Tec Empresarial
P-ISSN: 1659-2395; E-ISSN: 1659-3359

KNOWLEDGE, ATTITUDES, AND PRACTICES OF DENTAL PRACTITIONERS REGARDING INFECTION CONTROL IN SAUDI ARABIA: A SYSTEMATIC REVIEW OF CROSS-SECTIONAL SURVEYS

Dr. Nada Mushabab Algahtani
Corresponding Author, General dental and master in quality and patient safety,
Namalgahtani@moh.gov.sa, ministry of health - Imam Abdul Rahman Al Faisal Hospital, Riyadh

Abstract

Background. Infection control protects both patients and dental staff, yet the Saudi literature on how practising dentists understand and apply it has not been consolidated against verified primary studies. *Objective.* To synthesise primary evidence on knowledge, attitudes, and practices (KAP) regarding infection control among practising dentists and dental healthcare personnel in Saudi Arabia. *Methods.* PubMed was searched for English-language studies published from 2015 to 2025, following PRISMA 2020 reporting. Surveys of practising dentists or dental healthcare personnel in Saudi Arabia were eligible; surveys of students only or of patients were excluded. Data were extracted by one reviewer, methodological features were tabulated, and findings were synthesised narratively with a GRADE-informed certainty judgement. *Results.* Of 42 records, 10 studies met the criteria: nine questionnaire surveys (3,145 respondents) and one clinic-level survey (53 clinics), with data collected between 2014 and 2023. Knowledge was moderate and uneven; for example, 43.9% of dentists identified the correct COVID-19 incubation period and 54.6% of dental professionals showed average knowledge of impression disinfection. Attitudes toward protective measures were mostly positive (85.9% to 93.3% agreement on PPE use and glove and mask changes). Self-reported practice was high for basic measures (90.1% of dental healthcare workers in Hail scored at least 75% on a compliance scale; 94.3% to 98.1% of surveyed clinics reported gloves, gowns, and masks) but weaker for procedure-specific and infrastructure items, including endodontic file reprocessing (mean compliance 63.5%) and airborne isolation rooms (absent in 72% of respondents' clinics). Infection control training was reported by 53% to 84% of respondents, and perceived institutional commitment and adequate training were associated with better compliance. *Conclusions.* Saudi dental practitioners report positive attitudes and good adherence to basic precautions, with gaps in procedure-specific practice, infrastructure, and training coverage. Certainty is low because all studies are self-reported cross-sectional surveys. Observational audits, a shared KAP instrument, and structured training with institutional follow-up are priorities.

Keywords: infection control; dentistry; knowledge, attitudes, and practice; compliance; Saudi Arabia; systematic review

1. Introduction

Dental care involves close contact with saliva and blood, aerosol-generating instruments, and reusable devices, so dental practitioners and their patients are exposed to a range of transmissible pathogens. National guidance such as the United States Centers for Disease Control and Prevention summary of infection prevention practices in dental settings sets out basic expectations, including hand hygiene, personal protective equipment (PPE), sterilisation of reusable instruments, and safe injection and sharps handling (Centers for Disease Control and Prevention [CDC], 2016). Having guidance does not guarantee that it is applied. A systematic review of Iranian studies concluded

that knowledge, attitudes, and practice of infection control among dentists and dental students there were inadequate and fell short of global standards (Moradi Khanghahi et al., 2013). Interview data from dental clinics in the United States likewise show that staff with prior training still met practical barriers, including PPE shortages, discomfort, and incompatibility with specialty equipment, during the COVID-19 pandemic (Vogt et al., 2023).

In Saudi Arabia, a regional survey of dental healthcare workers in Hail reported high self-reported compliance with standard precautions and linked it to institutional commitment and perceived training adequacy (Haridi et al., 2016). A survey of dentists in Riyadh found that those who complied better with infection control procedures reported fewer past infections (Al-Zoughool & Al-Shehri, 2018). Since 2020, a cluster of surveys has examined how dentists responded to COVID-19, and newer work has looked at specific procedures such as impression disinfection and endodontic file reprocessing (Almalki & Khayat, 2024; Binassfour et al., 2024). These studies differ in population, instrument, and timing, and no review has brought them together while excluding surveys of students and patients, whose behaviour cannot stand in for that of practising clinicians.

