Review Article

Safa A. Azim Osman, Mohammed Seedahmed, Susu Zughaier and Kamran Ali*

Antibiotic prescribing patterns in general dental practice- a scoping review

https://doi.org/10.1515/med-2025-1352
Received July 22, 2025; accepted November 21, 2025;
published online December 19, 2025

Abstract

Introduction: Antibiotic prescribing in general dental practice is common and may contribute to antimicrobial resistance. A scoping review was undertaken to map the existing literature on patterns of antibiotics prescriptions in general dental practice to gain a more focused understanding of prescribing behaviors of general dental practitioners (GDPs).

Content: This review was conducted in accordance with the PRISMA extension for Scoping Reviews. The review protocol was registered on the Open Science Framework. Eligibility criteria included original research studies which reported the antibiotic prescribing behaviors of GDPs and published between January 1990–February 2025. Scopus and PubMed were searched, followed by screening of the articles based on the eligibility criteria. A total of 2,076 records were retrieved following searches on PubMed and Scopus. Title and abstract screening were carried out for 215 articles, and 34 articles were considered for full text screening and finally 17 studies were included in the review. Antibiotics were prescribed for a wide range of conditions including cellulitis, abscesses, periapical infection, and periodontal conditions. Amoxicillin and amoxicillin with clavulanic acid were prescribed most commonly.

Summary: The results highlight a disconnect between professional guidelines and prescribing practices of dentists. Dentists appear to prescribe antibiotics for clinical situations which may be managed better with operative interventions.

Outlook: The review underscores the need to improve antibiotic stewardship in general dental practice settings to curb inappropriate antibiotic use and address the escalating threat of antimicrobial resistance.

Keywords: antibiotics; antimicrobials; antibiotic resistance; dentists; general dental practice

Highlights

The review underscores the need to improve antibiotic stewardship in general dental practice settings to curb inappropriate antibiotic use and address the escalating threat of antimicrobial resistance.

Introduction

Antibiotics have been used for nearly a century since the discovery of Penicillin in 1928 and have played a crucial role in medicine, saving millions of lives. However, excessive use of antibiotics has led to a growing risk of antimicrobial resistance (AMR). The World Health Organization (WHO) considers AMR to be a major public health threat. AMR was linked to 4.59 million deaths, making it one of the top 10 public health threats to humans [1, 2]. The “The WHO AWaRe (Access, Watch, Reserve) antibiotic book” provides evidence-based guidance for healthcare professionals on choosing the right antibiotic, dose, route, and duration of treatment for common infections [3]. It emphasizes that dental caries and periodontal disease represent the two most common forms of dental disease, and the focus should be on prevention of these diseases by maintaining oral hygiene and reducing dietary and environmental risk factors. The WHO does not recommend the use of antibiotics to treat toothache and prophylactics antibiotics are not routinely required for most dental procedures.

The growing prevalence of AMR is a multifactorial challenge which may be related to factors such as misuse of

Registration for research protocol: This research protocol for this scoping review was registered on Open Science Framework (OSF) and is available at: https://doi.org/10.17605/OSF.IO/S7NFK

***Corresponding author: Kamran Ali**, College of Dental Medicine, Qatar University, Al Tarfa, 2713, Doha, Qatar, E-mail: ali.kamran@qu.edu.qa. https://orcid.org/0000-0002-3122-6729
Safa A. Azim Osman, College of Dental Medicine, Qatar University, Doha, Qatar. https://orcid.org/0000-0003-4405-0790
Mohammed Seedahmed, Almuhaidib Dental Group, Jouf, Saudi Arabia. https://orcid.org/0000-0001-6385-241X
Susu Zughaier, College of Medicine, Qatar University, Doha, Qatar. https://orcid.org/0000-0001-7487-8770

antimicrobials in agriculture and healthcare settings, poor infection prevention and control practices, inadequate sanitation, and limited development of new antibiotics [4]. The overuse of antibiotics is a key contributor to AMR, and in dentistry this problem is often compounded limited access to regular dental care, time constraints in clinical dental settings which drives practitioners to prescribe antibiotics as a temporary substitute for operative treatment. Moreover, patient demand and expectations for quick relief and fear of litigation amongst dentists can drive defensive prescribing [5]. Together, these factors encourage unnecessary or prolonged antibiotic use, amplifying the risk of resistance. Addressing AMR therefore requires a coordinated, multisectoral approach beyond curbing antibiotic overuse alone.

