ORIGINAL ARTICLE

Awareness and Application of Artificial Intelligence Tools in Prosthodontic Treatment Planning Among Dental Students and Practitioners in Saudi Arabia

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Abstract

Introduction: Artificial intelligence (AI) is increasingly utilized in dentistry to enhance diagnostic accuracy and treatment planning. In prosthodontics, AI tools have shown considerable potential in improving precision and efficiency; however, their awareness and clinical adoption among dental students and practitioners in Saudi Arabia remain limited. **Objectives:** This study aims to assess the awareness, knowledge, and application of AI tools in prosthodontic treatment planning among dental students and practitioners in Saudi Arabia. **Methodology:** A cross-sectional survey was conducted between July and December 2025 using a self-administered online questionnaire distributed through university channels and professional dental platforms. Participants included clinical dental students, interns, general dentists, and prosthodontic specialists actively practicing in Saudi Arabia. Preclinical students and non-prosthodontic practitioners were excluded. A minimum sample size of 384 was calculated, with a target of 422 to compensate for non-response. **Results:** Participants had a mean age of 25.9 years, and 63.7% were female. Most respondents were aware of AI applications in dentistry (81.8%) and acknowledged its role in enhancing treatment accuracy in prosthodontics (86.1%). However, self-rated knowledge was predominantly fair (39.9%) or poor (28.6%), and only 47.7% reported using AI tools in clinical practice. Computer-aided design/Computer-aided manufacturing (CAD/CAM) systems and digital impression technologies were the most commonly used tools. A majority supported integrating AI training into the dental curriculum (87.2%), while barriers included lack of training (44.5%), limited resources, and cost. Higher knowledge and more positive attitudes were significantly associated with older age, higher education level, and increased clinical experience. **Conclusion:** Despite high awareness and positive attitudes toward AI in prosthodontics among dental students and practitioners in Saudi Arabia, the actual application of AI remains limited, largely due to insufficient training and resource constraints. Strategic curriculum development, faculty training, and investment in digital infrastructure are recommended to improve the integration of AI into prosthodontic practice.

Key words: Artificial intelligence, awareness, prosthodontics, Saudi Arabia, treatment planning

INTRODUCTION

John McCarthy, a pioneer of artificial intelligence (AI), introduced the concept in 1956 with the aim of developing machines capable of analyzing data based on user preferences.[1,2] AI encompasses technologies such as neural networks, deep learning, and natural

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language processing and has become increasingly capable of automating complex tasks.[3] In prosthodontics, AI models have been applied for identifying anatomical landmarks, mapping preparation margins, and supporting computer-aided design workflows for various restorations.[4]

The integration of AI into dentistry has expanded rapidly, offering applications in diagnostic imaging, CAD/CAM workflows, and prosthodontic treatment planning.[5] Globally, AI tools, including virtual articulators and three-dimensional simulations, are gaining traction; however, clinical adoption remains limited due to factors such as high costs, inadequate training, and insufficient technological resources.[6]

In Saudi Arabia, several studies have assessed AI awareness among dental professionals. A national survey (n = 839) found that although 90.6% of participants were aware of AI in dentistry, only 25.4% had used AI tools clinically.[5] A multi-city study similarly reported relatively high awareness but low levels of formal training and practical utilization.[7] Prosthodontics-specific research remains limited; one study in Al-Qassim found that although 65.6% were aware of AI in fixed prosthodontics, only 40.3% had hands-on experience, despite strong interest in adopting AI tools (91.4%).[4] Postgraduate prosthodontic programs across the region report CAD/CAM adoption rates ranging from 50% to 80%, though AI integration continues to be hindered by limited faculty expertise and infrastructure.[6]

