Knowledge, Perception, and Future of Artificial Intelligence Among Graduates and Undergraduates. A Cross-sectional study.

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ABSTRACT:

Objective: This study aimed to evaluate the understanding, attitudes, and future outlooks regarding AI among undergraduate and postgraduate students at Baqai Dental College.

Methodology: A cross-sectional online survey was conducted between November and December 2024. A pre-validated questionnaire was shared with 200 participants via WhatsApp groups, achieving a response rate of 86.5% (173 participants). The survey assessed participants' demographic information, knowledge of AI, perceptions of its potential applications, and outlook on AI in dentistry. The collected data were analyzed using SPSS version 22, with frequencies and percentages presented in table format.

Results: The results showed that 88.4% of participants were familiar with AI, and 87.9% recognized its beneficial applications in medicine. However, 48% were unaware of AI's potential in diagnosing oral soft tissue lesions, while 52% believed AI could significantly advance dentistry. Diagnostic applications were perceived as the most valuable use of AI (31.8%). When faced with discrepancies between AI recommendations and their own judgment, 61.3% of participants favored their judgment. Additionally, 47.4% expressed intentions to integrate AI into their future diagnostic and treatment planning processes.

Conclusions: The findings highlight the need for greater AI literacy through foundational curricula in dental education. Promoting ethical awareness and trust is essential for successful integration into clinical practice. Overall, AI holds significant promise for revolutionizing dentistry and improving patient care outcomes.

Keywords: Artificial Intelligence, Dental Students. Knowledge, Radiography.

Cite as: Mazher Q, Hamid A, Marium Z, Nazir S, Wali A, Mirza A. Knowledge, Perception, and Future of Artificial Intelligence Among Graduates and Undergraduates. A Cross-sectional study. J Muhammad Med Coll. 17(1) April-Oct 2026

Introduction:

Artificial intelligence (AI) is the capability of machines to perform tasks that typically require human intelligence.[1] AI has been utilized in healthcare for many years and has the potential to transform dentistry by addressing various clinical challenges and optimizing the workflow of clinicians.[2] Recently, new technologies have been recognized and efficiently applied in the dental field. Dental practitioners can view AI as a valuable tool to enhance their capabilities, improve accuracy in diagnosis, support decision-making, refine treatment planning, achieve better treatment outcomes, and assist in disease diagnosis.[3] Recent advances in artificial intelligence have made it a possible tool to become a standard in dentistry. The benefits of integrating AI include increased efficiency, improved accuracy, enhanced monitoring capabilities, and time savings. However, it is recommended that further research should be conducted on the application of neural networks in dentistry to promote their routine use and improve the workflow for dentists.[4]

Miloglu et al[5] emphasize that technology occupies a unique role in artificial intelligence (AI) within dental practices. While AI cannot replace the essential human element in dentistry, it significantly aids in disease diagnosis. The effective use of large data sets and the promotion of multidisciplinary studies can enhance the use and acceptance of AI in the dental field. Dental professionals can utilize AI tools to improve the quality of care they provide for their patients. AI acts as a supplementary resource for dentists, enhancing diagnostic processes, treatment planning, and the prognosis of treatment issues. The integration of AI holds considerable promise for the future of dentistry, presenting a positive outlook for its continued advancement. Dental practitioners of all experience levels must embrace and implement this technology.[6]

Artificial intelligence can enhance human tasks and significantly impact academia and healthcare. Its adoption can improve educational experiences and healthcare delivery while supporting current functions and fostering future innovation.[7] Dental specialists faced several ethical challenges due to the introduction of advanced treatment options. A key ethical consideration is ensuring that patients are informed about the role of AI in decision-making. Upholding ethical values fosters trust between clinicians and patients.[8] Gowdar et al [9] observed that awareness of AI among study participants was below 50%. Overall, the attitude of dental professionals towards AI was generally opti-

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Received: June 2026, Revised: July 2026
Accepted: September 2026

mistic. Implementing a foundational curriculum focused on oral and dental artificial intelligence (AI) has the potential to improve oral and dental healthcare services. When creating educational programs centered on oral and dental AI, instructors and learners should consider this essential curriculum. Implementing such a curriculum could substantially enhance AI literacy among oral and dental healthcare professionals.[10]

This research aims to assess the understanding, attitudes, and future outlooks of postgraduate and undergraduate students regarding artificial intelligence.

