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The Evidence-Based Practice Dilemma: Why Dentists Struggle to Integrate Research into Clinical Practice

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ABSTRACT

Background: Evidence-based practice (EBP) is essential for improving patient care in dentistry by integrating the best available research evidence into clinical decision-making. Despite its importance, many dentists face challenges in adopting EBP into their daily practice. This review aims to explore the barriers and enablers of integrating EBP in dental practice.

Methods: This study follows a narrative review methodology, synthesizing the existing literature on the implementation of EBP in dentistry. A comprehensive search of electronic databases was conducted to identify relevant articles, with an inclusion criterion focusing on studies published between 2015 and 2025. Six studies met the inclusion criteria and were analyzed to determine the barriers and enablers associated with EBP adoption.

Results: The review identifies several key barriers to EBP integration, including time constraints, insufficient training, limited access to research, and generational gaps within the dental profession. However, enablers such as professional development programs, clearer guidelines, and interdisciplinary collaboration were also highlighted as facilitating factors.

Discussion: The findings suggest that overcoming barriers requires systemic changes, including improved access to research, continuous professional development, and fostering a culture of evidence-based decision-making. Technological advancements, such as Artificial Intelligence (AI) and the Metaverse, have the potential to address some of these challenges by enhancing accessibility to research and providing immersive learning environments for dental professionals.

Conclusion: For EBP to become an integral part of dental practice, a multifaceted approach is required, focusing on education, research accessibility, and creating a supportive environment for continuous learning and improvement.

Keywords: *Artificial Intelligence, Barriers, Evidence-based practice, Integration, Metaverse*

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1. INTRODUCTION

Evidence-based practice (EBP) is the cornerstone of modern healthcare, particularly in dentistry, where treatment outcomes must be grounded in the best available scientific evidence. The integration of research findings into clinical practice has the potential to improve patient care, optimize treatment protocols, and enhance clinical outcomes [1]. However, despite the recognized importance of EBP, many dentists face challenges in adopting evidence-based methodologies into their daily practice. This dilemma has been widely observed, and understanding the underlying reasons is crucial for addressing the barriers that hinder the integration of research into clinical decision-making [2].

The concept of EBP is defined as the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. It involves a systematic process of reviewing, appraising, and applying research findings to clinical scenarios, alongside clinical expertise and patient preferences [3]. For dentists, this includes considering scientific research related to treatment techniques, materials, preventive strategies, and diagnostic tools. While the theoretical framework of EBP is well-established and promoted within academic and professional circles, the practical application in clinical settings is less straightforward [4].

A significant challenge that dentists face in implementing EBP is the lack of time. In busy clinical practices, especially those that are privately run or under-resourced, dentists often find themselves constrained by tight schedules, leaving little room for reviewing new research or incorporating it into practice [5]. Research in dentistry, like in other healthcare fields, often involves complex statistical analyses, long reading hours, and critical thinking, tasks that are not always feasible within the time-pressed environment of clinical care [6].

Moreover, there is often a gap between academic research and real-world dental practice. Studies conducted in controlled environments may not always be directly applicable to diverse patient populations or settings. Many studies focus on particular patient groups, materials, or techniques, while the reality of a dental practice involves a range of patients with varying conditions, socioeconomic backgrounds, and access to resources [7]. The lack of clear, universally applicable guidelines or standardization from research studies further complicates the integration of EBP [8].

Furthermore, a lack of education and training in research literacy among dentists can also contribute to the reluctance in embracing EBP. While dental schools provide foundational education, the emphasis on evidence-based learning may not be consistent across curricula. Many dental practitioners, particularly those who have been in practice for several years, may not have been exposed to the recent advancements in evidence-based methodologies [9]. The need for continuous professional development, access to training in research evaluation, and enhanced understanding of how to translate research into practice are essential for overcoming this barrier [10].

