

A review of oral health promotion programmes in Eastern Mediterranean Region

Najat Abdrabbo Alyafei¹, Bushra Naaz Fathima Jaleel¹ and Hamad Al Mudahka¹

¹Primary Health Care Corporation, Doha, Qatar (Correspondence to Najat Alyafei: n_alsalahi@hotmail.com)

Abstract

Background: Oral health conditions, such as dental caries, periodontal disease, tooth loss, dental fluorosis, dental trauma, and oral cancer, are prevalent in the WHO Eastern Mediterranean Region. However, there has been no systematic review of oral health promotion interventions in the region.

Aims: To review existing literature on oral health promotion programmes in the Eastern Mediterranean Region and recommend improvements for the future.

Method: We reviewed on PubMed and Google Scholar 61 articles published in the Eastern Mediterranean Region between 2010 and 2023. Quality assessment of included studies was performed using established criteria. We used the content analysis approach to create appropriate themes from the studies and to document meaningful conclusions about oral health promotion.

Results: Majority of the studies were cross-sectional, a few were randomized controlled, quasi-experimental, longitudinal studies, or reviews. Oral health problems identified included poor oral health knowledge, dental caries, periodontal disease, tooth loss, dental fluorosis, and oral cancer. Although oral disorders were common in most of the countries, very few have implemented oral health promotion programmes.

Conclusion: We recommend prioritization of oral health promotion programmes in the Eastern Mediterranean Region to tackle the diverse oral health challenges. To be effective, such programmes should be region- and context-specific. More studies on oral health promotion are needed in the region.

Keywords: Oral health, dental caries, periodontal disease, tooth loss, dental fluorosis, dental trauma, oral cancer, Eastern Mediterranean

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Introduction

The WHO Eastern Mediterranean Region (EMR) comprises 22 countries and territories and is home to nearly 679 million people. The region is one of the most diverse geographically under WHO's mandate, despite many cultural, social, religious, linguistic and culinary similarities. While some countries with high incomes and robust healthcare systems, such as Morocco, Oman, Qatar, the Kingdom of Saudi Arabia, and the United Arab Emirates, stand out, others like Djibouti, Pakistan, and Sudan face challenges with their healthcare systems (1). In recent years, Middle Eastern nations such as Iraq, Libya, State of Palestine, Syrian Arab Republic, and Yemen have experienced escalating conflicts, further straining their healthcare infrastructure.

Dental caries and periodontal diseases are highly prevalent in all EMR countries (2). Oral health challenges persist in the region, necessitating targeted preventive measures. Addressing oral healthcare challenges is paramount, and comprehending the region's unique challenges is crucial for promptly implementing tailored strategies and interventions.

In 2021, WHO adopted a landmark resolution to prioritize and establish oral health as part of Universal

Health Coverage (4). In the EMR, this resolution facilitated an increased focus on oral health promotion and oral disease prevention programmes. We believe it is important to carefully review past programmes and interventions to facilitate documentation and replication of best practice programmes or develop new ones. The WHO country area profile programme database provides insights into oral health and dental caries prevalence among WHO Member States. However, the database has limitations. Not all Member States have registered their oral health data, and even when available, updates are not consistently provided (3).

Our aim was to review existing literature on oral health programmes and make recommendations based on best practices to improve oral health promotion and oral disease prevention programmes in the region in the future.

Methods

Literature search

We used a comprehensive and objective approach to search for literature in the PubMed and Google Scholar

databases to identify any relevant articles on the research topic.

The keywords used were “oral health”, “oral disease prevention programs”, “Eastern Mediterranean Region”, and “WHO Eastern Mediterranean region (Afghanistan, Bahrain, Djibouti, Egypt, the Islamic Republic of Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Occupied Palestinian Territory, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syria Arab republic, Tunisia, United Arab Emirates, Yemen)”. Boolean operators “AND” and “OR” was used to combine the search terms.

Inclusion criteria and literature selection

We only considered articles or studies published between 2010 and 2023 for inclusion in our study. We chose this 13-year time frame to ensure that the data was current enough to be relevant to oral health data, interventions and prevention programmes in the region. We considered all types of studies on oral health for inclusion in our study such as cross-sectional, observational, qualitative, quantitative, systematic reviews and randomized control trials (RCTs), among others, for review. We only included articles that were published in the English language and focused on EMR.