Antimicrobials continue to be prescribed in clinical dental practice for prophylactic and therapeutic purposes [6]. Where available, dentists are expected to follow national and local professional guidelines on the use of antimicrobials in dentistry [7, 8]. However, clinical guidelines on the appropriate use of antimicrobials in dentistry may not be used consistently by dentists especially in developing countries with limited surveillance of antibiotic use. Given that most dental infections are of bacterial origin, dentists primarily prescribe antibiotics in clinical practice. Published literature shows that dentists tend to overprescribe antibiotics underscoring the need for restricting antibiotic use to clinical situations where they are absolutely necessary [9–11]. A study on prescriptions by dentists in England showed that dental prescriptions accounted for 10.8 % of all oral antibiotic prescribing, 18.4 % of amoxicillin and 57.0 % of metronidazole prescribing in primary care settings [12]. Data from the United States of America (USA) shows that antibiotics prescribed by dentists ranged from 24.65 million prescriptions in 2018 to 25.17 million in 2022 representing 9.8% and 12.1 % of all outpatients antibiotic prescriptions respectively [13]. However, reliable longitudinal data on antimicrobial prescriptions by dentists globally is not available to quantify the contribution of dental antimicrobial prescriptions to AMR.

Although several reviews have been published on the use of antibiotics in dentistry, most studies report data from general and specialist dentists in primary and secondary care settings together. Given that GDPs in primary care are the first point of care for dental services worldwide, there is merit in exploring the antibiotic prescribing practices of general dentists in primary care. Unlike specialists, GDPs manage a broad and diverse case mix, often under time constraints and without specialist support. Understanding their prescribing behaviors is crucial to addressing inappropriate antibiotic use at the front lines of dental care. Therefore, the aim of the current study was to map the existing literature on patterns of antibiotics prescriptions in general dental practice to gain a more focused understanding of prescribing behaviors of general dental practitioners (GDPs).

Rationale

Antibiotic prescriptions in general dental practice represent approximately 10 % of antibiotic prescriptions in healthcare and may contribute to antimicrobial resistance. A scoping review was undertaken to explore the existing literature on the patterns of antibiotic prescriptions by GDPs.

Research objectives

The aim of this scoping review was to explore the published literature on prescribing antibiotics by GDPs, and if they conform to contemporary professional guidelines.

i. Document common indications for antibiotic prescriptions.
ii. Identify the types, dose, frequency and duration of antibiotics prescriptions.

Review framework

The scoping review will be based on the PCC (Participation./population, Concept and Context) framework as elaborated below:

Participant/Population:

General dental practitioners

Concept:

Dental practitioners commonly prescribe antibiotics to manage oral and dental infections. However, inappropriate prescribing and injudicious use of antibiotics may contribute to growing antibiotic resistance. Despite the progress made in updating professional guidelines and promoting antibiotic stewardship, inappropriate antibiotic prescribing by dentists remains a challenge.

Context:

General dental practice settings across both public and private sectors, without restriction by country or healthcare system.

Methods

Study protocol and registration

This scoping review adopted the updated methodological guidance proposed by the Joanna Briggs Institute (JBI) and

reported by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMAScR) [14]. The protocol was registered on the Open Science Framework (https://doi.org/10.17605/OSF.IO/S7NFK).

Eligibility criteria

Inclusion criteria:
- Original research studies which reported the antibiotic prescribing behaviors of GDPs.
- Studies published from 1st January 1990 to 28 Feb 2025 and accessible electronically.
- Studies published in English.

Exclusion criteria.
- Laboratory studies, reviews, editorials, and commentaries were excluded.

Outcome measure

Reasons (clinical indications) for antibiotic prescriptions.

Choice of antibiotic prescriptions including dose, frequency and duration.

Search strategy and information sources

A systematic search strategy was used with appropriate syntax for individual databases exploring different studies published in the last 35 years i.e., 1st January 1990–28 Feb 2025 to identify pattern of antibiotic prescription among general dental practitioners. A combination of key words, MeSH terms (PubMed) and search field (Scopus) were used by integrating Boolean operators to create meaningful search strings. Key search terms included dentist, antibiotic, antimicrobial, antibacterial, prescription, pattern, clinical practice, general practice, and dentist workspace. Searches were limited to studies published in English and the searches were re-run prior to final analysis. Comprehensive literature search of electronic bibliographic databases was conducted by research team members on PubMed and Scopus with support from an experienced librarian.

Data extraction (selection and coding)

The search results retrieved from the databases were transferred to EndNote (EndNote 20, Inc., Philadelphia, USA). Duplicate studies were removed using the software and confirmed by manual checks. The final list was then be exported to Microsoft Excel, where the screening will be completed based on eligibility criteria. Two reviewers independently screened the titles and abstracts of identified studies based on the inclusion and exclusion criteria. Any disagreements were resolved through discussions between the two reviewers, and any residual differences were addressed by consultation with a third reviewer.

Data items and synthesis

Standardized data extraction forms were utilized to capture key information from each included study. Bibliometric information on included studies was collated including the authors, journal or preprint server, publication year, volume and page numbers, and digital object identifier (doi). The included studies were coded and data extraction from these studies included the following:
- Study ID
- Author(s) and Year
- Population
- Study design
- Sample size
- Geographical Location
- Clinical indications for antibiotic prescription
- Antibiotic choice, dose, frequency, and duration
- Key Findings

Critical appraisal and synthesis of results

The initial screening of titles and abstracts identified articles for full text review which will also be evaluated independently by two reviewers. Any disagreements will be resolved through discussions between the two reviewers, and a third reviewer would be engaged to resolve any persistent differences through collaborative discussions to achieve consensus. Articles considered eligible after full text review will be the final set of studies to be included in the systematic review. The study selection process is depicted by a PRISMA flow diagram. A log of excluded studies along with the justification for exclusion will be maintained.

