

Review

# Relationships between Oral Health and the Sustainable Development Goals: A Scoping Review

Olunike Rebecca Abodunrin <sup>1</sup>, Mobolaji Timothy Olagunju <sup>2</sup>, Omolola Titilayo Alade <sup>3,4</sup>  
and Moréniké Oluwátóyìn Foláyan <sup>4,5,\*</sup>

- <sup>1</sup> Lagos State Health Management Health Agency, Lagos 100212, Nigeria; abodunrinolunike@gmail.com  
<sup>2</sup> Department of Epidemiology and Biostatistics, Nanjing Medical University, Nanjing 211166, China; olagunjumobolaji@gmail.com  
<sup>3</sup> Department of Preventive and Community Dentistry, Obafemi Awolowo University, Ile-Ife 22005, Nigeria; lolaalade@live.com  
<sup>4</sup> Oral Health Initiative, Nigerian Institute of Medical Research, Yaba, Lagos 100001, Nigeria  
<sup>5</sup> Department of Child Dental Health, Obafemi Awolowo University, Ile-Ife 22005, Nigeria  
\* Correspondence: toyinukpong@yahoo.co.uk

**Abstract:** The aim of this scoping review was to map the research that links oral health and sustainable development goals (SDGs). The question that guided this review was what is the published evidence specifically linking oral health and SDGs? The search of articles published between 2015 and June 2023 in English was conducted in June 2023 in PubMed, Web of Science, Cumulative Index to Nursing and Allied Health Literature, and Scopus. The extracted data from the 12 of the 520 publications that met the inclusion criteria were synthesized. These were publications from the African (n = 2) and European (n = 1) regions. Ten of the studies were not country specific. There were three observational studies. The referenced SDGs were SDG 1 (n = 1), SDG 3 (n = 11), SDG 4 (n = 3), SDG 5 (n = 2), and SDG 13 (n = 1). The studies linking oral health to SDG3 discussed a range of issues related to integrated oral health care, dental education on the SDGs, improved health equalities, access to universal health care, and sustainable health approaches. The small number of studies identified suggests the need to take proactive steps to generate research-based evidence that explores the interplay between oral diseases, oral health, and SDGs to address the dearth in the literature. By so doing, resources allocated to the SDGs can also be effectively uses to control oral diseases.

**Keywords:** sustainable development goals; oral health; universal health coverage; dental caries; periodontitis; edentulism



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## 1. Introduction

The global prevalence of oral diseases presents a significant burden on public health. It is estimated that approximately 3.5 billion individuals worldwide suffer from various forms of oral diseases [1]. This accounts for approximately 50% of the global population, surpassing the combined burden of the next five most prevalent non-communicable diseases by nearly a billion cases [1]. The primary contributors to oral disease burden include untreated dental caries in both primary and permanent teeth, severe periodontal disease, edentulism, and cancer of the lip and oral cavity [1]. Specifically, there are approximately 2,029,495,070 cases of caries in permanent teeth, 1,086,825,543 cases of severe periodontitis, 520,065,521 cases of caries in primary teeth, 351,808,988 cases of edentulism, and 1,401,286 cases of cancer of the lip and oral cavity [1]. The global burden of untreated dental caries in primary and permanent dentition has shown minimal change over the past three decades leading up to 2019 [2].

Oral diseases are complex but preventable problems [3] affecting various essential functions such as speaking, smiling, smelling, tasting, touching, chewing, and swallowing [4]. They undermine individuals' ability to express emotions confidently through facial

expressions, and often causing pain, discomfort, and disease within the craniofacial complex [4]. Additionally, oral diseases have implications for overall health and well-being due to the interconnectedness between oral health and general health [5]. While oral health is not explicitly mentioned as a sustainable development goal (SDG) agenda [6], recognizing the links between oral health and the SDGs can facilitate multifaceted interventions that harness the potential of the interconnected web of SDGs. This synergistic relationship offers a platform to significantly reduce the global burden of oral diseases. The economic costs for managing oral diseases are substantial, with estimated annual direct costs of approximately USD 387 billion (including public and private expenditure on dental care) and indirect costs of approximately USD 323 billion (including productivity losses associated with the leading causes of oral disease burden) [1].

The 17 SDGs set forth by the United Nations encompass a collective effort to promote peace, prosperity, and well-being for all in a sustainable fashion [7]. These goals include poverty eradication, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry and innovation, reduced inequality, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace and justice, and partnerships for achieving these goals [8]. Each of these SDGs has potential impacts on oral health. For instance, addressing poverty through SDG1 [7] can reduce inequitable access to oral health care [9,10]. Tackling hunger through SDG2 [7] can minimize the risks of malnutrition on oral health [11]. Likewise, achieving gender and social equality through the attainment of SDG5 and SDG6 gender discrimination in the labor market will be reduced, and there will be an improvement in maternal education and economic opportunities [7], which are vital for the control of early childhood caries [12]. Furthermore, SDG9 promotes innovative strategies, supportive infrastructure development, and industry investment in new technologies [7] and these are all relevant for developing new non-invasive tools for caries control. The complex interplay of urban related social, economic, and environmental factors as reflected by the SDG11 [7] constitutes significant risk factors for caries as the risk for caries and poor periodontal health are higher in slums [13]. On the other hand, paying attention to oral health can significantly contribute to attaining SDGs. For example, emphasizing preventive measures, promoting oral health, and utilizing recyclable dental materials can contribute to achieving SDG12 [7]. Global action on oral health is, therefore, imperative for achieving the SDGs.