Studies or articles conducted to evaluate oral health and oral health programmes worldwide, studies not from Eastern Mediterranean countries, and non-peer-reviewed such as grey literature articles were not considered. We also excluded short research communications, letters to editors, blogs or magazine articles, other non-academic materials and articles without open access to full text.

Two of the authors screened all 311 retrieved articles and selected articles for review independently. Any disparities were discussed and resolved. When needed, the third author was consulted until a consensus was achieved.

The screening process involved a multi-stage approach. An initial screening was conducted to exclude 44 articles which were duplicates. In the next stage 100 articles not meeting the inclusion criteria were excluded. After screening of titles and abstracts 80 articles were excluded. The remaining 87 articles were screened for eligibility. Finally, 61 articles qualified to be included in our review (Figure 1).

Data extraction

We used a structured data extraction form to systematically extract essential data from the selected literature. The form included the following data points: reference number, author’s name, year of publication, country, study design, aim, key findings and type of oral health promotion and prevention programme.

Quality assessment

We performed quality assessment of our selected studies using established criteria relevant to the respective study designs. We used the Critical Appraisal Skills Program (CASP) tool for quality appraisal, ensuring a rigorous evaluation of study quality (5). CASP is a tool

used to evaluate the methodological rigour of each study and identify potential sources of bias. Two authors conducted the quality assessment independently, with any disagreements resolved through discussion and consensus with the third author.

Data analysis

We used a method called thematic content analysis to analyse our extracted data. Content analysis is used to assess and examine the occurrence, significance and connections of particular words, themes or ideas related to oral health disease and prevention programs. Thematic content analysis was used by the authors to extract reliable data, which enabled them to develop meaningful interpretations and conclusions about the status of oral health and oral disease prevention and oral health promotion programmes in the EMR.

Results

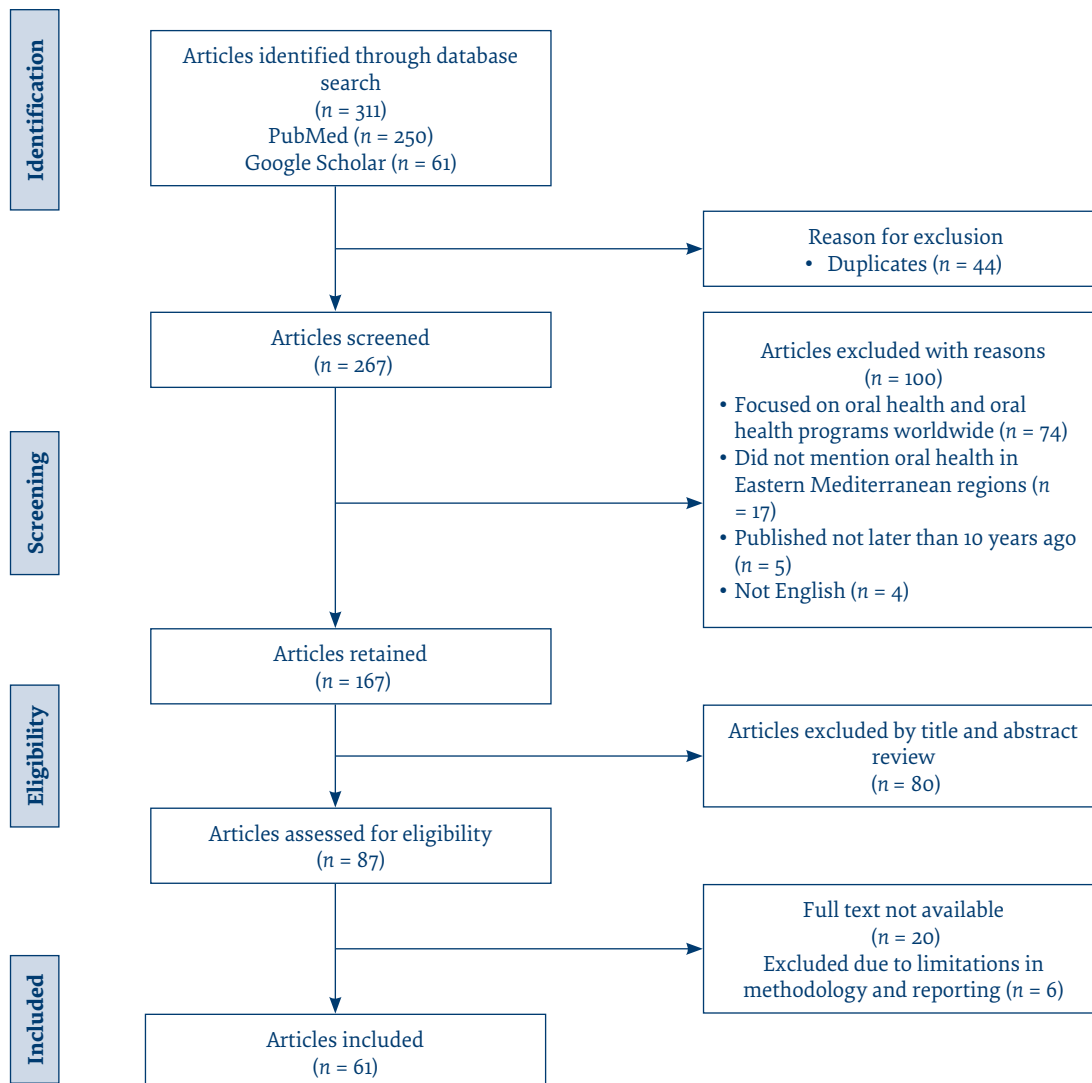
Our analysis of the literature identified a number of prevalent oral health conditions, existing data on oral health promotion and oral disease prevention programmes and future recommendations. The majority of the selected studies were cross-sectional, randomized control trials, quasi-experimental, longitudinal studies and reviews.

