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Knowledge and Perceptions Towards the Use of Artificial Intelligence in Dentistry Among Dental Students in Nellore City, India: A Cross-Sectional Survey

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ABSTRACT

Background: The human brain has been a frontier for scientific exploration for centuries. Artificial intelligence is one of the disruptive innovations that are transforming modern medicine. The use of AI-based technologies in dentistry practice has increased rapidly in recent years. Dental professionals frequently utilize artificial intelligence (AI) applications to help with patient diagnosis and treatment planning.
Aim: The main aim of this study was to evaluate knowledge and perceptions towards the use of AI in dentistry among dental students in Nellore city, Andhra Pradesh, India.
Methodology: A cross-sectional study was conducted to assess the knowledge and perceptions regarding the use of AI among the dental students of Nellore city, Andhra Pradesh. The study was conducted using a pre-validated questionnaire. The questionnaire was prepared in Google Form and sent through WhatsApp and Instagram to their respective groups.
Results: A total of 298 students responded to the questionnaire; More than half of participants (53.69%) agreed that AI could assist them in 3D implant planning and positioning; less than half of respondents (48.65%) agreed that artificial intelligence could transform dentistry; and more than half of participants (51.67%) reported that AI would never be able to take their place.

Keywords: Artificial intelligence, Dentistry, Dental students.

INTRODUCTION

The idea of artificial intelligence (AI) is not new; its notion dates to 1950. John McCarthy coined the appellation "artificial intelligence" in 1956 during a conference at Dartmouth. The ability of machines to carry out tasks that usually require human intelligence is known as artificial intelligence.[1]Artificial intelligence has been included in all dental specialties, including prosthodontics, periodontics, orthodontics, operative dentistry, and oral and maxillofacial surgery. Most artificial intelligence (AI) applications in dentistry focus on identifying problems based on radiography and optical images. Other tasks are less suitable than image-based activities due to limitations in data availability, data consistency, and processing capacity for handling three-dimensional (3D) data. Artificial intelligence applications in

dentistry also cover several key areas, such as diagnosis, treatment planning, image analysis, patient management, and personalized care. AI algorithms have shown promising results in the automatic detection and diagnosis of dental diseases such as dental caries, periodontal diseases, and oral cancers, assisting clinicians in early intervention and improving treatment results. In addition, AI-powered treatment planning systems use machine learning techniques to analyze huge amounts of patient data, pondering factors such as medical history, anatomical changes, and treatment success rates. These systems provide dental professionals with valuable insights and support in making evidence-based treatment decisions, ultimately leading to more predictable and personalized treatment approaches.[2,3]

Cooperation between dental professionals, AI experts, and policymakers is key to the development of a robust framework for the responsible and ethical implementation of AI in dentistry. Furthermore, AI-based robotics has introduced innovative methods for dental surgery, enabling accurate and minimally invasive procedures and ultimately reducing patient discomfort and recovery time. Applications of virtual reality (VR) and augmented reality (AR) further enhance dental education and training, enabling dental professionals to improve their skills in a realistic and immersive environment. The adoption of this technology and its future development will undoubtedly revolutionize the field of dentistry, promoting a more efficient, precise, and patient-centered approach to oral health care. Overall, AI is a powerful tool that can revolutionize different aspects of society, from improving health outcomes to optimizing business operations. Continuous research, development, and responsible implementation of AI technologies will shape our future, unlock new possibilities, and transform our way of life and work.[3]

AI algorithms optimize treatment plans by analyzing intricate patient data and considering various parameters. For example, AI can help in the accurate placement of dental implants, considering factors such as bone density, Occlusal balance, and aesthetic considerations. AI also allows virtual simulations and 3D modeling, which provide dentists and patients with visual presentations of expected treatment results. This increases communication and facilitates informed decision-making.[4,5]