Ethics approval

Ethical approval was not applicable to this study as it is a scoping review and no new data was generated.

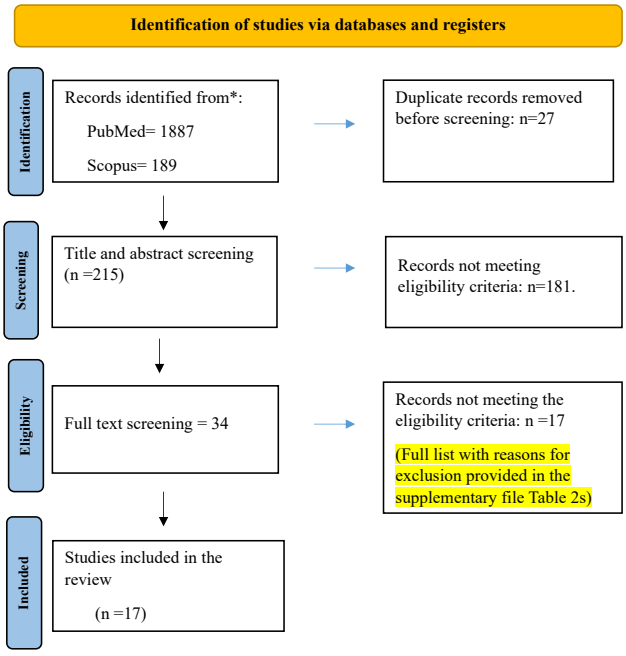

Figure 1: PRISMA flow chart for scoping review [14].

Results

Selection of sources of evidence

A total of 2,076 records were retrieved following searches on two databases PubMed and Scopus. After removal of duplicates, 2,049 distinct articles underwent initial screening to identify appropriate studies. Title and abstract screening were carried out for 215 articles, and 34 articles were considered for full text screening. Based on eligibility criteria, 17 out 34 studies were identified for inclusion in the final review as depicted in Figure 1.

Characteristics of included studies

The main characteristics of 17 studies included in this scoping review are summarized in Table 1. All studies used a cross-sectional study design and were carried out from 2000 to 2024. The included studies were conducted in France, Belgium, Switzerland, Italy, Norway Albania, Croatia, Saudi Arabia, Yemen, Iraq, Kuwait, Iran, Türkiye, Albania, Nigeria, Australia and Canada.

The combined sample size of all included studies was 5,486 across 17 studies. The sample size of individual studies varied from 68 [22] to 807 participants [23], with an average of 306 participants. The included studies focused on GDPs except two studies [21, 28]. which also included specialist dentists. However, these studies were included as the proportion of GDPs in both studies was over 50 % of the total sample size.

Table 1: Characteristics of included Studies.

Author(s) and year	Study design	Population	Sample size, n	Country
Al-Haroni et al. [15]	Cross-sectional	GDPs	150	Yemen
Al-Sebaei et al. [16]	Cross-sectional	GDPs	150	Saudi Arabia
Azodo et al. [17]	Cross-sectional	GDPs	146	Nigeria
Baskaradoss et al. [18]	Cross-sectional	GDPs	282	Saudi Arabia
Baudet et al. [19]	Cross-sectional	GDPs	455	France
Demirbas et al. [20]	Cross-sectional	GDPs	283	Norway
Epstein et al. [21]	Cross-sectional	GDPs Specialists	505	Canada
Jaunay et al. [22]	Cross-sectional	GDPs	68	Australia
Kabalak et al. [23]	Cross-sectional	GDPs	807	Türkiye
Loume et al. [24]	Cross-sectional	GDPs	331	Switzerland
Mainjot et al. [25]	Cross-sectional	GDPs	268	Belgium
Manciocchi et al. [26]	Cross-sectional	GDPs	360	Italy and Albania
Marah et al. [27]	Cross-sectional	GDPs	481	Iraq
Ozmenet al. [28]	Cross-sectional	GDPs Specialists	343 141	Türkiye
Perić et al. [29]	Cross-sectional	GDPs	110	Croatia
Salako et al. [30]	Cross-sectional	GDPs	168	Kuwait
Vessal et al. [31]	Cross-sectional	GDPs	438	Iran

*GDPs, general dental practitioners.

