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DISCOVERY SCIENTIFIC SOCIETY

Incorporating Oral Health into Medical Curricula: A Critical Necessity

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ABSTRACT

Introduction: Oral diseases are one of the most common health conditions, yet their prevalence is not reflected in medical teaching. Additionally, substantial research shows the close connection between oral health and systemic health, especially in patients with diabetes and cardiovascular diseases. Future doctors need to be aware of this link and prepared to address oral health as a key part of overall patient care. Methodology: This review examined studies published between January 2000 and April 2025 utilizing the following databases: PubMed, ResearchGate, and Google Scholar. Systematic reviews, meta-analyses, and curriculum studies from peer-reviewed journals were used as primary evidence. Commentaries and editorials were used to highlight policy implications. Results and Discussion: Medical schools provide minimal to no training in oral health. Several initiatives, particularly those incorporating interprofessional education, have demonstrated significant success in improving students' knowledge and collaborative skills. Effective oral health integration into medical education utilizes hands-on teaching and allows for direct engagement between medical and dental students. As the main barriers in addressing the dental-medical divide, educators identified limited resources, overpacked curricula, and a lack of ties to dental institutions. Conclusion: Sustainably positioning oral health as an integral part of medical education will require further interprofessional collaboration, policy support, and curriculum development.

Keywords: Medical education; Oral Health; Interprofessional education; Curriculum development

1. INTRODUCTION

Almost fifty percent of the global population suffers from oral diseases, predominantly of untreated tooth decay, periodontal disease, and cancers, making them the most common health conditions (WHO, 2022). Neglecting oral health directly impacts patients' quality of life and overburdens healthcare systems, often

widening extensive health inequalities (Peres et al., 2019; Barranca-Enríquez and Romo-González, 2022). The global scale of unmet dental needs and their consequences have driven the effort to urgently integrate oral health into primary healthcare. Given the shared determinants and risk factors among noncommunicable diseases, this presents a valuable opportunity to broaden preventive strategies that include oral health across diverse patient-provider interactions. While physicians acknowledge the importance of oral healthcare, they often lack the necessary knowledge to address it (Rabiei et al., 2012). A fundamental change is needed, beginning with the integration of interprofessional education early in the learning process.

The workforce imbalance is most apparent in remote and underserved areas, which drives efforts to incorporate oral health into medical curricula (Kumar et al., 2024). Interprofessional education (IPE) is the collaboration between at least two healthcare professions. This review examines recent developments in medical education, highlights their benefits, demonstrates opportunities for innovation, and identifies the gaps and challenges in delivering interprofessional education for oral health.