AI is gradually gaining its way into the realm of radiology in dentistry, with a stronger emphasis on cone-beam computed tomography, three-dimensional scans, and diagnostic imaging. A lot of data could potentially be collected and processed to build an AI, which will enable quick diagnosis and treatment planning. The most recent technological advancement is AI-powered, customized orthodontic treatment. AI has made it feasible to perform orthodontic diagnosis, treatment planning, and therapy monitoring. Using accurate 3D scans and virtual models, it is easy to 3D print the aligners with a customized treatment plan.[6]

Dental students are presently taught digital dentistry techniques such as CAD/CAM, intraoral scanners, CBCT, and 3D printing, which are also used in typical clinical practice. These technologies are instances of artificial intelligence. Virtual assistants are also being used to schedule patient appointments, digitize medical records, create treatment plans, and check on how well patients are sticking to therapy.[7,8] Currently, advanced AI technologies can make the most prudent decisions in challenging and ambiguous situations. Although it isn't thought of as a substitute for a dental professional, it is believed that automatic systems might reduce workload, complement, support, and perform at the level of a junior dentist.[9,10]

Dental students are the future of the profession, and their views on artificial intelligence will shape the way it is used in dental practice in the years to come hence, understanding the knowledge, attitudes, and

perspectives of dental students towards artificial intelligence is important for ensuring that this technology is used in a way that is beneficial for both patients and clinicians, therefore the present study was conducted with an aim to assess the knowledge and perceptions of dental students towards the use of Artificial intelligence in dentistry.

MATERIALS & METHODS

A descriptive cross-sectional study was conducted to assess the knowledge and perceptions regarding AI among the dental students at Narayana Dental College and Hospital, Andhra Pradesh, India. The study was approved by the institutional ethics committee of Narayana Dental College and Hospital (IEC, NDCH) with reference protocol number: IEC/NDCH/2023/NOV/P-104.

A pre-validated 18-item questionnaire was used to assess the knowledge regarding AI among the dental students. The questionnaire consists of two parts: the first part consists of two questions related to demographic details, and the second part consists of 16 questions related to knowledge and perception regarding AI in dentistry. The questionnaire was prepared in Google Form and sent through WhatsApp and Instagram to their respective groups. The study was conducted for a period of 2 months, and all the participants who responded to the questionnaire were included in the study.

Statistical Analysis The collected data was analyzed using SPSS version 20 (IBM, Inc., Armonk, NY, USA). A p-value of 0.05 was set as the level of significance. A Fisher exact test was used to compare the knowledge and perceptions among the students of various years.

RESULTS

The 298 participants who completed the questionnaire were included in the study.

Table- 1: Demographic Data

Variable		N (%)
Gender	Male	86(28.85)
	Female	212(71.14)
Year of study	Third year BDS	81 (27.81)
	Final year BDS	85 (28.52)
	Interns	85 (28.52)
	MDS	47 (15.77)

During the study period, 298 dental students completed the survey, of which 71.14% (n = 212) were female and 28.85% (n = 86) were male. Among the dental students who responded to the survey were interns (28.52%; n = 85), final year (28.52%; n = 81), third year (27.81%; n = 81), and MDS (15.77%; n = 47).

