DOI: https://doi.org/10.54393/pjhs.v6i5.3079

PAKISTAN JOURNAL OF HEALTH SCIENCES
(LAHORE)
https://thejas.com.pk/index.php/pjhs
ISSN (E): 2790-9352, (P): 2790-9344
Volume 6, Issue 05 (May 2025)

Original Article

OPEN ACCESS

Perceptions of Artificial Intelligence in Medical Education: A Cross-Sectional Study Among Students and Faculty at HBS Medical and Dental College, Islamabad

Sarah Ali[1], Saiqa Saleem[2], Rehab Falaq[3], Karishma Ali[4], Ruhina Salman[5] and Sikandar Ali Khan[6*]

[1]Department of Dental Education, Hazrat Bari Imam Sarkar Medical and Dental College, Islamabad, Pakistan
[2]Institute of Health Profession Education and Research, Khyber Medical University, Peshawar, Pakistan
[3]Department of Medical Education, Rehman College of Dentistry, Peshawar, Pakistan
[4]Department of Oral Pathology, Peshawar Medical and Dental College, Peshawar, Pakistan
[5]Department of Community Dentistry, Hazrat Bari Imam Sarkar Medical and Dental College, Rawalpindi, Pakistan
[6]Department of Biochemistry, Peshawar Medical and Dental College, Peshawar, Pakistan

ARTICLE INFO

Keywords:
Artificial Intelligence, Medical Education, Curriculum Integration, Faculty Perception

How to Cite:
Ali, S., Saleem, S., Falak, R., Ali, K., Salman, R., & Khan, S. A. (2025). Perceptions of Artificial Intelligence in Medical Education: A Cross-Sectional Study Among Students and Faculty at HBS Medical and Dental College, Islamabad: AI in Medical Education: Study Among Students and Faculty. Pakistan Journal of Health Sciences, 6(5), 130–135. https://doi.org/10.54393/pjhs.v6i5.3079

***Corresponding Author:**
Sikandar Ali Khan
Department of Biochemistry, Peshawar Medical and Dental College, Peshawar, Pakistan
siki4sikandar@gmail.com

Received Date: 5th April, 2025
Revised Date: 19th May, 2025
Acceptance Date: 23rd May, 2025
Published Date: 31st May, 2025

ABSTRACT

As artificial intelligence (AI) continues to transform healthcare, its integration into medical education is increasingly critical. However, many institutions lack formal AI curricula, leaving students and faculty underprepared for the digital demands of clinical practice. **Objectives:** To assess awareness, familiarity, perceived benefits, and concerns regarding AI among medical students and faculty, and to explore training preferences and barriers to AI integration in academic settings. **Methods:** A descriptive cross-sectional survey was conducted at HBS Medical and Dental College, with a total of 100 participants (76 students and 24 faculty). A questionnaire assessed demographic characteristics, AI familiarity, perceived benefits and concerns, and interest in formal training. Chi-square tests and logistic regression were used to analyse group differences and predictors of training interest. **Results:** Most participants (60%) were under 25 years old, and 76% were students. While 68% had heard of AI, only 43% reported basic familiarity. Interest in AI training was high (87%). Commonly cited benefits included faster knowledge access and personalized learning, while concerns focused on ethical issues and misinformation. A significant association was found between academic role and perceived lack of training (p=0.041). Logistic regression showed a non-significant trend linking prior AI exposure with interest in training (p=0.125). **Conclusions:** It was concluded that there is strong enthusiasm for AI in medical education among both students and faculty. However, limited familiarity and perceived barriers highlight the need for structured training and targeted curriculum reforms to build digital competence in future healthcare professionals.

