

Original article

# Knowledge, Attitudes, and Practices Regarding Artificial Intelligence Among Dental Professionals and Students

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## Abstract

Artificial intelligence (AI) is increasingly integrated into dental diagnostics, treatment planning, and education, yet the extent of awareness and engagement among dental professionals remains largely unexplored. This study assessed the knowledge, attitudes, and practices (KAP) regarding AI among a diverse sample of dental students, postgraduate trainees, practicing dentists, and faculty members. A cross-sectional, self-administered online questionnaire was distributed to 109 respondents between January 17 and February 6, 2026, capturing demographic data, AI familiarity, attitudinal perceptions, and views on accountability for AI-related errors. Results indicate that while 57.8% of respondents were familiar with the general concept of AI, knowledge of specific clinical applications, such as orthodontic planning (29.4%) and automated caries detection (36.7%), was notably lower. Participants demonstrated cautious optimism; 59.6% agreed that AI would drive professional advancements, and a similar percentage (59.6%) disagreed that AI would replace dentists. However, only 13.7% trusted AI outputs over human second opinions, and 50.5% expressed concerns regarding the loss of manual clinical skills. Furthermore, 69.7% of respondents advocated for shared accountability between dentists and software developers for AI-related misdiagnoses. In conclusion, dental professionals prefer to use AI as a diagnostic aid rather than a replacement, reflecting a desire for shared responsibility. These findings highlight a critical need to integrate applied AI content into dental curricula to bridge the gap between general awareness and deep clinical application.

**Keywords:** Artificial Intelligence, Dentistry, Knowledge Attitudes and Practices, Dental Education.

## Introduction

Artificial intelligence (AI) has moved from a theoretical concept to an applied clinical tool across multiple domains of dentistry, including radiographic interpretation, automated caries detection [1,2], orthodontic diagnosis and treatment planning [3,4], and administrative workflow automation. Deep learning models applied to bitewing, periapical, and panoramic radiographs have demonstrated caries-detection sensitivities and specificities that in several studies approach or match those of experienced clinicians [1,2], while AI-assisted tools for cephalometric analysis, landmark identification, and treatment-planning support are increasingly incorporated into orthodontic digital workflows, albeit still requiring human oversight [3,4].

As AI-enabled tools become more accessible — including general-purpose generative AI systems such as ChatGPT — dental students, trainees, and practicing clinicians are increasingly exposed to these technologies both in formal education and informal settings such as social media. Surveys of dental educators and students indicate rapidly growing use of chatbot-based tools for learning and clinical reasoning support, alongside persistent uncertainty about appropriate boundaries for their use [5,6].

Despite this growing exposure, the dental curriculum in most institutions has not yet formally incorporated AI literacy as a core competency [6]. Understanding how dental professionals and trainees currently perceive AI — what they know, how they feel about it, and how they use it in practice — is a necessary first step toward designing appropriate educational interventions and professional guidelines.

Knowledge, Attitudes, and Practices (KAP) surveys are a well-established methodology for characterizing a population's readiness for a new technology or public health intervention, and have previously been applied to AI in dentistry among students and practitioners in several country contexts, generally reporting moderate-to-good basic knowledge alongside cautiously positive attitudes [7–11]. This study applies the KAP framework to AI in dentistry, with the aim of answering three questions: (1) How familiar are dental students and professionals with AI concepts and applications? (2) What attitudes do they hold toward AI's clinical role, trustworthiness, and educational integration? (3) How is AI currently used in practice, and who is perceived as accountable when AI contributes to error?

## Methods

### Study Design and Setting

This was a cross-sectional, descriptive survey study conducted via an anonymous, self-administered online questionnaire (Google Forms). The survey was open for responses between January 17, 2026, and February 6, 2026.

## Participants

Participants were recruited from among undergraduate dental students, postgraduate students, practicing dentists, and dental faculty members. Participation was voluntary and anonymous. A total of 109 complete responses were collected and included in the final analysis; no responses were excluded.

## Ethical Approval

This study received ethical approval from the Scientific Research Ethics Committee (SREC), Faculty of Dentistry, University of Benghazi, Benghazi, Libya (Approval No. 0404; approved 10 May 2026). All participants provided informed consent prior to participation, and responses were collected anonymously.

