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Assessment of Knowledge About AI and Its Uses Among Dental Students and Faculty at Taibah University: A Cross-Sectional Study

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Abstract

Introduction and aim

Artificial intelligence (AI) is advancing dental practices, yet its knowledge among Taibah University's dental students and faculty remains unassessed, signaling a need for research to evaluate knowledge and integrate AI into the curriculum. The aim of the study is to assess the knowledge and uses of AI among dental students and faculty at Taibah University.

Materials and methods

A cross-sectional study using convenience sampling was conducted with 119 dental students and faculty at Taibah University. A 20-question Google Forms (Google LLC, Mountain View, CA, USA) questionnaire was used, addressing knowledge about AI and its uses in dentistry. The first section gathers demographics, while the second addresses basic principles, sources of AI knowledge, dental applications, and advantages. The final section included 10 statements to gauge participants' level of agreement.

Results

The participants demonstrated good basic knowledge and a positive attitude toward AI, with most interested in learning more and supporting its inclusion in the curriculum. Among the 119 participants, gender distribution was nearly equal, and AI information was mainly obtained from social media (77.3%). While 67.2% understood AI's basic principles and 82.4% were familiar with its uses, a small percentage (5.1%) had no knowledge, and 12% were uncertain about AI's role in dentistry.

Conclusion

The study found no significant difference in AI knowledge between dental students and faculty. Both groups are enthusiastic about AI's role in dentistry and support its inclusion in the dental curriculum.

Categories: Public Health, Epidemiology/Public Health, Dentistry
Keywords: artificial intelligence, attitudes and practice, dental education, dental students, digital dentistry, knowledge, taibah university

Introduction

Artificial intelligence (AI) refers to the capability of machines to carry out tasks that usually require human intelligence [1]. Although the concept of AI has been around since 1950, it only began to be used practically about 20 years ago, and nowadays, AI applications are making life more convenient for people [1]. In general, AI replicates human cognitive functions to handle complex tasks using robots and software algorithms. AI algorithms are commonly used in the field of medicine to analyse photos by extracting features from images [2]. In the field of dentistry, AI is being utilized across all dental specialties and is swiftly growing in various areas [1]. By learning from human expertise, AI can perform functions typically requiring human intelligence [1]. It assists dentists in a range of tasks, from the basic management of patient medical records to more intricate processes, including analysing collected data to determine accurate diagnoses, treatment options, and prognosis [3]. Additionally, AI plays a key role in interpreting auxiliary tests like X-rays, providing more precise findings and faster diagnoses [3]. By utilizing clinical data and diagnostic images, AI has been employed to detect and diagnose various oral conditions, including dental caries, maxillary sinus diseases, periodontal diseases, salivary gland disorders, temporomandibular joint (TMJ) issues, and oral cancer [3]. The incorporation of AI in the dental field will lead to the advancement of dentistry, including reducing treatment time and costs and minimizing errors in decision-making [4]. In addition, AI has the capability to

enhance patient care and treatment outcomes by reducing the likelihood of human error [4].

Recent studies in South India [5] and Cyprus [6] conducted an assessment of the knowledge and awareness of AI and its uses in dentistry among dental students. They reported that most dental students had little or no awareness of AI and its uses in dentistry, with participants agreeing that AI-related lectures should be included in dental curricula. In Saudi Arabia, a study by Aldowah et al. [7] surveyed 165 dental students from 20 different universities, most of them from King Khalid University and Najran University, and another study by AlAhmari [8] surveyed undergraduate dental students at King Saud University. Both studies revealed similar results, indicating that most dental students were excited about AI, but their basic knowledge about its uses did not reflect their level of enthusiasm. This reflects the need for undergraduate programs to prioritize incorporating AI into the dental curriculum to help dental students understand and develop their knowledge of AI and its uses in the future. However, to our knowledge, no published research has assessed the knowledge of AI and its uses among dental students and dental faculty at Taibah University. The role of AI in dentistry is undeniable, making its integration into dental education a priority. As new healthcare professionals enter the workforce, equipping them with AI knowledge is essential for keeping pace with digital advancements [9]. Furthermore, combining AI with simulation and robotic technologies offers enhanced learning opportunities, especially in areas such as self-assessment and feedback. It is crucial for dental professionals, students, and educators to develop a solid understanding of data science, robo-ethics, and AI algorithms as healthcare continues to evolve with AI-driven innovation [10]. A large multi-center survey from Türkiye further linked AI perceptions to age and gender and identified social media, rather than formal curricula, as the dominant source of AI information among dental professionals [11]. Similarly, recent cross-sectional surveys among dental students and practicing dentists in Kuwait [12], Saudi Arabia [13], Turkey [14], southern India [15], and Croatia [16] have consistently reported variable levels of AI knowledge coupled with generally positive attitudes toward its integration into dental practice and education. Therefore, the primary aim of this study is to assess the knowledge and uses of AI among dental students and dental faculty at Taibah University. As a secondary, comparative objective, this study also aims to compare dental students and dental faculty in their knowledge and attitudes regarding AI and its uses in dentistry.