Table-2: Knowledge about AI among dental students

Questions		Third BDS n (%)	Final BDS n (%)	CRRI n (%)	MDS n (%)	P-Value
Do you know about AI driven health care devices?	Yes	30(37.03%)	39(45.88%)	58(68.23%)	35(74.46%)	
	No	20(24.69%)	17(20.00%)	9(10.58%)	4(8.51%)	
	Maybe	31(38.27%)	29(34.11%)	18(21.17%)	8(17.02%)	0.001*
What is your opinion about using a software/ program in dentistry?	Agree	29(35.80%)	38(44.70%)	59(69.41%)	36(76.60%)	
	Disagree	20(24.70%)	17(20.00%)	9(10.59%)	4(8.51%)	
	Neutral	32(39.50%)	30(35.30%)	17(20.00%)	7(14.89%)	0.001*
Is the use of AI in dentistry exciting?	Yes	23(28.39%)	30(35.29%)	44(51.76%)	30(63.82%)	
	No	18(22.22%)	16(18.82%)	14(16.47%)	7(14.89%)	
	Maybe	40(49.38%)	39(45.88%)	27(31.76%)	10(21.27%)	0.001*
Do you think AI can lead to great advancements in dentistry?	Yes	27(33.33%)	38(44.70%)	48(56.47%)	32(68.09%)	
	No	19(23.46%)	18(21.17%)	15(17.64%)	7(14.89%)	
	Maybe	35(43.20%)	29(3412%)	22(25.89%)	8(17.02%	0.006*
Do you think AI can improve the doctor and patient relationship?	Yes	35(43.20%)	47(55.29%)	57(67.05%)	36(76.59%)	
	No	11(13.58%)	10(11.76%)	7(8.23%)	3(6.38%)	0.008*
	Maybe	35(43.20%)	28(32.94%)	21(24.70%)	8(17.02%)	
Do you think AI can be an aid in diagnosing a patient?	Yes	35(43.20%)	48(56.47%)	57(67.05%)	33(70.21%)	
	No	17(20.98%)	13(15.29%)	10(11.76%)	4(8.51%)	
	Maybe	29(35.80%)	24(28.23%)	18(21.17%)	10(21.27%)	0.04*
Do you think AI can be used as a prognostic tool to predict the course of disease & determine the chance of recovery?	Yes	32(39.50%)	36(42.35%)	49(57.65%)	32(68.08%)	
	No	12(14.82%)	10(11.76%)	7(8.24%)	3(6.38%)	
	Maybe	37(45.68%)	39(45.89%)	29(34.11%)	12(25.54%)	0.28*

Can AI establish a definite diagnosis?	Yes	22(27.16%)	30(35.29%)	44(51.76%)	30(63.83%)	<0.001*
	No	19(23.46%)	16(18.82%)	14(16.47%)	7(14.89%)	
	Maybe	40(49.38%)	39(45.89%)	27(31.76%)	10(21.28%)	
Do you think AI may replace dentists in the future?	Yes	31(38.27%)	24(28.25%)	9(10.59%)	3(6.38%)	<0.001*
	No	32(39.50%)	38(44.70%)	51(60.00%)	33(70.21%)	
	Maybe	18(22.23%)	23(27.05%)	25(29.41%)	11(23.41%)	
Do you think AI can be useful in the diagnosis of soft tissue lesions in oral cavities?	Yes	30(37.03%)	38(44.70%)	49(57.64%)	28(59.57%)	0.04*
	No	20(24.69%)	17(20.00%)	9(10.58%)	4(8.51%)	
	Maybe	31(38.27%)	30(35.29%)	27(31.76%)	15(31.91%)	
Do you think AI can be used for radiographic diagnosis of dental caries?	Yes	37(45.68%)	48(56.47%)	59(69.41%)	33(70.21%)	0.04*
	No	17(20.99%)	13(15.29%)	10(11.77%)	4(8.51%)	
	Maybe	27(33.33%)	24(28.24%)	16(18.82%)	10(21.28%)	
Do you think AI can be used for radiographic diagnosis of jaw pathologies?	Yes	36(44.44%)	48(56.47%)	56(65.89%)	35(74.47%)	0.03*
	No	11(13.58%)	10(11.76%)	7(8.23%)	3(6.38%)	
	Maybe	34(41.97%)	27(31.77%)	22(25.88%)	9(19.15%)	
Do you think AI can be used in forensic dentistry?	Yes	32(39.50%)	42(49.41%)	49(57.64%)	33(70.21%)	0.05*
	No	14(17.28%)	13(15.29%)	11(12.94%)	4(8.51%)	
	Maybe	35(43.20%)	30(35.29%)	25(29.41%)	10(21.27%)	
What is your opinion about using AI in the three-dimensional positioning and planning of implants?	Agree	32(39.50%)	39(45.88%)	55(64.70%)	34(72.34%)	0.002*
	Disagree	12(14.81%)	11(12.94%)	9(10.59%)	5(10.64%)	
	Neutral	37(45.69%)	35(41.17%)	21(24.71%)	8(17.02%)	
Do you think AI can be used as a quality control tool in the assessment of success rate of treatment?	Yes	30(37.03%)	39(45.88%)	50(58.82%)	32(68.08%)	0.02*
	No	16(19.75%)	12(14.11%)	10(11.76%)	5(10.63%)	
	Maybe	35(43.20%)	34(40.00%)	26(30.58%)	10(21.27%)	
Should AI applications be a part of undergraduate dental education?	Agree	36(44.44%)	48(56.47%)	59(69.41%)	33(70.21%)	0.03*
	Disagree	17(20.98%)	13(15.29%)	10(11.76%)	4(8.51%)	
	Neutral	28(34.56%)	24(28.23%)	16(18.82%)	10(21.27%)	
Should AI applications be a part of postgraduate dental education?	Agree	32(39.50%)	48(56.47%)	55(64.70%)	34(72.34%)	0.007*
	Disagree	12(14.81%)	11(12.94%)	9(10.58%)	5(10.63%)	
	Neutral	37(45.67%)	26(30.58%)	21(24.70%)	8(17.02%)	