INTRODUCTION

The rapid advancement of artificial intelligence (AI) is revolutionizing healthcare, introducing innovations in diagnostics, therapeutics, and education that were once the domain of science fiction. AI technologies such as image recognition, predictive analytics, natural language processing, and intelligent tutoring systems are now being applied across various healthcare sectors, including radiology, pathology, and surgical planning, to enhance clinical accuracy and efficiency [1, 2]. AI-based models like DeepMind's diagnostic tools have demonstrated performance comparable to human radiologists in detecting eye disease [3], while chatbots such as ChatGPT are increasingly explored for virtual patient simulation and self-directed learning in medical education [4, 5]. As healthcare becomes more digitally integrated, medical professionals need to understand and ethically engage

DOI: https://doi.org/10.54393/pjhs.v6i5.3079

with these technologies. However, despite global momentum, the incorporation of AI into undergraduate medical curricula remains inconsistent and underdeveloped. According to recent surveys, fewer than 20% of medical schools globally have formal AI instruction, and the majority of students report inadequate training in digital competencies [6]. The gap is particularly notable in low- and middle-income countries (LMICs), including Pakistan, where infrastructural limitations and lack of faculty readiness present additional barriers [7]. Most prior research has focused on clinical applications of AI or physician attitudes, with limited exploration of how medical students and educators perceive its role in teaching and learning. Moreover, faculty-specific challenges such as resistance to digital tools, concerns over role redundancy, and lack of training opportunities have received minimal attention [8, 9]. In South Asian contexts, cultural and systemic factors further compound the gap in understanding how educators and learners are preparing for an AI-integrated future [10]. To address this knowledge gap, the present study assesses the familiarity, attitudes, perceived benefits, and concerns regarding AI among medical students and faculty at a private institution in Pakistan. This dual-perspective approach enables a nuanced understanding of both learner readiness and institutional barriers. The study also aims to identify interest in AI training as a key outcome variable, to inform future educational strategies and curriculum development tailored to the local context.

This study aims to explore the familiarity, attitudes, and concerns related to artificial intelligence in medical education, focusing on both learners and educators. It seeks to bridge the gap between technological innovation and educational readiness, ensuring that future healthcare professionals are equipped not just with clinical skills, but with digital competence as well.

METHODS

This descriptive cross-sectional survey was conducted to examine the challenges and opportunities associated with the use of artificial intelligence (AI) in medical education. The study took place at HBS Medical and Dental College, Islamabad, which offers undergraduate and postgraduate programs in medical and dental sciences. The study was conducted over six months, from March to August 2024, following ethical approval. The Institutional Review Board (IRB) of HBS Medical and Dental College approved the research protocol under Reference No. App#ECO2/4. Participation was voluntary, and written informed consent was obtained from all participants. Anonymity and confidentiality were maintained throughout. The target population included both faculty members and students currently affiliated with the institution. Participants were selected through convenience sampling. Inclusion criteria required participants to be aged 18 years or older, currently enrolled or employed at the institution, and willing to participate. Administrative staff and those with incomplete responses were excluded. The final sample comprised 100 participants, including 76 students and 24 faculty members. This distribution allowed for group-based comparisons. The primary outcome variable for this study was interest in receiving formal AI training, assessed using a binary (Yes/No) response item. The sample size was calculated using the standard formula for estimating a single population proportion: $n = (Z^2 \times p \times (1 - p)) / d^2$. Where: n = required sample size, Z = 1.96 (corresponding to 95% confidence level), p = estimated proportion (0.06), based on Civaner *et al.*, [11], who reported 6% of medical students felt confident in communicating AI-related risks to patients and d = desired margin of error (0.05) Thus, the minimum required sample was 87 participants. To allow for potential non-response or incomplete data, the target was increased by approximately 15%, yielding a final sample size of 100 participants. The structured questionnaire used in this study was adapted from previously validated tools, including the needs assessment framework by Civaner *et al.*, [11], titled "Artificial Intelligence in Medical Education: A Cross-Sectional Needs Assessment". The questionnaire consisted of 28 structured items distributed across five key domains: Demographics (4 items): age group, gender, academic role (faculty/student), and prior exposure to AI. Awareness and Familiarity with AI (5 items): including binary questions like "Have you heard about AI?" and multi-level self-reported familiarity (None, Basic, Intermediate, Advanced). Perceived Benefits of AI (5 items): Likert-style and Yes/No questions on benefits such as faster access to knowledge, personalized learning, diagnostic support, engagement, and grading assistance. Concerns Regarding AI (5 items): binary (Yes/No) items assessing ethical dilemmas, misinformation, job replacement, and devaluation of clinical judgment. Training Interest and Perceived Barriers (9 items): questions on preferred learning modes (workshops, online, curriculum-based), interest in formal AI training (primary outcome variable), and barriers such as lack of training, infrastructure, and resistance. The primary outcome variable was interest in formal AI training, measured by a binary item: "Are you interested in receiving formal training in AI applications for medical education?" The questionnaire was reviewed by three experts for content validity and underwent pilot testing with 10 participants (excluded from final analysis). Reliability was assessed using Cronbach's alpha, which yielded a value of 0.81, indicating high internal consistency. To ensure content validity, the questionnaire was reviewed by a panel of three medical education and informatics experts. Their feedback was used to refine language clarity, item relevance, and domain coverage. A pilot test was conducted on 10 participants, and results informed