Materials And Methods

Using a convenience sampling technique, we approached participants at Taibah University's Dental College as part of a cross-sectional study design. Participants ranged from second-year dental students to interns and dental faculty. Non-faculty dentists, first-year dental students, and non-dental students were excluded. Postgraduate dental trainees were also invited to participate; however, only five agreed, and this subgroup was excluded from the final analysis because it was too small to permit meaningful comparison. Informed consent was obtained, and a questionnaire was used to collect data (see Appendix A); completing the questionnaire took up to seven minutes.

To collect the data, we utilized a Google Forms (Google LLC, Mountain View, CA, USA) as the survey tool. Twenty-two questions constituted our survey, which asked Taibah University's dental faculty and students about their understanding of AI and its uses. The questionnaire's first component collected information on demographic and social variables, including gender, age range, and grade level of the dental students or dental faculty. The second component covered several topics: sources of information about AI technologies, basic knowledge of the working principles of AI, uses of AI in dentistry, and the advantages of using AI.

In the last section, 10 statements were presented to the participants, who were asked about their level of agreement (strongly disagree, disagree, neutral, agree, or strongly agree). The participants included undergraduate dental students and dental faculty working and studying at the Dental College of Taibah University in Al-Madinah Al-Munawwarah, Saudi Arabia.

Ethical approval

Ethical approval for this study was granted by the Research Ethical Committee at Taibah University (approval number TUCDREC/241224/AMarghalani). Informed consent was obtained individually from each participant, with an explanation of the study provided beforehand, and the study was conducted in accordance with the Declaration of Helsinki.

Statistical analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 26.0 (Released 2018; IBM Corp., Armonk, NY, USA). The statistical analysis was performed by an independent biostatistician. Descriptive statistics were used to summarize the study variables, with categorical variables presented as frequencies and percentages, while continuous variables were reported as mean, standard deviation (SD), minimum, and maximum values. Composite knowledge and attitude scores were calculated and subsequently categorized into predefined levels. The knowledge score was calculated from participants' responses to AI-related knowledge questions, with higher scores indicating greater knowledge. The knowledge score was derived from three items assessing participants' basic understanding of how AI works, their awareness of its use in dentistry, and their familiarity with the concept and applications of AI; each item was scored as Yes = 2, Not

sure = 1, and No = 0, yielding a maximum possible score of 6. Based on the percentage of the maximum obtainable score, participants were categorized into poor knowledge (<60%), moderate knowledge (60-79%), and good knowledge (≥80%). Similarly, the attitude score was derived by summing responses to ten Likert-scale statements regarding AI applications in dentistry. Participants were subsequently classified as having a negative attitude (<60%), neutral attitude (60%-79%), or positive attitude (≥80%) according to their percentage score. These categorizations were adapted from Bloom's cut-off criteria and have been widely used in knowledge and attitude assessment studies.

The internal consistency of the attitude scale was assessed using Cronbach's alpha coefficient. Associations between categorical variables, including sociodemographic characteristics, knowledge levels, and attitude categories, were evaluated using the Pearson chi-square test. The relationship between knowledge level and attitude category was also examined using chi-square analysis. All statistical tests were two-tailed, and a p-value < 0.05 was considered statistically significant. For the cross-tabulation of age group by knowledge level, more than half of the expected cell counts were below 5; this association was therefore additionally verified using a Monte Carlo-simulated Pearson chi-square test (500,000 replications).