## Instrument

The questionnaire consisted of five sections: (1) demographic information (gender, academic/professional year, primary source of AI-related information); (2) knowledge and awareness of AI concepts and specific clinical applications (orthodontic treatment planning, automated caries detection), answered as yes / no / not sure; (3) attitudinal items rated on a five-point Likert scale (strongly disagree to strongly agree) covering fear of professional replacement, perceived diagnostic benefit, trust relative to human judgment, perceived impact on the profession, and support for curricular integration; (4) practice and ethics items, including frequency of generative AI use for academic purposes, the primary perceived concern regarding AI in dentistry, and perceived responsibility for AI-related misdiagnosis; and (5) an optional open-ended item for additional comments.

## Data Analysis

Responses were tabulated and analyzed descriptively using frequencies and percentages for all categorical items. Where relevant, responses were cross-tabulated by academic/professional role to explore differences in knowledge, attitudes, and concerns across respondent groups. Analysis was conducted in Python. No inferential statistical testing was performed, given the descriptive, exploratory aims of the study and the unequal group sizes; differences reported across subgroups should be interpreted as descriptive patterns rather than statistically confirmed effects.

## Results

### Sample Characteristics

Of 109 respondents, 96 (88.1%) identified as female and 13 (11.9%) as male. By academic/professional group, 43 (39.4%) were undergraduate students, 31 (28.4%) postgraduate students, 24 (22.0%) practicing dentists, and 11 (10.1%) faculty members. The most common sources of AI-related information were social media (42.2%) and university lectures (41.3%), followed distantly by scientific journals (11.9%) and friends/family (4.6%). Notably, information sources varied by role: faculty and postgraduate students relied more heavily on scientific journals (55% and 19% of their respective groups) than undergraduates (2%), who relied predominantly on social media (58%).

**Table 1. Sample demographic characteristics (N = 109)**

| Characteristic         | Category              | n  | %    |
|------------------------|-----------------------|----|------|
| Gender                 | Female                | 96 | 88.1 |
|                        | Male                  | 13 | 11.9 |
| Role                   | Undergraduate student | 43 | 39.4 |
|                        | Postgraduate student  | 31 | 28.4 |
|                        | Practicing dentist    | 24 | 22.0 |
|                        | Faculty member        | 11 | 10.1 |
| Primary AI info source | Social Media          | 46 | 42.2 |
|                        | University Lectures   | 45 | 41.3 |
|                        | Scientific Journals   | 13 | 11.9 |
|                        | Friends & Family      | 5  | 4.6  |

### Knowledge and Awareness

A majority of respondents (57.8%) reported being familiar with the basic concept of AI, while 27.5% were unsure and 14.7% were not familiar. Awareness dropped notably for application-specific knowledge: only 29.4% were aware of AI use in orthodontic treatment planning (51.4% not aware, 19.3% unsure), and 36.7% were aware of AI use in automated caries detection (42.2% not aware, 21.1% unsure). This gap suggests that general awareness of AI as a concept has outpaced awareness of its concrete clinical applications in dentistry.

**Table 2. Knowledge and awareness of AI concepts and applications (N = 109).**

| Item                                      | Yes, % | No, % | Not sure, % |
|-------------------------------------------|--------|-------|-------------|
| Familiar with basic AI concepts           | 57.8   | 14.7  | 27.5        |
| Aware of AI in orthodontic planning       | 29.4   | 51.4  | 19.3        |
| Aware of AI in automated caries detection | 36.7   | 42.2  | 21.1        |

### Attitudes

Attitudinal responses reflected cautious optimism rather than either enthusiasm or resistance. Concern about AI replacing dentists was relatively low: 59.6% disagreed or strongly disagreed, 22.0% were neutral, and 18.4% agreed or strongly agreed. A slim majority (51.4%) agreed AI would reduce human diagnostic error, though 22.0% remained neutral and 26.6% disagreed. Trust in AI relative to a human second opinion was the least favorable attitude measured: only 13.7% agreed or strongly agreed they trusted AI more than a human colleague, while 57.8% disagreed or strongly disagreed. Perceived professional impact was more positive, with 59.6% agreeing that AI would lead to major advances in dentistry. Support for making AI a mandatory part of the dental curriculum was moderate-to-positive, with 52.3% agreeing or strongly agreeing, 28.4% neutral, and 19.3% disagreeing or strongly disagreeing.