***Fisher exact test, P –Value is significant at p<0.05.**

Most of the MDS (74.46%), followed by the interns (68.23%), were aware of AI-powered medical devices, and the difference was statistically significant with a p-value of 0.0001. The perspective of using artificial intelligence in dentistry was more prevalent among MDS students and least prevalent among the third BDS students, and the difference was statistically significant with a p-value of 0.0001. MDS students (63.82%) exhibited more excitement in the application of AI in dentistry when compared with the other students, and the difference was statistically significant with a p-value of 0.002.

The majority of MDS, followed by interns, agreed that artificial intelligence might change dentistry, improve the doctor-patient relationship, be an aid, and establish a definite diagnosis, could be used as a prognostic tool to predict the course of a disease and the chance of recovery with a statistically significant difference among students.

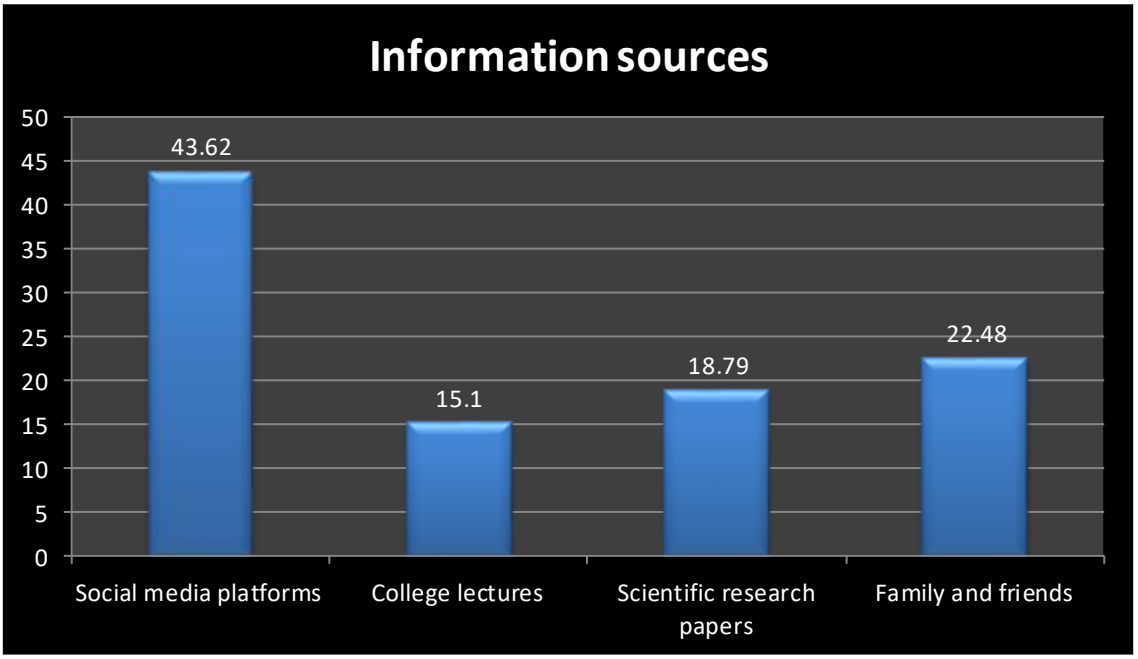
With a statistically significant difference, a majority of MDS, followed by interns, agreed that AI is an essential tool for identifying and managing a wide range of soft and hard tissue disorders of the oral cavity, 3D implant planning and positioning, forensic dentistry, radiographic interpretation of dental caries, and jaw pathologies.