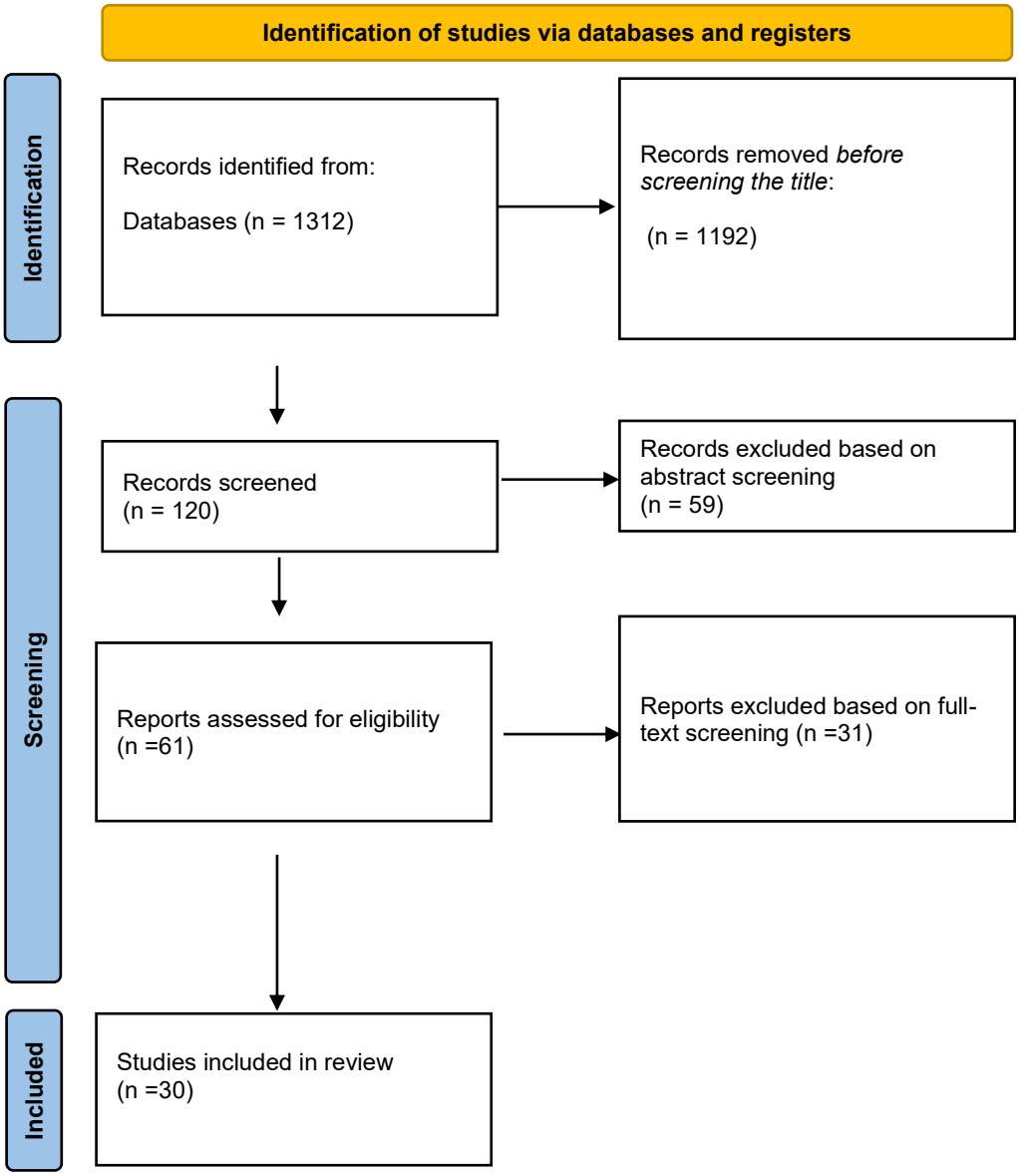

Figure 1. PRISMA flow diagram

2. REVIEW METHODS

To identify relevant publications, the research team utilized leading electronic databases - PubMed, ResearchGate, and Google Scholar. Keywords included "oral health education", "dental education", "oral health curriculum", "interprofessional education", "dental-medical integration", combined with the terms "medical school", "medical programs", and "medical students". The screening included

publications from January 2000 to April 2025, with a focus on articles from 2015 onward to reflect current practices and recent educational advancements.

The included manuscripts from peer-reviewed journals consisted of systematic reviews, meta-analyses, and curriculum studies. Additionally, commentaries and editorials were incorporated to highlight expert perspectives and policy implications, yet they were not used as primary evidence. Only studies published in English were included in the identification process. The research team curated a PRISMA chart to visualize the flow of article selection (Figure 1).

3. RESULTS AND DISCUSSION

Interconnectedness between Oral and Systemic health

Given the largely preventable nature of oral diseases, the task of early detection and intervention could be shared with medical doctors and other healthcare providers. This requires their engagement mostly through performing basic oral examinations and caries risk assessment. Patients with chronic conditions such as diabetes or cardiovascular diseases would especially benefit from improved care integration and interprofessional collaboration (Heaton et al., 2024; Barranca-Enríquez and Romo-González, 2022; Borgnakke et al., 2018). Another significant link has been identified between diet and oral health - poor dietary habits contribute to caries, and through reduced food intake, result in patients' nutritional deficiencies (Gondivkar et al., 2019).

In many cases, medical professionals other than dentists serve as the first point of contact for patients. Although oral diseases are instinctively associated with pediatrics and family medicine, they are also a critical concern in emergency medicine. With a growing number of patients presenting to emergency departments due to oral health issues, physicians need a basic understanding of how to manage acute dental conditions in the absence of dental professionals (Sun et al., 2015; Cohen et al., 2011).

Oral diseases extend beyond medical implications and pose a considerable social burden by disrupting daily family life, reducing productivity, and leading to missed school and workdays (Peres et al., 2019). Hence, integrating oral health into medical education and training by equipping future healthcare professionals with the skills needed to provide comprehensive and patient-centered care is urgently needed.

Current Status of Oral Health Education in Medical Curricula

A better understanding of dentistry enables medical students, and thus future physicians, to recognize the significance of oral health, the importance of interprofessional collaboration, and the need for coordinated care across disciplines (Rasmussen et al., 2022). The compartmentalization of dental medicine within the medical sciences has led to the neglect of oral health in medical curricula, while research increasingly ties oral health to systemic diseases. Limited effort has been made to map the current state of oral health education in medical schools globally. Studies from Malaysia, Australia, Iran, and the US have consistently shown a limited presence of oral health training within their medical curricula, particularly in terms of hands-on teaching (Abbott et al., 2018; Ahmad et al., 2017; Ferullo et al., 2011; Jadidfard and Yazdani, 2020). Hein et al., (2011) investigated the inclusion of oral-systemic health connection in the curricula of non-dental health professionals across Canada, the United States, Europe, Asia, Australia, and New Zealand. While most institutions recognized its importance, they reported their teaching on the topic as scarce and inadequate.