Although SDGs acknowledge interconnectedness to enhance the utilization of the global financial resources efficiently and effectively [14,15], there has been limited discussions on the interconnectedness and the management of oral health resources within the framework of the SDGs. The International Dental Federation acknowledges the significance of SDGs and, in its public statement, emphasizes the need for the dental profession to incorporate sustainable development goals into daily practice. They also advocate for the transition of dental practice to a green economy to promote healthy lives and well-being for people at all stages of life [16]. Research based evidence is, therefore, needed to understand the connectedness of oral health and SDGs, as this will facilitate the development of an investment case for global oral health programming. Investment in oral health can be economically rewarding [17]. The aim of this scoping review, therefore, was to map the research on the links between oral health and the goals of the 17 SDGs; and to make recommendations for future studies to address gaps in the links between oral health and the SDG targets.

## 2. Materials and Methods

We conducted a scoping review to investigate the evidence on the links between oral health and the targets of each of the 17 SDGs. The scoping review adhered to the preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines [18] to ensure methodological rigor and transparency.

### 2.1. Research Question

The following question guided this review: What is the published evidence specifically linking oral health and the SDGs?

### 2.2. Articles Identification

The initial search was conducted on four electronic databases in June 2023 namely Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, and Medline (Pubmed). The search period was between 2015 and June 2023 and was conducted in English. The search started in 2015 which was the period when the SDGs were declared. The search was performed using the following the search strategies enumerated in Appendix A. No protocol was published for this review.

### 2.3. Eligibility Criteria and Article Selection

The literature obtained through database searches was imported into the reference management software Rayyan. In Rayyan, duplicates were removed using the “duplicate items” function. Independent reviewers (ORA, MTO, and OTA) conducted the title and abstract screenings independently, following the eligibility criteria for this review. Full-text review of the remaining publications was then completed independently by four researchers (ORA, MTO, OTA, and MOF). No attempts were made to contact authors or institutions to find additional sources.

Any published manuscript presenting oral health findings and directly linking their findings with identified SDGs was considered. Inclusion criteria required that the publications be in English and have full texts available for extracting all relevant information. The review included letters, reviews, observational studies, and experimental studies. Articles with participants outside Nigeria were excluded. Articles whose full lengths could not be accessed, narrative reviews that did not focus on oral health and the SDGs, publications in books and grey literatures, and systematic reviews were excluded.

### 2.4. Data Charting

From the publications included in this review, information on the paper identifiers (title, author, link), the country, year of publication, study aim, study design, study location, the SDG target addressed, oral health condition assessed, and population studied were extracted. The extracted information from each publication was compiled and summarized in Table 1.

**Table 1.** Characteristics of Included Studies.

| S. No | Title   | Author (and Year of Publication) | Country of Study | Study Aim   | Publication Type | Study Population                | SDG Addressed | Key SDG Related Message  |
|-------|---|----------------------------------|------------------|---|------------------|---------------------------------|---------------|--|
| 1     | Oral health and feto-maternal outcomes in the context of sustainable development goals                              | Khanna et al. (2018) [19]        | Not applicable   | Not stated  | Narrative review | Pregnant women                  | SDG 3         | Multidimensional and multisectoral policy interventions Integrate needed for the integration of oral health care into maternal and fetal health care to achieve universal health coverage. |
| 2     | Oral and maxillofacial Surgery an opportunity to improve surgical care and advance sustainable development globally | Reddy et al. (2020) [20]         | Not applicable   | To describe the transitioning global health landscape as it relates to surgery, and outline how Oral and Maxillofacial surgeons can support and improve global health care delivery and global health policy to achieve greater equity in health. | Narrative review | Oral and Maxillofacial Surgeons | SDG 3         | Oral and maxillofacial surgery can contribute to reducing the global health inequity attributable to the impact of oral and craniofacial conditions.                                       |

Table 1. Cont.

