The results of this study may guide new educational and training programs for increasing its acceptance and efficient use in health communities.

CAPSULE SUMMARY

Most of the participants had heard about AI but lacked the formal AI education and were interested in receiving AI training. A strong relationship was seen between the level of qualification and AI training, and awareness. The biggest concerns were job loss, moral, and invasion of privacy issue, sacrificing human touch to patients Unawareness, inadequately trained personnel, and financial constraints were a few barriers towards the application of AI in healthcare.

METHODOLOGY

This cross-sectional study was undertaken among the medical students and healthcare personnel of CMH Kharian Medical College and CMH Kharian, from March – June, 2025. For sampling, a non-probability convenience technique was employed. The sample size was 384, calculated by the open epi calculator with a 95% confidence level, 50% expected frequency of knowledge, and 5% marginal error. All healthcare providers like house officers, medical officer, post graduate residents, consultants and students who agreed to be part of the study and gave consent were incorporated in the study.

We excluded healthcare professionals who were not practicing at present, and those from another profession that are not health-related. A close-ended survey instrument was developed through extensive literature review to evaluate participants' knowledge of AI; attitude toward the integration into clinical practice and perceived benefits and limitations. The face validity of questionnaire was established through expert reviews. Prior to data collection, participants gave their informed consent.

The participants were interviewed with an online questionnaire form after obtaining IERB NUMBER approval (CKMC/IERB/AC-00220). Data were analyzed using Statistical Package for Social Sciences (SPSS) version 27 and were summarized using descriptive statistics (frequencies and percentages). For inferential statistics, the association between qualification level and categorical variables was tested by the chi-square test. The ordinal variables such as knowledge levels and the scores of attitude on AI, improving the healthcare efficiency, and the levels of perception on the future role of AI, were compared using Mann Whitney U test between healthcare profession and medical students. Significance was recorded at $p < 0.05$.

RESULTS

Out of 384 participants, 382(99.5%) completed the survey questionnaire. Among them, there were 153 (40%) males and 229 (60%) females. A total of 98(26%) graduated healthcare professionals and 284(74%) undergraduate medical students. A large number of the subjects [W1] 300 (78.5%) fell in the 21-30 years' age group. Nearly three-fourths of them 276 (72.1%) [W2] had 0 to 5 years of work experience in healthcare. A total of 284 medical students were included in the study (Table 1) with 28(10%) in first year, 61(21%) in second year, 61(21%) in third year, and 54(19%) in fourth years, whereas those who participated from the fifth year were relatively higher than others and it is 80 (28%). Out of 98 healthcare professionals, 45 (46%) were house officers; 23(23%) were medical officers/demonstrators, 6(6%) were postgraduate residents, and 23 (23%) were consultants.

Table 1: Comparison of AI formal training, awareness and usage between medical students and health care professionals

Variables	Medical students		Healthcare professionals		p value
	Yes n(%)	No n(%)	Yes n(%)	No n(%)	
Formal Training	25(8.8)	259(91.2)	17(17.3)	81(82.7)	0.020*
Awareness	201(70.8)	83(29.2)	89(87.8)	12(12.2)	<0.001*
Use of AI applications	250(91.5)	24(8.5)	84(85.7)	14(14.3)	0.096

Table 2: Comparison of attitude and perception towards AI in health care between medical students and health care professionals

Variables	Medical students			Healthcare professionals			p value
	Yes n(%)	No n(%)	Unsure n(%)	Yes n(%)	No n(%)	Unsure n(%)	
Comfortable while using AI	199(70.1)	23(8.1)	62(21.8)	68(69.4)	15(15.3)	15(15.3)	0.069
Integration of AI	226(79.6)	17(6.0)	41(14.4)	83(84.7)	5(5.1)	10(10.2)	0.519
Additional AI training	260(91.5)	24(8.5)	-	91(92.9)	7(7.1)	-	0.680
Replacement of human healthcare professionals	56(19.7)	169(59.5)	59(20.8)	12(12.2)	63(64.3)	23(23.5)	0.240
Independent medical decisions	47(16.5)	185(65.1)	52(18.3)	13(13.3)	75(76.5)	10(10.25)	0.089

There was a significant relationship between the participants' qualification and their formal training on AI (p=0.020), indicating that healthcare professionals (17.3%) were more likely to undergo some form of formal training with respect to medical students (Table 1). There was a statistically significant difference between participants' qualification and knowledge of AI (p<0.001), showing that HCWs are more aware of AI (87.8%) compared to students of medicine (70.8%)(Table 1). Regarding the use of AI applications, medical students reported using AI applications (91.5%) more than healthcare professionals (85.7%), and the difference did not reach statistical significance (p = 0.096) (Table 1).

