The Public Health Approach to Oral Health: A Literature Review

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Abstract: Background: Oral health (OH) has evolved beyond dental concerns to encompass psychosocial dimensions and overall well-being. This study reviews OH strategies within a public health framework to identify key elements for effective OH promotion. Methods: A literature review following PRISMA guidelines identified 42 relevant articles from 62 screened. Five themes emerged: group-level, individual-level, policy-level (emphasizing devising OH policies), healthcare delivery, and communication. Common components included OH education, behaviour change, access to OH services, and policy integration. Results: Thematic analysis identified five overarching themes in oral health (OH) promotion strategies, with a focus on tailored approaches for specific populations and components such as education, access to services, interventions, and policy, emphasizing the multifaceted nature of OH promotion. Conclusion: Effective OH promotion requires a multifaceted approach and tailored strategies with interprofessional collaboration. Future research should focus on cost-effectiveness and user-friendly resources for OH professionals and policymakers.

Keywords: oral health; public health approach; strategies; interprofessional collaboration

1. Introduction

In an ever-evolving understanding of health, the concept of oral health (OH) has been redefined to extend beyond the condition of the mouth and teeth. The World Health Organization (WHO) characterizes OH as pivotal, encompassing not only physical aspects but also psychosocial dimensions that influence essential functions such as eating, breathing, and communication [1]. This perspective underscores the interplay between OH and broader well-being, accentuating the need for a comprehensive public health approach that addresses the intricate web of determinants shaping OH outcomes.

Central to this is the recognition of the far-reaching impact of OH on individuals’ quality of life and overall health. OH has been shown to be linked to various diseases and conditions, many of which are preventable [2,3]. The WHO’s global OH report (2022) emphasized the significance of conditions like dental caries, severe periodontal diseases, and oral cancer, which reflects the complex landscape of OH challenges [4]. Moreover, evidence highlights the bi-directional relationships between oral diseases and non-communicable diseases (NCDs), underscoring the common risk factors and the potential for mutual exacerbation [2,3].

The burden of oral diseases surpasses that of major NCDs, signifying the urgent need for targeted interventions [4]. It is evident that OH inequalities persist; vulnerable populations, including those living in poverty, children, the elderly, and remote communities, bear a disproportionate share of this burden.

This paradigm shift in the understanding of OH is mirrored in international initiatives, such as the WHO’s Global Strategy on OH (2022) [1] and subsequent Global OH Action Plan (2023) [5]. These emphasize the significance of holistic approaches to address OH disparities globally. The objectives of improving governance, promoting oral disease
prevention, enhancing the health workforce, integrating oral care into primary health care, strengthening information systems, and advancing research encapsulate the multifaceted nature of OH. The call for an integrated approach to OH aligns with the broader vision of global health and sustainable development, such as the pursuit of the Sustainable Development Goals (SDG). Organizations such as the WHO [5], World Dental Federation (FDI) [6], World Federation of Public Health Associations (WFPHA), and Centers for Disease Control and Prevention (CDC) [7] have highlighted the need to place OH as a public health issue, interweaving OH with overall health and well-being. The WFPHA emphasizes that this comprehensive approach is rooted in the recognition that OH is a human right, and, while they specifically refer to children, this can be expanded to include all age groups [8,9]. Moreover, their policy regarding OH for maternal and child health puts forth a series of recommendations encouraging the integration of OH education and services into existing care systems, alongside training of both dental and non-dental professionals in such efforts [8,9]. This multifaceted approach acknowledges that OH cannot be siloed from broader health determinants and societal concepts.

Notably, the first guiding principle of the Global Strategy on Oral Health is that of a public health approach to oral health [1]. The following is taken from the WHO global OH strategy: “A public health approach to OH strives to provide the maximum OH benefit for the largest number of people by targeting the most prevalent and/or severe oral diseases and conditions. A public health approach to OH requires intensified and expanded upstream actions involving a broad range of stakeholders, including those from social, economic, education, environment, and other relevant sectors” Ref. [1]. However, albeit this new understanding of OH from a public health lens, the literature placing it as such, that collates the strategies and components of this approach, is scarce.

With the recent action plan put forth by the WHO, there is a call for global action to ensure a public health approach to OH. In line with the Global Action Plan for OH, which outlines actions to ensure certain strategic objectives are achieved, this article aims to provide tangible, real-world examples of components and strategies to guide the implementation of a public health approach. This review of the literature aims to provide an answer to the question: What are the key components and strategies of a public health approach to oral health?

2. Methods

This literature review utilized the guidelines described by the Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA) [10].