Studies we selected for review followed the following geographic distribution: Afghanistan ($n=1$) (7), Bahrain ($n=2$) (8,9), Djibouti ($n=1$) (10), Egypt ($n=10$) (11,20), the Islamic Republic of Iran ($n=4$) (21-24), Iraq ($n=1$) (25), Jordan ($n=4$) (26-29), Kuwait ($n=3$) (30-32), Lebanon ($n=2$) (33-34), Libya ($n=4$) (35-38), Occupied Palestinian territory ($n=1$) (39), Pakistan ($n=1$) (40), Qatar ($n=7$) (41-47), Saudi Arabia ($n=5$) (48-52), Sudan ($n=4$) (53-56), Syria Arab republic ($n=3$) (57-59), United Arab Emirates ($n=6$) (60-65) and Yemen ($n=2$) (66,67) (Figure 1).

Oral health problems identified across the EMR include poor knowledge about oral health care, high rates of dental caries, periodontal disease, tooth loss, dental fluorosis and oral cancer. Our review suggests that due to the prominence of these issues in the EMR, recommendations and implementations of oral disease prevention and health promotion programmes were initiated for students, parents, pregnant women, medical/dental professionals, and the general population.

We identified many recommendations in the literature on the types of programmes that should be implemented in the EMR: (i) oral health education and awareness; (ii) promoting healthy eating; (iii) oral hygiene practices; (iv) preventative dental services; (v) improved dental education; (vi) dental visits/check-ups; (vii) community engagement via social media; (viii) the promotion of water fluoridation. Several studies used mobile phone applications to leverage modern communication technologies effectively in promoting and maintaining oral health, aiming to reach and engage diverse audiences.

Figure 1 PRISMA Flow Diagram



We found that the majority of EMR countries have data on oral diseases among children and emphasize the importance of oral health education for children, such as teaching proper oral hygiene and prohibition from eating sugar-laced foods such as candies (1,11,14,19,25,30,31,33,38,42,43,46,51,52,60). In Bahrain, Djibouti and Egypt, prevention and promotion programmes teach oral hygiene practices such as toothbrushing, fluoridation, healthy eating, and regular visits to a dentist (8-20). El-Nasr suggests that most primary school children experience dental problems due to poor eating habits and a lack of knowledge of oral health (14).