This review therefore asks: among practising dentists and dental healthcare personnel in Saudi Arabia, what is the reported level of knowledge, attitudes, and practice regarding infection control, and which factors are associated with compliance? Findings are set against international evidence to show what is shared and what may be specific to the Saudi context.

2. Methods

2.1 Design and reporting

The review followed the PRISMA 2020 statement (Page et al., 2021). It was not prospectively registered, and no protocol was published. Because the included studies are cross-sectional surveys with different outcome measures, a narrative synthesis was planned rather than a meta-analysis.

2.2 Eligibility criteria

Studies were eligible if they (a) surveyed practising dentists or dental healthcare personnel working in Saudi Arabia, (b) reported knowledge, attitudes, practice, or compliance related to infection control, (c) used a primary quantitative design, and (d) were published in English between January 2015 and December 2025. Studies were excluded if respondents were students or interns only, patients, or auxiliary staff only; if practitioners could not be separated from students in the reported results; if the topic was not infection control practice (for example, antibiotic prescribing or financial impact); if the sample was outside Saudi Arabia or multinational without a separable Saudi group; or if the record was a review, editorial, or commentary.

2.3 Information sources and search

PubMed was searched through its programmatic interface on 19 November 2026, with the publication-date filter set to 2015–2025. Free-text and MeSH-mapped queries combined dentists or dental clinics with infection control, knowledge, attitude, practice, compliance, and Saudi Arabia, for example "dentists infection control knowledge attitude practice Saudi Arabia" and "dental infection control Saudi Arabia cross-sectional compliance dentists", plus topic-specific queries (hand hygiene, sharps injury and hepatitis B vaccination, dental clinics in Jeddah, and a systematic-review filter). Known-item searches were used to verify specific records. Records were de-duplicated by PubMed identifier. Embase, Scopus, CINAHL, Web of Science, and grey literature were not searched (see Limitations).

2.4 Selection and data extraction

One reviewer screened titles and abstracts and assessed eligibility. For each included study the reviewer extracted region, design, data-collection period, sample size and response, population, and the main knowledge, attitude, practice, and compliance results. Values were taken from the PubMed record; for two studies whose abstracts omitted the sample size, the open-access full text was consulted (Al-Khalifa et al., 2020; Mustafa et al., 2020). No author contact was attempted.

2.5 Methodological appraisal and certainty

Most appraisal was necessarily at abstract level, so a numerical checklist score was not assigned. Instead, the sampling frame, response, instrument validation, and reliance on self-report were tabulated, and the principal source of bias for each study was noted. Certainty of evidence for each KAP domain was judged in a GRADE-informed manner, starting low for observational cross-sectional designs and adjusting for risk of bias, inconsistency, indirectness, and imprecision. No formal GRADE profile was produced.

2.6 Synthesis

Results were grouped by KAP domain and by the factors examined in the original studies (training, institutional support, experience, and sector). Percentages are reported as given by the study authors. Indicators were not pooled because instruments and scoring differ, and no funnel-plot or small-study analysis was undertaken, since fewer than ten comparable estimates were available for any single outcome.

3. Results

3.1 Study selection

The searches returned 42 unique records. Nine were excluded at title and abstract screening as off-topic or published before 2015. Of the 33 records assessed, 23 were excluded: five surveyed students only, two surveyed patients, four combined students and practitioners without separable results, one surveyed laboratory technicians only, four addressed topics other than infection control practice, six had non-Saudi or multinational samples, and one was a narrative review. Ten studies were included (Figure 1).