Methodology:

A cross-sectional online study was conducted among undergraduate and graduate students at Baqai Dental College from November 2024 to December 2024. Ethical approval was obtained from the Institutional Review and Ethics Board (IREB), reference BMU-IREB/11-2024/008. A convenience sampling method was employed to include all participants present on the day of data collection. A pre-validated questionnaire developed by Choudhary et al[11] and Jaideep Sur et al[12] was used, and the link was shared with 200 participants via WhatsApp groups. Participants were informed about the study's objectives in the preface of the questionnaire. The survey instrument comprised 20 closed-ended questions organized into multiple categories, including demographic information, understanding and familiarity with AI, and possible future uses of AI in dental practice.

The first section collected demographic information, while the second part contained eight questions assessing knowledge of AI. The third section focused on perceptions of AI, and the final part included questions about the future of AI in Pakistan. Participants were instructed to select one option for each question and to submit the form after completion. However, the online response rate was relatively low, with only 173 completed forms received. The collected data were compiled in an Excel sheet and imported into SPSS software version 22 for analysis. Frequencies and percentages of the responses were calculated and presented in table format.

Results:

A total of 173 participants completed the questionnaire. Table 1 displays the participants' demographic information. Concerning participants' AI knowledge, 153 (88.4%) were acquainted with AI and its uses. Additionally, 152 (87.9%) acknowledged AI's beneficial applications in medicine. Table 2 illustrates the participants' knowledge levels. While 83 (48%) participants were unaware that AI could be utilized for diagnosing oral soft tissue lesions, 90 (52%) strongly believed that AI could lead to significant advancements in dentistry. Table 3 outlines the participants' perceptions of AI.

Of the respondents, 55 (31.8%) indicated that AI is most valuable for diagnostic purposes. When faced with a discrepancy between AI and their own medical opinion, 106 (61.3%) participants stated they would favor their judgment. Furthermore, 81 (47.4%) expressed their intention to incorporate AI in future diagnosis and treatment planning. Table 4 presents the participants' outlook on AI in dentistry.

Table 1 Demographic characteristics of the participants.

Gender	n	percentage
Male	62	35.8%
Female	111	64.2%
Undergraduates	142	82.1%
Postgraduates	31	17.9%

Table 2 Association of Knowledge and educational level of the participants towards AI.

Questions	Responses n (%)				
	Strongly agree	Agree	Strongly disagree	Disagree	No idea
Artificial intelligence can be used in the diagnosis of soft tissue lesions of the mouth	6(3.5)	63 (36.4)	6 (3.5)	15 (8.7)	83 (48)
AI can be used in the radiographic diagnosis of pathologies in the jaws	11 (6.4)	75 (43.4)	3 (1.7)	11 (6.4)	73 (42.2)
Do you think Artificial Intelligence applications could be integrated into undergraduate dental training?	1(0.6)	107 (61.8)	18 (10.4)	15 (8.7)	32 (18.5)
Do you think Artificial intelligence could be part of postgraduate dental training?	23 (13.3)	110 (63.6)	2 (1.2)	8 (4.6)	30 (17.3)
Do you foresee that Artificial intelligence could lead to major progressions in dentistry?	90 (52.0)	0	2 (1.2)	11 (6.4)	70 (40.5)

Figure 1 shows Knowledge of AI and its application.