In Afghanistan, preventive dental services and community water fluoridation is recommended to address oral health needs (13). Bahrain has demonstrated that social media engagement can improve community oral health awareness (9). Kuwait's School Oral Health Program and Qatar's "Asnani Program" are well established school oral health programmes (22,30,45). United Arab Emirates' mother and child preventive programme operating in maternity health centres has been successful in oral health promotion for expectant

mothers and children (60). The 2015 National Oral Healthcare Reform in the Islamic Republic of Iran covering all children up to the age of 14 years nationwide has greatly improved the nation's overall oral health (21).

Countries like Egypt, Lebanon and Yemen have reported the need for specialized oral health education and prevention interventions for children with special needs such as autism spectrum disorder, congenital heart defects, Downs syndrome and other disabilities (17,20,34,67). Parents, especially mothers, have been recognized as an important target group for oral health education and awareness programmes in higher income countries like Egypt, Qatar, the Kingdom of Saudi Arabia and the United Arab Emirates (11,16,18,47,48,54). Parental practices and their knowledge have substantial influence on a child's oral health status and oral hygiene practices. In Egypt, we noted that parents are not discerning about what their children consume and do not prohibit them from taking sugary foods that can damage their teeth (19).

We noted that lower income or fragile-conflict zone areas like the State of Palestine, Pakistan and Sudan only recommend health education interventions for pregnant

women (39,40,54). Articles from Djibouti, Egypt, Qatar and Sudan also tend to focus on oral cancer, precancer, tooth loss and gum diseases but not necessarily promotion or prevention programmes. (10,41,44,53,55,56). One study from the Islamic Republic of Iran showed how an oral health literacy programme can be effective in preventing and managing future oral health problems (24).

Discussion

Through our review of the literature, we found that very few peer-reviewed studies are available in the EMR that evaluate the burden of oral health and oral health disorders, including dental caries, periodontal diseases, fluorosis, gingivitis, tooth loss, oral cancer and other related diseases. We identified only a few specific programmes designed to prevent or reduce the prevalence of oral health disorders.

This review shows that majority of research on oral health in the EMR is from Egypt, Qatar and the Kingdom of Saudi Arabia. While there are fewer articles published from other countries, they still contribute valuable information regarding specific health problems and the prevention and promotion programmes that have been implemented or recommended to address oral health issues in the region.

Regarding preventative oral health practices, we found that in the EMR, oral health interventions focus on activities such as daily toothbrushing, dental flossing and mouth rinsing. We noted that active oral disease prevention and oral health promotion programmes in the region have facilitated access to basic oral health services, raised awareness of proper oral hygiene practices and prevented common oral health issues such as dental caries and gum disease (21). Oral health education and training should be offered to all non-dental medical practitioners including pediatricians, nurses, medical and dental students so they can better advise their patients (8,28,32,37,63,65,66).

Our review shows that the majority of people in the EMR may not be aware of the importance of regular brushing and flossing or the potential consequences of poor oral hygiene. To address this challenge, education programmes are recommended for individuals and communities on proper oral hygiene practices. Such programmes can be delivered through various channels, including community health centres, schools, and social media. In addition to education on oral hygiene, prevention programmes can be developed to address common oral health issues. For example, fluoride treatments or water fluoridation can be used to prevent dental caries, while regular dental check-ups can help in

identifying and treating gum disease before it progresses to oral cancer or other life-threatening oral health conditions. Community interventions through the use of mobile phone applications and social media to advertise oral health practices are some of the newer interventions we noted in the region (9,10, 24, 48,55,58).

Overall, oral disease prevention and oral health promotion programmes are crucial to improving oral health outcomes in the EMR. By increasing awareness of proper oral hygiene practices, addressing common oral health issues, and promoting access to basic oral health education, there is a greater chance that EMR Member States can work towards ensuring that everyone in the region has access to oral health promotion and oral disease prevention programmes.