A 2023 study from Jeddah reported that 72% of dental professionals believed AI could enhance treatment precision; however, only 15% had access to AI-enabled clinical systems, and no significant differences were observed between junior and senior practitioners ($P > 0.05$).[8] Similarly, a 2024 survey from Qassim revealed that although 65.6% of participants were aware of AI, only 40.3% reported a strong understanding of its clinical applications.[9] A 2025 multi-institutional survey found that while 63% of dental students had exposure to digital dentistry, only 28% used AI regularly in clinical practice, primarily due to insufficient training and limited educational resources.[10]

These findings highlight a persistent gap between theoretical awareness and practical utilization of AI in prosthodontics. The present study aims to address this gap by evaluating awareness, knowledge, and application of AI tools among both dental students and practitioners in Saudi Arabia, thereby offering a comprehensive view of readiness for AI integration into prosthodontic treatment planning.

Objectives

This study aims to assess Saudi Arabian dental students' and practitioners' knowledge of and use of AI tools in prosthodontic treatment planning also to investigate how prepared and eager dental professionals and students are to use AI in their clinical work.

METHODOLOGY

Study design and setting

This cross-sectional study was conducted between July and December 2025 to assess awareness, knowledge, and application of AI tools in prosthodontic treatment planning among dental students and practitioners in Saudi Arabia. A self-administered online questionnaire (Google Forms) was distributed through academic institutions, professional networks, and social media platforms.

Sample size

The minimum required sample size for this study was calculated to estimate the overall awareness and application of AI tools in prosthodontic treatment planning among dental students and practitioners in Saudi Arabia. The calculation was performed using the Raosoft sample size calculator (Raosoft, Inc., Seattle, WA, USA), assuming an indicator proportion of 50%, a 5% margin of error, and a 95% confidence interval. The formula applied was:

$$n = \frac{Z^2 \times P(1-P)}{E^2}$$

Where Z = 1.96 for a 95% confidence level, P = 0.50 and E = 0.05. Substituting these values yielded a minimum required sample size of 384 participants. To compensate for a possible non-response rate of 10%, the final target sample size was increased to 422 participants.

Inclusion and exclusion criteria

This study was including clinical dental students and interns currently enrolled in dental schools across Saudi Arabia, as well as licensed dental practitioners, including general dentists and specialists, who are actively practicing within the country. Eligible participants must have experience or involvement in prosthodontic treatment planning. Participation is voluntary, and only those who provide informed consent and can understand and complete the questionnaire in either English or Arabic was included.

Exclusion criteria consist of preclinical dental students (from the 1st–3rd year of study), dental professionals not engaged in prosthodontic care (such as oral surgeons without relevant exposure), and individuals who do not currently reside or practice in Saudi Arabia. In addition, those who choose not to participate or who fail to complete the questionnaire was excluded from the study. Non-clinical personnel, including dental technicians, hygienists, and administrative staff, are also excluded.

Method for data collection, instrument

An electronic questionnaire was developed to evaluate dental students' and practitioners' awareness and application of AI

tools in prosthodontic treatment planning in Saudi Arabia. The questionnaire's clarity, content validity, and reliability were confirmed through pilot testing with selected participants and review by experts, including statisticians and dental professionals. The survey was distributed electronically to a convenience sample of dental students and practitioners across Saudi Arabia. Participation was voluntary and anonymous, with informed consent implied by completion of the questionnaire.

The questionnaire used in this study was structured into four main sections. The first section collected demographic data, including age, gender, academic or professional status, and residential area. The second section assessed participants' awareness and knowledge of AI concepts and tools in dentistry, with a specific focus on their familiarity with AI applications in prosthodontics. The third section explored participants' attitudes and perceptions toward the integration of AI in prosthodontics, including their willingness to learn about and adopt such technologies. The fourth section examined the actual application of AI tools in prosthodontic treatment planning, covering the types of tools used and the perceived barriers to their adoption.

Awareness scores were calculated by awarding one point for each correct response to designated awareness questions, yielding a total score ranging from 0 to 6. Based on Bloom's cutoff criteria, participants' awareness levels were categorized as low, moderate, or high.