Articles were considered eligible if they focused on a public health approach to oral health. Specifically, the inclusion criteria were as follows:

Population: Studies involving diverse demographic groups, including maternal and/or child, older adults, individuals with disabilities, and indigenous populations, without age or geographical limitations;

Interventions: Focus on components, strategies, interventions, policies, and initiatives related to a public health approach to oral health, encompassing health promotion, disease prevention, access to oral health services, and integration into broader healthcare systems;

Comparisons: No explicit comparisons were specified;

Outcomes: Assessment of effectiveness, feasibility, and impact of various oral health promotion strategies and components, as well as outcomes related to oral health disparities, access to care, and overall well-being;

Study Design: Systematic reviews, reviews, policy reports, and case studies were included;

Exclusion criteria included: Published outside of established range; out-of-scope or do not pertain to the overall theme of public health approach to OH; non-English language and narrow focus–excluding publications that solely discuss dental procedures, treatments, or specific clinical cases without a broader public health context.

We conducted a search through the PubMed database, using a search strategy developed using a combination of MeSH terms (i.e., oral health, oral hygiene, public health.
approach, global health, preventive dentistry, dental public health, community dentistry, and oral health promotion). Reference lists of publications that satisfied the eligibility criteria were hand-searched for additional articles not identified by the search strategy and yielded 10 additional publications. Given the relatively broad scope of the review, the publication date was limited to studies published within the past 7 years. We chose this date as the sustainable development goals (SDG) came into force in 2016 [11]. As per the landmark global strategy on oral health (OH; World Health Organization, 2022), OH is to be integrated into sustainable development goal (SDG) #3 ‘good health and well-being’ (United Nations, n.d.).

Publications were screened based on title and abstract. Selected articles were then considered for inclusion based on pre-established eligibility criteria. For data extraction and analysis, thematic analysis was conducted using Excel. Data collected involved citation, type of study, geographical region of focus, population of focus, action area per the Ottawa Charter, OH strategy and components, outcome, recommendation, and other comments. Please see the Supplementary Table S1 for the complete thematic analysis.

Given its continued relevance for public health, we collected data regarding action area per the Ottawa Charter for Health Promotion. However, most of the included articles did not specify an action area; therefore, the information retrieved was subjective.

Operational Definitions

Public health approach: Here, we borrow from Watt et al. (2019), who define the public health approach as “it should emphasise health promotion and disease prevention; it should monitor and respond to population needs; it should be evidence-based, clinically effective, and cost-effective, as well as sustainable, equitable, and universal; and it should be empowering for individuals and populations” [12].

3. Results

A total of 157 records were screened. Of these, 95 were excluded on the basis of title and abstract. A total of 20 studies appeared to meet the inclusion criteria but were excluded on the basis of wrong content focus (n = 15), non-English publication (n = 3), and out of publication range date (n = 2).

Of the 62 articles screened for eligibility and relevance to topic, 42 articles met the criteria and were included in the final sample. Included publications were as follows: 1 rapid review, 17 systematic reviews, 9 scoping reviews, 3 reports, and 12 narrative reviews. Figure 1 depicts a flow diagram of the process, as per PRISMA guidelines [10].

Through thematic analysis, we identified five overarching themes: (1) group-level, (2) individual-level, (3) policy-level, (4) healthcare delivery, and (5) communication and awareness. These themes were then subdivided into a series of strategies to better understand how they align with different levels of implementation and their intended impact on OH promotion and care.

Within the group-level, we included community-based, senior-citizen-centre-based, school-based, population-based, and workplace-based strategies. Here, the majority of articles fell into the community-based strategies [13–18], followed by school-based strategies [19–21]. At the individual-level, we identified two strategies: behavioural change interventions [22] and general OH promotion [23–26]. In some instances, there was difficulty in ascertaining exactly what specific strategy was used; thus, these articles were included within the general OH promotion. For policy-level, we included the establishment of an OH committee, municipal public health planning, and devising OH policies. Of these, most articles involved devising OH policies [12,27–30]. We separated municipal public health planning from devising OH policies because the former focused on the mention of OH policies within the public health plans of rural local governments as opposed to specifically focusing on the creation of new OH policies. Healthcare delivery included non-dental health workers, change care model—which focused on changing the oral care model—teledentistry, and mobile health (referring to the use of mobile devices
for healthcare purposes, hereafter ‘mHealth’). Here, non-dental health workers had the most mentions [31–38], followed by mHealth [39–41] and teledentistry [42,43]. In this case, teledentistry was separated from mHealth as articles that focused on mHealth involved OH education using social and/or digital media whereas those that mentioned teledentistry emphasized its use to increase access to OH services and OH screening. Finally, within communication and awareness, we included mass media campaigns.