Results

A total of 119 participants were included in the study (Table *1*). Of the 156 eligible students and faculty members approached, 119 completed the questionnaire, yielding a response rate of 76.3%. More than half were males (52.1%), while females accounted for 47.9%. Most participants were aged 18-24 years (68.9%), followed by those aged 35-44 years (12.6%). Regarding educational level, dental faculty members represented the largest group (25.2%), followed by fifth-year (21.0%) and sixth-year dental students (20.2%). Dental interns comprised 9.2% of the sample.

Variable	Category	n	%
Gender	Male	62	52.1
	Female	57	47.9
Age Group (years)	18-24	82	68.9
	25-34	10	8.4
	35-44	15	12.6
	45-54	9	7.6
	≥55	3	2.5
Level of Education	2nd-year dental student	12	10.1
	3rd-year dental student	7	5.9
	4th-year dental student	10	8.4
	5th-year dental student	25	21.0
	6th-year dental student	24	20.2
	Dental Intern	11	9.2
	Dental Faculty Member	30	25.2

TABLE 1: Sociodemographic Characteristics of the Study Participants (N = 119)

Most participants demonstrated awareness of AI, with 67.2% reporting basic knowledge of its working principles, 77.3% indicating that they had ideas about its applications in dentistry, and 82.4% stating that they were familiar with the concept of AI and its uses. Furthermore, the vast majority of participants (95.0%) expressed willingness to use AI-based software or programs that could assist in dental practice (Table *2*).

Item	Response	n	%
Do you have basic knowledge about the working principle of Artificial Intelligence?	Yes	80	67.2
	Not sure	26	21.8
	No	13	10.9
Do you have any ideas about how AI might be used in dentistry?	Yes	92	77.3
	Not sure	16	13.4
	No	11	9.2
Are you familiar with the concept of AI and its uses?	Yes	98	82.4
	Not sure	15	12.6
	No	6	5.0
Would you like to use a software/program that can be helpful in dentistry?	Yes	113	95.0
	Not sure	4	3.4
	No	2	1.7

TABLE 2: Knowledge and Awareness Regarding AI Among the Participants

The sources of information about AI showed that social media was the most frequently reported source (77.3%). Approximately one-third of participants obtained information from friends and family (31.9%) and university lectures (31.1%), while newspapers and magazines were the least common source (10.1%). Regarding the perceived advantages of AI, the majority of participants believed that AI can provide large amounts of clinically relevant data in real time (81.5%), while 70.6% felt that AI could improve healthcare efficiency and reduce medical errors. More than one-third (37.0%) perceived the absence of emotional exhaustion and physical limitations as an important advantage of AI. More than half of the participants (53.8%) believed that AI would be most useful in interpreting complicated radiographic scans. Approximately one-quarter (24.4%) considered AI most valuable for making diagnoses, while 14.3% felt it would be most useful in supporting treatment decisions. Only 7.6% perceived direct treatment as the primary area in which AI could be applied (Table *3*).

Variable	Category	n	%
Source of Information*	Social Media	92	77.3
	Friends & Family	38	31.9
	Lectures in University	37	31.1
	Newspaper & Magazine	12	10.1
Perceived Advantages of AI	AI can deliver vast amounts of clinically relevant high-quality data in real time	97	81.5
	AI can speed up healthcare processes and reduce medical errors	84	70.6
	AI has no emotional exhaustion or physical limitation	44	37.0
Perceptions Regarding the Most Useful Field of Dentistry for AI	Interpreting complicated radiographic scans	64	53.8
	Making a diagnosis	29	24.4
	Making treatment decisions	17	14.3
	Direct treatment	9	7.6

TABLE 3: Sources of Information and Perceived Advantages of AI Among the Participants

Note: *Participants could select more than one option for sources of information and perceived advantages; percentages are based on the total number of respondents and therefore do not sum to 100%.