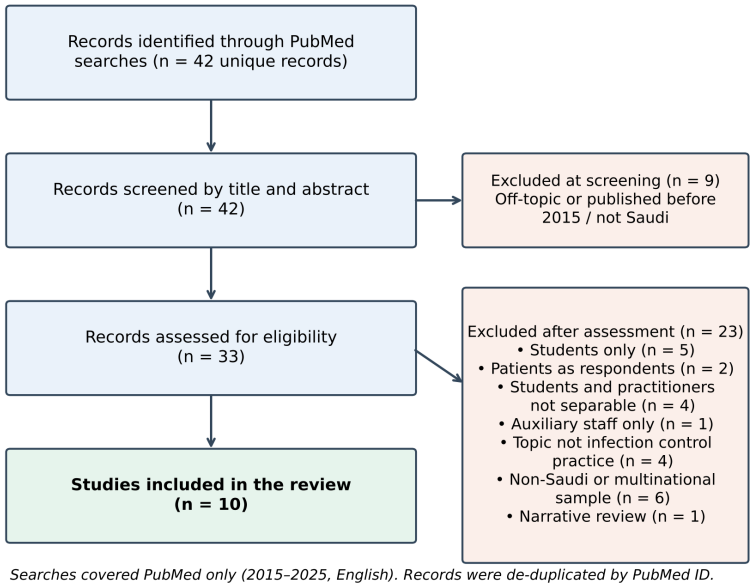


Figure 1. PRISMA 2020 flow diagram of study selection. Counts come from PubMed searches run on 19 November 2026; records were de-duplicated by PubMed identifier.

3.2 Study characteristics

Nine studies were individual-level questionnaire surveys and one sampled dental clinics. Together the nine surveys enrolled 3,145 respondents, ranging from 176 to 718 per study, and the clinic survey covered 53 clinics. Where dates were reported, data collection ran from 2014 (Hail) through the first half of 2020 (Mustafa, Al-Khalifa, and Nassar) to 2022 and 2023 (Binassfour and Almalki); two studies were published before COVID-19 and the others did not give dates in the abstract. Seven of the ten studies were framed around COVID-19-era guidance. Three had a regional or city focus (Hail, Riyadh, Jeddah), and the other seven recruited dentists across the country. Table 1 summarises the studies.

Table 1. Characteristics of the 10 included studies

Study	Region	Design and data collection	Participants	Focus
Haridi et al. (2016)	Hail	Regional questionnaire survey; Aug–Nov 2014	307 dental healthcare workers (response 73.1%)	Compliance with standard precautions
Al-Zoughool & Al-Shehri (2018)	Riyadh	Questionnaire survey in three clinic types	515 dentists (274 male, 241 female)	Compliance, injury, and infection
Natto et al. (2021)	Jeddah	Ecological correlational survey of randomly sampled clinics	53 clinics (10 declined)	COVID-19-era infection control protocols
Mustafa et al. (2020)	National	Online convenience survey; 17 Mar–3 Apr 2020	269 dentists	KAP and risk perception, COVID-19
Al-Khalifa et al. (2020)	National	Online survey of random list; 23–31 May 2020	287 dentists (response 28.7%)	Preparedness and infection control measures
Tarakji et al. (2021)	National	Social-media survey; dates not stated in abstract	177 dentists (response 28.2%)	Awareness and practice, COVID-19
Nassar (2021)	National	Online survey; Mar–May 2020	294 dentists	Knowledge of COVID-19 and MOH guidelines
ALOsaimi et al. (2022)	National	Online survey with expert-validated 45-item tool	176 dental healthcare personnel (143 practitioners)	KAP of infection control
Binassfour et al. (2024)	National	Online survey; Dec 2022–Mar 2023	718 dentists, assistants, technicians, hygienists	Impression disinfection protocol
Almalki & Khayat (2024)	National	Electronic survey; Jun–Jul 2023	402 dentists performing endodontics	Endodontic file use and reprocessing

MOH, Saudi Ministry of Health; KAP, knowledge, attitudes, and practice. All included studies were conducted in Saudi Arabia (setting tag: Saudi).

3.3 Methodological features

All studies relied on self-reported questionnaires, which invites social desirability and recall bias. Only Natto et al. (2021) and Al-Khalifa et al. (2020) used a random sampling frame; the latter drew 1,000 e-mail addresses from a national licensing database but achieved a response of 28.7%. Several studies recruited through social media or messaging groups, which cannot support estimates of the whole workforce. Instrument validation was reported for most studies, but no two used the same questionnaire (Table 2).