Critical appraisal within sources of evidence

The clinical indications, choice of antibiotics, along with dosage and duration are summarized in Table 2. The commonest indication for antibiotic administration were cellulitis [18, 19, 22, 24, 27, 31]; dental infections associated with systemic features [21, 23, 24, 30]; periapical and periodontal abscesses. [18–20, 23, 25, 26]. Other periodontal conditions managed with antibiotics were pericoronitis [17–19, 26] necrotizing periodontal disease [22–24, 26, 31], gingivitis [15]

Table 2: Antibiotic prescriptions: Indications, type, dose, frequency and duration.

Author	Indication(s) for antibiotic prescription	Antibiotic of choice	Antibiotic dose	Antibiotic duration
Al-Haroni et al. [15]	– Chronic apical infections (72 %) – Marginal gingivitis (54 %)	Penicillin (72 %)	Not reported	Not reported
Al-Sebaei et al. [16]	– Routine surgical extraction (70 %),	Amoxicillin and clavulanic acid (64.6 %)	Not reported	Not reported
Azodo et al. [17]	– Acute pericoronitis (49.3 %) – Dry socket (41.1 %) – ANUG (4.1 %)	Amoxicillin and metronidazole (35.6 %) Amoxicillin (27.4 %)	Not reported	Not reported
Baskaradoss et al. [18]	– Cellulitis (85.5 %) – Pericoronitis (66 %) – Re-implantation of tooth (57.1 %) – Periapical abscess before drainage (48.6 %)	Amoxicillin	Not reported	Not reported
Baudet et al. [19]	– Abscess (82.5 %) – Cervicofacial cellulitis (74.2 %) – Pericoronitis (58.6 %,)	Amoxicillin	1-g 12-hourly	6–7 days
Demirbas et al. [20]	– Abscesses – Endodontics – Oral surgery	Amoxicillin	Not reported	7 days
Epstein et al. [21]	– Pre-operative for extraction of impacted tooth with acute infection (50.8 %) – Dental infection with fever (94.9 %)	Amoxicillin (64.0 %)	1–1.2 g/day (72.2 %)	Average 6.92 days
Jaunay et al. [22]	– Cellulitis (98 %) – Acute necrotizing ulcerative gingivitis (80 %) – Extraction third molar with current pericoronitis (75 %)	Amoxicillin (90 %) Metronidazole (84 %)	Not reported	Not reported
Kabalak et al. [23]	– Periodontal diseases/conditions associated with systemic signs and symptoms (83.9 %), – Periodontal abscess (58.3 %) – Necrotizing ulcerative periodontitis (52.4 %)	Amoxicillin and clavulanic acid (57.6 %)	Not reported	Not reported
Loume et al. [24]	– Abscess with systemic symptoms (89 %) – Cellulitis (81.5 %),	Amoxicillin	375 mg 8 hourly	7 days
Mainjot et al. [25]	– Periapical abscess (51.9 %) – Periodontal abscess (14.2 %) – Pulpitis (4.4 %)	Amoxicillin/amoxicillin + clavulanic acid (75.1 %).	Not reported	Average 4.8 days
Manciocchi et al. [26]	– Acute apical abscess (Italian 96.7 % of Italian and 84.4 % of Albanian dentists) – Chronic apical abscess (33.5 % of Italian and 66.5 % of Albanian dentists) – Pericoronitis (Italian:84 %, Albanian: 65 %) – Necrotising periodontal disease (Italian: 90.6 %, Albanian: 72.2 %)	Italian penicillin (96.6 %) Albanian penicillin (82.8 %)	Not reported	6 days
Marah et al. [27]	– Acute periapical infection (79.2 %) – Cellulitis (76.7 %) – Prophylaxis for infective endocarditis (72.6 %)	Amoxicillin (43.7 %)	250 mg 2,000 mg	1–8 days
Ozmen et al. [28]	– Acute apical periodontitis (50.1 %)	Amoxicillin + clavulanic acid (65.2 %)	Not reported	7 days
Perić et al. [29]	– Periapical abscess (41.7 %) – Periodontal abscess (46.7 %),	Amoxicillin and clavulanic acid (57.6 %)	1.912 mg/day	7 days
Salako et al. [30]	– Gross or diffuse swelling (92 %) – Elevated temperature evidence of systemic spread (89.3 %) – Surgical extraction (89.3 %)	Amoxicillin	Not reported	Not reported
Vessal et al. [31]	– Acute periapical infection (77.2 %), cellulitis (75.3 %) – Acute ulcerative gingivitis (63.0 %)	Amoxicillin	250–500 mg dose 8 hourly (70.6 %)	6–10 days.

and periodontitis [23]. Antibiotics were also reported to be administered for pulpitis [26], chronic apical infections [15] acute apical infections [27, 28, 31] and dry socket [17].

Other indications for antibiotics included prophylactic administration before routine surgical extractions [16, 30], extraction of impacted teeth with acute infection [21, 22], intentional reimplantation of teeth [18], oro-antral communication, or sinus infection [24] and prophylaxis for infective endocarditis [27]. Three studies did not provide details of specific types of dental infections for which antibiotics were prescribed [10, 32, 33].