Participants' attitudes toward AI applications are given in Table 4. The highest level of agreement was observed for incorporating AI into postgraduate dental training (90.8%), followed by the perception that AI in dentistry and medicine is exciting (83.2%). Most participants agreed that AI could be used for the radiographic diagnosis of tooth caries (78.2%), periodontal diseases (73.9%), and jaw pathologies (68.9%). Support was also observed for including AI applications in undergraduate dental education (77.3%). In contrast, opinions were more divided regarding AI as a definitive diagnostic tool, with only 38.7% agreeing and 31.1% remaining neutral. Nearly half of the participants (46.2%) were neutral regarding the impact of AI on doctor-patient relationships.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Has AI improved doctor-patient relationships?	1 (0.8)	17 (14.3)	55 (46.2)	29 (24.4)	17 (14.3)
I find the use of AI in dentistry and medicine exciting.	1 (0.8)	2 (1.7)	17 (14.3)	52 (43.7)	47 (39.5)
AI can be used as a definitive diagnostic tool in disease diagnosis.	10 (8.4)	26 (21.8)	37 (31.1)	27 (22.7)	19 (16.0)
AI can be used as a prognostic tool to predict disease outcomes and recovery.	0 (0.0)	9 (7.6)	38 (31.9)	49 (41.2)	23 (19.3)
AI can be used for radiographic diagnosis of tooth caries.	1 (0.8)	5 (4.2)	20 (16.8)	51 (42.9)	42 (35.3)
AI can be used in the radiographic diagnosis of periodontal diseases.	0 (0.0)	6 (5.0)	25 (21.0)	58 (48.7)	30 (25.2)
AI can be used in the diagnosis of soft tissue lesions of the mouth.	1 (0.8)	12 (10.1)	36 (30.3)	43 (36.1)	27 (22.7)
AI can be used in the radiographic diagnosis of pathologies in the jaws.	0 (0.0)	5 (4.2)	32 (26.9)	50 (42.0)	32 (26.9)
AI applications should be part of undergraduate dental training.	0 (0.0)	5 (4.2)	22 (18.5)	44 (37.0)	48 (40.3)
AI applications should be part of postgraduate dental training.	0 (0.0)	0 (0.0)	11 (9.2)	50 (42.0)	58 (48.7)

TABLE 4: Attitudes Toward AI Applications in Dentistry

The reliability analysis demonstrated good internal consistency of the 10-item attitude scale (Table 5). The overall Cronbach's alpha was 0.807, indicating that the items showed good coherence in measuring attitudes toward AI in dentistry. Furthermore, the average-measures intraclass correlation coefficient (ICC) was 0.807 (95% CI: 0.751-0.855, $p < 0.001$), reflecting good overall reliability of the composite attitude score. Although the single-measure ICC was 0.295 (95% CI: 0.232-0.371, $p < 0.001$), which indicates only fair reliability at the individual item level, the average-measures ICC confirms that the combined scale provides a reliable assessment of participants' attitudes.

Reliability Measure	Value	95% Confidence Interval	p-value
Cronbach's Alpha	0.807	-	-
Intraclass Correlation Coefficient (ICC) - Single Measures	0.295	0.232-0.371	<0.001
Intraclass Correlation Coefficient (ICC) - Average Measures	0.807	0.751-0.855	<0.001

TABLE 5: Reliability Analysis of the Attitude Scale

The mean knowledge score among participants was 5.02 ± 1.51 out of a maximum possible score of 6. The majority of participants (74.8%) demonstrated a good level of knowledge, whereas 15.1% and 10.1% exhibited poor and moderate knowledge levels, respectively. The mean attitude score was 38.61 ± 5.37 out of a maximum possible score of 50. More than half of the participants (55.5%) exhibited a neutral attitude toward AI applications in dentistry, while 38.7% demonstrated a positive attitude and only 5.9% showed a negative attitude (Table 6).

Variable	Category/Statistic	n (%)	Mean ± SD	Min-Max
Knowledge Score	Overall score	-	5.02 ± 1.51	0-6
Knowledge level	Poor	18 (15.1)	-	-
	Moderate	12 (10.1)	-	-
	Good	89 (74.8)	-	-
Attitude Score	Overall score	-	38.61 ± 5.37	28-50
Attitude level	Negative	7 (5.9)	-	-
	Neutral	66 (55.5)	-	-
	Positive	46 (38.7)	-	-

TABLE 6: Distribution of Knowledge and Attitude Scores and Categories Among Participants

The association between participants' sociodemographic characteristics and knowledge level regarding AI is given in Table 7. No statistically significant association was observed between knowledge level and gender ($p = 0.754$) or educational level ($p = 0.496$). However, a significant association was found between age group and knowledge level ($p = 0.007$). Because several expected cell counts in this cross-tabulation were below 5, this association was confirmed using a Monte Carlo-simulated chi-square test (500,000 replications, $p = 0.0125$). Participants aged 25-34 years and 35-44 years demonstrated uniformly good knowledge levels (100%), whereas a greater proportion of participants aged 18-24 years exhibited poor or moderate knowledge.