Statistical analysis did not indicate any significant relationship between the respondents' qualification and comfort in use of AI (p=0.069), attitude towards application of AI in medical education and training (p=0.519), willingness for additional AI training, perception that Artificial Intelligence can replace human healthcare professional (p = 0.240) and perception that AI can decide without any human intervention (p = 0.089) (Table 2).

The median (IQR) of knowledge score was 3.00(2) for both healthcare professionals and medical students. There was a non-significant difference between medical students' and

Table 3: Comparison of frequency of Knowledge of AI medical students and among health care professionals

Knowledge of AI	Medical students n(%)	Healthcare professionals n(%)	p-value
Very knowledgeable	35(12.3)	11(11.2)	0.30
Somewhat knowledgeable	76(26.8)	36(36.7)	
Neutral	55(19.4)	13(13.3)	
Slightly knowledgeable	92(32.4)	32(32.7)	
Not knowledgeable at all	26(9.2)	6(6.1)	

Table 4: Comparison of the frequency of Attitude towards AI improving healthcare efficiency between medical students and healthcare professionals.

Improvement in healthcare	Medical students n(%)	Healthcare professionals n(%)	p value
Strongly agree	66(23.2)	27(27.6)	0.65
Agree	156(54.9)	50(51.0)	
Neutral	54(19.0)	20(20.4)	
Disagree	8(2.8)	1(1)	
Strongly disagree	0(0)	0(0)	

Table 5: Comparison of frequency of Perception towards future role of AI in healthcare between medical students and healthcare professionals

Future Role of AI	Medical students n(%)	Healthcare professionals n(%)	p value
Very optimistic	39(13.7)	15(15.3)	0.83
Somewhat optimistic	128(45.1)	44(44.9)	
Neutral	100(35.2)	33(33.7)	
Somewhat pessimistic	11(3.9)	6(6.1)	
Very pessimistic	6(2.1)	0(0)	

healthcare workers' knowledge levels, U=13031.0, z= -0.97 and p = 0.331. The frequency comparison of the two groups is displayed in Table 3. There was no significant difference in the attitude towards AI as a tool to enhance healthcare efficiency between medical students and health professionals (U= 13351.0, z=-0.661, p=0.50). Healthcare professionals had a median(IQR) attitude score of 2.00(1), and the median(IQR) attitude score of medical students was 2.00(0). The frequency comparison of the two groups is displayed in Table 4. There was no significant difference in perception level towards the future role of AI between medical students and healthcare workers, U=13620.5, z=-0.337, p=0.73. The perception among medical students had a median(IQR) score of 2.00(1). when compared with healthcare workers, who also received a median(IQR) of 2.00(1). The comparison of frequency between the two groups is listed in Table 5.

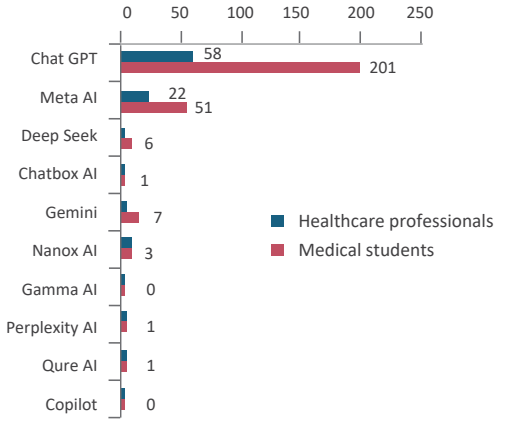

Figure 1: Different AI applications used by medical students and healthcare professionals