Results of individual sources of evidence

Amoxicillin was reported as the first choice antibiotic by nine studies [18–22, 24, 27, 30, 31] while a combination of amoxicillin and clavulanic acid was reported as the antibiotic of choice by four studies. [16, 23, 28, 29]. One study reported amoxicillin or amoxicillin with clavulanic acid as the antibiotics of choice [25] while a combination of amoxicillin and metronidazole was the first choice in another study [17]. Two studies reported penicillin as the antibiotic of choice but did not mention a specific type of penicillin [15, 26].

Most studies reported the use of adult dosages for antibiotics administered orally for 5–7 days except for one study in which 2 g of amoxicillin were administered for prophylaxis against endocarditis [27]. The duration of antibiotic therapy exceeded seven days in two studies [27, 31].

Synthesis of results

The results of the study show marked variations in antibiotics prescription patterns some of which conflicted with professional guidelines. The indications for antibiotic prescriptions in general dental practice settings included a wide range of localized (abscess, periapical infection, periodontal infection) and spreading infection (cellulitis). Antibiotics were also prescribed postoperatively following a range of operative procedures such as tooth extraction and reimplantation of teeth and complications such as oro-antral communications. Amoxicillin and metronidazole were the most commonly prescribed antibiotics although the duration and frequency of antibiotic therapy varied amongst different studies. The inconsistencies in antibiotics prescribing behaviors identified in the current scoping review not only highlight gaps in adherence to guidelines but also pose a significant risk of contributing to antimicrobial resistance, underscoring the urgent need for greater stewardship in dental practice.

Discussion

Antibiotics have traditionally played a significant role in managing dento-alveolar infections. However, the rising threat of antibiotic resistance poses a serious global health challenge, underscoring the need for evidence-based and prudent prescribing [1, 34, 35]. Like all medications, antibiotics carry the risk of adverse reactions and contribute to healthcare costs. Therefore, their use should be reserved for cases where they are absolutely necessary, with careful consideration of the patient's medical history, current medications, and potential drug interactions [2, 36–38].

Summary of evidence

The results of this scoping review indicate significant deviations from professional guidelines on antibiotic administration in clinical dentistry. Antibiotics should not be prescribed for pulpitis or well-localized peri-radicular infections, and these conditions are best managed with interventions such as endodontics or tooth extraction based on clinical assessment and restorability of a tooth [7, 8, 39, 40]. Similarly, dental abscesses of peri-radicular and periodontal origin should be managed by achieving drainage using appropriate means such as endodontic access, extraction or soft tissue incision as dictated by the clinical condition [7, 39]. It is recognized that antibiotics may be indicated in oral and dental infections associated with diffuse soft tissue swelling accompanied by fever (≥38 °C), malaise, and lymphadenopathy. However, clinical assessment must be carried out objectively rather than relying merely on patients' history and symptoms.

Current evidence does not support routine use of antibiotics for tooth extractions in healthy patients. However, antibiotic prescriptions may be considered for patients with an increased risk of post-extraction infection due to immunosuppression or for extractions carried out during phases of acute infection [9]. Similarly, antibiotics are not indicated for alveolar osteitis (dry socket) as it is a localized healing defect which can be best managed with local irrigation and placement of analgesic dressing in the extraction socket [9].

A number of factors may be responsible for overprescription of antibiotics by dentists. These include diagnostic uncertainties, lack of appointment time for operative dental treatment, patient demand for antibiotics, limited understanding of risks of antibiotic resistance and ingrained

habits of routine antibiotic prescribing. Moreover patient related factors such as reluctance or inability to undergo operative dental treatment, demand for antibiotics and lack of knowledge regarding risks of antibiotics are also recognized. As research into AMR continues to grow, dentists practice should evaluate their antibiotic prescribing practices to ensure compliance with professional guidelines [11, 13, 41].

Amoxicillin was the most common first choice antibiotic in 52.94 % (n=9) of studies included in this review, a finding which corroborates with previous studies [11, 13]. Based on the available evidence, phenoxy methyl penicillin (penicillin V) and amoxicillin are generally considered the first choice antibiotics to manage oral and dental infections [13, 39]. A combination of amoxicillin and clavulanic acid as the antibiotic of choice was reported in 23.52 % (n=4) studies. However, most clinical guidelines recommend that a combination of amoxicillin and clavulanic acid is considered a second line choice due to higher risks of side effects compared to amoxicillin alone [39].

Review of recent literature suggest that although there is some reduction in inappropriate antibiotic prescribing by dentists in some Western countries. A 5.3 % reduction in the use of antibiotics from 2018 to 2022 in primary and secondary care settings in England was reported in the English surveillance programme for antimicrobial utilization and resistance (ESPAUR) report 2022–23 [36]. However, more commitment to reducing antibiotic resistance is required by the dental profession. Dentists may benefit from regular continuing professional development (CPD) activities, and clinical audits on antibiotic prescriptions in dental practice. Moreover, dentists also need to educate the public by developing patient information leaflets, posters, and other forms of educational materials which may be shared with the patients, their caregivers, and the public at large. Disseminating risks of antibiotic resistance to both colleagues and patients can help to raise awareness of the importance of using antibiotics responsibly and encourage more judicious use of these drugs [42].