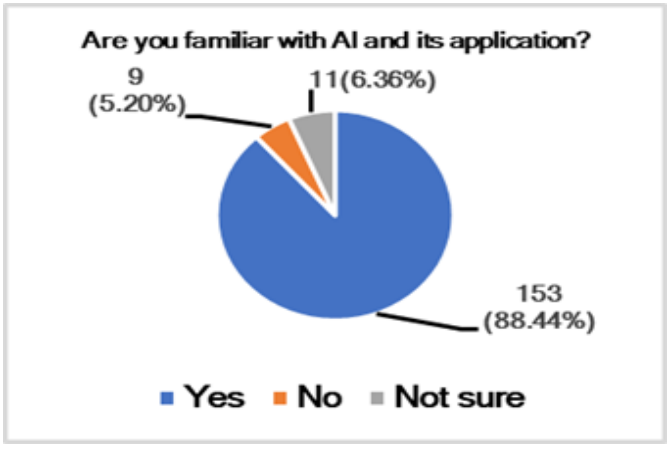


Table No 3 Attitudes and Perception of the participants towards AI in dentistry

Responses	Education Level		
	Undergraduate	Graduate	p-value
Do you have any ideas about how AI might be used in dentistry?			
Yes	84(59.2)	20(64.5)	0.581
No	58(40.8)	11(35.5)	
Not sure	0	0	
Are you familiar with AI-driven health care devices?			
Yes	52(36.6)	11(35.5)	0.844
No	60(42.3)	12(38.7)	
Not sure	30(21.1)	8(25.8)	
Do you think AI can replace the diagnostic ability of doctor's professional knowledge?			
Yes	40(28.2)	8(25.8)	0.258
No	63(44.4)	10(32.3)	
Not sure	39(27.5)	13(41.9)	
Software/program could be a supportive aid in radiological diagnosis, give your opinion?			
Yes	93(65.5)	24(77.4)	0.255
No	15(10.6)	1(3.2)	
Not sure	34(23.9)	6(19.4)	

Table No 4: Future perspectives of the participants about AI in dentistry.

Questions	Responses n (%)		p-value
	Undergraduates	Graduates	
In which field of dentistry do you think AI will be most beneficial?			
Making a diagnosis	45(31.7)	10(32.3)	**0.531**
Making treatment decisions	43(30.3)	6(19.4)	
Direct treatment (including surgical robots)	19(13.4)	4(12.9)	
Interpreting complicated radiographic scans	35(24.6)	11(35.5)	
What are the benefits of using AI, in your opinion? (Select all that apply)			
AI can deliver vast amounts of clinically relevant high-quality data in real time.	46(32.4)	6(19.4)	0.491
AI does not experience emotional exhaustion or physical limitations.	18(12.7)	4(12.9)	
AI can speed up processes in healthcare and reduce medical errors.	15(10.6)	5(16.1)	
All the above	63(44.4)	16(51.6)	
What decision would you me if your medical opinion and AIs differ?			
My own opinion	88(62)	18(58.1)	0.899
AI's opinion	11(7.7)	3(9.7)	
Not sure	43(30.3)	10(32.3)	

Figure 2 shows Knowledge of AI and its useful application in the medical field.

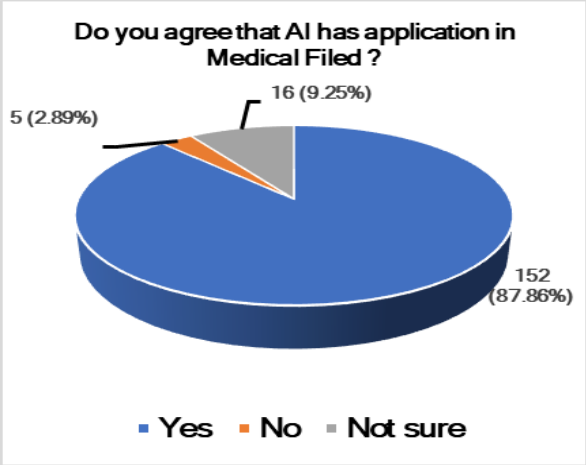


Figure 3 shows Basic Knowledge about the working principles of AI.