There were some limitations to this review. First, only 2 databases were searched (PubMed and Google Scholar), which may have limited the ability to find additional articles from other databases like CINAHL and Cochrane Library. Second, only articles published between 2010 and 2023 and in English language were chosen. This could have impacted the quality of findings as older sources may have facilitated comparison between past and current oral health programmes in the EMR and enable meaningful conclusions regarding any changes. To address this limitation, we reviewed in-depth the 61 selected studies to provide insights into the current burden of oral disease and initiatives to mitigate or prevent poor oral health in the EMR. Additionally, there may be instances where oral health programmes in certain countries have not been published and thus remain inaccessible.

Given the focus on the EMR in this systematic review, data availability was limited, highlighting the need for further investigation to gather additional evidence on oral disease prevention and oral health promotion programmes in other regions.

Conclusion

Our review underscores the importance of designing and prioritizing region- and context-specific oral disease prevention and oral health promotion programmes in the EMR to effectively address the unique and diverse oral health challenges in the region. Such programmes will play a vital role in promoting proper oral hygiene practices and preventing common oral health problems. Further studies are needed to document oral health programmes in EMR countries to obtain accurate and more comprehensive information about their oral health practices.

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Revue des programmes de promotion de la santé bucco-dentaire dans la Région de la Méditerranée orientale

Résumé

Contexte : Les affections bucco-dentaires, telles que les caries dentaires, les parodontopathies, la perte de dents, la fluorose dentaire, les traumatismes dentaires et le cancer de la bouche, sont prévalentes dans la Région OMS de la Méditerranée orientale. Cependant, aucune revue systématique des interventions de promotion de la santé bucco-dentaire n'a été effectuée dans la Région.

Objectifs : Examiner la littérature existante sur les programmes de promotion de la santé bucco-dentaire dans la Région de la Méditerranée orientale et recommander des améliorations pour l'avenir.

Méthodes : Nous avons passé en revue 61 articles publiés sur PubMed et Google Scholar dans la Région de la Méditerranée orientale entre 2010 et 2023. L'évaluation de la qualité des études incluses a été effectuée à l'aide des critères établis. Nous avons utilisé l'approche d'analyse de contenu pour créer des thèmes appropriés à partir des études et pour documenter des conclusions significatives sur la promotion de la santé bucco-dentaire.

Résultats : La majorité des études étaient transversales, quelques-unes étaient des études contrôlées randomisées, quasi-expérimentales, longitudinales ou des analyses. Parmi les problèmes de santé bucco-dentaire recensés figuraient les connaissances insuffisantes dans ce domaine, les caries dentaires, les parodontopathies, la perte de dents, la fluorose dentaire et le cancer de la cavité buccale. Bien que les troubles bucco-dentaires soient courants dans la plupart des pays, très peu de pays ont mis en œuvre des programmes de promotion de la santé bucco-dentaire.

Conclusion : Nous recommandons de prioriser les programmes de promotion de la santé bucco-dentaire dans la Région de la Méditerranée orientale afin de s'attaquer aux différents défis dans ce domaine. Pour être efficaces, ces programmes doivent être spécifiques à la Région et au contexte. D'autres études sur la promotion de la santé bucco-dentaire sont nécessaires dans la Région.

استعراض منهجي لبرامج تعزيز صحة الفم في إقليم شرق المتوسط

نجاة عبد ربه اليافعي، بشرى ناز فاطمة جليل، حمد المضاحكة

الخلاصة

الخلفية: تنتشر في إقليم منظمة الصحة العالمية لشرق المتوسط اعتلالات صحة الفم: مثل تسوس الأسنان، ومرض دواعم الأسنان، وفقدان الأسنان، وتسمم الأسنان بالفلور، ورضح الأسنان، وسرطان الفم. ومع ذلك، لم يُجرَ استعراض منهجي للتدخلات الرامية إلى تعزيز صحة الفم في الإقليم. الأهداف: هدفت هذه الدراسة إلى الاستعراض المنهجي للمؤلفات المتاحة التي تتناول برامج تعزيز صحة الفم في إقليم شرق المتوسط، والتوصية بتحسينات في المستقبل.

طرق البحث: استعرضنا على موقع PubMed وموقع Google Scholar 61 مقالة منشورة في إقليم شرق المتوسط بين عامي 2010 و2023. وأجري تقييم لجودة الدراسات المشمولة باستخدام معايير مُقرّرة. واستخدمنا نهج تحليل المحتوى لإعداد مواضيع مناسبة مستمدة من الدراسات وتوثيق استنتاجات هادفة بشأن تعزيز صحة الفم.