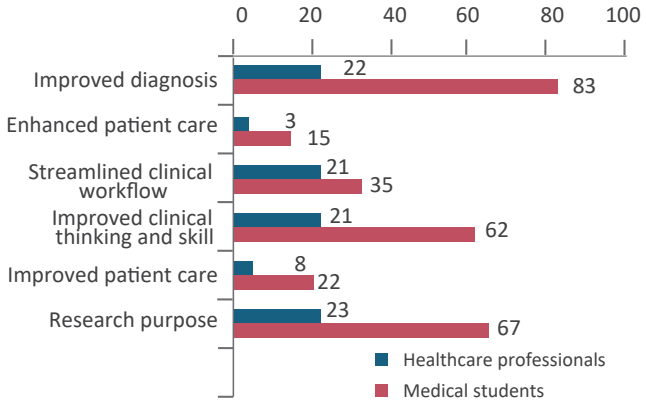

Figure 2: Perception of participants towards the benefits of AI in healthcare

The two AI apps used by the audience are ChatGPT and Meta AI. Out of 98 healthcare professionals and 284 medical students, 70.7% of medical students and 59.1% of healthcare professionals were using Chat GPT, and 17.9% of medical students and 22.4% of healthcare professionals were using Meta AI. (Figure 1)

Total 29.22 % medical students and 22.4 % healthcare professionals perceived that AI could improve diagnosis, 12.32 % medical students and 21.4% healthcare professionals believed that AI could streamline clinical workflow, 21.8% medical students and 21.1% healthcare professionals perceived the utility of AI in improved clinical thinking and skill while

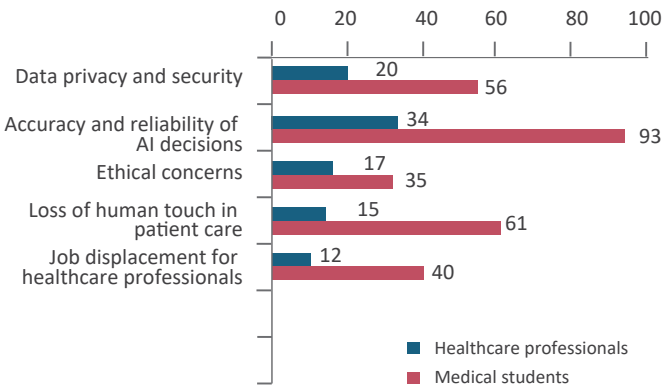

Figure 3: Concerns of participants about AI use in healthcare

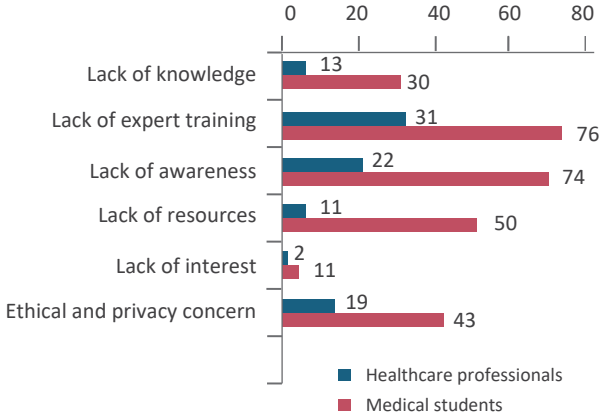

Figure 5: Perception of participants about barriers towards successful implementation of AI in healthcare

23.59% medical students and 23.4 % healthcare professional believed AI to be beneficial for research purposes.

Among 284 medical students and 98 healthcare professionals, 19.7% medical students and 20.4% healthcare professionals believed data privacy and security to be the concerns, 32.7% medical students and 34.69% healthcare professionals pointed towards accuracy and reliability of AI diagnosis as the concerns, 12.32% medical students and 17.3% healthcare professionals mentioned the ethical concerns, 21.4% medical students and 15.3% healthcare professionals believed the loss of