Table 2. Methodological features and principal bias concern of included studies

Study	Sampling	Response	Instrument	Principal concern
Haridi et al. (2016)	All health facilities in region	73.1%	Self-report scale; validation not stated in abstract	Self-reported compliance; authors flag dental assistants and private staff
Al-Zoughool & Al-Shehri (2018)	Three clinic types, Riyadh	Not stated in abstract	Structured questionnaire	Self-reported compliance and injury; recall bias
Natto et al. (2021)	Random sample of clinics	53 of 63 (84.1%)	Survey built from ADA, CDC, and MOH guidance	Clinic-level data; not individual behaviour
Mustafa et al. (2020)	Convenience, WhatsApp and Facebook	About 45% (269 of about 600)	Pilot test-retest, Cronbach alpha 0.89	Convenience sample; early-outbreak timing
Al-Khalifa et al. (2020)	Random list of 1,000 licensed dentists	28.7%	Pretested on 20 dentists; ICC 0.70	Low response; self-report
Tarakji et al. (2021)	Social media	28.2% (177 of 627)	24-item questionnaire	Low response; self-selection
Nassar (2021)	Online sample	Not stated in abstract	Online questionnaire	Self-selection; early-outbreak timing
ALOsaimi et al. (2022)	Convenience sample	Not stated in abstract	Expert panel and pilot	Convenience sample; small n
Binassfour et al. (2024)	Social media	Not stated in abstract	Validated, reliable 38-item tool	Self-selection; mixed professions
Almalki & Khayat (2024)	Distribution not stated in abstract	Not stated in abstract	Validated electronic tool	Self-reported compliance score

ICC, intra-class correlation coefficient; ADA, American Dental Association; CDC, Centers for Disease Control and Prevention. "Not stated in abstract" means the value was not available to the reviewer at the level of appraisal used.

3.4 Knowledge

Knowledge was moderate and uneven across topics. Among 269 dentists surveyed early in the outbreak, 43.9% identified the correct incubation period, and only 24.9% had attended COVID-19 training (Mustafa et al., 2020). In another national sample, 72.4% of 294 dentists knew about the published MOH guidelines, and awareness of PPE donning and doffing guidance was 64.6% and 78.6%, respectively (Nassar, 2021). On impression disinfection, 54.6% of 718 dental professionals had average knowledge, and knowledge differed by profession, nationality, qualification, and experience (Binassfour et al., 2024). ALOsaimi et al. (2022) described acceptable knowledge overall, with better scores among dental assistants and respondents in private universities. Awareness of the MOH policy on endodontic file reprocessing was 76.1% among 402 dentists (Almalki & Khayat, 2024).

3.5 Attitudes

Attitudes toward protective measures were generally positive. In Mustafa et al. (2020), 85.9% agreed that PPE protects against suspected COVID-19 patients and 93.3% considered changing masks and gloves between patients important; 86.6% preferred not to treat suspected cases. ALOsaimi et al. (2022) reported acceptable attitudes with no significant differences between groups. Attitudes were less favourable on a specific procedure: 54.7% of respondents held neutral attitudes toward impression disinfection (Binassfour et al., 2024).

3.6 Practice and compliance

Self-reported compliance with basic measures was high. In Hail, 90.1% of dental healthcare workers reached at least 75% on a compliance scale, 86.3% were aware of standard-precaution guidelines, and 88.9% reported hepatitis B vaccination (Haridi et al., 2016). Among Jeddah clinics, 98.1%, 96.2%, and 94.3% used gloves, gowns, and face masks, respectively, during all procedures (Natto et al., 2021). Among 287 dentists, 89% said they routinely followed universal precautions before the pandemic and 88% reported following MOH COVID-19 guidance (Al-Khalifa et al., 2020). Surface cleaning after each patient was reported by 91.5% (Tarakji et al., 2021), and 76.5% showed adequate practice on impression disinfection (Binassfour et al., 2024).