Scoring system

The application of AI tools in prosthodontics treatment planning among dental students and practitioners in Saudi Arabia is assessed using a total of 45 statements. Correct responses are awarded one point, while incorrect responses receive zero. Bloom's cutoff point is used to evaluate the level of knowledge and application. According to this criterion, a high level of knowledge and application is defined as 80–100% (equal to or >45 points), a moderate level as 60–79% (34–44points), and low level as <60% (34 points or fewer).

Pilot test

A pilot test was conducted on a small sample of approximately 20 participants to assess the clarity, simplicity, and feasibility of the questionnaire. Feedback was used to make necessary adjustments before distributing the final version. The data collected from the pilot test were not be included in the main study analysis.

Analyzes and entry method

Data were entered into the device using the "Microsoft Office Excel Software" with Windows (2021). After the data were collected, it was statistically analyzed using the Statistical Package for the Social Science Software (SPSS) tool, version 20 (IBM SPSS Statistics for Microsoft Windows, Version 21.0). Descriptive statistics were used to summarize the numerical variables for baseline characteristics. For categorical variables, frequencies and percentages were calculated. The Chi-square test was used to identify associations between categorical variables.

RESULTS

Table 1 displays various demographic parameters of the participants with a total number of (812). Most participants were young dental professionals with a mean age of 25.9 years with a majority of them being females (63.7%). The majority (37.3% southern and 31.4% western) of the respondents belonged to the south and the west. The sample was balanced in the number of dental students, interns, and

Table 1: Sociodemographic characteristics of participants (*n*=812)

Parameter	No.	Percentage
Age (mean: 25.9, STD: 5.3)		
18–22	181	22.3
23–24	188	23.2
25–26	176	21.7
27–28	102	12.6
29 or more	165	20.3
Gender		
Female	517	63.7
Male	295	36.3
Residential area		
Northern region	53	6.5
Southern region	303	37.3
Central region	150	18.5
Eastern region	51	6.3
Western region	255	31.4
Educational qualification		
4th-year dental student	151	18.6
5th-year dental student	105	12.9
6th-year dental student	130	16.0
Intern	111	13.7
General dentist	185	22.8
Specialist	130	16.0
Years of experience		
<3 years	269	33.1
3–5 years	96	11.8
More than 5 years	89	11.0
None	358	44.1

STD: Standard deviation

practicing dentists to present a holistic view regarding the application of AI in prosthodontic care. Interestingly, 44.1% said that they did not have any clinical experience.

As shown in Figure 1, most of the participants (39.9%) considered their level of knowledge as good and poor (28.6%), which is an average level of awareness. Only a lower percentage (24.5) had good knowledge and only 7% said that their understanding was excellent.

Table 2 shows that the awareness of the participants about AI in dentistry is high, with 77.3% of them knowing the basic principles of AI and 81.8% of people being aware of the use of AI in dental care. Furthermore, 86.1 of them were aware of the role of AI in improving the accuracy and outcomes of prosthodontic treatment. Nevertheless, few of them (66% specifically) were conversant with its application in the field of prosthodontics, like in actualizing crowns design and even simulation of treatments. Even with such awareness, most of the respondents rated their knowledge as fair (39.9% or 28.6%).

As shown in Figure 2, a huge percent (55.8) strongly agreed or (34.4) agreed, which strongly reflects optimism on the clinical benefits of AI in improving quality and reducing procedure time. The percentage of those who left it was only a small percentage (9.4%), and the percentage of those who disagreed was minimal (0.5%).

Table 3 shows that most of the participants gave affirmative answers that AI can improve the quality of treatment (55.8), accuracy (52.3), and shorten the time of the procedure. In addition, 87.2% of them were in favor of the integration of AI training into dental literature, and more than 83.0% were interested in learning and using AI tools in their practice in future. It is remarkable that 81.6% believed that AI would have a significant impact on the future of prosthodontics, but only a smaller segment of participants (64.2) felt that it had the potential to eliminate some of the work of clinicians.