**Table 3. Distribution of attitudinal responses on a five-point Likert scale (N = 109)**

| Attitude item                        | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|--------------------------------------|-------------------|----------|---------|-------|----------------|
| Worried AI will replace dentists     | 26.6%             | 33.0%    | 22.0%   | 14.7% | 3.7%           |
| AI reduces human diagnostic error    | 10.1%             | 16.5%    | 22.0%   | 43.1% | 8.3%           |
| Trust AI more than human 2nd opinion | 16.5%             | 41.3%    | 28.4%   | 11.9% | 1.8%           |
| AI will lead to major advances       | 6.4%              | 12.8%    | 21.1%   | 41.3% | 18.3%          |
| AI should be mandatory in curriculum | 5.5%              | 13.8%    | 28.4%   | 45.0% | 7.3%           |

### Practice and Perceived Accountability

Regarding use of generative AI tools (e.g., ChatGPT) for academic purposes, 26.6% reported daily use, 29.4% weekly, 35.8% rarely, and 8.3% never — indicating that the large majority of respondents (91.7%) have at least occasional exposure to generative AI in their studies.

When asked about their primary concern regarding AI in dentistry, half of the respondents (50.5%) selected loss of manual/clinical skills, followed by ethical liability (22.0%), data privacy (19.3%), and high cost (8.3%). On the question of accountability for AI misdiagnosis, a clear majority (69.7%) held that responsibility should be shared between the dentist and the software company ("Both"), while 17.4% assigned responsibility solely to the dentist and 12.8% solely to the software company.

**Table 4. Practice patterns and perceived accountability (N = 109).**

| Item                               | Category              | %    |
|------------------------------------|-----------------------|------|
| GenAI use frequency                | Daily                 | 26.6 |
|                                    | Weekly                | 29.4 |
|                                    | Rarely                | 35.8 |
|                                    | Never                 | 8.3  |
| Primary concern                    | Loss of manual skills | 50.5 |
|                                    | Ethical liability     | 22.0 |
|                                    | Data privacy          | 19.3 |
|                                    | High cost             | 8.3  |
| Responsibility for AI misdiagnosis | Both (shared)         | 69.7 |
|                                    | The Dentist           | 17.4 |
|                                    | The Software Company  | 12.8 |

### Differences by Academic/Professional Role

Cross-tabulation by role revealed several descriptive patterns. Self-reported familiarity with AI concepts was highest among postgraduate students (67.7%) and undergraduates (60.5%), and notably lowest among faculty (27.3%) — despite faculty relying most heavily on scientific journals as an information source. Concern profiles also diverged: undergraduates most frequently cited data privacy (32.6%) as their top concern, whereas dentists, faculty, and postgraduate students converged on loss of manual skills as their leading concern (62.5%, 63.6%, and 61.3% respectively). Support for mandatory AI curriculum content was highest among faculty (72.7%) and lowest among practicing dentists (33.3%), with undergraduates (58.1%) and postgraduates (51.6%) in between. Worry about professional replacement was low across all groups (14–23%) with no clear role-based pattern.

**Table 5. Selected knowledge, concern, and attitude indicators by academic/professional role.**

| Role (n)           | Familiar with AI, % | Top concern (%)              | Supports mandatory curriculum, % |
|--------------------|---------------------|------------------------------|----------------------------------|
| Undergraduate (43) | 60.5                | Data privacy (32.6)          | 58.1                             |
| Postgraduate (31)  | 67.7                | Loss of manual skills (61.3) | 51.6                             |
| Dentist (24)       | 54.2                | Loss of manual skills (62.5) | 33.3                             |
| Faculty (11)       | 27.3                | Loss of manual skills (63.6) | 72.7                             |

### Qualitative Comments

A small number of respondents provided open-ended comments. Recurring themes among these were that AI is best positioned as a supportive or adjunct tool rather than a replacement for clinical judgment, that its current accuracy is still limited relative to expectations, and that formal training on AI applications during clinical internship would be valued. A minority of comments expressed outright rejection of AI's role in dentistry. Given the small number and brevity of responses, these comments are reported as illustrative themes rather than systematically coded qualitative data.