| S. No | Title  | Author (and Year of Publication)      | Country of Study | Study Aim   | Publication Type      | Study Population                  | SDG Addressed       | Key SDG Related Message  |
|-------|--|---------------------------------------|------------------|---|-----------------------|-----------------------------------|---------------------|--|
| 3     | Oral health: the first step to Sustainable Development Goal 3  | Huang et al. (2022) [21]              | Not applicable   | To discuss the similar risk factors for oral and common non-communicable diseases, and oral health impacted by social determinants of health.   | Short communication   | Not applicable                    | SDG3                | Implementation of oral health care and oral health promotion, contributes to general health and well-being.  |
| 4     | Sustainable development goals and ending early childhood caries as a public health crisis  | Saikia et al. (2022) [22]             | Not applicable   | To highlight three significant strategies to combat the burden of ECC, namely, (i) integration of oral health services into primary health care centers (ii) amalgamating oral and general healthcare for better patient care; and (iii) multidisciplinary collaboration with a wide range of healthcare workers. | Narrative review      | Children younger than 6 years old | SDG 3               | The burden of early childhood caries can be reduced through the adoption of the three strategies for sustainable oral healthcare that is local context relevant.         |
| 5     | Assessment of permanent first molars in children aged 7 to 10 years old  | Urvasizoglu et al. (2022) [23]        | Turkey           | To evaluate the decayed, missing filled teeth (dmft) scores of permanent first molars in the early post-eruptive stage, within the scope of the United Nations Agenda for 2030 Sustainable Development Goals.   | Cross-sectional study | School children                   | SDG 3               | The current oral health policy in Erzurum was very promising for improving these kids' dental health status in the future though it can be augmented with newer policies |
| 6     | Challenge and action of improving oral health inequities in the time of COVID-19 pandemic  | HUNG and Chang. (2022) [24]           | Not applicable   | Not defined   | Opinion piece         | People living with disabilities   | SDG 3, 4            | Elimination of oral health inequalities can be achieved through the implementation of appropriate education and effective health promotion policy                        |
| 7     | Sustainability in dentistry: a multifaceted approach needed  | Duane et al. (2020) [25]              | Not applicable   | An introduction to environmentally sustainable dentistry and offers perspectives on managing drivers to reduce carbon emissions and make dentistry more environmentally sustainable.  | Narrative review      | Not applicable                    | SDG 13              | Identified ways of practicing green dentistry can reduce carbon footprints that dentistry may leave.   |
| 8     | Universal health coverage: a unique policy opportunity for oral health   | Mathur et al. (2015) [26]             | Not applicable   | Not stated  | Editorial             | Not applicable                    | SDG 3               | Oral health should be recognized as a key public health priority and integrated into the universal health coverage policy agenda as a component of the SDG               |
| 9     | Crossing the innovation chasm: identifying facilitators and barriers to early adoption of the global health starter kit curriculum | Lee et al., (2021) [27]               | Not Applicable   | To evaluate and describe barriers to and facilitators for using and implementing the Global Health Starter Kit curriculum across a variety of new users.  | Mix method study      | Dental schools                    | SDG 3               | The content of the curriculum targets specific things, like the SDG's, oral health and how it connects with general health and universal care                            |
| 10    | Improving access to oral healthcare  | National Research Council (2022) [28] | Not applicable   | Not Stated  | Policy statement      | Not applicable                    | SDG 3, 4, 5, and 8. | Support for the integration of oral health care into universal health care to improve oral health outcomes and reduce inequalities in access to care                     |

Table 1. Cont.

| S. No | Title   | Author (and Year of Publication) | Country of Study | Study Aim   | Publication Type      | Study Population | SDG Addressed      | Key SDG Related Message   |
|-------|---|----------------------------------|------------------|---|-----------------------|------------------|--------------------|---|
| 11    | Association between oral health-related quality of life and general health among dental patients: a cross-sectional study | Farghaly et al. (2021) [29]      | Egypt            | To assess the relationship between oral health-related quality of life and general health of dental patient | Cross-sectional study | Dental patients  | SDG 1, 3, 4, and 5 | The study complied with the University's plan to achieve the United Nations SDGs. By working with students and dental patients to provide free dental treatment without discrimination (SDG1), assessment and education of patients about their oral and general health (SDG3), engagement of students in research at an early stage of their education (SDG4) and equality in the treatment of all genders (SDG5). |
| 12    | Advocacy for a digital oral health that leaves no one behind  | Giraudeau. (2021) [30]           | Not applicable   | To create advocacy for the adoption of digital platform for oral service delivery                           | Position paper        | Not applicable   | SDG 3              | Digital tools can accelerate the implementation of universal health coverage and help achieve the 2030 Sustainable Development Agenda, leaving no one behind  |

### 3. Results

The initial search using the predefined search terms from four databases yielded 520 studies. After duplicates were removed and screening completed, 12 studies met the eligibility criteria and were included in the review as shown in Figure 1.