النتائج: كانت غالبية الدراسات مقطعية، وكان قليل منها دراسات مضبوطة ذات عينات عشوائية، أو دراسات شبه تجريبية، أو دراسات طولانية، أو مراجعات. وشملت مشكلات صحة الفم المرصودة: ضعف المعرفة بصحة الفم، وتسوس الأسنان، وأمراض اللثة، وفقدان الأسنان، وتسمم الأسنان بالفلور، وسرطان الفم. ورغم شيوع الاضطرابات الفموية في معظم البلدان، فإن عددًا قليلًا جدًا من تلك البلدان نفذ برامج لتعزيز صحة الفم.

الاستنتاجات: نوصي بإعطاء الأولوية لبرامج تعزيز صحة الفم في إقليم شرق المتوسط للتصدي للتحديات المتنوعة المتعلقة بصحة الفم. ولتكون هذه البرامج فعالة، ينبغي أن تكون محدّدة المناطق والسياق. وتدعو الحاجة إلى مزيد من الدراسات عن تعزيز صحة الفم في الإقليم.

References

1. Alkhaibari RA, Smith-Merry J, Forsyth R, et al. Patient-centered care in the Middle East and North African region: a systematic literature review. BMC Health Serv Res. 2023;23(1):135. doi:10.1186/s12913-023-0772-9
2. Beiruti N. Views on oral health care strategies. East Mediterr Health J. 2005;11(1-2):209-216. PMID: 16532690.
3. Kale S, Kakodkar P, Shetiya S, Abdulkader R. Prevalence of dental caries among children aged 5–15 years from 9 countries in the Eastern Mediterranean Region: a meta-analysis. East Mediterr Health J. 2020;26(6):726-735. doi:10.26719/emhj.20.043