Table 4 shows that almost half of the respondents (47.7%) have used AI tools in the treatment planning in prosthodontic practice, of which, 30.3% and 29.7% are related to digital planning and image analysis, respectively. The most used tools were CAD/CAM (36.9%) and digital impression systems (35.5). Although this is a positive uptake, 44.5% of the respondents cited a lack of training as the greatest obstacle to the use of AI. The educational interest was high with most participants (83%) having a positive view about the inclusion of AI in the dental curriculum. Furthermore, 43.3% believed that AI would be a normal practice in 3–5 years.

Table 5 shows that more than half of the participants showed a high level of knowledge regarding AI tools in prosthodontic treatment (72%), while 28% reported low knowledge level.

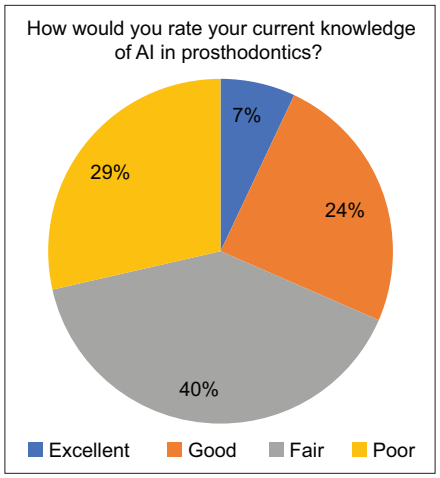

Figure 1: Participants current knowledge of artificial intelligence in prosthodontics

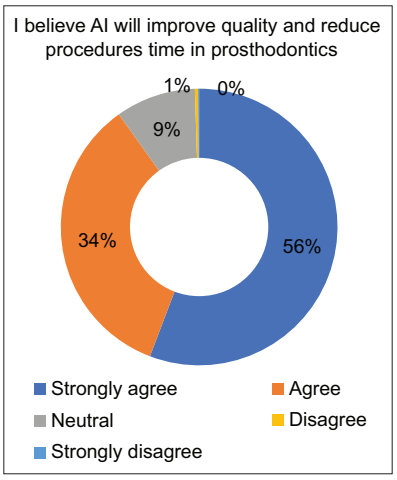

Figure 2: Illustrates participants' trust in AI in improving quality and reducing procedure time

Table 6 shows that most participants showed a high level of attitude regarding AI tools in prosthodontic treatment (76.5%). While 21.1% reported moderate attitude level, and only 2.5% had low attitude level toward AI in prosthodontics treatment.

Table 7 shows that more than half of the participants showed low level of application of AI tools in prosthodontic treatment (59.4%), while only 40.6% reported high application level of AI.

Table 8 shows that knowledge and awareness about AI tools in prosthodontic treatment had statistically significant relation to age ($P = 0.001$), educational qualifications ($P = 0.0001$), and years of experience ($P = 0.0001$). It also shows statistically insignificant relation to gender and residential area.

Table 9 shows that attitude and practice about AI tools in prosthodontic treatment had statistically significant relation to age ($P = 0.003$) and residential area ($P = 0.048$). It also

Table 2: Parameters related to knowledge and awareness regarding AI tools in prosthodontic treatment (*n*=812)

Parameter	No.	Percentage
Familiar with the basic concepts of AI in dentistry		
No	184	22.7
Yes	628	77.3
I am aware of AI tools such as Chat GPT, image analysis systems, and deep learning models		
No	124	15.3
Yes	688	84.7
I know that AI applications can enhance the accuracy and outcomes of prosthodontics treatment planning		
No	113	13.9
Yes	699	86.1
Have you heard of artificial intelligence "AI" in dentistry?		
No	148	18.2
Yes	664	81.8
Are you familiar with the use of AI in prosthodontics, for example, crowns design and treatment simulation?		
No	276	34.0
Yes	536	66.0
How would you rate your current knowledge of AI in prosthodontics?		
Excellent	57	7.0
Good	199	24.5
Fair	324	39.9
Poor	232	28.6

AI: Artificial intelligence

shows statistically insignificant relation to gender educational qualifications and years of experience.