DOI: https://doi.org/10.54393/pjhs.v6i5.3079

minor revisions (rewording unclear terms). These pilot responses were excluded from the final data analysis. Internal consistency reliability was assessed using Cronbach's alpha, which yielded a score of 0.81, indicating high reliability of the instrument across domains. Data analysis was performed using IBM SPSS Statistics version 23. Descriptive statistics (frequencies and percentages) summarized participant characteristics and survey responses. Inferential statistics included Chi-square (χ^2) tests to assess associations between academic role (faculty vs. student) and other categorical variables. Cramér's V was used to evaluate effect size. A p-value of <0.05 was considered statistically significant. Binary logistic regression was used to identify predictors of interest in formal AI training. Independent variables included gender, role, AI exposure, familiarity level, awareness of AI, and use of AI tools. Odds ratios (OR) with 95% confidence intervals (CI) were calculated. Model fit was assessed using the Hosmer-Lemeshow test and Nagelkerke R^2. This approach allowed for both group-wise comparisons and multivariate analysis to assess independent predictors of the primary outcome.

RESULTS

The study included 100 participants, with the majority (60%) under 25 years, 31% aged 25–30, and 9% over 30. Females slightly outnumbered males (54% vs. 46%).Most respondents were students (76%), while faculty comprised 24%.Only 30% reported prior exposure to AI tools or concepts, indicating limited hands-on familiarity.The demographic profile shows that younger individuals, particularly students, formed the bulk of the sample.The near-equal gender distribution and low overall exposure to AI highlight a foundational gap in digital preparedness among future and current medical educators (Table 1).

Table 1: Demographic Characteristics of Participants (n=100)

Variables	Frequency (%)
Age Group	
<25	60 (60.0%)
25–30	31 (31.0%)
>30	9 (9.0%)
Gender	
Female	54 (54.0%)
Male	46 (46.0%)
Role	
Student	76 (76.0%)
Faculty	24 (24.0%)
Previous Exposure to AI	
Yes	30 (30.0%)
No	70 (70.0%)

Study compares faculty and students' awareness and engagement with AI. The proportion of those who had heard about AI was similar across both groups (p=0.872), indicating no significant difference in general awareness. When evaluating familiarity levels, students showed greater representation in intermediate and advanced familiarity; however, the difference was not statistically significant (χ^2=6.382, df=3, p=0.094). Regarding actual use of AI tools such as ChatGPT, faculty and students differed slightly, but the difference was not statistically significant (p=0.304)(Table 2).