Procedure-specific and infrastructure indicators were weaker. Mean compliance with the MOH policy on endodontic files was 63.5% (SD 16.7), only 13.2% used single-use files, and 36.6% did not use an endodontic box (Almalki & Khayat, 2024). In Al-Khalifa et al. (2020), an airborne infection isolation room and an extra-oral suction system were absent from the clinics of 72% and 59% of respondents, and about half reported no staff training sessions for COVID-19 management. Patient temperature screening was reported by 92% and 88.7% of dentists in two surveys, but by only 30.2% of Jeddah clinics (Figure 2A); the clinic-level unit of the Jeddah study limits direct comparison. Table 3 lists the main findings by study.

Table 3. Main findings of included studies by knowledge, attitude, and practice domain

Study	Knowledge	Attitudes	Practice and compliance	Other findings
Haridi et al. (2016)	86.3% aware of standard precautions	—	90.1% scored ≥75% on compliance scale	84.4% trained; 88.9% hepatitis B vaccinated; OR 4.34 (institutional commitment), 3.51 (adequate training), 2.99 (dentist role)

Study	Knowledge	Attitudes	Practice and compliance	Other findings
Al-Zoughool & Al-Shehri (2018)	Occupational safety knowledge assessed	—	Better compliance linked to fewer infections: OR 0.31 (95% CI 0.12–0.84)	More experience, fewer injuries (OR 0.48, 0.38); safety training not linked to fewer injuries
Natto et al. (2021)	—	—	Gloves 98.1%, gown 96.2%, mask 94.3%; temperature check 30.2%; mask on entry 58.5%	COVID-19 incidence among dentists 11.79%
Mustafa et al. (2020)	43.9% correct incubation period	85.9% PPE useful; 93.3% change gloves and masks	—	68% infection control trained; 24.9% COVID-19 trained
Al-Khalifa et al. (2020)	83% familiar with transmission-based precautions	72% would wear N95 routinely	89% universal precautions (pre-pandemic); 88% followed MOH guidance; 92% temperature checks	AIIR absent 72%; extra-oral suction absent 59%; older dentists more compliant (97.6% vs 85.9%)
Tarakji et al. (2021)	Most aware of transmission and symptoms	—	Temperature check 88.7%; surface cleaning 91.5%; emergency-only care 82.5%	Some inappropriate practices noted
Nassar (2021)	72.4% knew MOH guidelines; PPE donning 64.6%, doffing 78.6%	All agreed on masks and hand sanitiser	—	53% had infection control training
ALOsaimi et al. (2022)	Acceptable; higher in assistants and private universities	Acceptable; no group differences	Facilities acknowledged by most	More training recommended
Binassfour et al. (2024)	54.6% average	54.7% neutral	76.5% adequate	r = 0.283 (knowledge–practice), 0.258 (knowledge–attitude), 0.196 (attitude–practice)

Study	Knowledge	Attitudes	Practice and compliance	Other findings
Almalki & Khayat (2024)	76.1% aware of MOH file policy	—	Mean compliance 63.5% (SD 16.7); single-use files 13.2%	36.6% no endodontic box

AIIR, airborne infection isolation room; OR, odds ratio; CI, confidence interval; — , not reported in the abstract or text available to the reviewer. Figures are as reported by study authors.