Table 10 shows that level of application of AI tools in prosthodontic treatment had statistically significant relation to age (P = 0.0001) and residential area (P = 0.029), educational qualification (P = 0.0001), and years of experience (P = 0.0001). It also shows statistically insignificant relation to gender.

DISCUSSION

The present study aimed to assess the awareness, knowledge, and application of AI tools in prosthodontic treatment planning among dental students and practitioners in Saudi Arabia. This research is timely, given the increasing integration of AI in dental practice, particularly in prosthodontics, where such

Table 3: Participants' attitude and practice toward AI tools in prosthodontic treatment (*n*=812)

Parameter	No.	Percentage
I believe AI will improve quality and reduce procedures time in prosthodontics		
Strongly agree	453	55.8
Agree	279	34.4
Neutral	76	9.4
Disagree	3	0.4
Strongly disagree	1	0.1
I support including AI training in the dental education curriculum		
Strongly agree	482	59.4
Agree	226	27.8
Neutral	78	9.6
Disagree	23	2.8
Strongly disagree	3	0.4
I am interested in learning and training on AI tools in prosthodontics		
Strongly agree	456	56.2
Agree	220	27.1
Neutral	114	14.0
Disagree	18	2.2
Strongly disagree	4	0.5
I believe AI can improve treatment accuracy in prosthodontics		
Strongly agree	425	52.3
Agree	272	33.5
Neutral	99	12.2
Disagree	12	1.5
Strongly disagree	4	0.5
I am interested in learning more about AI in dentistry		
Strongly agree	507	62.4
Agree	213	26.2
Neutral	79	9.7
Disagree	8	1.0
Strongly disagree	5	0.6
I am willing to adopt AI tools in my future clinical practice		
Strongly agree	421	51.8
Agree	252	31.0
Neutral	113	13.9
Disagree	21	2.6
Strongly disagree	5	0.6
AI will play a major role in the future of prosthodontic treatment		

(*Contd*...)

Table 3: (*Continued*)

Parameter	No.	Percentage
Strongly agree	421	51.8
Agree	242	29.8
Neutral	121	14.9
Disagree	18	2.2
Strongly disagree	10	1.2
AI can replace some tasks currently done by clinicians		
Strongly agree	311	38.3
Agree	210	25.9
Neutral	183	22.5
Disagree	80	9.9
Strongly disagree	28	3.4

AI: Artificial intelligence

tools have potential to improve diagnostic precision, treatment workflows, and patient outcomes.[11-15] The principal findings of this cross-sectional survey involving 812 participants indicated a high level of awareness regarding AI applications in dentistry (81.8%), with most recognizing the value of AI in enhancing treatment accuracy and efficiency, yet a majority reported only moderate to low actual clinical application. This discussion compares our data with existing literature, explores implications, and briefly outlines study limitations.

Our results reflect high AI awareness levels, with 81.8% of participants cognizant of AI's role in dental care, and 86.1% aware that AI may improve prosthodontic treatment accuracy. Previous surveys in Saudi Arabia echo these findings, for example, Aljulaydan *et al*. reported that 65.6% of dental students, interns, and dentists were acquainted with AI applications in fixed prosthodontics, and more than 70% recognized its value for enhancing treatment.[4] Similar data from Gad *et al*. showed that exposure to digital dentistry and AI was moderate to high among dental students, yet less than one-third reported regular use in clinical practice.[9] These findings, including our own, collectively highlight a consistent pattern: while knowledge is prevalent, translation into hands-on practice remains limited. The present study's assessment of clinical application found that only 47.7% of respondents had personally used AI-based tools in prosthodontic treatment planning, with CAD/CAM and digital impression systems being the most utilized. These results align with BioMed central (BMC) Oral Health's multi-institutional survey of Saudi prosthodontics postgraduate programs, where half to 80% of respondents used CAD/CAM, but actual AI integration lagged due to limited resources and lack of structured training.[20] The international evidence further supports these observations; Schwendicke *et al*., in a systematic review, demonstrated that AI has been most successfully implemented in diagnostic imaging, treatment