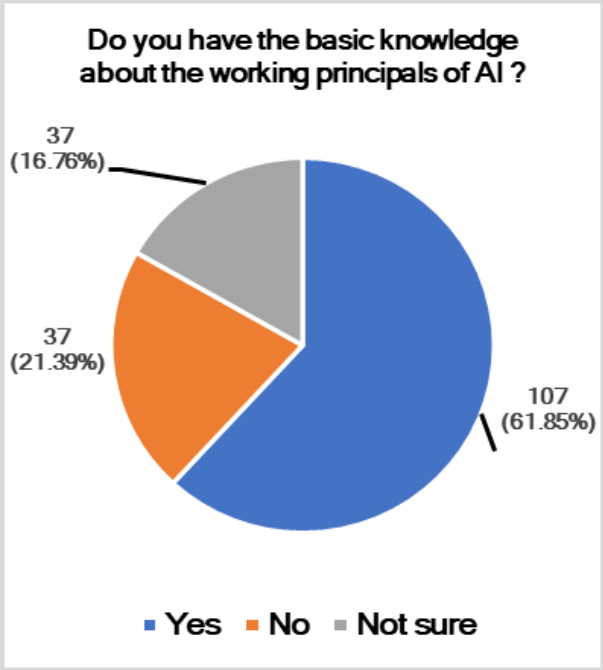
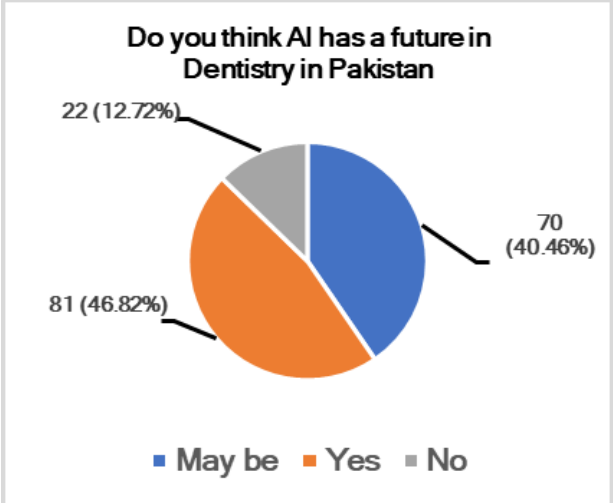


Figure 4 shows future perspectives of AI in Pakistan.



Discussion:

Out of 200 participants, 173 completed the online survey and submitted it. The students exhibited remarkable knowledge of artificial intelligence. Among the participants, 153 (88.4%) were familiar with AI and its applications, while 9 (5.2%) were not familiar, and 11 (6.4%) were unsure about AI. Sadeep H[12] reported that 67% of participants were familiar with the concept of AI and its uses, while 23% were not. Similar results were reported by Asmatahasin M et al[13] and Seram T.[14] Dissimilar results were reported by Fernandes S[15], Yuzbasıoglu E[16], and Khanagar S et al.[17] When asked about useful applications of AI in the medical field, the present study reported that 152(87.9%) of the participants agreed. Fernandes S et al[15] in a study reported that 69.5% of the participants agreed. The current study found that participants had a strong understanding of how Artificial Intelligence works. Akhtar H et al[18] reported similar results. Yuzbasioglu E,[16] reported that the general knowledge of essential working principles was low. This may reflect the difficulty of replacing physicians or dentists with AI technologies. AI cannot gain patients' trust, reassure them, or show empathy, which is one of the challenges it faces.[19] The implementation of AI in radiology over the next ten years is expected to substantially enhance the quality, value, and scope of radiological contributions to patient care, public health, and radiologist efficiency[14] The current research found that 75(43.4%) of respondents believed AI could be employed for radiographic diagnosis of medical conditions. A study by Seram T[14] reported similar findings, with participants agreeing that AI could be utilized for radiological diagnosis in the future.

Respondents in this study concluded that AI could be incorporated into dental education at both undergraduate and postgraduate levels. A study by Akhter H [18] noted that participants showed enthusiasm and strong interest in including AI as part of the dental curriculum for undergraduate and postgraduate students. Comparable results were reported by Asmatahasin M et al[13], Khanagar S[17], and Hosny et al.[20]

The study participants indicated that they primarily acquired information about AI principles through social media rather than academic sources. This finding corresponds with the study's observations of limited awareness regarding AI applications, as these topics are not typically included in standard dental curricula. It was discovered that dental students are not exposed to AI and its basic principles during their undergraduate studies. This aligns with survey-based studies conducted on dental and medical students in various countries, including India,[13] Turkey,[16] Saudi Arabia,[17]Canada,[21] and Germany,[22] all of which indicate that students predominantly learn about AI through social media instead of formal educational channels.