Table 2: Familiarity with AI by Academic Role (n=100)

Variables		Faculty (n=24)	Student (n=76)	χ^2 (df)	p-Value	Cramér's V
Heard About AI	Yes	16	52	0.026 (1)	0.872	0.016
	No	8	24			
Familiarity Level	Advanced	0	4	6.382 (3)	0.094	0.253
	Intermediate	1	18			
	Basic	13	30			
	Non	10	24			
Use of AI Tools	Yes	13	50	1.057 (1)	0.304	0.103
	No	11	26			

Findings summarise participants' perceptions of AI's potential benefits in medical education. Overall, both faculty and students strongly agreed on the positive impact of AI. The most commonly endorsed benefits were faster access to information, personalized learning, and diagnostic support. However, none of the comparisons between faculty and students reached statistical significance. The closest was in the area of personalized learning, suggesting a trend toward stronger endorsement by faculty, but the difference was not statistically significant (χ^2=1.170, p=0.279). These results reflect a shared optimism about AI's value, regardless of academic role. Results explore the concerns expressed by faculty and students regarding AI integration in medical education. While concerns such as ethical dilemmas, misinformation, and the

DOI: https://doi.org/10.54393/pjhs.v6i5.3079

threat to traditional teaching roles were common, no statistically significant differences were found between faculty and students. The concern that came closest to significance was the risk of misinformation, although students expressed slightly higher concern, the difference was not statistically significant (χ^2=2.602, p=0.107). The overall similarity in concern levels points to shared anxieties (Table 3).

Table 3: Perceived Benefits and Concerns Regarding AI by Academic Role

Perceived Benefits	Faculty (Yes/No)	Student (Yes/No)	χ^2 (df)	p-Value	Cramér's V
Perceived Benefits					
Faster Knowledge Access	21 / 3	60 / 16	0.867 (1)	0.352	0.093
Personalized Learning	20 / 4	55 / 21	1.170 (1)	0.279	0.108
Enhanced Diagnostics	16 / 8	51 / 25	0.002 (1)	0.968	0.004
Student Engagement	13 / 11	38 / 38	0.127 (1)	0.722	0.036
Grading Assistance	9 / 15	26 / 50	0.087 (1)	0.768	0.029
Concerns Regarding AI in Medical Students					
Ethical Dilemmas	14 / 10	56 / 20	2.047 (1)	0.153	0.143
Threat to Teaching Roles	14 / 10	36 / 40	0.877 (1)	0.349	0.094
Risk of Misinformation	6 / 18	33 / 43	2.602 (1)	0.107	0.161
AI Replacing Teachers	10 / 14	27 / 49	0.295 (1)	0.587	0.054
Devaluation of Clinical Judgement	12 / 12	47 / 29	1.057 (1)	0.304	0.103

Results compare faculty and student perspectives regarding AI training preferences and perceived barriers to integration. A large majority in both groups expressed interest in AI training, but the difference was not statistically significant (p=0.191). Most participants preferred workshops or curricular integration over online modules. Among perceived barriers, only "lack of training" showed a significant difference (χ^2 = 4.176, p=0.041), with faculty members more frequently citing it as a constraint. Other barriers, including infrastructure limitations and faculty resistance, did not show meaningful differences between groups.These findings suggest a general openness to AI training, with targeted faculty development needed to address capacity gaps (Table 4).

Table 4: AI Integration Preferences and Barriers by Academic Role (n=100)

Variables		Faculty	Student	χ^2 (df)	p-Value	Cramér's V
Interested in Training	Yes	19	68	1.713 (1)	0.191	0.131
	No	5	8			
Preferred Learning Mode	Curriculum	9	20	1.113 (2)	0.573	0.106
	Online	6	23			
	Workshops	9	33			
Lack of Training	Yes	21	50	4.176 (1)	0.041	0.204
	No	3	26			
Limited Infrastructure	Yes	15	44	0.160 (1)	0.689	0.040
	No	9	32			
Faculty Resistance	Yes	7	29	0.640 (1)	0.424	0.080
	No	17	47			