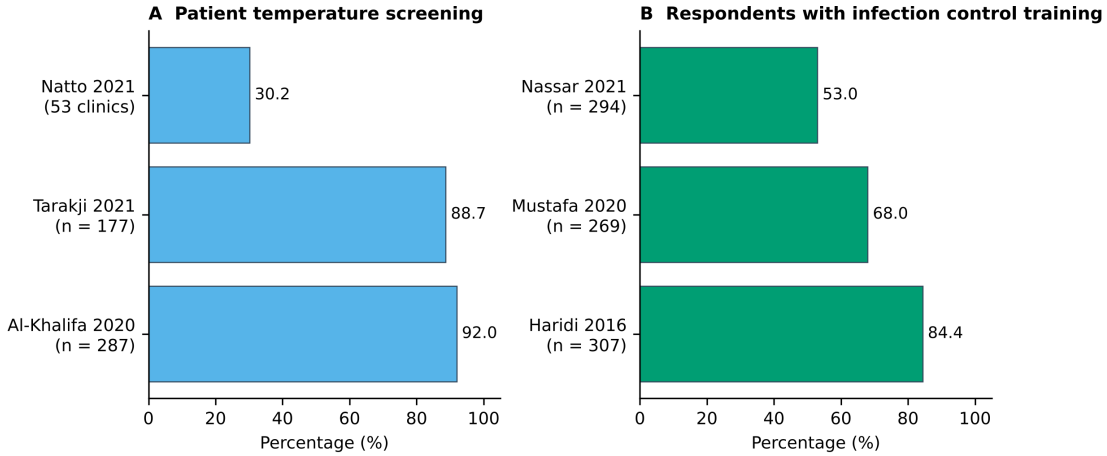


Figure 2. Comparable indicators from included studies: (A) proportion reporting patient temperature screening; (B) proportion of respondents reporting infection control training. Values are percentages as reported by study authors; sample sizes are shown beside each study. Natto et al. (2021) reports clinic-level data; the other studies report individual respondents, so bars are not pooled.

3.7 Factors associated with compliance

Training coverage varied: 84.4% in Hail, 68% and 24.9% (general infection control and COVID-19-specific) in the national sample of Mustafa et al. (2020), and 53% in Nassar (2021) (Figure 2B). In Hail, perceived institutional commitment (OR 4.34), perceived training adequacy (OR 3.51), and working as a dentist rather than another role (OR 2.99) independently predicted good compliance (Haridi et al., 2016). In Riyadh, higher compliance was associated with fewer reported infections, whereas having attended safety training was not associated with fewer injuries or infections (Al-Zoughool & Al-Shehri, 2018). Experience and age showed mixed links: older dentists reported more routine use of universal precautions (97.6% versus 85.9%) in Al-Khalifa et al. (2020), and more years of practice were associated with fewer injuries in Riyadh. Sector findings were inconsistent. Private-sector dentists were more familiar with transmission-based precautions (89.7% versus 80.2%) in Al-Khalifa et al. (2020), respondents in private universities had higher knowledge scores in ALOsaimi et al. (2022), and Haridi et al. (2016) called for attention to dental assistants and private-sector staff. No study showed a consistent advantage of public over private practice.

3.8 Certainty of evidence

Certainty was low or very low for all domains (Table 4). Every study was a self-reported cross-sectional survey, response was often low or unknown, and instruments differed, so estimates cannot be compared directly or pooled.

Table 4. GRADE-informed certainty of evidence by domain

Domain	Studies	Certainty	Main reasons
Knowledge	9	Low	Cross-sectional design; convenience sampling; different instruments and topics (COVID-19, procedures); estimates not comparable
Attitudes	5	Low	Self-report; positive attitudes consistent in direction but measured with different items
Practice and compliance	8	Very low	Self-reported behaviour without observational verification; low or unknown response; wide variation in indicators
Association of training and institutional support with compliance	2	Very low	Cross-sectional associations only; one study found no link between safety training and injury; confounding likely

Counts show studies contributing results to each domain in Table 3. Certainty ratings are the reviewer's judgement, not a formal GRADE profile.

4. Discussion

This review brings together ten studies of dental practitioners in Saudi Arabia. Three patterns stand out. First, attitudes toward infection control were consistently positive, and self-reported adherence to basic precautions such as gloves, masks, and surface cleaning was high. Second, results were weaker where measurement moved from generic precautions to specific procedures or infrastructure, such as endodontic file reprocessing, impression disinfection, and isolation facilities. Third, training and institutional commitment were the factors most often linked to better compliance, although the evidence is correlational.

The link between knowledge and practice appears real but modest. In the largest survey, knowledge, attitude, and practice scores correlated with coefficients between 0.20 and 0.28 (Binassfour et al., 2024), which suggests that knowledge on its own explains little of behaviour and that organisational conditions matter. This fits the Hail finding that institutional commitment and training adequacy predicted compliance (Haridi et al., 2016), and the Riyadh finding that compliance, rather than training attendance, was associated with fewer infections (Al-Zoughool & Al-Shehri, 2018). The pattern suggests that the content, follow-up, and workplace reinforcement of training may matter more than whether training was attended.