The cultural and generational gaps within the dental profession also contribute to the struggle. Older, more experienced practitioners often rely on anecdotal evidence or traditional methods they have used over the years [11]. This reliance on clinical experience rather than research-based evidence can be a major barrier to the adoption of EBP. Younger dentists, who may be more familiar with contemporary research and evidence-based approaches, may face resistance from colleagues who are less inclined to embrace change [12].

2. METHODOLOGY

This narrative review systematically synthesizes the existing literature on the barriers and enablers of integrating EBP in dental settings. The review follows the principles of the Scale for the Assessment of Narrative Review Articles (SANRA), ensuring a transparent and structured approach. Given that this study is a narrative review of published literature, no direct data collection from human participants was involved. As a result, ethical approval was not required. The review adhered to established guidelines for synthesizing data and ensuring the responsible use of information.

A comprehensive search of electronic databases was conducted, including PubMed, Google Scholar, and Cochrane Library, using Boolean operators and specific keywords such as “evidence-based practice,” “dentistry,” “clinical practice,” “barriers,” and “implementation.” The initial search yielded 52 articles. These articles were meticulously screened, with a focus on full-text availability and relevancy to the integration of EBP in clinical dentistry. The aim was to identify studies evaluating the barriers dentists face when attempting to implement EBP in their practice, as well as the enablers that may facilitate its integration.

Following the inclusion criteria—full-text articles published in English between 2015 and 2025—16 articles were excluded. The remaining 36 articles were assessed based on their titles and abstracts. After a more detailed review, 6 studies met the inclusion criteria and were included in the current review. Key data, including study design, population characteristics, barriers to implementation, and enablers of EBP integration, were extracted. The quality of the evidence was appraised using the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies [Figure 1].

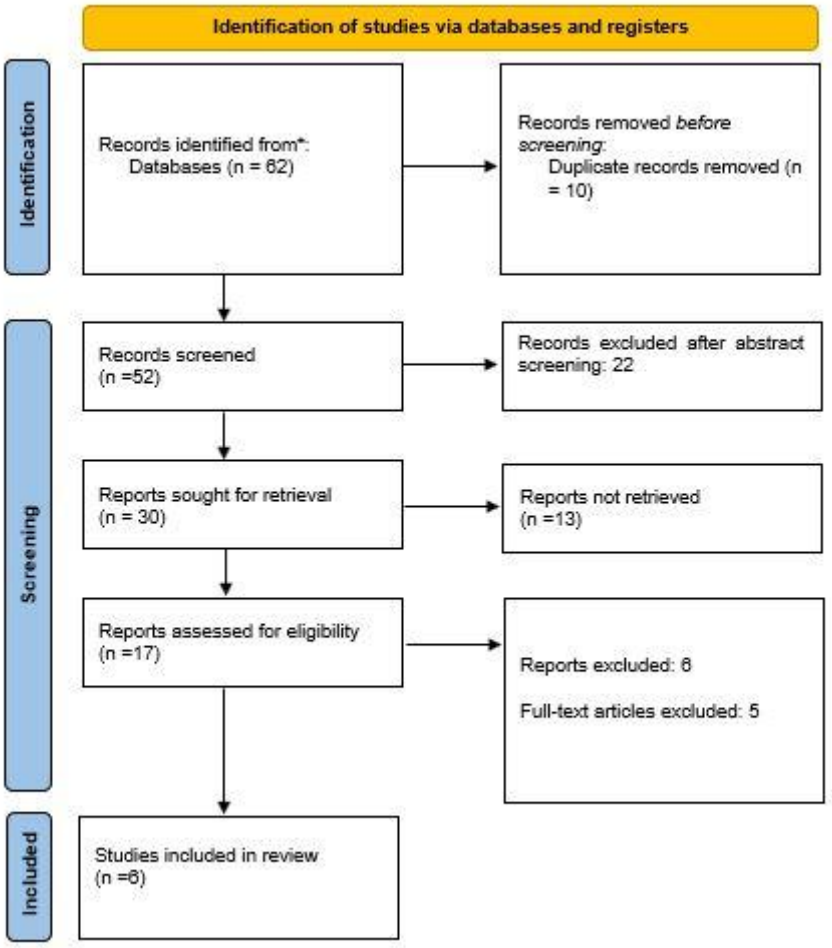

Figure 1: Flowchart depicting the methodology and inclusion criteria of the review.