Conclusion:

The study concluded that both undergraduates and graduates were familiar with the concept of AI.

Recommendations:

It is recommended that further surveys be conducted to gain a deeper understanding of the potential uses of AI in dentistry. In addition, it's suggested that more conferences should be organized to facilitate discussion and knowledge sharing on the topic. Dental academic curriculum should incorporate lectures on AI to educate dental students on its practical application in their daily practice.

References:

1. Oh S, Kim JH, Choi SW, Lee HJ, Hong J, Kwon SH. Physician Confidence in Artificial Intelligence: An Online Mobile Survey. J Med Internet Res. 2019 Mar 25;21 (3):e12422. doi: 10.2196/12422. PMID: 30907742; PMCID: PMC6452288.
2. Ghaffari M, Zhu Y, Shrestha A. A Review of Advancements of Artificial Intelligence in Dentistry. Dentistry Review. 2024:4(2);100081. doi: 10.1016/j.dentre.2024.100081.
3. Ding H, Wu J, Zhao W, Matinlinna JP, Burrow MF, Tsoi JKH. Artificial intelligence in dentistry-A review. Front Dent Med. 2023 Feb 20;4:1085251. doi: 10.3389/fdmed.2023.1085251. PMID: 39935549; PMCID: PMC11811754.
4. Jyoti Lamba, Taniya Malhotra, Drishti Palwankar, Vrinda Vats and Akshat Sachdeva. Artificial Intelligence in Dentistry: A Literature Review. Biomed J Sci & Tech Res 51 (1)-2023. BJSTR. MS.ID.008050. doi: 10.26717/BJSTR.2023.51.008050
5. Miloglu O, Guller MT, Turanli Tosun Z. The Use of Artificial Intelligence in Dentistry Practices. Eurasian J Med. 2022 Dec;54(Suppl1):34-42. doi: 10.5152/eurasianjmed.2022.22301. PMID: 36655443; PMCID: PMC11163356.
6. Chakravorty, Shibani1; Aulakh, Basant Kaur2; Shil, Malabika3; Nepale, Mayuri4; Puthenkandathil, Rahul5; Syed, Wali6. Role of Artificial Intelligence (AI) in Dentistry: A Literature Review. Journal of Pharmacy and Bioallied Sciences 16(Suppl 1):p S14-S16, February 2024. doi: 10.4103/jpbs.jpbs_466_23
7. Islam NM, Laughter L, Sadid-Zadeh R, Smith C, Dolan TA, Crain G, Squarize CH. Adopting artificial intelligence in dental education: A model for academic leadership and innovation. J Dent Educ. 2022 Nov;86(11):1545-1551. doi: 10.1002/jdd.13010. Epub 2022 Jul 3. PMID: 35781809.
8. Duggal I, Tripathi T. Ethical principles in dental healthcare: Relevance in the current technological era of artificial intelligence. J Oral Biol Craniofac Res. 2024 May-Jun;14(3):317-321. doi: 10.1016/j.jobcr.2024.04.003. Epub 2024 Apr 13. PMID: 38645705; PMCID: PMC11031811.
9. Gowdar IM, Alateeq AA, Alnawfal AMA, Alharbi AFA, Alhabshan AMS, Aldawsari SMS, AlHarbi NAH. Artificial Intelligence and its Awareness and Utilization among Dental Students and Private Dental Practitioners at Alkharj, Saudi Arabia. J Pharm Bioallied Sci. 2024 Jul;16 (Suppl 3):S2264-S2267. doi: 10.4103/jpbs.jpbs_188_24. Epub 2024 Jun 7. PMID: 39346463; PMCID: PMC11426746.
10. Schwendicke F, Chaurasia A, Wiegand T, Uribe SE, Fontana M, et al. IADR e-oral health network and the ITU/WHO focus group AI for health. Artificial intelligence for oral and dental healthcare: Core education curriculum. J Dent. 2023 Jan;128:104363. doi: 10.1016/j.jdent.2022.104363. Epub 2022 Nov 21. PMID: 36410581.