Findings present a logistic regression analysis assessing predictors of interest in formal AI training. Although several variables showed elevated odds, none reached statistical significance (p>0.05). Participants with prior AI exposure had higher odds of expressing interest in training (OR=2.80, 95% CI: 0.75–10.47, p=0.125). Similarly, those who had heard about AI were more likely to be interested (OR=2.08, p = 0.361), though not significantly so. Familiarity level also showed trends: intermediate familiarity was associated with increased interest (OR=3.08, p=0.187), while basic familiarity showed decreased odds (OR=0.15, p=0.168) compared to those with no familiarity. Gender, academic role, and AI tool usage were not significant predictors. The model demonstrated acceptable fit (Hosmer–Lemeshow p=0.54) and explained 12% of the variance in training interest (Nagelkerke R^2=0.12) (Table 5).

DOI: https://doi.org/10.54393/pjhs.v6i5.3079

Table 5: Logistic Regression Predicting Interest in AI Training (n=100)

Predictor Variables	B	OR (Exp B)	95% CI for OR	p-Value
Gender (Male vs Female)	-0.367	0.69	0.16–3.05	0.627
Role (Student vs Faculty)	-1.016	0.36	0.08–1.58	0.177
Previous Exposure to AI	1.030	2.80	0.75–10.47	0.125
Heard About AI	0.730	2.08	0.43–9.92	0.361
Familiarity Level (overall)	—	—	—	0.237
└ Basic vs None	-1.875	0.15	0.01–2.20	0.168
└ Intermediate vs None	1.125	3.08	0.58–16.41	0.187
└ Advanced vs None	0.319	1.38	0.19–9.78	0.750
Use of AI Tools (Yes vs No)	-0.970	0.38	0.10–1.52	0.170
Constant	1.714	5.55	—	0.117

DISCUSSION

This study examined the perceptions, familiarity, and attitudes of medical students and faculty toward artificial intelligence (AI) in medical education. Despite the increasing integration of AI technologies in healthcare, findings indicate limited hands-on experience and moderate familiarity among participants, particularly among faculty members. This trend aligns with previous research highlighting a general awareness of AI but a lack of deep understanding and practical application among educators [12, 13]. While this study revealed most participants reported having heard of AI, the difference in awareness between faculty and students was not statistically significant. Students showed slightly higher self-reported familiarity and usage of tools like Chat-GPT, though these differences were not statistically significant. Comparable results were noted in studies by Buabbas *et al.*, and Sami *et al.*, which highlighted that while students are more open to AI, both groups lack structured training and often use AI informally without institutional guidance [8, 14]. Respondents across roles recognized AI's benefits, including faster access to knowledge, personalized learning, and diagnostic support. These perceptions align with findings from Civaner *et al.*, and Yañez *et al.*, who reported general optimism toward AI integration among learners and educators alike [11, 15]. Nonetheless, the present study, like others, found no statistically significant role-based differences in perceived benefits, which may reflect a shared but superficial engagement with AI's potential. Concerns such as ethical dilemmas, misinformation, and the potential erosion of traditional teaching roles were frequently cited by both groups, with no statistically significant differences observed. This mirrors the observations of Saleh *et al.*, and Abouammoh *et al.*, who documented widespread concern about AI's implications for teaching quality, academic integrity, and professional boundaries [16, 17]. Faculty in particular noted the threat of being replaced or undervalued, a sentiment echoed by Nevárez Montes and Elizondo-Garcia, who emphasized faculty apprehension in integrating generative AI tools into their educational practices [18]. A statistically significant association was found between academic role and perceived lack of training, with faculty more likely to cite this as a barrier.This suggests a need for faculty development programs tailored to digital competencies. Although logistic regression analysis did not identify any statistically significant predictors of interest in formal AI training, participants with prior exposure to AI were nearly three times more likely to show interest. Similar trends were observed by Kong *et al.*, and Yilmaz *et al.*, suggesting that even limited interaction with AI may enhance motivation to pursue structured learning [19, 20]. It is also worth noting that the model explained 12% of the variance in training interest, suggesting other unexplored factors may contribute. This aligns with findings from Al-Qahtani *et al.*, and Khlaif *et al.*, who underscored the complexity of AI adoption in educational settings and recommended multi-level frameworks for successful integration [21, 22].