	Variable	Knowledge Level			p-value	χ^2 (df)
		Poor	Moderate	Good		
Gender	Male	8 (12.9)	6 (9.7)	48 (77.4)	0.754	0.564 (df=2)
	Female	10 (17.5)	6 (10.5)	41 (71.9)		
Age Group (years)	18-24	16 (19.5)	10 (12.2)	56 (68.3)	0.007	21.025 (df=8)†
	25-34	0 (0.0)	0 (0.0)	10 (100.0)		
	35-44	0 (0.0)	0 (0.0)	15 (100.0)		
	45-54	0 (0.0)	1 (11.1)	8 (88.9)		
	≥55	2 (66.7)	1 (33.3)	0 (0.0)		
Level of Education	2nd-year dental student	2 (16.7)	2 (16.7)	8 (66.7)	0.496	11.389 (df=12)
	3rd-year dental student	3 (42.9)	1 (14.3)	3 (42.9)		
	4th-year dental student	3 (30.0)	1 (10.0)	6 (60.0)		
	5th-year dental student	5 (20.0)	3 (12.0)	17 (68.0)		
	6th-year dental student	2 (8.3)	2 (8.3)	20 (83.3)		
	Dental Intern	1 (9.1)	1 (9.1)	9 (81.8)		
	Dental Faculty Member	2 (6.7)	2 (6.7)	26 (86.7)		

TABLE 7: Association Between Sociodemographic Characteristics and Knowledge Level Regarding AI

p-values were obtained using Pearson's Chi-square test; p<0.05 is considered statistically significant.

†Due to sparse cell counts (expected count <5 in 9 of 15 cells), the age-group association was additionally verified using a Monte Carlo-simulated Pearson chi-square test (500,000 replications; p = 0.0125), consistent with the asymptotic result.

Table *8* shows the association between sociodemographic characteristics and attitude toward AI in dentistry. No statistically significant associations were observed between attitude category and gender (p = 0.495), age group (p = 0.860), or educational level (p = 0.183). Across all demographic groups, the majority of participants demonstrated either neutral or positive attitudes toward AI. Positive attitudes were most common among participants aged 35-44 years (53.3%) and among second-year dental students (58.3%).

	Variable	Attitude Level			p-value	χ^2 (df)
		Poor	Moderate	Good		
Gender	Male	5 (8.1)	35 (56.5)	22 (35.5)	0.495	1.407 (df=2)
	Female	2 (3.5)	31 (54.4)	24 (42.1)		
Age Group (years)	18-24	5 (6.1)	46 (56.1)	31 (37.8)	0.86	3.970 (df=8)
	25-34	1 (10.0)	7 (70.0)	2 (20.0)		
	35-44	1 (6.7)	6 (40.0)	8 (53.3)		
	45-54	0 (0.0)	5 (55.6)	4 (44.4)		
	≥55	0 (0.0)	2 (66.7)	1 (33.3)		
Level of Education	2nd-year dental student	0 (0.0)	5 (41.7)	7 (58.3)	0.183	16.178 (df=12)
	3rd-year dental student	2 (28.6)	4 (57.1)	1 (14.3)		
	4th-year dental student	0 (0.0)	7 (70.0)	3 (30.0)		
	5th-year dental student	0 (0.0)	15 (60.0)	10 (40.0)		
	6th-year dental student	1 (4.2)	15 (62.5)	8 (33.3)		
	Dental Intern	2 (18.2)	5 (45.5)	4 (36.4)		
	Dental Faculty Member	2 (6.7)	15 (50.0)	13 (43.3)		

TABLE 8: Association Between Sociodemographic Characteristics and Attitude Toward AI

p-values were obtained using Pearson's Chi-square test; p<0.05 is considered statistically significant.