Figure 1. PRISMA flowchart.

We then analysed the data to identify the main components of said strategies and grouped them in clusters based on their thematic similarities—focusing on educational, service-related, intervention, and policy aspects of OH. There were four clusters: (1) education and awareness, (2) OH services and access, (3) interventions and treatments, and (4) policy, environment, and population health.

Within education and awareness, identified components were OH education, OH behaviour change motivation, behaviour guidance, and OH advocacy. The majority of articles had some component of OH education in their strategies [13,14,16–23,25–27,31–35,37–49], followed by a component related to OH behaviour change motivation [18–22,31,33,34]. OH education was most commonly found in articles that cited strategies using non-dental health workers [31–35,37,38] and community-based strategies [13,14,16–18]. OH services and access involved access to OH services, OH screening, OH status, employment of local health workers, integrated OH, and OH resources. OH status was included within this
cluster, as opposed to interventions and treatments, as it refers to the current condition of OH as identified by a health worker. Within this cluster, the component ‘access to OH services’ was the most prevalent [27,32,34–37,40,42,43,45,49,50], followed by OH status [14,16,18,19,39]. The cluster interventions and treatments included four components: OH restorative treatment, chemical interventions (fluoride and/or chlorhexidine), mechanical interventions (toothbrush), and teledentistry. For chemical interventions, we included fluoride at both the individual level (e.g., silver diamine fluoride) and the population level (e.g., fluoridation of water). Although having been used as a strategy, teledentistry was also included as a component due to its use in an integrated OH intervention. Within this cluster, chemical interventions were the most prevalent [15,17,23,24,48], followed by mechanical interventions [13,23,24,47]. The final cluster, policy, environment, and population health, included the following components: OH policies, food environment, population health, and evidence-informed OH. The OH policies [32,51] and population health [12,29] components were the most prevalent.

Table 1 presents a matrix that organizes the included articles within clusters and components, as well as themes and strategies.

In regards to the population these articles focused on, the majority focused on adolescents and children (n = 7), followed by Indigenous (n = 4), intellectual developmental disabilities (n = 3), maternal and/or child health (n = 4), older adults (n = 3), working adults (n = 1), visually impaired individuals (n = 1), rural and remote communities (n = 1), people with type 2 diabetes (n = 1), and refugees (n = 1). There were eight articles that did not specify population; however, it was inferred from the text that they had a varied population focus.

To visualize what strategies were used most per population, we organized the data into a matrix. Table 2 presents this matrix, where themes and strategies are cross-referenced with populations. When omitting the population group ‘varied’, the majority of articles include strategies aimed at improving OH for adolescents and children. For this population, most strategies were school-based [15,19–21]. Strategies focusing on the Indigenous population group were divided between community-based strategies [14,16], those involving non-dental health workers [36,37], and integrated OH intervention strategies [49]. Strategies focusing on maternal and/or child health were dividing between population-based [48], general OH promotion [25], non-dental health workers [31,38], and teledentistry [43]. Regarding individuals with developmental disabilities, two articles involved general OH promotion [23,24], and one was community-based [13]. As for older adults, strategies were divided between senior-citizen-centre-based strategies [47], devising OH policies [27], and teledentistry [42].

Data were also collected regarding what action areas each article best fit. More than one action area could be present within an article. Of the five action areas, develop personal skills appeared 18 times (n = 18) followed by reorient health services (n = 17), build healthy public policy (n = 12), create supportive environments (n = 8), and strengthen community action (n = 4).

Given the nature of this review (not systematic), no quantitative analysis was performed, and we did not assess for publication bias in the identified studies.
<table>
<thead>
<tr>
<th>Cluster</th>
<th>Education and Awareness</th>
<th>OH Services and Access</th>
<th>Interventions and Treatments</th>
<th>Policy, Environment, and Population Health</th>
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<tr>
<td>Theme</td>
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<td><strong>Access to OH Services</strong></td>
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<td><strong>Mechanical Interventions</strong></td>
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<td><strong>Teledentistry</strong></td>
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<td><strong>Evidence Informed OH</strong></td>
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- **Community-based** [13,14,16–18] [18] [14,16,18] [16] [15,17] [13]
- **Senior-citizen-centre-based** [47]
- **School-based** [19–21] [19–21] [19]
- **Population-based** [48]
- **Workplace-based** [44] [44]
- **Behavioural change interventions** [22] [22]
- **General OH promotion** [23,25,26] [23,24] [23,24]
- **Establishment of an OH committee** [45] [45] [45]
- **Municipal public health planning** [45]
- **Devising OH policies** [27] [29,30] [27] [12,30,52] [53] [12,29] [28]
- **Non-dental health workers** [31–35,37,49] [31,33,34] [32,34–37,46] [34] [31,32] [31] [49] [32]
- **Change care model** [50]
- **Teledentistry** [42,43] [43] [42,43] [42,43]
- **mHealth** [39–41] [40] [39]