#### Overview of Studies

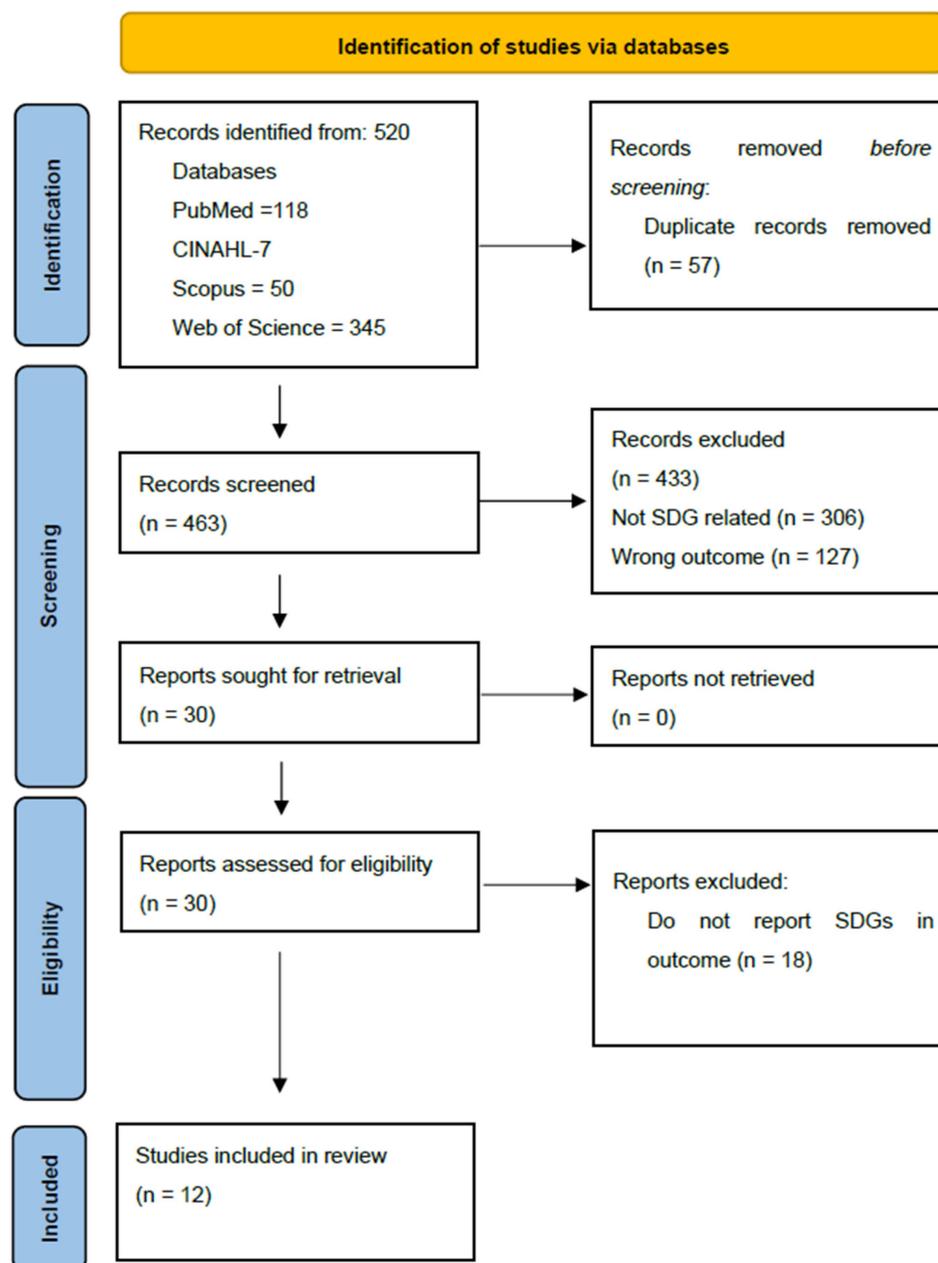
Table 1 shows that there were 12 studies conducted that specifically focused on oral health and the targets of the sustainable development goal. The 12 studies were published between 2015 and 2023: one in 2015 [26], one in 2018 [19], three in 2021 [27,29,30], and five in 2022 [21–24,28]. These studies were published in the African Region specifically from Egypt [29], and from the European Region from Turkey [23]. Ten of the studies were not country specific [19–22,24–28,30].

The types of studies directly linking oral health to the goals of SDGs range from those that gave expert opinions (short communications [21,24], editorial [26], position paper [30]), to observational studies (cross-sectional studies [23,29], mix-method study [27]), reviews (narrative reviews [19,20,22,25]) and a policy paper [28].

Study populations referred to in the study ranged from children [22,23] to pregnant women [19], people with disabilities [24], oral and maxillofacial surgeons [20], and dental schools [27]. The focus of the studies ranged from early childhood caries [22,23] to oral health and pregnancy [19], and to Universal Health Coverage [26,28].