The association between knowledge level and attitude toward AI showed that participants with good knowledge had the highest proportion of positive attitudes (42.7%) and the lowest proportion of negative attitudes (4.5%). Participants with moderate knowledge showed the highest proportion of neutral attitudes (75.0%). However, the association between knowledge level and attitude category was not statistically significant ($\chi^2 = 4.198$, $p = 0.380$) (Table *9*).

Knowledge Level	Attitude			Total	p-value	χ^2 (df)
	Negative	Neutral	Positive			
Poor	2 (11.1)	10 (55.6)	6 (33.3)	18 (100.0)	0.380	4.198 (df=4)
Moderate	1 (8.3)	9 (75.0)	2 (16.7)	12 (100.0)		
Good	4 (4.5)	47 (52.8)	38 (42.7)	89 (100.0)		
Total	7 (5.9)	66 (55.5)	46 (38.7)	119 (100.0)		

TABLE 9: Association Between Knowledge Level and Attitude Toward AI

The knowledge and attitude levels in the two different groups showed no statistically significant differences. Good knowledge was reported by 70.8% of students and 86.7% of dental faculty members (p=0.210). Positive attitudes were observed among 37.1% of students and 43.3% of faculty members, while most participants in both groups demonstrated neutral attitudes (p=0.785) (Table *10*).

Domain	Level	Students (n = 89)	Dental Faculty Members (n = 30)	Total (n = 119)	p-value	χ^2 (df)
Knowledge	Poor	16 (18.0)	2 (6.7)	18 (15.1)	0.210	3.119 (df=2)
	Moderate	10 (11.2)	2 (6.7)	12 (10.1)		
	Good	63 (70.8)	26 (86.7)	89 (74.8)		
Attitude	Negative	5 (5.6)	2 (6.7)	7 (5.9)	0.785	0.485 (df=2)
	Neutral	51 (57.3)	15 (50.0)	66 (55.5)		
	Positive	33 (37.1)	13 (43.3)	46 (38.7)		

TABLE 10: Comparison of Knowledge and Attitude Levels Between Students and Dental Faculty Members

Students vs. faculty comparison: knowledge (p = 0.210), attitude (p = 0.785).

Discussion

The present study showed that the majority of participants had good knowledge of AI, with 67.2% of participants reporting a basic understanding of AI concepts and 82.4% being familiar with its applications in dentistry. Similar results were obtained by Kalaimani et al. [5] and Firincioglulari [6], who showed that the majority of participants were familiar with AI. On the other hand, despite participants' strong interest in AI, AlAhmari [8] and Aldowah et al. [7] reported lower levels of AI knowledge. In keeping with the results of Firincioglulari [6] and Aldowah et al. [7], who also found that participants relied more on social media and the internet than academic sources, social media was the main source of AI-related knowledge among participants. Furthermore, the majority of participants said AI could deliver high-quality, clinically relevant data in real time, with radiographic interpretation being seen as its most useful use. These results are consistent with those of Kalaimani et al. [5] and AlAhmari [8], who found that participants mostly identified AI for its ability to enhance clinical decision-making and its diagnostic accuracy. The study's participants had positive attitudes toward AI and were overwhelmingly in favor of its incorporation into undergraduate and postgraduate dental education. AlAhmari [8], Firincioglulari [6], Kalaimani et al. [5], and Aldowah et al. [7] all found similar results and stressed the significance of integrating AI into dentistry curricula. Additionally, participants did not believe that AI would take the role of dentists, which is in line with previous studies indicating that, despite the growing use of AI, clinical judgment, communication, and patient connection are still crucial components of dental practice.