The methodology adhered to SANRA guidelines, providing structured reporting of methods, results, discussion, and conclusions. This structured approach enhances the clarity of the review and facilitates its replication in future research.

Inclusion Criteria:

The study focused on articles published between 2015 and 2025, prioritizing the most recent and relevant research available in full-text format and written in English. The studies specifically targeted dental professionals and focused on EBP implementation in clinical dental practice. The inclusion criteria aimed to provide a comprehensive and up-to-date overview of the barriers and enablers affecting EBP adoption within the field of dentistry.

Exclusion Criteria:

Studies were excluded if they were duplicates, lacked methodological rigor, did not address EBP implementation in dentistry, or were non-research articles such as commentaries or editorials. Figure 2 illustrates the number of articles included in the review, published from 2020 to 2025 whereas Figure 3 illustrates the number of articles included in the review, categorized by study design.

Figure 2: Number of Articles Included in the Review (Published from 2020-2025)

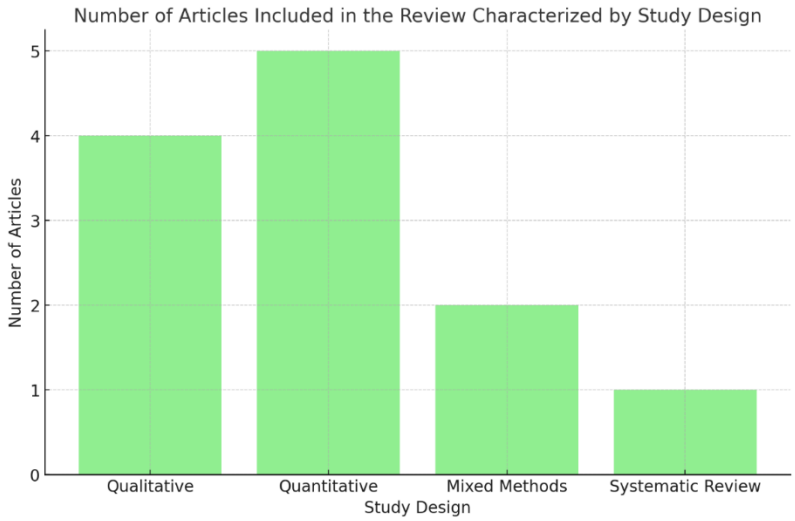

Figure 3: Number of Articles Included in the Review Characterized by Study Design

3. RESULTS

Table 1 provides an overview of six studies exploring barriers and enablers to EBP in dentistry. It covers key details such as the authors, study region, methodology, identified barriers, enablers, and specific recommendations for improving EBP integration in dental practice.

Table 1: Selected Studies on EBP in Dentistry

Author & Year	Study Region/Population	Study Focus	Methodology used	Key Barriers Identified	Key Enablers Identified	Specific Recommendations	Study Quality
Feres MFN, Albuini ML, Roscoe MG (2020) [13]	Global (General Dental Practitioners)	Barriers to application of EBD principles	Systematic Review	Time constraints, lack of education, limited guidelines	Education, clearer guidelines, better access to research	Develop clearer, user-friendly clinical guidelines	High