* Chemical interventions: fluoride and/or chlorhexidine and ** Mechanical interventions: toothbrush.
Table 2. Matrix of OH themes and strategies and populations, with corresponding articles.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Strategy</th>
<th>Adolescents and Children</th>
<th>Indigenous</th>
<th>Intellectual Disabilities</th>
<th>Maternal and/or Child Health</th>
<th>Older Adults</th>
<th>People with Type 2 Diabetes</th>
<th>Refugees</th>
<th>Rural/Remote Communities</th>
<th>Varied</th>
<th>Visually Impaired</th>
<th>Working Adults</th>
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<tr>
<td>Group-level</td>
<td>Community-based</td>
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<td>Individual-level</td>
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<td>Communication and awareness</td>
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4. Discussion

Several insights can be drawn from the included articles:

1. Components in Multipronged Approaches

The enhancement of OH promotion involves a comprehensive and multifaceted approach, as evidenced by various strategies that adopt multipronged tactics. This highlights the importance of addressing OH from multiple angles to achieve maximum impact. Within this broader context, the prevalence of certain components stands out: OH education and behaviour change motivation emerge as particularly prevalent components across numerous strategies.

OH education encompassed many aspects, such as toothbrushing skills, dietary information, and oral hygiene education. It led to an increased awareness of risk factors to OH \cite{13,17,21} and impacted OH knowledge and OH attitudes \cite{25}. This is important given the myths and negative stigma surrounding dentistry in various populations. Customized OH and diet information, tailored to specific populations such as refugees’, was found to improve OH status and lower sugar consumption \cite{26}. Moreover, the focus on OH behaviour change motivation indicates a strong dedication to empower individuals to take control of their OH through informed decision making and behaviour modification. Whether through education, motivation, or peer-led programs, behaviour change techniques are useful to improve OH outcomes across diverse populations. For example, assessing behaviours through established health behaviour change theories were found to be more meaningful among adolescents \cite{18,21}, where ‘down-up’ OH instruction proved more effective (e.g., participatory demonstrations, skill sessions, and involvement of participants in diagnosing and understanding individual risks for poor OH). A multidisciplinary approach involving behaviour change theories led by non-dental health workers improved the success of OH interventions for maternal and child health \cite{31}.

Notably, strategies utilizing non-dental health workers, such as health visiting teams and community health workers, have proven to combine a diverse range of components, such as OH education, access to OH services, and OH resources, improving OH outcomes in a wide array of populations \cite{31,32,38,47}. Non-dental health workers in school- and community-based interventions targeting adolescents and children have shown promise \cite{18,33}. These interventions have led to improved OH outcomes by involving not only traditional healthcare providers but also engaging the wider community in educational endeavours, fostering a collective commitment to OH. For the Indigenous population, findings show how non-dental health workers, particularly Indigenous health workers, were crucial in enabling OH education that was sensitive to cultural values and knowledge \cite{16,36,37}. These tailored approaches recognize that OH education is not a one-size-fits-all, but rather a nuanced and context-specific pursuit.

However, to enable non-dental health workers to effectively promote OH, barriers such as limited resources, communication issues with dental services, and the provision of conflicting OH advice must be addressed \cite{37}. There is a need to ensure continued training, as well as regular and supportive supervision, to non-dental health workers to enable long-term program sustainability \cite{34}. Legislative changes that recognize the importance of non-dental health workers, such as Indigenous health workers, in the provision of OH care is required to enable a more involved OH role for non-dental health workers and ensure a formal OH training \cite{37}.

2. Diverse Strategies for Diverse Populations

Strategies targeting different groups emphasize the need for tailored approaches to cater to the unique OH needs of each population. Whether the focus is on Indigenous communities, individuals with developmental disabilities, or older adults, the effectiveness of interventions is enhanced when they are designed to address specific needs and challenges. Strategies emerge in a variety of themes to target a variety of populations: group-level, individual-level, and policy-level with an emphasis on devising OH policies, healthcare delivery, and communication and awareness. Moreover, OH education, behaviour change
motivation, access to OH services, and policy integration emerge as common components, reflecting the multifaceted nature of promoting OH among diverse populations.