Psychological factors play a significant role in driving patient demand for antibiotics in dentistry [43]. Many patients associate dental pain with infection and assume that antibiotics provide the quickest and most effective relief, overlooking the need for operative treatment. Fear of pain and anxiety about dental procedures often reinforce reluctance to undergo definitive interventions, leading to a preference for what is perceived as an easier ‘quick fix.’ [44] Misconceptions may also exist regarding the effectiveness of antibiotics in managing dental pain. Addressing these factors requires multifaceted strategies, including patient education and public awareness campaigns to dispel myths, the provision of clear and accessible information such as practice-based leaflets, and personalized advice from dentists to help patients understand when antibiotics are appropriate and when operative care is the necessary course of action [45].

Limitations

Some limitations need to be considered when interpreting the findings of the current review. First, the inclusion of only 17 published studies significantly limits the breadth of evidence and restricts understanding of global prescribing patterns, especially in underrepresented regions. The studies originate from various countries with differing healthcare systems, prescribing guidelines, and dental practices, which introduce considerable heterogeneity and undermines meaningful cross-country comparisons. Furthermore, all studies relied on self-reported data collected through questionnaires, a methodology that is inherently prone to recall bias, response bias, and social desirability bias. As a result, the accuracy of the reported prescribing behaviors is uncertain.

The inclusion of studies without longitudinal data restricts the capacity to evaluate temporal trends in antibiotic prescriptions, thereby limiting the depth of insights that can be drawn. Furthermore, the application of narrowly defined eligibility criteria may have introduced selection bias and may have potentially constrained the representativeness of the evidence base, thus limiting the generalizability of the findings.

Critically, most studies failed to provide sufficient clinical context or details regarding the assessment of patients, making it difficult to determine whether the antibiotic prescriptions were clinically justified. This absence of diagnostic information precludes any meaningful evaluation of the appropriateness or rationality of antibiotic use. Additionally, the lack of longitudinal data limits the ability to assess trends in prescribing over time, which is essential for evaluating the clinical guidelines on antibiotic stewardship.

This review was based solely on publications indexed on Scopus and PubMed only and grey literature was not searched. The authors acknowledge that this approach may not capture all relevant publications in the field. However, the search was restricted to two databases due to rigorous indexing standards and use of high-quality sources. Moreover, articles in languages other than English were excluded which could introduce language bias, limit comprehensiveness, and skew findings toward English-speaking or high-income contexts. It may result in missing culturally relevant or region-specific data. However, this restriction was

considered appropriate due to limited resources, and the dominance of English in publishing. Overall, these limitations highlight the need for more robust, context-rich, and clinically grounded research to inform evidence-based practices in antibiotic stewardship in general dentistry.

Recommendations

The findings of this review identify practical implications for dentists, and healthcare policy makers. For dentists, the findings highlight the need to strengthen adherence to evidence-based prescribing guidelines, prioritize operative interventions over pharmacological 'quick fixes,' and engage in patient education to address misconceptions about antibiotics. Regular clinical audits to monitor antibiotic prescription patterns in general dental practice settings is recommended to identify inappropriate prescriptions. For policymakers, the results underscore the importance of implementing robust antimicrobial stewardship programs in dental settings, developing targeted professional training, and supporting public health campaigns to reduce unnecessary antibiotic demand. Collectively, these measures can help curb inappropriate prescribing and mitigate the growing threat of AMR. Future research should focus on identifying effective educational interventions that can close the gap between professional guidelines and prescribing behaviors of dentists how awareness regarding risks of antibiotic resistance can be raised. It is also essential to explore how geographic, cultural and other local factors influence antibiotic prescribing practices in dentistry across different countries. Additionally, investigating the role of dental schools in shaping students' understanding and attitudes toward antibiotic use will provide valuable insights for development of dental curricula with the aim to achieve a long-term behavioral change in future generations of dentists.

Conclusions

The results of this scoping review highlight a disconnect between professional guidelines and prescribing practices of dentists. Notwithstanding the limitations of the current review, dentists appear to prescribe antibiotics for clinical situations which may be managed better with operative interventions alone. This review also highlights the real world challenges in general dental practice settings which drive inappropriate antibiotic prescribing. These findings underscore the need for continuing professional development education on antibiotic stewardship and regular clinical audits to mitigate the risks of growing antibiotic resistance globally.

Funding information: This research received no external funding.

Author contribution: Conceptualization: KA conceptualized the study. Methodology: KA, SZ, SO. The literature search, screening and data extraction conducted by SO and MS; Original draft preparation SO and KA. Reviewing and Editing: All authors reviewed and agreed to the submitted version of the manuscript.