The mentioned Sustainable Development Goals (SDGs) in the references were SDG 1 [29], SDG 3 [19–24,26–30], SDG 4 [24,28,29], SDG 5 [28,29], and SDG 13 [25]. The reference to SDG 1 (no poverty) aimed to teach dental students how to provide non-discriminatory free dental treatment. SDG 3 (good health and wellbeing) focused on various aspects, such as enhancing patient access to oral health education for improved overall health and well-being [21,29]. It also involved integrating oral health into general healthcare through universal health coverage [19,26,28], creating global health-focused dental educational curricula [27], developing appropriate policies to integrate oral and general health [19,23,24], utilizing digital tools to improve oral health access [30], addressing health inequalities associated with oral and craniofacial conditions [20], and establishing sustainable oral healthcare approaches for managing early childhood caries [22]. The reference to SDG 4 (quality education) concerned involving dental students in their early years of dental education in the design and implementation of research [29] and promoting access to oral health promotional education in people with disabilities [24], with considerations for re-

ducing and promoting gender equality in healthcare access, as referenced in SDG 5 (gender inequality) [28,29]. Additionally, one study explored ways to reduce carbon emissions in dentistry practice, aligning with the objectives of SDG 13 (climate change) [25].



**Figure 1.** Flowchart of the systematic review of the literature on oral health and the SDGs.

#### 4. Discussion

This scoping review suggests there is very little written on the direct connectedness of oral health and the SDGs. The few studies originated from three of the six World Health Organization Regions and were majorly focused on the oral health and the SDG3. There is a paucity of primary studies showing the link between the SDGs and oral health although a few of the studies showed links with the SDG 1, 4, 5, and 13. The single epidemiological study indicated a distal rather than a proximal link between oral diseases and SDG 3. The few studies reported, however, demonstrated a commitment to incorporating the principles and objectives of various SDGs into dental education and practice. They recognize the importance of not only providing quality dental care but also addressing broader issues

related to health, education, gender equality, environmental sustainability, and social inclusion, contributing to the overall advancement of sustainable development goals.

The paucity of research-based evidence directly linking oral health and the SDGs, and the main focus of the few publications on the link between oral health and the SDG being with SDG3, suggest that the oral health fraternity are doing little to maximize the potential that can be harnessed through highlighting the interconnectedness between the goals of the SDGs, oral health, and the effective and efficient use of resources for the SDG to foster a more equitable and sustainable approach to oral health care. However, it is evident that achieving SDG3 relies on the progress made in the other 16 SDGs [31,32]. Consequently, if oral health is closely intertwined with the objectives of SDG3, it is reasonable to establish connections between oral health and the other SDGs as well.

We, as authors, recognize that numerous published papers have the potential to be associated with the SDGs if they are thoroughly reviewed. Nonetheless, when authors fail to actively establish these connections throughout the research process, from planning and implementation to reporting, it underscores the importance of not only recognizing the potential alignment of research with the SDGs but also actively and effectively translating this recognition into tangible actions and outcomes. Yet, making such connections encourage authors to consider the broader societal implications of their work and highlights the responsibility they bear in contributing to the achievement of these globally significant goals. By doing so, stakeholders working on oral health can play a crucial role in addressing some of the most pressing challenges facing our world today.

The SDGs represent a framework for addressing some of the world's most complex and interconnected challenges. Research can be a powerful tool for generating knowledge and solutions that contribute to these goals. However, without intentional efforts to bridge the gap between research endeavors and the SDGs, the potential impact of research remains unrealized. This "gap" in the direct connection of oral health with multiple SDGs, as exemplified by the possibility of the connect of the SDG3 with other SDGs and targets [31,33], is a missed opportunity to leverage oral health related research findings for the betterment of society and the environment.

When there is the lack of supporting evidence for such connections, it may hinder the development of policies that effectively measure the benefits derived from investments in attaining the SDGs. The SDGs present a unified impact framework and common language, which enhances global accessibility and facilitates comparisons of results across different regions [34]. Additionally, the SDGs encourage the exchange of knowledge and expertise among multi-stakeholder partnerships and voluntary commitments related to the SDGs, enabling periodic updates on their progress.

Furthermore, considering the specific context of each country is crucial since countries have committed to prioritizing progress for the most marginalized populations. However, the lack of reports on the impact of country-level progress on the SDGs on oral health could impede the potential positive effects of the SDGs on oral health outcomes. This scoping review only found two narratives that focused on the link between the SDGs and ECC within a country-specific context [23,24]. To fully understand the impact of the SDGs on oral health, future studies assessing country-level progress on the SDGs should also measure the influence on indicators related to oral disease control in each country. These oral health indicators [35] are essential for all countries that have committed to the SDGs, and reporting on them in relation to the SDGs will provide valuable insights and support progress in achieving oral health goals.