Understanding student perspectives and knowledge on interprofessional teaching, particularly in oral health, can significantly influence the success of curricular development. A survey of students' attitudes toward interprofessional education revealed that their appreciation for the relevance of other disciplines to their future professional lives motivates them to continue IPE after graduation (Hackenberg et al., 2022). Students already have a fair understanding of dental health problems but lack knowledge about specific symptoms and their significance (Vijayabala et al., 2022; Ahmad et al., 2017). Findings from Malaysia and Australia further reflect this gap, as students reported believing they have insufficient knowledge in managing dental trauma, detecting cancerous lesions, and providing dietary advice (Ahmad et al., 2017).

As some of the barriers to integrating oral health teaching, educators have identified curriculum overload, lack of teaching expertise, limited awareness, scarce resources, and clinical materials (Ahmad et al., 2017; Mouradian et al., 2005; Gill et al., 2022). The delivery of integrated care and education, especially its hands-on components, may be influenced by the structure of academic institutions. With fewer than one in three medical schools maintaining affiliations with dental schools and only 36.5% connected to dental residency programs (Ferullo et al., 2011), creating opportunities for interprofessional collaboration may pose a significant challenge for stand-alone medical programs (Loster and Likeman, 2012; Gill et al., 2022; Ahmad et al., 2017).

To address physicians' knowledge deficit in oral health, the Society of Teachers of Family Medicine pioneered its Smiles for Life National Oral Health Curriculum. The program offers comprehensive coverage of the dental aspects essential for medical doctors, including oral-systemic health connectivity, adult and pediatric oral health, emergencies, pregnancy, and topical fluoride application (Douglass et al., 2007). It allowed healthcare practitioners to enhance the quality and frequency of oral health practice (Clark et al., 2017). Professional organizations widely endorse the program, and it has attracted growing interest, particularly among nurses and physicians (Garland et al., 2014). Although the primary focus of this curriculum was residency programs, numerous US-based schools have since benefited from its adaptation into curricula, which has effectively improved students' oral health knowledge (Silk et al., 2009; Morel et al., 2022). Educators point out the importance of clinical application of the material, which in turn builds students' confidence in advising patients on preventive care and improves their confidence in performing oral health examinations (Morel et al., 2022).

Harvard achieved similar success with the revision of their Patient-Doctor Course (Park et al., 2017). With clearly defined learning objectives, educators employed a combination of methods essential for competency development, including peer learning, lectures, and hands-on practice. These activities were conducted in mixed groups of dental and medical students, resulting in significant improvements in students' understanding of oral health and their ability to perform oral examinations (Park et al., 2017). A similar program, combining theoretical aspects delivered remotely with practical instruction, was introduced at a college in Cincinnati as part of a pediatric rotation (Cully et al., 2021). Post-pilot evaluation revealed that students recommended introducing oral health concepts as early as the first year of medical school, with most indicating that current exposure to the topic is insufficient. Online learning could be a valuable tool for schools that lack an affiliated dental institution or have limited access to specialized faculty. The use of digital tools has also proven highly successful at the University of São Paulo, where a combination of a basic oral health promotion curriculum, ambulatory patient interactions, an internet-based course, and biweekly proactive contact with a dentist was found to be most effective in enhancing students' skills (de Sousa Eskenazi et al., 2011). The study also demonstrated that an objective structured clinical examination (OSCE) is a suitable method for evaluating students' competencies following oral health training.

Berkowitz et al., (2017) utilized OSCEs to evaluate the effect of oral health instruction on physician assistant students. They found that, as a result of the training, students began to incorporate greater attention to oral health issues in their history and physical write-ups. The neglect of dental aspects in medical history-taking led to a revision of the head, ears, eyes, nose, and throat (HEENT) examination to include an "O" for oral health—resulting in the HEENOT acronym, adopted as a new teaching standard for health professions students (Haber et al., 2015).

Previous studies introduced oral health on a limited, single-occasion basis. At the same time, the University of Washington integrated the Oral Health Curriculum for Medical Students throughout all years of study within pediatric, family medicine, and geriatric rotations, offering it as both required and elective courses (Mouradian et al., 2005).

Polish universities are mandated by a government directive to include no less than 15 hours of oral health education for medical students (Loster and Likeman, 2012). Provided guidelines for the course identify competencies and objectives, which are developed around the impact of medical treatment on the oral cavity and systemic manifestations of oral diseases. A clinical element is not included as part of this course. Table 1 summarizes selected national initiatives that aim to integrate oral health into medical education.