Table 4: Participants' application of AI tools in prosthodontic treatment (*n*=812)

Parameter	No.	Percentage
Have you used AI tools in prosthodontic treatment planning?		
No	425	52.3
Yes	387	47.7
If yes, what type of application?* (*n*=387)		
Digital planning	246	30.3
Images analysis	241	29.7
Simulation	185	22.8
Treatment plan	2	0.2
Others	3	0.4
What barriers do you face in applying AI?		
Cost	255	31.4
Resources	176	21.7
Training	361	44.5
All	11	1.4
None	9	1.1
Have you ever used any AI-based tools in prosthodontics treatment planning?		
No	369	45.4
Yes	443	54.6
If yes, which tools have you used? (Select all that apply)* (*n*=443)		
CAD/CAM	300	36.9
Digital impression systems	288	35.5
Virtual treatment planning software	178	21.9
None	369	45.4
Do you think AI tools should be included in the dental curriculum?		
No	70	8.6
Yes	674	83.0
Not sure	68	8.4
In your opinion, how soon will AI become a standard part of prosthodontics practice?		
Within 1–2 years	195	24.0
In 3–5 years	352	43.3
After more than 5 years	157	19.3
Never	17	2.1
Unsure	91	11.2
Which of the following AI tools are you aware of in dental practice? (Select all that apply)*		

(*Contd*...)

Table 4: (*Continued*)

Parameter	No.	Percentage
CAD/CAM systems	615	75.7
Virtual articulators	250	30.8
Digital smile design software	405	49.9
AI-based diagnostic tools	252	31.0
3D printing with AI integration	355	43.7
None of the above	86	10.6
Have you received any formal education or training on AI in dentistry?		
No	454	55.9
Yes	358	44.1

*Results may overlap. AI: Artificial intelligence

Table 5: Shows knowledge and awareness about artificial intelligence tools in prosthodontic treatment score results

Knowledge level	Frequency	Percentage
High knowledge level	585	72.0
Low knowledge level	227	28.0
Total	812	100.0

Table 6: Attitude and practice about artificial intelligence tools in prosthodontic treatment score results

Attitude level	Frequency	Percentage
High attitude level	621	76.5
Moderate attitude level	171	21.1
Low attitude level	20	2.5
Total	812	100.0

Table 7: Application of artificial intelligence tools in prosthodontic treatment score results

Level of application	Frequency	Percent
High level of application	330	40.6
Low level of application	482	59.4
Total	812	100.0

simulation, and digital workflow optimization, but reported a gap between theoretical and practical adoption due to education and infrastructure barriers.[21] Attitudes toward AI were particularly positive in this cohort, with 87.2% supporting the inclusion of AI-centric education in the dental curriculum and more than 83% expressing interest in future AI adoption. These data mirror the optimism documented by Khanagar *et al*., who noted that clinicians recognize the great potential of AI for workflow efficiency, patient-specific planning, and outcome refinement.[10] Notably, 76.9% of

Table 8: Relationship between knowledge and awareness about artificial intelligence tools in prosthodontic treatment and sociodemographic characteristics