Some of the third BDS (38.27%) students believed that artificial intelligence would eventually replace them. At a p-value of <0.001, this difference was statistically significant.

MDS students (68.08%) anticipated that AI could be used as a quality control tool in the assessment of the success rate of treatment when compared with the other students, and the difference was statistically significant with a p-value of 0.020.

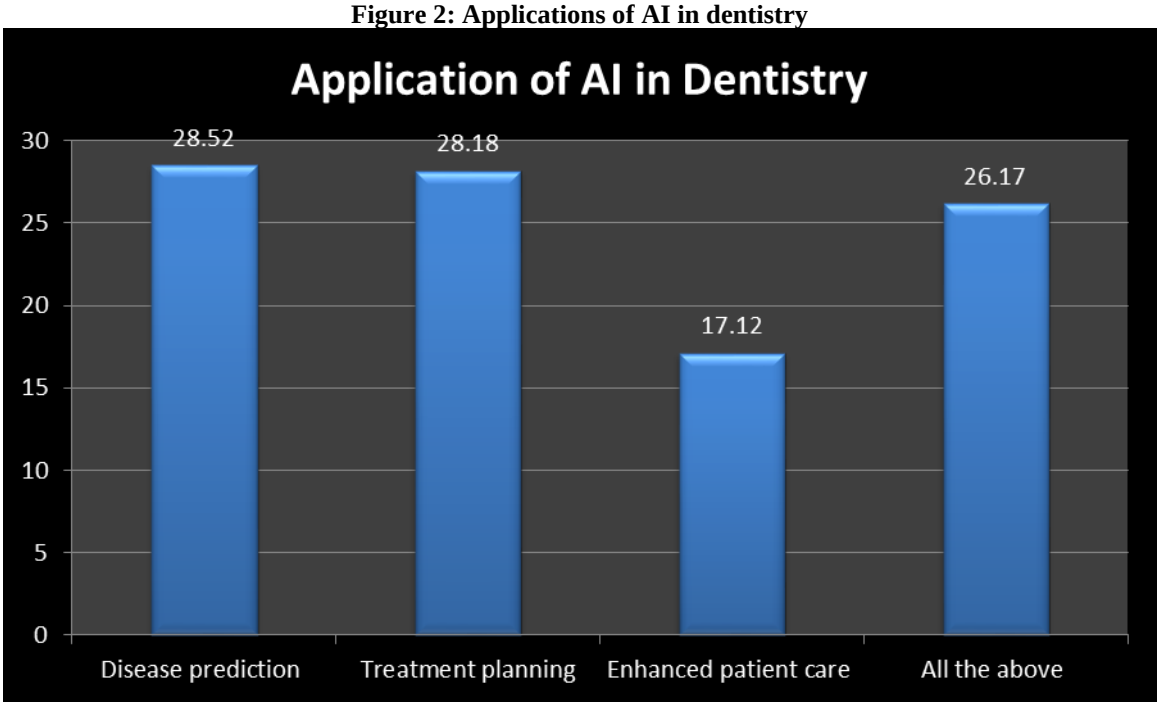
Many MDS, followed by interns, thought that AI should be a part of undergraduate, and postgraduate dental curriculum, and the difference was statistically significant.