Our scoping review indicates that one group of oral health professionals—oral and maxillofacial surgeons—advocated for their role in achieving SDG3 [20]. Such recognition of the importance of oral health professionals can also encourage in-depth discussions and monitoring of the connections between oral health and the SDGs. Another significant professional group that can play a crucial role in generating evidence and promoting understanding of this link is oral epidemiologists. They have the capacity to organize epidemiological surveillance, capturing specific information about the occurrence and

distribution of oral diseases, and explore how the SDGs may impact them [36]. The findings of this review serve as a call to action for other oral health professionals to act as allies and actively monitor the impact of investments in the SDGs on oral diseases relevant to their respective fields. Through collaboration and collective efforts, oral health professionals can contribute to progress in achieving oral health-related SDG targets.

Of importance was the recognition in some of the literature of the possible contributions oral health can make to facilitating gender equality in oral health care access, reducing inequality through access to oral health education, and the contribution of dentistry to climate change. These recognitions underscore the multidimensional impact of the dental profession. This highlights the importance of dentistry not only in promoting oral health but also in advancing broader societal goals related to social equity, education, and environmental sustainability. By embracing these contributions, dental professionals can actively participate in addressing some of the most pressing global challenges and facilitate investment and the development of oral indicators to monitor progress in oral health as output measures for these SDGs.

It is feasible that oral health can be linked with multiple SDGs. To generate new evidence on the direct links between oral health, oral diseases, and the SDGs and targets, education of stakeholders in dentistry about the goals and targets of the SDGs and new research methodologies may be required. As acknowledged by authors identified in this scoping review [27,29], increasing the connections between dentistry and the SDGs needs to be a deliberate action targeting dental students, oral health researchers and the faculties. This understanding should extend beyond a surface-level awareness to a deeper appreciation of how these global objectives relate to specific research topics.

In addition, methodologies should assess the links and monitor the impacts of sustainable developmental efforts at macro, meso, and micro levels, incorporating biological, behavioral, environmental, and structural strategies. They should also help identify cost-effective solutions to oral healthcare that is applicable in low-resource settings. These oral health interventions should specifically evaluate the impact of each SDG intervention on the burden of oral diseases and the contributions of each intervention to oral disease control. By understanding and addressing these connections significant progress can be made in improving oral health and aligning it with the broader global sustainable development agenda.

This study is the first to highlight the paucity of evidence directly linking oral health and the SDG. It is a wakeup call to the oral health research fraternity to do a lot more research using the SDG platform. One limitation of this study is that we only considered publications written in English. Additionally, we may have missed relevant studies that could have provided evidence linking oral health to the SDGs but did not explicitly identify this connection in their research. This highlights the possibility that valuable evidence linking oral health and the SDGs could be overlooked by researchers while searching through databases. To address this issue, oral health researchers should enhance their ability to align their research findings with the SDGs, recognizing and addressing potential risks and opportunities related to social, environmental, and economic aspects. By doing so, they can contribute meaningfully to the global agenda and create value for their research.

## 5. Conclusions

This scoping review highlights that there are only a few publications explicitly addressing the connections between oral health and the SDGs. The few articles focus mainly on the SDG3. The few that make connections between oral health and SDG 1, 4, 5, and 13 emphasize on promoting access to free oral health care to address poverty, promoting oral health education to improve general health, equality in access to oral health, and reducing carbon emission through dental practice. Moreover, there was limited information regarding country-level links between oral health and the SDGs, with only one oral health professional body acknowledging its role in the context of SDG3. To address this gap, it is essential to take proactive steps in generating research-based evidence that explores the

interplay between oral diseases, oral health, and the broader 17 SDGs. By doing so, we can enhance the commitment of resources towards effectively controlling this substantial public health challenge.

**Author Contributions:** M.O.F. conceived the study. The Project was managed by M.O.F. Data curating was done by O.R.A., M.T.O. and O.T.A. Data analysis was conducted by M.O.F. and O.T.A. M.O.F. developed the first draft of the document. O.R.A., M.T.O., and O.T.A. read the draft manuscript and made inputs prior to the final draft. All authors have read and agreed to the published version of the manuscript.

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### Appendix A

**Table A1.** Web of Science Database. Search outcome = 345.

| Keywords       | Search String   |
|----------------|---|
| #1 Oral Health | (((((TS = (Oral health)) OR TS = (Dental health)) OR TS = (Stomatognathic Diseases)) OR TS = (Disease, Stomatognathic)) OR TS = (Mouth and Tooth Diseases)) OR TS = (Dental Diseases)) OR TS = (Disease, Dental)) OR TS = (HALITOSIS)) OR TS = (Caries, Dental)) OR TS = (Dental Cavity)) OR TS = (Dental Decay)) OR TS = (Cariou Lesions)) OR TS = (Decay, Dental)) OR TS = (Cariou Dentin)) OR TS = (Dentins, Cariou)) OR TS = (Dental White Spot)) OR TS = (White Spots, Dental)) OR TS = (Dental White Spots)) OR TS = (Gingivitis)) OR TS = (Diseases, Periodontal)) OR TS = (Oral Ulcers)) OR TS = (Mouth Ulcer)) OR TS = (Ulcers, Mouth)) OR TS = (Mouth Neoplasm)) OR TS = (Oral Neoplasms)) OR TS = (Cancer of Mouth)) OR TS = (Mouth Cancers)) OR TS = (Oral Cancer)) OR TS = (Cancer of the Mouth)) OR TS = (Mouth Cancer)) OR TS = (Cancer, Mouth) and Preprint Citation Index (Exclude—Database) |
| #2 SDG         | (((((TS = (Development, Sustainable)) OR TS = (Developments, Sustainable)) OR TS = (Sustainable Development Goals)) OR TS = (Development Goal, Sustainable)) OR TS = (Development Goals, Sustainable)) OR TS = (Sustainable Development Goal)) OR TS = (Smart Growth)) OR TS = (SDGs) and Preprint Citation Index (Exclude—Database)  |
| #3             | #2 AND #1 and Preprint Citation Index (Exclude—Database)  |