Parameters	Knowledge and awareness		Total (*n*=812)	*P*-value
	High knowledge level	Low knowledge level		
Gender				
Female	376	141	517	0.566
	64.3%	62.1%	63.7%	
Male	209	86	295	
	35.7%	37.9%	36.3%	
Age				
18–22	110	71	181	0.001
	18.8%	31.3%	22.3%	
23–24	145	43	188	
	24.8%	18.9%	23.2%	
25–26	133	43	176	
	22.7%	18.9%	21.7%	
27–28	81	21	102	
	13.8%	9.3%	12.6%	
29 or more	116	49	165	
	19.8%	21.6%	20.3%	
Residential area				
Northern region	38	15	53	0.616
	6.5%	6.6%	6.5%	
Southern region	210	93	303	
	35.9%	41.0%	37.3%	
Central region	107	43	150	
	18.3%	18.9%	18.5%	
Eastern region	38	13	51	
	6.5%	5.7%	6.3%	
Western region	192	63	255	
	32.8%	27.8%	31.4%	
Educational qualification				
4th-year dental student	92	59	151	0.0001
	15.7%	26.0%	18.6%	
5th-year dental student	68	37	105	
	11.6%	16.3%	12.9%	
6th-year dental student	98	32	130	
	16.8%	14.1%	16.0%	

(*Contd*...)

Table 8: (*Continued*)

Parameters	Knowledge and awareness		Total (*n*=812)	*P*-value
	High knowledge level	Low knowledge level		
Intern	93	18	111	
	15.9%	7.9%	13.7%	
General dentist	143	42	185	
	24.4%	18.5%	22.8%	
Specialist	91	39	130	
	15.6%	17.2%	16.0%	
Years of experience				
<3 years	216	53	269	0.0001
	36.9%	23.3%	33.1%	
3–5 years	72	24	96	
	12.3%	10.6%	11.8%	
More than 5 years	71	18	89	
	12.1%	7.9%	11.0%	
None	226	132	358	
	38.6%	58.1%	44.1%	

**P*-value was considered significant if ≤0.05

the Qassim-based respondents believed that AI will play a pivotal role in the future of prosthodontics,[4] an outlook corroborated among our participants (81.6%). Despite broad awareness, proficiency and actual application were unevenly distributed, with knowledge and practical scores most strongly associated with age, level of education, and clinical experience rather than gender or geographic area. These observations are consistent with findings reported by Radwan *et al*. and Madfa *et al*., both of whom described how exposure to technology and direct hands-on training are critical for bridging the gap between theoretical preparation and clinical practice.[16,17] Our data underscore significant obstacles to AI integration in practice, most notably lack of formal training (44.5%), insufficient resources, and perceived high costs. Similar barriers were reported by Aboalshamat *et al*. in a national survey: Lack of educational opportunity (73%) and limited clinical evidence were the predominant impediments.[7] Systematic reviews, including Schwendicke *et al*. and others, concur that infrastructural investment, staff upskilling, and ongoing curriculum reform are necessary to facilitate widespread adoption.[11] Several limitations warrant mention in our study. The cross-sectional design precludes causal inference, and the convenience sampling introduces potential selection bias toward participants with greater technological engagement. Responses were self-reported and may involve recall bias or social desirability effects. Furthermore, while the sample was demographically broad, relative underrepresentation from certain regions or subgroups may impact external

Table 9: Relationship between attitude and practice about artificial intelligence tools in prosthodontic treatment and sociodemographic characteristics

Parameters	Attitude and practice		Total (*n*=812)	*P*-value
	High attitude level	Moderate/ low attitude level		
Gender				
Female	388	129	517	0.204
	62.5%	67.5%	63.7%	
Male	233	62	295	
	37.5%	32.5%	36.3%	
Age				
18–22	125	56	181	0.003
	20.1%	29.3%	22.3%	
23–24	141	47	188	
	22.7%	24.6%	23.2%	
25–26	152	24	176	
	24.5%	12.6%	21.7%	
27–28	75	27	102	
	12.1%	14.1%	12.6%	
29 or more	128	37	165	
	20.6%	19.4%	20.3%	
Residential area				
Northern region	40	13	53	0.048
	6.4%	6.8%	6.5%	
Southern region	249	54	303	
	40.1%	28.3%	37.3%	
Central region	112	38	150	
	18.0%	19.9%	18.5%	
Eastern region	38	13	51	
	6.1%	6.8%	6.3%	
Western region	182	73	255	
	29.3%	38.2%	31.4%	
Educational qualification				
4th-year dental student	103	48	151	0.067
	16.6%	25.1%	18.6%	
5th-year dental student	81	24	105	
	13.0%	12.6%	12.9%	
6th-year dental student	105	25	130	
	16.9%	13.1%	16.0%	
Intern	85	26	111	
	13.7%	13.6%	13.7%	

(*Contd*...)