A recent study by Gill et al., (2022) analyzed how U.S.-based institutions integrate oral health into medical curricula. Their initiative highlights the importance of monitoring and evaluating educational interventions, for which they have recommended the validated Oral Health Curriculum Evaluation Tool (OHCET). Apart from identifying a wide range of resources that can support curriculum development, its authors emphasized the importance of having a dedicated champion to lead cooperation efforts and the need to identify strategic partners. Some of the responding medical schools have established experiential learning opportunities for students through partnerships within their communities. Another innovative initiative has been the use of patient testimonials to demonstrate the importance of collaboration between dental and medical professionals.

Between all programs, the theoretical aspects addressed more frequently were oral anatomy, causes and prevention of caries, periodontal disease, dental trauma, oral cancers, and fluoride (Cully et al., 2021; Park et al., 2017; Morel et al., 2022; Mouradian et al., 2005).

In order to successfully prepare students to enter the workforce, universities began to shift to competency-based curricula. This framework was used with success in the development of the interprofessional Oral Health TIPS program, which builds on the importance of communication, collaboration, and ethics. This initiative aims to strengthen the primary care system and reinforce attention to oral health at every visit with an elderly patient—not only for medical but also for nursing and pharmacy students (Dolce

et al., 2014). The program also places particular emphasis on experiential learning through community service and includes simulation activities that replicate primary care settings. Connecting theory to patient care illustrates the real-world impact of interprofessional education. At New York University, the pediatric rotation has been highly effective in fostering interprofessional competencies through team-based clinical experiences involving medical, dental, and nursing students (Hartnett et al., 2019).

The American Association of Medical Colleges (AAMC) has urged medical schools to integrate oral health into their curricula through medical-dental collaboration as early as 2008 (Cully et al., 2021), which helps explain why most reported models and initiatives originate from the United States. Despite the significant efforts of individual institutions to formulate learning objectives, define relevant competencies, and design curricula to improve patient outcomes, these improvements continue to be made on a case-by-case basis. Structural reforms at both national and international levels are needed to build on the momentum toward bridging the dental–medical divide.

Table 1. Selected national interventions aimed at integrating oral health into medical education.

Country	Approach	Reference
United States (Smiles for Life Curriculum)	Interprofessional curriculum with clinical components	Morel et al., 2022
Poland	Government-mandated oral health education with defined objectives and competencies, but no clinical component	Loster and Likeman, 2012
Brazil	Hybrid oral health program including clinical exposure and a dental mentor	de Sousa Eskenazi et al., 2011

Future directions

In response to emerging innovations in medical education, medical schools and accreditation bodies have developed meaningful and impactful learning opportunities. An example of this is the suggestion to utilize improvisational teaching techniques to promote better collaboration and communication among health professionals (Chan and Makansi, 2022). This method has shown a high degree of success in strengthening interprofessional relationships while also enhancing communication with patients and extending beyond the professional setting (Zelenski et al., 2020).

Experts have described this scenario as one that improves outcomes and access to care while also reducing healthcare costs (Donoff and Daley, 2020). Hence, there is a strong case for the early introduction of dental-medical interactions through interprofessional courses or collaborative learning opportunities, which yield better communication and respect between professionals (Loster and Likeman, 2012). This approach is especially valuable in underserved areas, where the limited number of healthcare professionals requires a more integrated model of care. To make lasting changes in breaking down medical-dental silos, the workforce would benefit from dually trained professionals who can lead integration by reshaping both education and clinical practice (Donoff and Daley, 2020).

Postgraduate and continuing education programs are essential for reinforcing and expanding the integration of oral health into everyday medical practice. Integrating oral health beyond the educational aspect requires a shift in perception and procedural changes. The latter is most urgent with respect to the flow of patients' electronic medical records, as consolidating patient information facilitates gaining a holistic picture of patients' health (Abuhatem et al., 2024).

4. CONCLUSION

Oral diseases are a significant public health challenge for the global population. With limited resources, engaging non-dental health professionals in the issue offers new pathways for prevention and early detection. Accreditation bodies, policymakers, medical councils, and universities should respond to the societal need for integrating oral health into medical curricula through interprofessional education models. There is significant room for professional organizations to work across the divide to develop transferable frameworks for students in both fields. This review of available material highlights the need for further research into the topic and advocates for ongoing evaluation of existing programs.

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Author's Contribution

Conceptualization, A.S. and A.G.; Methodology, A.S., A.R. and A.G.; Software, N.G. and M.W.; Validation: F.C. and M.W.; Formal analysis: A.K. and A.Z.; Investigation: P.L. and F.C.; Resources: A.S. and A.R.; Data curation: P.L. and A.Z.; Writing- Original- draft preparation: A.S., A.G and A.K. Writing-review and editing: M.W. and N.G.; Supervision: A.R. and P.L.; Project administration: A.S., A.G., M.W., N.G., A.K., A.Z., F.C., P.L., A.R.

Informed consent

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Ethical approval

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Conflict of interest

The authors declare that there is no conflict of interest.

Data and materials availability

All data associated with this work are present in the paper.

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