4. World Health Organization (WHO). Oral health. Seventy-Fourth World Health Assembly (WHA74.5), Agenda item 13.2, 31 May 2021. [Accessed on 31/1/2024] https://apps.who.int/gb/ebwha/pdf_files/WHA74/A74_R5-en.pdf
5. Long HA, French DP, Brooks JM. Optimising the value of the critical appraisal skills programme (CASP) tool for quality appraisal in qualitative evidence synthesis. *Res Meth Med Health Sci.* 2020;1(1):31-42. doi:10.1108/RMHS-08-2019-0037
6. Kleinheksel AJ, Rockich-Winston N, Tawfik H, Wyatt TR. Demystifying Content Analysis. *Am J Pharm Educ.* 2020;84(1):7113. doi:10.5688/ajpe7113
7. Schwendicke F, Doost F, Hopfenmüller W, Meyer Lueckel H, Paris S. Dental caries, fluorosis, and oral health behavior of children from Herat, Afghanistan. *Community dentistry and oral epidemiology.* 2015;43(6):521-531. doi:10.1111/cdoe.12170
8. Alrowaili EF. Self-reported knowledge about dental caries at young age and variations between dental practitioners in the Ministry of Health in Bahrain. *BDJ open.* 2021;7(1):18. doi:10.1038/s41405-021-00090-3
9. Sivaramakrishnan G, AbdulAmeer F, Faisal F, Mansoor Z, Hasan S, Ebrahim S, AlSalihi L, Alsobaiei M. Use of Social Media to View and Post Dentistry-related Information in Bahrain: A Cross-Sectional Study. *Healthcare Informatics Research.* 2023;29(1):31-39. doi:10.4258/hir.2023.29.1.31
10. Bennani A, Mohamed S. Effect of Khat consumption on oral health: study carried out in Djibouti City. *Oral Health Dental Sci.* 2021;5(1):1-8. doi:10.19080/OHD.2021.05.555650
11. AbdAllah EA, Metwalli NE, Badran AS. Effectiveness of a one-year oral health educational and preventive program in improving oral health knowledge and oral hygiene practices of a group of Autistic Egyptian children and their caregivers. *Futur Dent J.* 2018;4(1):23-29. doi:10.1016/j.fdj.2017.12.002
12. Moussa A, Ibrahim E, Esmat A, Eissa S, Ramzy M. An overview of oral health status, socio-economic and behavioral risk factors, and the pattern of tooth loss in a sample of Egyptian rural population. *Bull Natl Res Cent.* 2020;44(1):1-6. doi:10.1186/s42269-020-0262-5
13. Mekhemar M, Ebeid K, Attia S, Dörfer C, Conrad J. Oral health attitudes among preclinical and clinical dental students: A pilot study and self-assessment in an Egyptian State-Funded University. *Int J Environ Res Public Health.* 2020;18(1):234. doi:10.3390/ijerph18010234
14. El-Nasr EM. Oral health intervention program among primary school children at El-Qalyubia Governorate, Egypt. *Nurs. J.* 2017;14(2):100. doi:10.21608/egnj.2017.6481.1013
15. Abou El Fadl R, Abdel Fattah M, Ezz M. Assessing the prevalence of early childhood caries and the associated determinants in a group of preschool children: results from a national oral health survey in Egypt. *Egypt. Dent. J.* 2019;65:31-39. doi: 10.21608/edj.2015.71243
16. Mohamed YS. Assessment of the knowledge and awareness among Egyptian parents in relation to oral health status of their children. *Egypt. Dent. J.* 2020;66:737-746. doi: 10.21608/edj.2020.25196.1058
17. Abourady HA, El-Malt MA, El-Araby S, Esmat A. Effectiveness of an Oral Health Intervention Program for Group of Egyptian Children with Congenital Heart Defects. *Al-Azhar Dent. J. Girls.* 2023;10(1):247-257. doi: 10.21608/adjg.2022.86694.1401
18. Aly NM, Mohamed AA, Abdelaziz WE. Parenting practices and oral health status in rural areas in Egypt: a household survey. *BMC Oral Health.* 2020;20(1):134. doi:10.1186/s12903-020-01176-7
19. Abbass MMS, Mahmoud SA, El Moshy S, et al. The prevalence of dental caries among Egyptian children and adolescences and its association with age, socioeconomic status, dietary habits and other risk factors. A cross-sectional study. *F1000Res.* 2019;8:8. doi:10.12688/f1000research.17753.1
20. El Khatib AA, El Tekeya MM, El Tantawi MA, Omar T. Oral health status and behaviours of children with Autism Spectrum Disorder: a case-control study. *Int J Paediatr Dent.* 2014;24(4):314-323. doi: 10.1111/ipd.12061
21. Khoshnevisan M, Ghasemianpour M, Samadzadeh H, Baez R. Oral Health Status and Healthcare System in I.R. Iran. *J. Contemp. Med. Sci.* [Internet]. 2018 Sep. 26 [cited 2024 May 9];4(3). Available from: <https://www.jocms.org/index.php/jcms/article/view/460>
22. Yekaninejad MS, Eshraghian MR, Nourijelyani K, Mohammad K, Foroushani AR, Zayeri F, Pakpour AH, Moscowchi A, Tarashi M. Effect of a school-based oral health-education program on Iranian children: results from a group randomized trial. *Eur J Oral Sci.* 2012 Oct;120(5):429-437. doi: 10.1111/j.1600-0722.2012.00999.x
23. Asgari F, Majidi A, Koochpayehzadeh J, Etemad K, Rafei A. Oral hygiene status in a general population of Iran, 2011: a key lifestyle marker in relation to common risk factors of non-communicable diseases. *Int J Health Policy Manag.* 2015 Jan 30;4(6):343-352. doi: 10.15171/ijhpm.2015.13
24. Sistani MM, Yazdani R, Virtanen J, Pakdaman A, Murtomaa H. Oral health literacy and information sources among adults in Tehran, Iran. *Community Dent Health.* 2013 Sep;30(3):178-182. doi: 10.1922/CDH_3091Sistanio5
25. Ghanim AM, Manton DJ, Morgan MV, Mariño RJ, Bailey DL. Trends of oral health care and dental treatment needs in relation to molar incisor hypomineralisation defects: a study amongst a group of Iraqi schoolchildren. *Eur Arch Paediatr Dent.* 2012 Aug;13(4):171-178. doi: 10.1007/BF03262831
26. BaniHani A, Tahmassebi J, Zawaideh F. Maternal knowledge on early childhood caries and barriers to seek dental treatment in Jordan. *Eur Arch Paediatr Dent.* 2021 Jun;22(3):433-439. doi: 10.1007/s40368-021-00593-x