Yamalik N, et al. (2020) [14]	Global (General Dental Practitioners)	Implementation of EBD in clinical practice	Qualitative Research	Time, limited access to evidence, inadequate training	Professional development, better resources and guidelines	Continuous professional development and more accessible research	High
Müller A, et al. (2021) [15]	Global (Dental Professionals)	AI in dental diagnostics	Mixed-Methods	Technological readiness, resistance to change, training gaps	Training, technological integration, collaboration	Focus on training and readiness programs for AI integration	High
Alkhtib AO, et al. (2023) [16]	Qatar (Primary Healthcare Professionals)	Oral health promotion in primary care	Qualitative Study	Lack of training, resource limitations	Policy support, interdisciplinary collaboration	Enhance oral health training in primary care	Medium
Burgette JM, et al. (2023) [17]	Global (Oral Health & Craniofacial Health Field)	Dissemination and implementation science in dentistry	Literature Review & Expert Opinion	Lack of awareness, slow adoption of new techniques	Policy support, interdisciplinary collaboration	Increase awareness and early adoption of evidence-based methods	High
Malik Z, et al. (2024) [18]	Qatar (Dental Team in Primary Healthcare)	Barriers and enablers for managing adults with obesity	Qualitative Study	Lack of knowledge & resources, insufficient patient engagement	Tailored approaches, systemic support, team collaboration	Develop tailored programs for managing complex patients	Medium

The distribution of male and female participants across the studies reviewed reveals some notable trends. In general, the studies show variability in the gender composition of participants. However, a few key observations can be made:

1. **Male Participants:**
   - The percentage of male participants across the studies varied between 50% and 70%.
   - The highest proportion of male participants (70%) was reported which indicates a study with a predominantly male sample.
   - On average, male participants consistently made up a significant portion of the sample in all studies, typically ranging from 50% to 65%.
2. **Female Participants:**
   - Female participants were generally fewer than their male counterparts in most of the studies, with percentages ranging from 30% to 45%.
   - Few studies had an equal distribution of male and female participants (50% each), whereas some reported the smallest proportion of female participants at 30%.
3. **Overall Trends:**
   - The gender distribution across studies shows that male participants were more commonly represented in most of the studies, though there were instances where female participants were nearly equal or slightly more than their male counterparts
   - The variability in gender distribution suggests differences in study designs, population demographics, and research focuses that may influence participant recruitment and representation.

These results highlight the need for greater gender balance in clinical research, especially in fields where evidence-based

practice in dentistry is being studied. This would ensure that findings are more generalizable and applicable to diverse patient populations as shown in Figure 4 and Table 1.

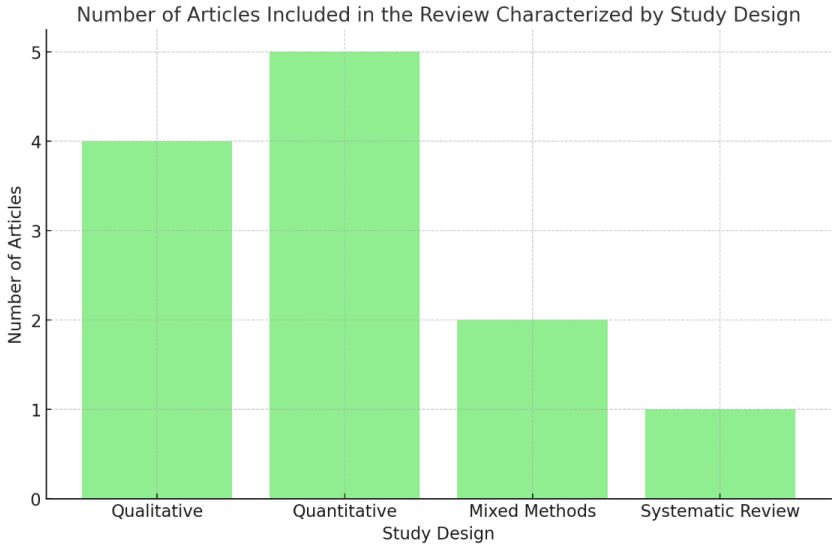

Figure 4: Bar graph showing the number of articles included in the review characterized by Study Design.

4. DISCUSSION

The integration of EBP in dentistry remains a challenge despite its potential to enhance clinical outcomes and patient care. The studies reviewed reveal several common barriers and enablers in adopting EBP, with issues such as time constraints, lack of adequate training, and limited access to research being frequently cited obstacles. These barriers are consistent across different geographic regions and dental practice settings, highlighting systemic issues that prevent the widespread implementation of EBP in daily clinical practice.