CONCLUSIONS

AI is widely recognized as a transformative force in medical education. Our study showed that familiarity, practical use, and structured training remain limited among both students and faculty. There was a clear enthusiasm for AI's potential benefits, but also shared concerns and barriers, particularly the lack of formal training. Structured curriculum development, targeted faculty workshops, and more widespread exposure to practical AI tools may bridge this gap and foster responsible integration of AI in medical education.

Authors Contribution

Conceptualization: SA
Methodology: SA, RF, KA, SAK
Formal analysis: SA, SS, RF, KA
Writing review and editing: SS, KA, RS

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Oluwadiya KS, Adeoti AO, Agodirin SO, Nottidge TE, Usman MI, Gali MB *et al.* Exploring Artificial Intelligence in the Nigerian Medical Educational Space: An Online Cross-Sectional Study of Perceptions, Risks and Benefits Among Students and Lecturers from Ten Universities.Nigerian Postgraduate Medical Journal.2023Oct;30(4):285-92.doi:10.4103/npmj.npmj_186_23.

[2] Weidener L and Fischer M. Artificial Intelligence in Medicine: Cross-Sectional Study among Medical Students on Application, Education, and Ethical

DOI: https://doi.org/10.54393/pjhs.v6i5.3079

Aspects. Journal of Medical Internet Research Medical Education.2024Jan;10(1):e51247.doi:10.2196/51247.

[3] 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. medRxiv.2023 Dec: 2023-12. doi: 10.1101/2023.12.09.23299744.

[4] Jackson P, Ponath Sukumaran G, Babu C, Tony MC, Jack DS, Reshma VR *et al.* Artificial Intelligence in Medical Education-Perception among Medical Students. BioMed Central Medical Education.2024 Jul; 24(1): 804. doi: 10.1186/s12909-024-05760-0.

[5] Jebreen K, Radwan E, Kammoun-Rebai W, Alattar E, Radwan A, Safi W *et al*. Perceptions of Undergraduate Medical Students on Artificial Intelligence in Medicine: Mixed-Methods Survey Study from Palestine. BioMed Central Medical Education.2024 May; 24(1): 507. doi: 10.1186/s12909-024-05465-4.

[6] Almalki M, Alkhamis MA, Khairallah FM, Choukou MA. Perceived Artificial Intelligence Readiness in Medical and Health Sciences Education: A Survey Study of Students in Saudi Arabia.BioMed Central Medical Education.2025Mar;25(1):439.doi:10.1186/s12909-025-06995-1.

[7] Pucchio A, Rathagirishnan R, Caton N, Gariscsak PJ, Del Papa J, Nabhen JJ *et al.* Exploration of Exposure to Artificial Intelligence in Undergraduate Medical Education: A Canadian Cross-Sectional Mixed-Methods Study. BioMed Central Medical Education. 2022 Nov; 22(1): 815. doi: 10.1186/s12909-022-03896-5.

[8] Buabbas AJ, Miskin B, Alnaqi AA, Ayed AK, Shehab AA, Syed-Abdul S *et al*. Investigating Students' Perceptions Towards Artificial Intelligence in Medical Education.In Healthcare.2023May;11(9):1298.doi:10.3390/healthcare11091298.

[9] Derakhshanian S, Wood L, Arruzza E. Perceptions and Attitudes of Health Science Students Relating to Artificial Intelligence (AI): A Scoping Review.Health Science Reports.2024Aug;7(8):e2289.doi:10.1002/hsr2.2289.

[10] Swed S, Alibrahim H, Elkalagi NK, Nasif MN, Rais MA, Nashwan AJ *et al.* Knowledge, Attitude, and Practice of Artificial Intelligence Among Doctors and Medical Students in Syria: A Cross-Sectional Online Survey. Frontiers in Artificial Intelligence.2022Sep; 5:1011524. doi: 10.3389/frai.2022.1011524.