Figure-1: It represents the information sources about artificial intelligence in dentistry



Regarding the source of artificial intelligence in dentistry, 43.62% (n = 130) of students knew about AI through social media platforms (Instagram, Facebook, Twitter, WhatsApp), 15.10% (n = 45) of students knew about AI via lectures given in the college, 18.79% (n = 56) of students knew about AI from scientific research papers, and 22.48% (n = 67) through friends and family.

Figure 2: Applications of AI in dentistry



It was predominantly agreed among the students that AI could be successfully used in a variety of applications and tasks, such as disease prediction (28.52%; n = 85), treatment planning (28.18%; n = 84), enhanced patient care (17.11%; n = 51), and all the above (26.17%; n = 78).

DISCUSSION

In various fields, including healthcare, artificial intelligence (AI) has been found to be a revolutionary technology.[14] AI integration in dentistry has the potential to revolutionize dental education by improving treatment planning, enhancing learning experiences, and improving diagnostic accuracy. As the field of dentistry evolves, it is essential to analyze dental students' attitudes and perceptions on the integration of artificial intelligence (AI) into their curriculum.[15] Dental education has always relied on clinical training, didactic lectures, and hands-on experience to provide students with the knowledge and skills they require.[16] Although as health care is dynamic, emerging innovations must constantly be incorporated and adapted. Artificial Intelligence (AI) has the potential to revolutionize dental education by generating insights, discovering patterns, and processing enormous amounts of data. For AI to be successfully implemented and accepted in dental education, it is essential to understand the dental students perceive its integration.[17]

The purpose of this study was to evaluate the attitudes and perceptions about the use of artificial intelligence in dentistry of dental students of Nellore city, Andhra Pradesh, India. A total of Two hundred and ninety-eight students who responded to the questionnaire were evaluated. The results indicate that most of the participants agreed that artificial intelligence would have real and great advancements in dental practice. This was in accordance with the study done by Milan Karan-Romero et al.,[20] Hira Akhtar et al.,[11] Khalid T et al.,[19] Emir Yuzbasıoglu et al.[18]

A significant number of study participants concurred that AI is an essential tool for identifying and managing a variety of soft and hard tissue lesions of the oral cavity, as well as for implant placement, forensic dentistry, and the interpretation of radiographic images. This was in accordance with the study done by Hira Aktar et al.,[11] Milan Karan-Romero et al.,[20] Gyananmbi Kalaimani et al.,[21] Khalid T et al.,[19] and Vamshi Ram et al.[23] Most of the study participants in the present study agreed that the use of AI will be exciting, and this was in accordance with the study done by Milan Karan-Romero et al.,[20] Hira Akhtar et al.,[11] Khalid T et al.,[19] and Emir Yuzbasıoglu et al.[18] Most of the study participants, irrespective of the year of study, knew about AI-powered healthcare devices, and this was in accordance with the study done by Vamshi Ram et al.,[23] where nearly 84% of participants knew about AI-powered healthcare devices.

Most of the study participants didn't agree that AI will replace dentists in the future, and this was in accordance with the study done by G Krishna Prakash et al.,[24] Emir Yuzbasioglu et al.,[18] Hira Akhtar et al.,[11] and Gyananmbi Kalaimani et al.[21] and was contradictory to the study done by Khalid T et al.,[19] Milan Karan-Romero et al.[20] Most of the study participants, irrespective of the year of study, agreed that AI education should be included in the dental education curriculum, and this was in accordance with the study done by Hira Akhtar et al.,[11] Gyananmbi Kalaimani et al.,[21] Emir Yuzbasioglu et al.,[18] and Zuhal Y Hamd et al.[22]

In the present study, most of the study participants reported that they got information regarding AI from social media platforms, and this was in accordance with the study done by Hira Akhtar et al.[11] and Khalid T et al.,[19] which shows the potentially huge impact this technology will have on the future landscape of dentistry.