Resource and infrastructure gaps recur. Few clinics had airborne isolation rooms or extra-oral suction during the pandemic (Al-Khalifa et al., 2020), and only 13.2% of dentists used single-use endodontic files (Almalki & Khayat, 2024). The United States interviews likewise recorded PPE shortages and modification of protocols even among trained staff (Vogt et al., 2023; Table 5), which indicates that infrastructure and supply limits are not unique to Saudi Arabia. By contrast, the Iranian systematic review described inadequate knowledge, attitudes, and practice (Moradi Khanghahi et al., 2013). The Saudi surveys report more favourable figures, but the studies differ in period, instruments, and respondent groups, and self-reported scores are likely to overstate observed behaviour, so the two bodies of evidence should not be ranked against each other.

Table 5. International comparator studies used to contextualise the Saudi findings

Study	Setting tag	Design	Sample	Key finding	Relevance
Moradi Khanghahi et al. (2013)	International (Iran)	Systematic review of Iranian studies, 1985–2012	15 articles from 698 records	Knowledge, attitude, and practice of infection control judged inadequate; PPE use and measures below global standards	Regional benchmark; older evidence
Vogt et al. (2023)	International (USA)	Semistructured qualitative interviews in 8 dental clinics	70 and 63 dental healthcare personnel in two interview rounds	86% reported prior training; PPE shortages, discomfort, and reuse were common barriers; an educational video was found helpful	Shows that supply and practical barriers persist even with training

Setting tag distinguishes Saudi evidence (Tables 1 to 3) from international comparators. Findings are as reported in the PubMed abstracts.

Public-private comparisons were inconsistent in this evidence base. This matters because a common assumption is that regulated public facilities outperform private clinics. The available studies did not show a stable ordering, and some indicators favoured private settings. Sector comparisons should therefore be tested with observational audits and adjusted analyses before they inform policy.

4.1 Implications

- Pair self-report with direct observation or audit, since self-reported compliance is subject to social desirability bias.
- Adopt a shared, validated KAP instrument aligned with MOH and CDC guidance so that studies can be compared and pooled.
- Target training at procedure-specific tasks, such as instrument reprocessing and impression disinfection, and follow it with institutional checks.
- Report sector, region, profession, and experience in a way that allows stratified comparison, including for dental assistants and private clinics.

4.2 Strengths and limitations

Strengths include a defined question, exclusion of student and patient surveys that would dilute the practitioner evidence, and extraction checked against the PubMed record. Limitations are material. Only PubMed was searched, so relevant studies indexed elsewhere may be missing, and the search was run through a programmatic interface with a limited set of queries. Screening and extraction were done by one reviewer, most appraisal was at abstract level, and the review was not registered. English-language restriction may have excluded Arabic-language reports. The included studies are self-reported cross-sectional surveys with low or unknown response, and several were fielded in the early weeks of the COVID-19 outbreak, when guidance was changing; findings may not generalise to routine practice. No meta-analysis or publication-bias assessment was possible.

International comparison rests on two studies and should be read as context rather than as a formal comparison.

5. Conclusions

Dental practitioners in Saudi Arabia report positive attitudes and generally high adherence to basic infection control precautions, but results are weaker for procedure-specific practices, infrastructure, and training coverage. Perceived institutional commitment and training adequacy are the factors most consistently associated with compliance. Because the evidence is low-certainty and entirely self-reported, the next step is observational and audit-based assessment using a common instrument, followed by evaluation of structured training programmes with institutional follow-up.

Declarations

Registration and protocol: not registered. *Ethics approval and consent:* not applicable; the review used published data only. *Funding:* Not applicable. *Data availability:* all extracted data appear in Tables 1 to 4 and can be verified against the cited records and their DOIs. *Use of AI:* AI assistance was used for literature retrieval from PubMed, data extraction, and drafting. All extracted values and references were checked against the PubMed records, and the authors remain responsible for the content. *Origin:* this article was developed from a research project submitted for the Executive Master of Healthcare Quality and Patient Safety (HQS590), 2025; the evidence base was rebuilt and verified for this version.