[11] Civaner MM, Uncu Y, Bulut F, Chalil EG, Tatli A. Artificial Intelligence in Medical Education: A Cross-Sectional Needs Assessment.BioMed Central Medical Education .2022Nov;22(1):772.doi:10.1186/s12909-022-03852-3.

[12] Rani S, Kumari A, Ekka SC, Chakraborty R, Ekka S. Perception of Medical Students and Faculty Regarding the Use of Artificial Intelligence (AI) in Medical Education: A Cross-Sectional Study.Cureus.2025 Jan; 17(1). doi: 10.7759/cureus.77514.

[13] Liu DS, Sawyer J, Luna A, Aoun J, Wang J, Boachie L *et al.* Perceptions of US Medical Students on Artificial Intelligence in Medicine: Mixed Methods Survey Study. Journal of Medical Internet Research Medical Education. 2022 Oct; 8(4): e38325. doi:10.2196/38325.

[14] Sami A, Tanveer F, Sajwani K, Kiran N, Javed MA, Ozsahin DU *et al.* Medical Students' Attitudes Toward AI in Education: Perception, Effectiveness, and Its Credibility. BioMed Central Medical Education.2025 Jan; 25(1): 82. doi: 10.1186/s12909-025-06704-y.

[15] Yañez OJ, Kim J, Montalvo F, Romero MV. Perspectivas Estudiantiles y Docentes sobre la IA en la Educación Sanitaria: Scoping Review.Revista Española de Educación Médica.2025Feb;6(2).doi:10.6018/edumed.633811.

[16] Saleh ZT, Rababa M, Elshatarat RA, Alharbi M, Alhumaidi BN, Al-Za'areer MS *et al.* Exploring Faculty Perceptions and Concerns Regarding Artificial Intelligence Chatbots in Nursing Education: Potential Benefits and Limitations. BioMed Central Nursing. 2025 Apr; 24(1): 440. doi: 10.1186/s12912-025-03082-0.

[17] Abouammoh N, Alhasan K, Aljamaan F, Raina R, Malki KH, Altamimi I *et al*. Perceptions and Earliest Experiences of Medical Students and Faculty with ChatGPT in Medical Education: Qualitative Study. Journal of Medical Internet Research Medical Education. 2025 Feb; 11: e63400. doi: 10.2196/63400.

[18] Nevárez Montes J and Elizondo-Garcia J. Faculty Acceptance and Use of Generative Artificial Intelligence in Their Practice.In Frontiers in Education .2025 Feb;10:1427450.doi 10.3389/feduc.2025.14274 50.

[19] Kong SC, Yang Y, Hou C. Examining Teachers' Behavioural Intention of Using Generative Artificial Intelligence Tools for Teaching and Learning Based on the Extended Technology Acceptance Model. Computers and Education: Artificial Intelligence. 2024 Dec; 7: 100328. doi: 10.1016/j.caeai.2024.100328.

[20] Yilmaz FG, Yilmaz R, Ceylan M. Generative Artificial Intelligence Acceptance Scale: A Validity and Reliability Study.International Journal of Human–Computer Interaction.2024Dec;40(24):8703-15. doi: 10.1080/10447318.2023.2288730.

[21] Al-Qahtani AS, Al-Garni AM, Almohaya AY. Applications of Generative Artificial Intelligence (AI) in Medical Education: A Current Application and Future Prospects in Saudi Arabia.2024.doi: 10.21203/r s .3.rs-4150369/v1.

[22] Khlaif ZN, Ayyoub A, Hamamra B, Bensalem E, Mitwally MA, Ayyoub A *et al.* University Teachers' Views on the Adoption and Integration of Generative AI Tools for Student Assessment in Higher Education. Education Sciences.2024Oct 6;14(10):1090.doi:10.3390/educsci14101090.