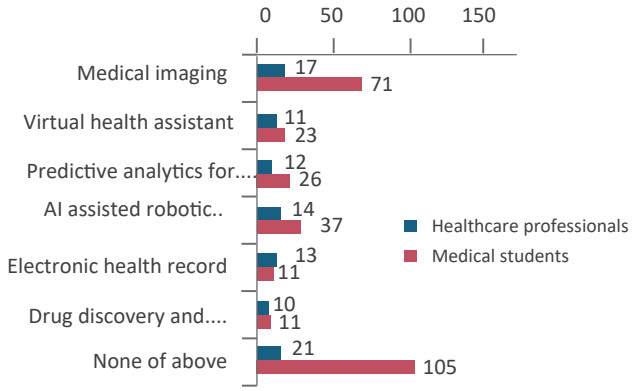

Figure 4: Knowledge of participants regarding AI applications in healthcare

human touch in patient care, and 14.08% medical students and 12.2% healthcare professionals believed the job displacement for human healthcare professionals were the concerns (Figure 3).Among 284 medical students and 98 healthcare professionals, 25% medical students 17.3% and healthcare professionals knew about medical imaging analytics (AI assisted x-rays and MRI), 8.09% medical students and 11.2% healthcare professionals are familiar with virtual health assistant, 9.15% medical students and 12.2% healthcare professionals were familiar with predictive analytics for diseases diagnosis, 13.02% medical students and 14.2% healthcare professionals are familiar with AI assisted robotic surgeries, 3.8% medical students and 13.2% healthcare professionals were familiar with electronic health record (EHR) automation 3.8% medical students and 10.2% healthcare professionals were familiar with drug discovery and development (Figure 4).

Regarding the potential barriers towards successful AI integration in healthcare, 26.05% medical students and 22.02% healthcare professionals believed it was the lack of awareness, 26.7% medical students and 31.6% healthcare professionals mentioned the lack of expert training, 10.56% medical students and13.3% healthcare professionals said the lack of knowledge, 15.14% medical students and19.3% healthcare professionals pointed to the ethical and privacy concerns, and 17.6% medical students and11.22% healthcare professionals believed that lack of resources were the barriers.

DISSCUSION

We set out to understand how people perceive and form attitudes towards AI in healthcare. The study revealed that most of interviewees had heard about AI but personally lacked the formal AI education and were interested in receiving further training about AI. The discrepancies between IT and traditional education levels reflect the growing recognition of the importance of AI in healthcare. A discrepancy persists between the state-of-the-art and strong models of learning. A cross-sectional study was done with the medical students from Kerala during 2024, to determine their knowledge & perceptions regarding AI. Of total 325 responders, 57.2% and 54.2% believed AI technology would be supportive to avoid errors in medication and improve decision accuracy in healthcare. Around 49% believed that AI would make medical services more accessible. Total 37.6% of respondents were concerned that AI would take away medical jobs. Around 69.2% were concerned about reduced human touch of medicine[8]. A research carried out in Jordan found out that only about 69% people were knowledgeable about AI, 46.2% individuals were interested in learning about AI. Around 54.1% reported that AIs in automatic diagnoses of disease was useable. Ethical issues from AI development were raised by 42.4% participants[9]. A cross-sectional survey in Riyadh found that 73.39% participants were aware of AI. Around 69.4% reported that AI was a

medium to be employed by healthcare professionals. Total 75.1% thought AI might reduce medical errors[10]. In another study, majority (64%) stated that they had never been exposed to application of AI at work place while as high as 80% believed use of AI might jeopardize their privacy. A large number (40%) considered AI being harmful and 10% showed their fear that they might be replaced by AI. Conversely, 79% said AI would probably be useful in their area of work[11]. One cross-sectional study was conducted in Vietnamese medical students. Among them 92% had no prior exposure to AI in health care. Around 77.9% believed that AI might be useful for their job. Around 83.54% students said that decreased funding was a challenge to implement AI in healthcare. Total 81% said a lack of training was the main factor in hampering health care from using AI[12]. In another study, 83.3% students favoured the use of AI in administration. Total 91.7 percent participants said AI was an acceptable tool to use with health data in research. Around 33.3% expressed concern that their data was not sufficiently guaranteed and 58.3% were concerned about being observed at work in the future[13].

The IT skills related to AI in medical curriculum are considered important by medical students. Regarding applications in teaching and learning, there are potential applications of ChatGPT in education. There was a modest student rated gain in treatment expectations through AI compared with human delivered information[14]. Artificial Intelligence scenario teaching mode allows to be more student engaging and central for teaching, which aids in student performance significantly. It enhances clinical thinking and skills[15]. A study conducted throughout Germany, Austria and Switzerland revealed that individuals were relatively inexperienced with AI, around 487 participants had little formal education in the area. Total 189 had bad experiences with AI based chat apps such as ChatGPT. Around 349 individuals believed that AI would have a positive effect on medicine[16]. A cross-sectional survey conducted in 2023 among American students studying a healthcare profession revealed that 42.99% of the individuals didn't know about ChatGPT. Most students agreed that ChatGPT was a helpful tool in healthcare setting and it provided trustworthy data. Participants recognized ChatGPT as useful for clinical education, medical info and ease of work[17]. A study conducted in Jordan in 2023 showed that 66.4% individuals had no or limited AI knowledge and as high as 54.4% gained awareness about the subject matter not from their school, but from social media. On the other hand 51.2% had positive attitude of AI and 77.6% would approve of AI involvement in the health profession. Participants recognized that obstacles between medical professionals were lack of expert training (53 %), lack of awareness (50%), and lack of interest (41%)[18].