One of the main limitations of our study is the method of data collection. The study was conducted only on dental students at one dental college., hence, the results cannot be generalized because the data might not be pertinent to all dental students. The other limitation of this study includes the years of experience among students, which have varied results at various levels., hence, further studies should be conducted with a large sample and in multiple centers to generalize the results, and dental education

institutes must consider its inclusion at the undergraduate teaching level to produce competent graduates who can cope with delivering high-quality patient health care.

CONCLUSION

AI is developing quickly and has the potential to be used in prognostic, therapeutic, and diagnostic applications. This survey found that students felt it would be useful to apply AI to dentistry. Study participants agreed that diagnosis and treatment planning were the fields of dentistry where AI would be most useful. In order to explore these problems further, follow-up surveys and multicenter research should be carried out. These findings suggest the process by which lectures and seminars should be organized to provide dental students with an in-depth understanding of AI and, eventually, enable them to participate in a fully informed and actively involved role in the development, implementation, and use of artificial intelligence (AI) in dentistry. Dental education institutions must consider its inclusion at the undergraduate teaching level to produce competent graduates who can cope with delivering high-quality patient health care.

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REFERENCES

1. Ossowska A, Kusiak A, Świetlik D. Artificial Intelligence in Dentistry - Narrative Review. International Journal of Environmental Research and Public Health. 2022; 19(6):3449. https://doi.org/10.3390/ijerph19063449
2. Ding H, Wu J, Zhao W, Matinlinna JP, Burrow MF and Tsoi JKH (2023) Artificial intelligence in dentistry - A review. Front. Dent. Med 4:1085251. Doi: 10.3389/fdmed.2023.1085251
3. Dhopte A, Bagde H (June 30, 2023) Smart Smile: Revolutionizing Dentistry With Artificial Intelligence. Cureus 15(6): e41227. DOI: 10.7759/cureus.41227
4. Shan T, Tay FR, Gu L: Application of artificial intelligence in dentistry. J Dent Res. 2021, 100:232-44. 10.1177/0022034520969115
5. Tandon D, Rajawat J: Present and future of artificial intelligence in dentistry. J Oral Biol Craniofac Res.2020, 10:391-6. 10.1016/j.jobcr.2020.07.015
6. S. Deshmukh, Artificial intelligence in dentistry, J. Int. Clin. Dent. Res. Organ. 10 (2) (2018) 47, https://doi.org/10.4103/jicdro.jicdro_17_18.
7. Dragan IF, Walji M, Vervoorn M, Quinn B, Johnson L, Davis J, et al. ADEA-ADEE shaping the future of dental education III: the impact of scientific technologies and discoveries on oral health globally. J Dent Edu. 2020;84(1):111-116. Available from: https://doi.org/10.1002/jdd. 12027
8. Xiao C, Choi E, Sun J. Opportunities and challenges in develop- ing deep learning models using electronic health records data: a systematic review. J Am Med Inform Assoc. 2018;25(10):1419- 1428. Available from: https://doi.org/10.1093/jamia/ocy068
9. Nguyen TT, Larrivée N, Lee A, Bilaniuk O, Durand R. Use of Artificial Intelligence in Dentistry: Current Clinical Trends and Research Advances. J Can Dent Assoc. 2021;87(17):1488-2159. Available from: https://jcda.ca/sites/default/files/17.pdf
10. Chen H, Zhang K, Lyu P, Li H, Zhang L, Wu J, et al. A deep learning approach to automatic teeth detection and numbering based on object detection in dental periapical films. Sci Rep. 2019;9(1):3840;1-10. Available from: https://doi.org/10.1038/s41598-019-40414-y
11. Akhtar H, Faheem S, Qasim R, Irfan F, Tanwir A, Hammad H, Hirani S. Assessment of knowledge and perceptions of artificial intelligence among dental students of Karachi, Pakistan. A multi-center survey. Pak Oral Dent J 2022; 42(4):193-199.
12. Inkater B. Sarda 8, Subramanian V. An Empathy-Driven, S, Conversational Artificial Intelligence Agent (Wysa) for Digital Mental Well-Being: Real-World Data Evaluation Mixed-Meth. ods Study. JMIR mHealth and uHealth. 2018,6(11)