### Discussion

This study found that dental students and professionals hold generally favorable but measured attitudes toward AI in dentistry, broadly consistent with prior KAP surveys in this field that have similarly reported moderate knowledge alongside cautious optimism [1–5]. The gap between general AI familiarity (57.8%) and awareness of specific clinical applications (29–37%) suggests that exposure to AI as a cultural or technological phenomenon — largely through social media — has not translated into application-specific clinical literacy, echoing prior findings that postgraduate and faculty populations with greater exposure to the primary literature tend to report higher application-specific awareness than undergraduates relying on informal sources [3,5]. This is consistent with the finding that social media was the leading information source overall, particularly among undergraduates, while more clinically grounded sources such as scientific journals were used mainly by faculty and postgraduate students.

Low trust in AI relative to human judgment (only 13.7% agreement), combined with relatively low fear of professional replacement and majority agreement that AI will drive advances in the field, together paint a picture of AI being viewed as a complementary diagnostic aid rather than an autonomous decision-maker. This aligns with the broader evidence base on AI in caries detection and orthodontics, where AI models frequently match expert-level performance on narrow diagnostic tasks yet are consistently described as requiring human supervision rather than functioning as autonomous decision-makers [6–9]. This interpretation is reinforced by the qualitative comments emphasizing AI's role as a "supportive tool."

The finding that loss of manual/clinical skills was the dominant concern, particularly among dentists, faculty, and postgraduates, may reflect this group's greater proximity to hands-on clinical training and awareness of deskilling risk, whereas undergraduates — who have had less exposure to hands-on clinical practice to date — were more concerned about data privacy. The finding that faculty most strongly supported mandatory AI curriculum content, despite reporting the lowest personal familiarity with AI, may indicate that faculty recognize a gap in their own and their students' AI literacy and see curricular reform as the appropriate response, a concern also raised in reviews calling for structured institutional guidance on generative AI in dental education [11].

The near-70% preference for shared accountability between dentist and software developer for AI misdiagnosis is a notable finding with direct relevance to emerging discussions of AI liability frameworks in healthcare. Legal and ethical analyses of AI-related medical error consistently note that accountability is currently distributed and unsettled across clinicians, institutions, and developers, with no single well-defined standard of liability yet established [12,13]. The respondents' preference for shared responsibility suggests that, from the practitioner's perspective, AI is not perceived as a tool whose use absolves the clinician of responsibility, nor as one for which the clinician alone should bear full liability — a view broadly congruent with current legal scholarship on this question [12,13].

### Limitations

The study's findings are constrained by several methodological issues. The sample was drawn from a single institution without random selection, limiting generalizability. Respondents were predominantly female (88.1%), which may not represent the wider dental community. Group sizes were unequal, and no inferential statistical tests were applied, so role-based differences remain descriptive rather than statistically validated. Reliance on self-reported measures introduces potential bias, as responses were not verified against objective knowledge testing. The qualitative component was weak due to limited substantive comments, reducing depth of insight. Finally, the cross-sectional design prevents assessment of changes in knowledge, attitudes, or practices over time.

### Conclusion

Dental students and professionals in this sample demonstrated general awareness of AI but limited knowledge of its specific clinical applications, alongside cautiously positive attitudes that favor AI as a diagnostic aid rather than a replacement for clinical judgment. Concerns centered on loss of manual skills and, among students, data privacy, while a

strong majority favored shared accountability between clinicians and AI developers for diagnostic error. These findings support integrating structured, application-specific AI education into dental curricula, particularly given that faculty — despite reporting the lowest personal familiarity — were the strongest advocates for mandatory curricular inclusion. Future research with larger, more demographically balanced samples and validated knowledge instruments would help confirm and extend these findings.

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### Conflicts of Interest

The authors declare no conflicts of interest. The authors have no personal or financial circumstances or interests that could be perceived as having inappropriately influenced the representation or interpretation of the reported research results.

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