A study among 486 Canadian undergraduate medical students in 2023 revealed that 94% felt that AI use in medicine would be routine eventually. Artificial Intelligence would benefit medicine according to 84% of the respondents, 67% wanted AI to be part of medical curricula. Around 85% participants were uneducated in relation to AI[19]. In a cross-sectional study from northern India in 2022, out of (367 patients), 74.4% thought that AI would have a significant part in future healthcare delivery. The majority (79.6%) of the participants had no knowledge regarding the application of AI. Doctors' interest to know more about AI was 51.6%. The 69.3% of students were eager to gain specific information and to know more about AI. Around 62.5% of doctors and 84.4% of medical students considered AI, beneficial to the healthcare career[20].

In an Egyptian cross sectional study on perception, attitude along with possible barriers toward AI among medical students and house officers (1346 participants), 76.4% had insufficient knowledge about significance and usefulness of AI in health sphere. The proportion of negative attitude to AI constitutesd 87.4%[21]. In another study on 2522 medical students, moderate computer literacy was demonstrated by 75.7%, technology for learning was a constant use among 57.5%, and the scenario on AI significantly affecting healthcare had a concordant opinion by 48.8%. The majority of participants, around 66%, accepted to conduct the AI education for the entire students studying medical under graduate level in order to enrich their educational quality[22]. The explosive progress of AI and machine-learning are offering novel tools to the clinicians. Legitimate concerns exist, that make it unlikely to supplant human evaluation. But these tools have real promise to help in screening the patients, exposing physician bias and nudging the next step, following capacity building [23].

Another study at Rangaraya Medical College was conducted among medical students in the year 2023. The study found out that 85.5% students were familiar with AI and only 45% responded that AI would make errors while diagnosing the diseases. Most of the students believed AI to be important in both pathological as well as radiological diagnostic processes. Fear of replacement of doctors with AI was reported by 58% students, followed by fear of loss of privacy (75.2%) and less human interaction with patients (93.1%)[24]. Artificial Intelligence has been previously evaluated in the Syrian doctors and students regarding their knowledge, attitude and practice towards it. Total 1494 participants were included in this study, 1055 had prior knowledge about AI and 357 knew its application in medicine. Positive attitudes towards the application of AI in medicine were captured during study[25]. Another study in Sultan Qaboos University, aiming to evaluate knowledge, attitude and perception of AI in healthcare among medical students, revealed that 75.4% students did not have experience with AI in healthcare. Further, 78.7% participants believed that every medical student should be formally trained on AI competences. The study demonstrated that medical students had a favourable perception and attitude of AI[26].

In the year 2021, a research was carried out to determine perceptions of Western Australian Medical Students about AI in healthcare. Total 134 students were enrolled in the study, and 84.8% had basic knowledge about AI; with 58.6% students believing that AI should be a part of their medical training, while concerning was that 56.6% did not believe AI would affect their job security as a doctor [27].

Based on a survey from Pakistan to evaluate the knowledge, attitude & perception of healthcare students and professionals towards use of AI in healthcare (616 participants), 78.7% hadn't received any training about AI, 70.3% believed more ethical dilemmas would result by the use of AI and 66.4% supported AI's incorporation in undergraduate education[6]. A study was conducted in Mardan , KPK, Pakistan in 2023 on 150 doctors from various departments of a medical complex. Around 66% of the respondents had heard of AI but they were not sure about its application in healthcare. Most doctors in this study had little knowledge and low practice level of AI[28].

Our results indicated that most participants did not have AI training, which was also found in similar study conducted across Germany, Austria and Switzerland and a study done in Pakistan[16,6]. This projects a common trend of defied structured AI education and learning in healthcare. Alluding to the small proportion of study participants who were trained in AI, level of awareness was high in our study participants, similar findings have been reported in a study conducted in Jordan in 2024[9].