Table 9: (*Continued*)

Parameters	Attitude and practice		Total (*n*=812)	*P*-value
	High attitude level	Moderate/ low attitude level		
General dentist	151	34	185	
	24.3%	17.8%	22.8%	
Specialist	96	34	130	
	15.5%	17.8%	16.0%	
Years of experience				
<3 years	215	54	269	0.306
	34.6%	28.3%	33.1%	
3–5 years	72	24	96	
	11.6%	12.6%	11.8%	
More than 5 years	70	19	89	
	11.3%	9.9%	11.0%	
None	264	94	358	
	42.5%	49.2%	44.1%	

**P*-value was considered significant if ≤0.05

Table 10: Relationship between level of application of artificial intelligence tools in prosthodontic treatment and sociodemographic characteristics

Parameters	Level of application		Total (*n*=812)	*P*-value
	High level of application	Low level of application		
Gender				
Female	203	314	517	0.291
	61.5%	65.1%	63.7%	
Male	127	168	295	
	38.5%	34.9%	36.3%	
Age				
18–22	48	133	181	0.0001
	14.5%	27.6%	22.3%	
23–24	62	126	188	
	18.8%	26.1%	23.2%	
25–26	94	82	176	
	28.5%	17.0%	21.7%	
27–28	42	60	102	
	12.7%	12.4%	12.6%	
29 or more	84	81	165	
	25.5%	16.8%	20.3%	
Residential area				
Northern region	20	33	53	0.029
	6.1%	6.8%	6.5%	
Southern region	105	198	303	
	31.8%	41.1%	37.3%	
Central region	68	82	150	
	20.6%	17.0%	18.5%	
Eastern region	28	23	51	
	8.5%	4.8%	6.3%	
Western region	109	146	255	
	33.0%	30.3%	31.4%	
Educational qualification				
4th-year dental student	42	109	151	0.0001
	12.7%	22.6%	18.6%	
5th-year dental student	24	81	105	
	7.3%	16.8%	12.9%	
6th-year dental student	38	92	130	
	11.5%	19.1%	16.0%	
Intern	65	46	111	
	19.7%	9.5%	13.7%	
General dentist	91	94	185	
	27.6%	19.5%	22.8%	
Specialist	70	60	130	
	21.2%	12.4%	16.0%	
Years of experience				
<3 years	122	147	269	0.0001
	37.0%	30.5%	33.1%	
3–5 years	51	45	96	
	15.5%	9.3%	11.8%	
More than 5 years	50	39	89	
	15.2%	8.1%	11.0%	
None	107	251	358	
	32.4%	52.1%	44.1%	

**P*-value was considered significant if ≤0.05

(*Contd*...)

validity. Future studies should employ longitudinal designs and focus on outcome-based metrics to further elucidate the real-world impact of AI in prosthodontics.

CONCLUSION

Our investigation corroborates growing but unevenly realized readiness for AI integration in prosthodontic practice across Saudi Arabia. The field is well-positioned for ongoing innovation, which provided that strategic investments in digital infrastructure, targeted training programs, and outcome-focused research continue to address gaps between awareness and clinical application. Emphasis on experiential learning, faculty development, and policy alignment will be critical to harness the full transformative potential of AI in dental education and prosthodontic care.

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ETHICAL APPROVAL

After fully explaining the study and emphasizing that participation was optional, each participant gave informed consent. The information gathered was safely stored and utilized exclusively for the study.

INFORMED CONSENT

Written informed consent was acquired from each study participant.

DATA AND MATERIALS AVAILABILITY

All data associated with this study are presented in the paper.

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