Most participants demonstrated a good level of AI knowledge (67.2%), while the majority showed a neutral attitude toward AI. This indicates that although knowledge of AI is relatively high, participants may still have concerns regarding its practical implementation. Opposite findings were reported by Aldowah et al. [7], who found positive perceptions despite limited knowledge, and by Kalaimani et al. [5] and Firincioglulari [6], who emphasized the need for further AI education to improve confidence and acceptance. Furthermore, age was significantly associated with knowledge level, whereas gender and educational level showed no significant association, which may reflect greater clinical experience among older participants. In contrast, Firincioglulari [6] reported higher knowledge among male students, while Aldowah et al. [7] found that senior students demonstrated better knowledge than junior students. In addition, no significant association was observed between sociodemographic characteristics and attitudes toward AI, suggesting that acceptance of AI was generally similar across different participant groups. This finding is consistent with previous studies by Aldowah et al. [7] and Kalaimani et al. [5], which also reported generally positive attitudes regardless of participant characteristics. Although participants with good knowledge tended to demonstrate more positive attitudes toward AI, the association was not statistically significant, indicating that attitudes may be influenced by factors beyond knowledge alone, such as confidence in AI and clinical experience. This observation agrees with previous studies, which emphasized that practical AI training, in addition to theoretical knowledge, is essential to improve confidence and facilitate the successful integration of AI into dental practice [5,7].

Comparing the two groups directly, dental faculty showed a somewhat higher rate of good knowledge than students (86.7% vs. 70.8%, p = 0.210) and a slightly higher proportion of positive attitudes (43.3% vs. 37.1%, p = 0.785), though neither difference reached statistical significance and neutral attitudes predominated in both groups. This finding is consistent with previous studies by Kalaimani et al. [5]. This study has certain limitations. The use of a convenience sampling technique at a single dental college limits the generalizability of the findings to dental students and faculty elsewhere. The relatively small sample size, particularly the response rate from dental faculty members and the small number of postgraduate trainees invited, constrained subgroup comparisons and statistical power for some analyses. Knowledge and

attitudes were self-reported using a non-validated questionnaire, which may be subject to recall and social desirability bias and may not fully capture participants' actual competence with AI tools. The cross-sectional design precludes any causal interpretation of the associations observed. Future research involving larger, multi-institutional samples, validated instruments, and longitudinal follow-up is necessary to gain a more comprehensive understanding of AI awareness and its integration into dental education.

Conclusions

Dental students and faculty at Taibah University demonstrated good overall knowledge of AI and positive attitudes toward its application in dentistry. Both groups are excited about AI's potential, believe in its effective use across various aspects of the field, and recognize the need to incorporate AI technology into the dental curriculum to help students learn these emerging technologies. No statistically significant differences in knowledge or attitude were detected between dental faculty and dental students in this sample.

Appendices

Appendix A

Question	Options
Gender	Female Male
What is your age group?	a) 18-24 b) 25-34 c) 35-44 d) 45-54 e) 55 and above
Level of Education	1) 2nd-year dental student 2) 3rd-year dental student 3) 4th-year dental student 4) 5th-year dental student 5) 6th-year dental student 6) Dental Intern 7) Dental Faculty member
Do you have the basic knowledge about the working principle of Artificial Intelligence?	Yes No Not sure
Do you have any ideas about how AI might be used in dentistry?	Yes No Not sure
Are you familiar with the concept of AI and its uses?	Yes No Not sure
Would you like to use a software/program that can be helpful in dentistry?	Yes No Not sure
Source of Information about AI	Social Media Friends & Family Lectures in University Newspaper & Magazine
What according to you are the advantages of using AI? (you can choose more than one option)	AI can deliver vast amounts of clinically relevant high quality data in real time AI has no emotional exhaustion nor physical limitation AI can speed up processes in healthcare and reduce medical errors
In which field of dentistry do you think AI will be most useful?	Interpreting complicated radiographic scans Direct treatment Making a diagnosis Making treatment decisions
Has AI improved doctor-patient relationships?	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
I find the use of artificial intelligence in dentistry and medicine exciting.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence can be used as a definitive diagnostic tool in the diagnosis of diseases.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence can be used as a prognostic tool to predict the course of a disease and determine whether there is a chance of recovery.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence can be used for radiographic diagnosis of tooth caries.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence can be used in the radiographic diagnosis of periodontal diseases.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence can be used in the diagnosis of soft tissue lesions of the mouth.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence can be used in the radiographic diagnosis of pathologies in the jaws.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence applications should be part of undergraduate dental training.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed
Artificial intelligence applications should be part of postgraduate dental training.	Strongly agreed Agreed Neutral Disagreed Strongly disagreed

TABLE 11: Questionnaire

The questionnaire was built by the research team.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Ahmed A. Marghalani