References

Al-Khalifa, K. S., AlSheikh, R., Al-Swuailem, A. S., Alkhalifa, M. S., Al-Johani, M. H., Al-Moumen, S. A., & Almomen, Z. I. (2020). Pandemic preparedness of dentists against coronavirus disease: A Saudi Arabian experience. *PLOS ONE, 15*(8), Article e0237630. https://doi.org/10.1371/journal.pone.0237630

Almalki, M., & Khayat, W. (2024). The use and reprocessing of endodontic files in Saudi Arabia: A cross-sectional study. *Cureus, 16*(2), Article e54427. https://doi.org/10.7759/cureus.54427

ALOsaimi, M. M., Almeslet, A. S., & ALWisali, Q. M. (2022). Knowledge, attitude, and practice of infection control among dental healthcare personnel: The updated guidelines for COVID-19 in dental settings. *The Journal of Contemporary Dental Practice, 23*(11), 1150–1156. https://doi.org/10.5005/jp-journals-10024-3430

Al-Zoughool, M., & Al-Shehri, Z. (2018). Injury and infection in dental clinics: Risk factors and prevention. *Toxicology and Industrial Health, 34*(9), 609–619. https://doi.org/10.1177/0748233718769553

Binassfour, A. S., Baseer, M. A., & Ingle, N. A. (2024). Knowledge, attitude, and practice of dental health professionals toward dental impression disinfection protocol during the COVID-19 pandemic in Saudi Arabia: A cross-sectional study. *BMC Medical Education, 24*(1), Article 246. https://doi.org/10.1186/s12909-024-05238-z

Centers for Disease Control and Prevention. (2016). *Summary of infection prevention practices in dental settings: Basic expectations for safe care*. U.S. Department of Health and Human Services.

Haridi, H. K., Al-Ammar, A. S., & Al-Mansour, M. I. (2016). Compliance with infection control standard precautions guidelines: A survey among dental healthcare workers in Hail Region, Saudi Arabia. *Journal of Infection Prevention, 17*(6), 268–276. https://doi.org/10.1177/1757177416645344

Moradi Khanghahi, B., Jamali, Z., Pournaghi Azar, F., Naghavi Behzad, M., & Azami-Aghdash, S. (2013). Knowledge, attitude, practice, and status of infection control among Iranian

dentists and dental students: A systematic review. *Journal of Dental Research, Dental Clinics, Dental Prospects, 7*(2), 55–60. https://doi.org/10.5681/joddd.2013.010

Mustafa, R. M., Alshali, R. Z., & Bukhary, D. M. (2020). Dentists' knowledge, attitudes, and awareness of infection control measures during COVID-19 outbreak: A cross-sectional study in Saudi Arabia. *International Journal of Environmental Research and Public Health, 17*(23), Article 9016. https://doi.org/10.3390/ijerph17239016

Nassar, A. A. (2021). Knowledge about coronavirus disease 2019: Implication for dentists in Saudi Arabia. *Nigerian Journal of Clinical Practice, 24*(5), 747–752. https://doi.org/10.4103/njcp.njcp_340_20

Natto, Z. S., Alshehri, M. M., & Alghamdi, F. K. (2021). Infection control practices at the dental clinics in Jeddah, Saudi Arabia. *Journal of Multidisciplinary Healthcare, 14*, 2951–2957. https://doi.org/10.2147/JMDH.S330567

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372*, Article n71. https://doi.org/10.1136/bmj.n71

Tarakji, B., Nassani, M. Z., Alali, F. M., Alsalhani, A. B., Alqhtani, N. R., Bin Nabhan, A., Alenzi, A., & Alrafedah, A. (2021). COVID-19: Awareness and practice of dentists in Saudi Arabia. *International Journal of Environmental Research and Public Health, 18*(1), Article 330. https://doi.org/10.3390/ijerph18010330

Vogt, L. C., Reske, K. A., Park, D., Habrock Bach, T., Stewart, H. B., Arter, O. G., Stoeckel, D., Steinkamp, H. M., Liang, S. Y., Durkin, M. J., & Kwon, J. H. (2023). Personal protective equipment use among dental healthcare personnel during the coronavirus disease 2019 (COVID-19) pandemic and the impact of an educational video in clinical practice. *Infection Control & Hospital Epidemiology, 44*(9), 1472–1480. https://doi.org/10.1017/ice.2023.6