**Table A2.** SCOPUS Database. search outcome = 50.

| S/N | Search Term | Search String   |
|-----|-------------|---|
| 1   | Oral health | oral AND health OR dental AND health OR stomatognathic AND diseases OR disease, AND stomatognathic OR mouth AND tooth AND diseases OR dental AND diseases OR disease, AND dental OR halitosis OR caries, AND dental OR dental AND cavity OR dental AND decay OR carious AND lesions OR decay, AND dental OR carious AND dentin OR dentins, AND carious OR dental AND white AND spot OR white AND spots, AND dental OR dental AND white AND spots OR gingivitis OR diseases, AND periodontal OR oral AND ulcers OR mouth AND ulcer OR ulcers, AND mouth OR mouth AND neoplasm OR oral AND neoplasms OR cancer AND of AND mouth OR mouth AND cancers OR oral AND cancer OR cancer AND of AND the AND mouth OR mouth AND cancer OR cancer, AND mouth |
| 2   | SDG         | development, AND sustainable OR developments, AND sustainable OR sustainable AND development AND goals OR development AND goal, AND sustainable OR development AND goals, AND sustainable OR sustainable AND development AND goal OR smart AND growth OR sdgs   |
| 3   |             | oral AND health OR dental AND health OR dental AND caries OR gingivitis OR periodontitis OR oral AND cancer OR oral AND disease OR dental AND white AND spot  |