Critical review of the manuscript for important intellectual content: Ahmed A. Marghalani, Omar M. Alaryani

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Taibah University College of Dentistry Research Ethics Committee issued approval TUCDREC/241224/AMarghalani. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Ding H, Wu J, Zhao W, Matinlinna JP, Burrow MF, Tsoi JK: Artificial intelligence in dentistry - a review . Front Dent Med. 2023, 4:85251. 10.3389/fdmed.2023.1085251
2. Bernauer SA, Zitzmann NU, Joda T: The use and performance of artificial intelligence in prosthodontics: a systematic review. Sensors (Basel). 2021, 21:6628. 10.3390/s21196628
3. Karan-Romero M, Salazar-Gamarra RE, Leon-Rios XA: Evaluation of attitudes and perceptions in students about the use of artificial intelligence in dentistry. Dent J (Basel). 2023, 11:125. 10.3390/dj11050125
4. Haleem A, Javaid M, Khan IH: Artificial intelligence (AI) applications in dentistry . Curr Med Res Pract. 2020, 10:36-8.
5. Kalaimani G, Sivapathasundharam B, Chockalingam RM, Karthick P: Evaluation of knowledge, attitude, and practice (KAP) of artificial intelligence among dentists and dental students: a cross-sectional online survey. Cureus. 2023, 15:e44656. 10.7759/cureus.44656
6. Firincioglulari M: Evaluation of knowledge, attitude, and perception of artificial intelligence and its education among dental students in North Cyprus: a cross-sectional online survey. Turk Online J Educ Technol. 2024, 23:20-8.
7. Aldowah O, Almakrami A, Alghuwaynim Y, et al.: Perceptions and knowledge of undergraduate dental students about artificial intelligence in dental schools: a cross-sectional study. J Contemp Dent Pract. 2024, 25:148-55. 10.5005/jp-journals-10024-3633
8. AlAhmari F: Perspectives of Saudi dental students on the impact of artificial intelligence in dentistry: a cross-sectional study. J Res Med Dent Sci. 2022, 10:33-45.
9. Zitzmann NU, Kovaltschuk I, Lenherr P, Dedem P, Joda T: Dental students' perceptions of digital and conventional impression techniques: a randomized controlled trial. J Dent Educ. 2017, 81:1227-32. 10.21815/JDE.017.081
10. Pethani F: Promises and perils of artificial intelligence in dentistry . Aust Dent J. 2021, 66:124-35. 10.1111/adj.12812
11. Altındağ A, Uzun S, Altındağ Ö, Orhan K: Artificial intelligence in dentistry: knowledge, attitudes, and educational readiness among dental students and dentists. BMC Med Educ. 2026, 26:972. 10.1186/s12909-026-09264-x
12. Ali K, Al-Ali A, Safar M, Qudeimat M: Awareness, attitudes, and barriers toward artificial intelligence in dentistry: a cross-sectional survey of dental professionals in Kuwait. Dent J. 2026, 14:618.
13. Abouzeid HL, Chaturvedi S, Abdelaziz KM, Alzahrani FA, AlQarni AA, Alqahtani NM: Role of robotics and artificial intelligence in oral health and preventive dentistry - knowledge, perception and attitude of dentists. Oral Health Prev Dent. 2021, 19:353-63. 10.3290/j.ohpd.b1693873
14. Yılmaz C, Erdem RZ, Uygun LA: Artificial intelligence knowledge, attitudes and application perspectives of undergraduate and specialty students of faculty of dentistry in Turkey: an online survey research. BMC Med Educ. 2024, 24:1149. 10.1186/s12909-024-06106-6
15. Pringle AJ, Kumaran V, Missier MS, Nadar AS: Perceptiveness and attitude on the use of artificial intelligence (AI) in dentistry among dentists and non-dentists - a regional survey. J Pharm Bioallied Sci. 2024, 16:S1481-6. 10.4103/jpbs.jpbs_1019_23
16. Ivanišević A, Tadin A: Artificial intelligence and modern technology in dentistry: attitudes, knowledge, use, and barriers among dentists in Croatia - a survey-based study. Clin Pract. 2024, 14:2623-36. 10.3390/clinpract14060207