Conflict of interest: The authors declare no conflicts of interest.

Data availability statement: The datasets analysed during the current study are available from the corresponding author on reasonable request.

References

1. Murray CJ, Ikuta KS, Sharara F, Swetschinski L, Robles Aguilar G, Gray A, et al. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. Lancet 2022;399:629–55.
2. Laxminarayan R, Van Boeckel T, Frost I, Kariuki S, Khan EA, Limmathurotsakul D, et al. The lancet infectious diseases commission on antimicrobial resistance: 6 years later. Lancet Infect Dis 2020;20:e51–60.
3. The WHO AWaRe (access, watch, reserve) antibiotic book 2022. https://www.who.int/publications/b/61917 [Accessed 10 Sep 2025].
4. Prestinaci F, Pezzotti P, Pantosti A. Antimicrobial resistance: a global multifaceted phenomenon. Pathog Glob Health 2015;109:309–18.
5. Böhmer F, Hornung A, Burmeister U, Köchling A, Altiner A, Lang H, et al. Factors, perceptions and beliefs associated with inappropriate antibiotic prescribing in German primary dental care: a qualitative study. Antibiotics 2021;10:987.
6. Kariyawasam RM, Julien DA, Jelinski DC, Larose SL, Rennert-May E, Conly JM, et al. Antimicrobial resistance (AMR) in COVID-19 patients: a systematic review and meta-analysis (november 2019–June 2021). Antimicrob Resist Infect Control 2022;11:45.
7. Lockhart PB, Tampi MP, Abt E, Aminoshariae A, Durkin MJ, Fouad AF, et al. Evidence-based clinical practice guideline on antibiotic use for the urgent management of pulpal- and periapical-related dental pain and intraoral swelling: a report from the American dental association. JADA (J Am Dent Assoc) 2019;150:906–21.e12.
8. Segura-Egea JJ, Gould K, Şen BH, Jonasson P, Cotti E, Mazzoni A, et al. European society of endodontology position statement: the use of antibiotics in endodontics. Int Endod J 2018;51:20–5.
9. Lodi G, Azzi L, Varoni EM, Pentenero M, Del Fabbro M, Carrassi A, et al. Antibiotics to prevent complications following tooth extractions: a cochrane review. Dent Cadmos 2021;89:416–27.
10. Palmer NOA, Martin MV, Pealing R, Ireland RS, Roy K, Smith A, et al. Antibiotic prescribing knowledge of national health service general dental practitioners in England and Scotland. J Antimicrob Chemother 2001;47:233–7.
11. Stein K, Farmer J, Singhal S, Marra F, Sutherland S, Quiñonez C. The use and misuse of antibiotics in dentistry: a scoping review. JADA (J Am Dent Assoc) 2018;149:869–84.e5.