12106. Available frum: https://doi.org/10.2196/12106
13. Johnston SC. Anticipating and Training the Physician of the Future: The Importance of Caring in an Age of Artificial Intelligence. Acad Med. 2018;93(8):1105-1106. Available from: https:// doi.org/10.1097/ACM,0000000000002175
14. Bohr A, Memarzadeh K. The rise of artificial intelligence in healthcare applications. Artificial Intelligence in Healthcare. 2020:25–60. doi: 10.1016/B978-0-12-818438-7.00002-2. Epub 2020 Jun 26. PMCID: PMC7325854.
15. Nadim M. Islam, Lory Laughter , Ramtin Sadid-Zadeh, Carlos Smith, Deresa A.Dolan , Geralyn Crain . Adopting artificial intelligence in dental education: A model for academic leadership and innovation. Journal of dental education 2022; 86(11):1545-155.
16. Lin GSS, Tan WW, Tan HJ, Khoo CW, Afrashtehfar KI. Innovative Pedagogical Strategies in Health Professions Education: Active Learning in Dental Materials Science. Int J Environ Res Public Health. 2023 Jan 22;20(3):2041. doi: 10.3390/ijerph20032041. PMID: 36767406; PMCID: PMC9915854.
17. Khanagar SB, Al-Ehaideb A, Maganur PC, Vishwanathaiah S, Patil S, Baeshen HA, Sarode SC, Bhandi S. Developments, application, and performance of artificial intelligence in dentistry - A systematic review. J Dent Sci. 2021 Jan;16(1):508-522. doi: 10.1016/j.jds.2020.06.019. Epub 2020 Jun 30. PMID: 33384840; PMCID: PMC7770297
18. Yüzbaşıoğlu E. Attitudes and perceptions of dental students towards artificial intelligence. J Dent Educ. 2020;1–9. https://doi.org/10.1002/jdd.12385.
19. Aboalshamat, Khalid. (2022). Perception and Utilization of Artificial Intelligence (AI) among Dental Professionals in Saudi Arabia. The Open Dentistry Journal. 16. 10.2174/18742106-v16-e2208110.
20. Karan-Romero, M.; Salazar-Gamarra, R.E.; Leon-Rios, X.A. Evaluation of Attitudes and Perceptions in Students about the Use of Artificial Intelligence in Dentistry. Dent. J. 2023, 11, 125. https://doi.org/10.3390/dj11050125.
21. Kalaimani G, B S, Chockalingam R M, et al. (September 04, 2023) Evaluation of Knowledge, Attitude, and Practice (KAP) of Artificial Intelligence Among Dentists and Dental Students: A Cross-Sectional Online Survey. Cureus 15(9): e44656. DOI 10.7759/cureus.44656
22. A closer look at the current knowledge and prospects of artificial intelligence integration in dentistry practice: A cross-sectional study Hamd, Zuhal Y. et al., Heliyon, Volume 9, Issue 6, e17089.
23. Vamshi Ram V, Sadeep H: Assessment of knowledge and awareness of artificial intelligence and its uses in dentistry among dental students. (2022). Journal of Pharmaceutical Negative Results, 1304-1309. https://doi.org/10.47750/pnr.2022.13.S04.155
24. G. Krishnaprakash, P. Jodalli, R. P. Shenoy, I. P. Mohammed, and S. Amanna, "Dentists' knowledge, attitude, and perception regarding robotics and artificial intelligence in oral health and preventive dentistry: A cross-sectional study," J. Clin. Diagn. Res. 17, ZC47 (2023). https://doi.org/10.7860/jcdr/2023/63299.18239

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