AI is rapidly becoming an evolving field in health delivery. The majority of participants in our study agreed on integration of AI into medical curriculum, incorporating in education and training part. These findings were reinforced in other studies conducted in Pakistan in 2024, Western Australia in 2021[27]and Jordan in 2023 that illustrated the potential importance of preparing future healthcare professionals with AI-related skills[6,27,9]. In our study most of the participants expressed willingness to have further AI training , in line with the research done by Sultan Qaboos University in year 2023, showing agreement and adaptability to technical evolution from healthcare providers, and medical students[26].

In this study, majority of the subjects were not agreed with the possibility of AI substituting human healthcare providers, which is in conjunction with a study conducted in Kerala and Rangaraya Medical College[8,24]. Further, opinion of human intervention in the medical decision rather than AI independence is also consistent with a previous study conducted in 2023[23].

In our study, participants reported the application of chat GPT and Meta AI as relevant to their practice consistent with findings of another study done in 2024[14]. A majority agreed that AI could result in improved diagnosis and clinical knowledge and skills which was also observed in other studies[10,15,23].

Use of the AI in research was recognized by most participants in our study. These results are in accordance with a study conducted in 2023. Potential barriers to a successful integration with healthcare are lesser awareness and novice's training as reported in Jordan[18]. In our study some participants believed it to be a result of limited finances. These findings are similar with results reported among Vietnamese Medical Students in 2023[12]. Ethical concern and privacy related concerns due to AI were raised by many of the participants in our study. These results are consistent with a Pakistani study[6]. Our participants believed on asserted view that AI could lead clinical practice towards no human touch which was aligned with finding from study conducted in Kerala and in Rangaraya Medical College[8,24].

Many of the participants indicated that they were afraid of losing their jobs, this is in line with the results of the study performed in Western Australia in 2021[27]. Ultimately majority of participants in this study reported to have little knowledge about AI, like the findings of a survey conducted at Jordan in 2024[8]. Most participants were somehow optimistic about AI's future role aligning with the studies conducted in Northern India in 2022[20].

A major limitation of this work is that it was cross-sectional, and thus we were unable to make causal inferences. These responses could be susceptible to recall or social desirability bias in the sense that participants may have exaggerated or underestimated what they know about or how they perceived AI related change. The findings of the sample are likely not representative of all medical students and healthcare professionals among institutions or regions. Qualitative interviews or focus groups were not conducted as part of the study, which would have offered further explanation for attitudes and perceptions. The study did not specify responses by medical specialty, which can shape opinions on AI.

To avoid such bitter experiences in future, with optimal integration of AI into healthcare, medical/healthcare education curriculum should include both fundamental and applied concepts of AI, so the students will have better preparation when they enter in real-life healthcare environment. Hospitals and health organizations should arrange workshops, webinars and certification courses in AI for the existing workforce foster collaborations between medical and computer science faculties to develop AI modules that are used in practice, frame ethical guidelines for the use of AI in healthcare. This will dispel fears and encourage safe use of AI. Health Authorities should generate greater awareness about the importance of using AI in this sector, which is expected to have implications for all stakeholders.

CONCLUSION

Despite limited AI knowledge , participants' attitude and perception were positive regarding the implementation of AI in healthcare. There was a strong relationship between level of qualification and AI training, and awareness. Job loss, moral issues and invasion of privacy, sacrificing human touch to patient-care were among the biggest concerns raised by majority of the responders. Unawareness, inadequately trained personnel and financial constraints were a few barriers towards effective application of AI in healthcare.

The study limitation is that only face validation of questionnaire was performed without undergoing comprehensive validation and reliability testing.

ETHICAL APPROVAL: *Reference number: CKMC/IERB/AC-00220, Date: 07-02-2025*

CONSENT FOR PUBLICATION: *Written, informed consent was obtained from the study participants.*

AVAILABILITY OF DATA: *Data is available from the corresponding author on a justified request.*

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CONFLICT OF INTEREST: *None*

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AUTHORS' CONTRIBUTION

- ***Muqadus Rizwan:*** *Conception and design, Acquisition of data, Aanalysis and interpretation of data, Drafting the article*
- ***Ahmad Murtaz Khalid:*** *Critical revision, Drafting the article*

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