12. Folayan, M.O.; El Tantawi, M.; Vukovic, A.; Schroth, R.J.; Alade, M.; Mohebbi, S.Z.; Al-Batayneh, O.B.; Arheiam, A.; Amalia, R.; Gaffar, B.; et al. Governance, maternal well-being and early childhood caries in 3–5-year-old children. *BMC Oral Health* **2020**, *20*, 166. [CrossRef] [PubMed]
13. Osuh, M.E.; Oke, G.A.; Lilford, R.J.; Owoaje, E.; Harris, B.; Taiwo, O.J.; Yeboah, G.; Abiona, T.; Watson, S.I.; Hemming, K.; et al. Prevalence and determinants of oral health conditions and treatment needs among slum and non-slum urban residents: Evidence from Nigeria. *PLoS Glob. Public Health* **2022**, *2*, e0000297. [CrossRef] [PubMed]
14. SDG Zone. What Are Sustainable Development Goals. Available online: [https://sdgzone.com/learn/what-are-the-sdgs/#:~:text=The%20goals%20and%20targets%20are,a%20job%20\(Goal%208\)](https://sdgzone.com/learn/what-are-the-sdgs/#:~:text=The%20goals%20and%20targets%20are,a%20job%20(Goal%208)) (accessed on 29 July 2023).
15. Suehrer, J. The Future of FDI: Achieving the Sustainable Development Goals 2030 through Impact Investment. *Glob. Policy* **2019**, *10*, 413–415. [CrossRef]
16. FDI World Dental Federation. Sustainability in Dentistry Statement: Adopted by FDI General Assembly August, 2017 in Madrid, Spain. Available online: <https://www.fdiworlddental.org/sustainability-dentistry-statement> (accessed on 29 July 2023).
17. Jevdjevic, M.; Listl, S. Investment Cases for Oral Health: Development of a Primer. IADR Abstract Archives. 2020. Available online: <https://iadr.abstractarchives.com/abstract/20iags-3325803/investment-cases-for-oral-health-development-of-a-primer> (accessed on 29 July 2023).
18. Tricco, A.C.; Lillie, E.; Zarin, W.; O'Brien, K.K.; Colquhoun, H.; Levac, D.; Moher, D.; Peters, M.D.J.; Horsley, T.; Weeks, L.; et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann. Intern. Med.* **2018**, *169*, 467–473. [CrossRef]
19. Khanna, S.; Khedkar, S.S.; Malhotra, S. Oral Health and Feto-maternal Outcomes in the Context of Sustainable Development Goals. *Cureus* **2018**, *10*, e3500. [CrossRef] [PubMed]
20. Reddy, C.L.; Patterson, R.H.; Wasserman, I.; Meara, J.G.; Afshar, S. Oral and Maxillofacial Surgery: An Opportunity to Improve Surgical Care and Advance Sustainable Development Globally. *Oral Maxillofac. Surg. Clin. N. Am.* **2020**, *32*, 339–354. [CrossRef] [PubMed]
21. Huang, Y.K.; Chang, Y.C. Oral health: The first step to sustainable development goal 3. *J. Formos. Med. Assoc.* **2022**, *121*, 1348–1350. [CrossRef] [PubMed]
22. Saikia, A.; Aarthi, J.; Muthu, M.S.; Patil, S.S.; Anthonappa, R.P.; Walia, T.; Shahwan, M.; Mossey, P.; Dominguez, M. Sustainable development goals and ending ECC as a public health crisis. *Front. Public Health* **2022**, *10*, 931243. [CrossRef]
23. Urvasizoglu, G.; Bas, A.; Sarac, F.; Celikel, P.; Sengul, F.; Derelioglu, S. Assessment of Permanent First Molars in Children Aged 7 to 10 Years Old. *Children* **2022**, *10*, 61. [CrossRef]
24. Huang, Y.K.; Chang, Y.C. Challenge and action of improving oral health inequities in the time of COVID-19 pandemic. *J. Formos. Med. Assoc.* **2022**, *121*, 1024–1026. [CrossRef]
25. Duane, B.; Stancliffe, R.; Miller, F.A.; Sherman, J.; Pasdeki-Clewer, E. Sustainability in Dentistry: A Multifaceted Approach Needed. *J. Dent. Res.* **2020**, *99*, 998–1003. [CrossRef]
26. Mathur, M.R.; Williams, D.M.; Reddy, K.S.; Watt, R.G. Universal health coverage: A unique policy opportunity for oral health. *J. Dent. Res.* **2015**, *94* (Suppl. S3), 3S–5S. [CrossRef]
27. Lee, J.; Tan, E.; Barrow, J.; Bocala, C.; Seymour, B. Crossing the Innovation Chasm: Identifying Facilitators and Barriers to Early Adoption of the Global Health Starter Kit Curriculum. *Ann. Glob. Health* **2021**, *87*, 113. [CrossRef]
28. Improving Access to Oral Healthcare: Adopted by the FDI General Assembly: 27–29 September 2021, Sydney, Australia. *Int. Dent. J.* **2022**, *72*, 2–3. [CrossRef]
29. Farghaly, M.M.; Sabah, A.A.H.; Keraa, K.M. Association between oral health-related quality of life and general health among dental patients: A cross-sectional study. *J. Prev. Med. Hyg.* **2021**, *62*, E67. [PubMed]
30. Giraudeau, N.; Varenne, B. Advocacy for a digital oral health that leaves no one behind. *JDR Clin. Transl. Res.* **2022**, *7*, 25–28. [CrossRef] [PubMed]
31. World Health Organisation. Monitoring the Health-Related Sustainable Development Goals (SDGs). February 2017. Available online: [https://cdn.who.int/media/docs/default-source/searo/hsd/hwf/01-monitoring-the-health-related-sdgs-background-paper.pdf?sfvrsn=3417607a\\_4&download=true#:~:text=Achieving%20SDG%203%20will%20depend,safer%20cities%20\(Box%201\)](https://cdn.who.int/media/docs/default-source/searo/hsd/hwf/01-monitoring-the-health-related-sdgs-background-paper.pdf?sfvrsn=3417607a_4&download=true#:~:text=Achieving%20SDG%203%20will%20depend,safer%20cities%20(Box%201)) (accessed on 29 July 2023).
32. Fernandez, R.M. SDG3 Good Health and Well-Being: Integration and Connection with Other SDGs. In *Good Health and Well-Being*; Leal Filho, W., Wall, T., Azul, A.M., Brandli, L., Özuyar, P.G., Eds.; Encyclopedia of the UN Sustainable Development Goals; Springer: Cham, Switzerland, 2020. [CrossRef]
33. Nunes, A.R.; Lee, K.; O'Riordan, T. The importance of an integrating framework for achieving the Sustainable Development Goals: The example of health and well-being. *BMJ Glob. Health* **2016**, *1*, e000068. [CrossRef]
34. SOPACT. Aligning SDG, Targets and Indicators. 2023. Available online: <https://www.sopact.com/sdg-targets-indicators#whyalignwithSDG> (accessed on 29 July 2023).
35. Barmes, D.E. Indicators for oral health and their implications for developing countries. *Int. Dent. J.* **1983**, *33*, 60–66.
36. Eduardo, O.C.J.; David, V.L.O.; Nayelet, G.S.R. Importance of Epidemiology in Oral Health: Mexican Epidemiological System. *Acta Sci. Dent. Sci.* **2019**, *3*, 15–17. [CrossRef]

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