12. Thornhill MH, Dayer MJ, Durkin MJ, Lockhart PB, Baddour LM. Oral antibiotic prescribing by NHS dentists in England 2010-2017. Br Dent J 2019;227:1044–50.
13. Huynh C-VT, Gouin KA, Hicks LA, Kabbani S, Neuburger M, McDonald E, et al. Outpatient antibiotic prescribing by general dentists in the United States from 2018 through 2022. J Am Dent Assoc 2025;156: 382–9.
14. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med 2018;169:467–73.
15. Al-Haroni M, Skaug N. Knowledge of prescribing antimicrobials among Yemeni general dentists. Acta Odontol Scand 2006;64:274–80.
16. Al-Sebaei MO, Jan AM. A survey to assess knowledge, practice, and attitude of dentists in the Western region of Saudi Arabia. Saudi Med J 2016;37:440–5.
17. Azodo CC, Ojehanon PI. Antibiotics prescription in Nigerian dental healthcare services. Odontostomatol Trop 2014;37:34–42.
18. Baskaradoss JK, Alrumaih A, Alshebel A, Alfaqih A, Aleesa M, Alkhashan S, et al. Pattern of antibiotic prescription among dentists in Riyadh, Saudi Arabia. J Investig Clin Dent 2018;9. https://doi.org/10.1111/jicd.12339.
19. Baudet A, Kichenbrand C, Pulcini C, Descroix V, Lesclous P, Thilly N, et al. Antibiotic use and resistance: a nationwide questionnaire survey among French dentists. Eur J Clin Microbiol Infect Dis 2020;39: 1295–303.
20. Demirbas F, Gjermo PE, Preus HR. Antibiotic prescribing practices among Norwegian dentists. Acta Odontol Scand 2006;64:355–9.
21. Epstein JB, Chong S, Le ND. A survey of antibiotic use in dentistry. J Am Dent Assoc 2000;131:1600–9.
22. Jaunay T, Dambrook P, Goss A. Antibiotic prescribing practices by South Australian general dental practitioners. Aust Dent J 2000;45:179–86.
23. Kabalak M, Aytac EGE, Tarhan N, Karabulut E, Keçeli̇ H. Potential barriers to the rational antibiotic use in dental and periodontal practice: a questionnaire-based online survey. Dent Med Probl 2024;61:373–83.
24. Loume A, Gardelis P, Zekeridou A, Giannopoulou C. A survey on systemic antibiotic prescription among dentists in romandy. Swiss Dent J 2023;133:800–8.
25. Mainjot A, D'Hoore W, Vanheusden A, Van Nieuwenhuysen JP. Antibiotic prescribing in dental practice in Belgium. Int Endod J 2009; 42:1112–17.
26. Manciocchi E, Xhajanka E, D'Addazio G, Tafuri G, Santilli M, Rexhepi I, et al. Antibiotic prescribing patterns among dentists in Italy and Albania: a comparative questionnaire analysis. Heliyon 2024;10. https://doi.org/10.1016/j.heliyon.2024.e33575.
27. Marah ZAA, Abdulkareem AA, Gul SS, Alshami ML. A survey of systemic antibiotic prescription patterns amongst Iraqi dentists. Int Dent J 2022; 72:338–45.
28. Ozmen EE, Sahin TN. Antibiotic use in pediatric dental infections: knowledge and awareness levels of dentists. Sci Rep 2024;14:24877.
29. Perić M, Perković I, Romić M, Simeon P, Matijević J, rpić MGP, et al. The pattern of antibiotic prescribing by dental practitioners in Zagreb, Croatia. Cent Eur J Public Health 2015;23:107–13.
30. Salako NO, Rotimi VO, Adib SM, Al-Mutawa S. Pattern of antibiotic prescription in the management of oral diseases among dentists in Kuwait. J Dent 2004;32:503–9.
31. Vessal G, Khabiri A, Mirkhani H, Cookson BD, Askarian M. Study of antibiotic prescribing among dental practitioners in shiraz, Islamic Republic of Iran. East Mediterr Health J 2011;17:763–9.
32. Jones E, Cope A. Knowledge and attitudes of recently qualified dentists working in Wales towards antimicrobial prescribing and resistance. Eur J Dent Educ 2018;22:e730–6.
33. Pisarnturakit PP, Sooampon S, Sooampon S. Managing knowledge for health care quality: an investigation of rational antibiotic use among Thai dentists. Int J Health Plann Manag 2020;35:606–13.
34. The Lancet Global Health. Fighting antimicrobial resistance on all fronts. Lancet Glob Health 2017;5:e1161.
35. UK 20-year vision for antimicrobial resistance - GOV.UK. https://www.gov.uk/government/publications/uk-20-year-vision-for-antimicrobial-resistance [Accessed 14 Aug 2025].
36. Ashiru-Oredope D, Cunningham N, Casale E, Muller-Pebody B, Hope R, Brown CS, et al. Reporting England's progress towards the ambitions in the UK action plan for antimicrobial resistance: the English surveillance programme for antimicrobial utilisation and resistance (ESPAUR). J Antimicrob Chemother 2023;78:2387–91.
37. McEwen SA, Collignon PJ. Antimicrobial resistance: a one health perspective. Microbiol Spectr 2018;6. https://doi.org/10.1128/microbiolspec.arba-0009-2017.
38. Antimicrobial resistance. https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance [Accessed 14 Aug 2025].
39. Drug prescribing | Scottish dental clinical effectiveness programme. https://www.sdcep.org.uk/published-guidance/drug-prescribing/ [Accessed August 18 2025].
40. Agnihotry A, Thompson W, Fedorowicz Z, van Zuuren EJ, Sprakel J. Antibiotic use for irreversible pulpitis. Cochrane Database Syst Rev 2019;2019. https://doi.org/10.1002/14651858.CD004969.pub5.
41. Byrne MK, Miellet S, McGlinn A, Fish J, Meedya S, Reynolds N, et al. The drivers of antibiotic use and misuse: the development and investigation of a theory driven community measure. BMC Public Health 2019;19:1425.
42. Zughaier SM, Ali K. Antimicrobial resistance. Clini Dental Pharmaco 2024:57–61. https://doi.org/10.1002/9781119984962.ch7.
43. Dionisio F, Baquero F, Fuertes M. Psychological and cultural factors influencing antibiotic prescription. Trends Microbiol 2023;31:559–70.
44. Contaldo M, D'Ambrosio F, Ferraro GA, Di Stasio D, Di Palo MP, Serpico R, et al. Antibiotics in dentistry: a narrative review of the evidence beyond the myth. Int J Environ Res Public Health 2023;20: 6025.
45. Löffler C, Böhmer F. The effect of interventions aiming to optimise the prescription of antibiotics in dental care – a systematic review. PLoS One 2017;12. https://doi.org/10.1371/journal.pone.0188061.

Supplementary Material: This article contains supplementary material (https://doi.org/10.1515/med-2025-1352).