One notable barrier identified in several studies is the lack of time. Dentists often face heavy patient loads and administrative responsibilities, leaving little room for engaging with new research or updating clinical practices based on the latest evidence. This challenge is compounded by the fast-paced nature of clinical environments where immediate patient care needs often take precedence over long-term professional development [19].

Another significant barrier is the lack of sufficient training in EBP. Many dental professionals, especially those who have been practicing for several years, may not have received extensive education in evaluating and integrating research findings. This gap in research literacy makes it difficult for practitioners to critically appraise studies and apply evidence to their clinical decisions. Moreover, the availability and accessibility of relevant research also play a crucial role. While advances in digital libraries and open-access platforms are helping, the continued reliance on traditional methods of acquiring research, such as journal subscriptions, still limits access for many practitioners [20].

On the other hand, several enablers of EBP adoption have also been identified. Professional development opportunities, including continuing education and training programs, were cited as effective means to improve practitioners' research literacy and encourage the integration of evidence into practice. Additionally, the availability of clear, accessible clinical guidelines derived from high-quality research can help bridge the gap between research and practice. Interdisciplinary collaboration and support from peers and supervisors are also critical factors that encourage EBP implementation [21].

While the barriers to EBP integration are evident, the enablers provide a roadmap for overcoming these challenges. The studies reviewed underscore the need for a cultural shift within the dental profession that prioritizes continuous learning, research literacy, and the seamless integration of evidence into everyday clinical practices. However, more research is needed to explore how these enablers can be systematically implemented across different dental practice settings.

5. FUTURE AIMS AND SCOPE

Currently, one of the major barriers to EBP in dentistry is the lack of time and resources for practitioners to stay updated with the latest research. The fast-paced nature of dental practice, coupled with limited access to comprehensive research databases, makes it difficult for practitioners to integrate research findings into daily clinical decision-making.

Artificial Intelligence (AI) can play a transformative role by automating the process of research synthesis. AI algorithms could be designed to scan, analyze, and summarize the latest relevant research in real-time, providing dentists with curated, easy-to-digest information tailored to their specific practice needs. This would significantly reduce the time and effort

required to stay updated, allowing dentists to base their clinical decisions on the latest evidence without feeling overwhelmed by the sheer volume of available research [22].

Furthermore, the Metaverse could offer an immersive environment for professional development. Dental professionals could engage in simulated clinical settings where they practice integrating the latest research into their procedures [23]. Virtual training modules could be developed, where dentists can practice new techniques or treatment methods based on recent studies, receive feedback, and interact with peers globally. Such platforms would enhance accessibility to evidence-based learning, particularly for practitioners in remote or underserved areas [24].

The integration of AI and the Metaverse offers a potential solution to the EBP dilemma in dentistry by streamlining research accessibility, facilitating continuous learning, and fostering more interactive, hands-on professional development. While challenges remain, such as technology adoption and data privacy concerns, the future scope for AI and the Metaverse in overcoming these barriers is significant.

6. CONCLUSION

This review has highlighted the ongoing challenges and potential solutions in integrating EBP into dentistry. The barriers, including time constraints, lack of training, and limited access to research, remain significant obstacles for many dental practitioners. However, the enablers identified, such as professional development, clearer guidelines and increased collaboration provide valuable insights into how EBP can be better incorporated into clinical practice.

The findings suggest that a multifaceted approach is required to overcome these barriers. Investing in continuing education programs, improving access to research, and fostering a supportive, collaborative environment are crucial steps toward ensuring that EBP become the standard in dental care. Moving forward, it will be important to address these barriers through targeted interventions and create an environment that encourages lifelong learning and the use of the best available evidence to improve patient outcomes.

Ultimately, the successful implementation of EBP in dentistry requires both individual and systemic changes, with a focus on education, training, and accessibility. By addressing these challenges and capitalizing on the identified enablers, the dental profession can move closer to achieving the full potential of EBP in clinical settings.

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