For example, surrounding individuals with developmental disabilities are strategies targeting training of caregivers which led to improved OH outcomes [13]. Findings point to the need to consider the unique situation of the individual and their caregiver when adapting OH interventions to this population [23,24]. Strategies involving maternal and/or child health emphasize the importance of empowering mothers and caregivers with the knowledge and motivation to ensure proper OH practices for themselves and their children [25,31,43]. When targeting older adults, strategies encompassed the group-level with community-based strategies [47], the policy-level encompassing the creation of OH policies that involve the expansion of OH education and incorporation of clinical training in geriatric dentistry [27], and healthcare delivery with teledentistry [42].

The need for diverse strategies for diverse populations is further emphasized by the role of healthcare delivery innovations. The inclusion of non-dental health workers, mHealth, and teledentistry in healthcare delivery strategies indicates the incorporation of technology and innovative approaches to increase access to a broader range of the population and subsequently bridging gaps in OH services. These technologies have been found to increase OH literacy, changing OH knowledge, attitudes, and practices [40,41], leading to improved OH status [39,41] in diverse populations. Teledentistry is noted as a valuable tool to widen the scope of OH care throughout pregnancy, among older adults, and in remote/rural communities, fostering the use of OH services, and increasing OH awareness [42,43]. However, the recognition of the limitations of these technologies due to potential misinformation denotes the need for quality control and the development of professional media platforms to ensure accurate and reliable information dissemination [39–41]. Furthermore, while teledentistry provides programs with limited resources to deliver targeted interventions, success largely depends on access to technology, which is a challenge in rural areas and/or developing countries [42].

3. Components Reflecting Holistic Care

The clusters of components within strategies indicate a comprehensive approach. Education and awareness, access to services, interventions and treatments, and policy aspects are all crucial portions of a holistic OH approach. This is furthered through the emphasis on multiple strategies for each theme. Strategies such as community-, senior-citizen-centre-, and school-based interventions highlight the need to embed OH promotion within the fabric of communities, across different age groups. The inclusion of non-dental health workers, change care models, teledentistry, mHealth, and integrated OH interventions underscore the evolving landscape of healthcare delivery. This indicates an understanding that improving OH requires multifaceted approaches that address various aspects of care, from education to policy change.

Successful interprofessional collaboration was emphasized in many articles [13,31,34,52], citing how the integration of OH programs into general health interventions permitted non-dental health staff to participate in OH education programs [31,34]. When OH teams are engaged with other chronic disease stakeholders, they can reduce common risk factors [27,34,35]. For example, the integration of OH in diabetes care was found to improve OH status [35]. Obesity and overweight prevention has been linked to efforts to prevent dental caries in children [29], where the food environment emerges as a key player to consider when developing and implementing OH interventions [53]. This approach recognizes that OH is linked to overall health, requiring a holistic perspective that spans multiple disciplines. There is a need to expand the composition of the OH workforce to include different health professions and community members [52].

The incorporation of policy-level strategies, such as municipal public health planning, the establishment of an OH committee, and devising OH policies highlight the essential role of policy and structural integration. It reflects the acknowledgement that systemic changes are crucial for sustainable OH [12,27,29,30,52,53]. The importance of integrating OH considerations into broader public health frameworks and policies is evident. Evidence
shows how linking specific actions to improve OH in the public health plan can impact implementation and lead to improved OH outcomes [51].

Future directions:
1. Aspects of cost-effectiveness

Moving forward, an important area of focus in OH promotion lies in assessing the cost-effectiveness of the diverse strategies and components outlined in the literature. While the included articles provide valuable insights into the effectiveness of these strategies, a deeper understanding of their economic implications is essential to guide resource allocation decisions and prioritize interventions.

2. Creation of One-Stop-Shop for User-Friendly Access

As OH promotion strategies become increasingly diverse and nuanced, there is a growing need to create a centralized and user-friendly platform that offers easy access to these components and strategies. This could serve as a comprehensive resource hub for OH professionals, researchers, policymakers, and community health workers. It would collate information on best practices, evidence-based interventions, case studies, educational materials, behaviour change theories, and policy guidelines tailored for various populations.

5. Conclusions

The insights from the included studies highlight the complexity of OH promotion, denoting the multifaceted nature of effective interventions. Optimal OH requires the following: (1) a comprehensive and multipronged approach, (2) diverse strategies tailored to the needs of specific populations, and (3) holistic care and interprofessional collaboration.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/oral4020019/s1, Table S1: Thematic Analysis.

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