11. Choudhary A, Jaral S, Malik A, Kaul R, Sharma A. Assessment of knowledge and awareness of artificial intelligence and its uses in dentistry among dental students in Jammu and Kashmir: A questionnaire based survey [Internet]. IP Indian J Conserv Endod. 2023;8(4):210-214. doi:10.18231/j.ijce.2023.040
12. Sadeep H. Assessment of knowledge and awareness of artificial intelligence and its uses in dentistry among dental students. Journal of Pharmaceutical Negative Results. 2022;13(4):1304-9. doi:10.47750/pnr.2022.13.S04.155
13. Asmatahasin M, Pratap KV, Padma TM, Kalyan VS, Kumar VS. Attitude and perception of dental students towards artificial intelligence. Indian Journal of Basic and Applied Medical Research. 2021;10(3):305-14. doi: 10.36848/IJBAMR/2020/29215.557818
14. Seram, T., Batra, M., Gijwani, D., Chauhan, K., Jaggi, M., & Kumari, N. (2021). Attitude and perception of dental students towards artificial intelligence. University Journal of Dental Sciences, 7(3). doi:10.21276/ujds.2021.7.3.13
15. Fernandes S, Bafna Y, Patel DC. Knowledge attitude and practice of dental students towards artificial intelligence (AI): a questionnaire-based survey. Journal of Xidian University. 2022;16(8):284-91. doi:10.37896/jxu16.8/029
16. Yüzbaşıoğlu E. Attitudes and perceptions of dental students towards artificial intelligence. J Dent Educ. 2021 Jan;85(1):60-68. doi: 10.1002/jdd.12385. Epub 2020 Aug 26. PMID: 32851649.
17. Khanagar S, Alkathiri M, Alhamlan R, Alyami K, Alhejazi M, Alghamdi A. Knowledge, attitudes, and perceptions of dental students towards artificial intelligence in Riyadh, Saudi Arabia. Medical Science, 2021, 25(114), 1857-1867. https://discoveryjournals.org/medicalscience/current_issue/v25/n114/A8.pdf.
18. Hira Akhtar, Sanam Faheem, Rimsha Qasim, Fariha Irfan, Anum Tanwir, Hina Hammad, et al. Assessment of knowledge and perceptions of artificial intelligence among dental students of Karachi, Pakistan. A multi-center survey. Pak Oral Dent J [Internet]. 2023 Jan;42(4):193-9. Available from: https://podj.com.pk/index.php/podj/article/view/711.
19. Inkster B, Sarda S, Subramanian V. An Empathy-Driven, Conversational Artificial Intelligence Agent (Wysa) for Digital Mental Well-Being: Real-World Data Evaluation Mixed-Methods Study. JMIR Mhealth Uhealth. 2018 Nov 23;6(11):e12106. doi: 10.2196/12106. PMID: 30470676; PMCID: PMC6286427.
20. Hosny A, Parmar C, Quackenbush J, Schwartz LH, Aerts HJWL. Artificial intelligence in radiology. Nat Rev Cancer. 2018 Aug;18(8):500-510. doi: 10.1038/s41568-018-0016-5. PMID: 29777175; PMCID: PMC6268174.
21. Mehta N, Harish V, Bilimoria K et al. Knowledge and Attitudes on Artificial Intelligence in Healthcare: A Provincial Survey Study of Medical Students [version 1]. MedEdPublish 2021, 10:75 .doi:10.15694/mep.2021.000075.1
22. Pinto Dos Santos D, Giese D, Brodehl S, Chon SH, Staab W, Kleinert R, Maintz D, Baeßler B. Medical students' attitude towards artificial intelligence: a multicentre survey. Eur Radiol. 2019 Apr;29(4):1640-1646. doi: 10.1007/s00330-018-5601-1. Epub 2018 Jul 6. PMID: 29980928.

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Aleena Hamid	Methodology; Validation;
Zoya Marium	Validation; Formal Analysis,
Shakila Nazir	Supervision, draft approval
Aisha Wali	Writing – Review & Editing
Arsalan Mirza	Proof reading