27. Salim NA, ElSa'aideh BB, Maayta WA, Hassona YM. Dental services provided to Syrian refugee children in Jordan: a retrospective study. *Special Care in Dentistry*. 2020 May;40(3):260-266. doi: 10.1111/scd.12485
28. Alzammam N, Almalki A. Knowledge and awareness of periodontal diseases among Jordanian University students: A cross-sectional study. *J Indian Soc Periodontol*. 2019 Nov-Dec;23(6):574-579. doi: 10.4103/jisp.jisp_424_18.
29. Abu Sharour L. A cross-sectional study on oncology nurses' knowledge and practice of oral mucositis among cancer patients in Jordan. *Int J Nurs Sci*. 2019 May 30;6(3):283-287. doi: 10.1016/j.ijnss.2019.05.008
30. Ariga J, Al-Mutawa S, Nazar H. School Oral Health Program in Kuwait. *Med Princ Pract*. 2014;23(1):43-46. doi: 10.1159/000355499
31. Alsumait A, ElSalhy M, Behzadi S, Raine KD, Gokiart R, Cor K, Almutawa S, Amin M. Impact evaluation of a school-based oral health program: Kuwait National Program. *BMC Oral Health*. 2019 Sep 2;19(1):202. doi: 10.1186/s12903-019-0859-4
32. Ali DA. Assessment of oral health attitudes and behavior among students of Kuwait University Health Sciences Center. *J Int Soc Prev Community Dent*. 2016 Sep-Oct;6(5):436-446. doi: 10.4103/2231-0762.192967
33. Daou MH, Eden E, El Osta N. Age and reasons of the first dental visit of children in Lebanon. *J Med Liban*. 2016 Jan-Mar;64(1):18-22. doi: 10.12816/0027985
34. Diab HA, Hamadeh GN, Ayoub F. Evaluation of periodontal status and treatment needs of institutionalized intellectually disabled individuals in Lebanon. *J Int Soc Prev Community Dent*. 2017 May-Jun;7(3):76-83. doi: 10.4103/jispcd.JISPCD_129_17
35. Peeran SW, Altaher OB, Peeran SA, Alsaïd FM, Mugrabi MH, Ahmed AM, Grain A. Oral health in Libya: addressing the future challenges. *Libyan J Med*. 2014 Mar 24;9(1):23564. doi: 10.3402/ljm.v9.23564
36. Almoudi MM, Hussein AS, Doss JG, Schroth RJ. Expectant mothers' readiness to initiate preventive oral health care for their children. *The Saudi Journal for Dental Research*. 2016 Jul 1;7(2):118-126. doi: 10.1016/j.sjdr.2015.06.005
37. Naveenkumar PG, Kakodkar P, Peeran S, Abdalla KA. Oral self-care practices and self-assessment of dental health reported by the dental students from Sebha (Libya). *J Dent Res Sci Dev*. 2014 Jul 1;1:46-50. doi: 10.4103/2348-1471.135994
38. Huew R, Waterhouse PJ, Moynihan PJ, Maguire A. Prevalence and severity of dental caries in Libyan schoolchildren. *Int Dent J*. 2011 Aug;61(4):217-223. doi: 10.1111/j.1875-595X.2011.00042.x
39. Kateeb E. Palestinian women's oral health status, knowledge, practices, and access to dental care during pregnancy: a cross-sectional study. *The Lancet*. 2018 Feb 21;391:S10. doi: 10.1016/S0140-6736(18)30469-7
40. Riaz A, Javed MQ, Chaudhary FA, Khan AM. Knowledge, attitude, and practices of pregnant women regarding oral health at Railway Hospital Rawalpindi, Pakistan. *Pakistan Journal of Medical and Health Sciences*. *Pakistan J. Medical Health Sci*. 2020; 14(4): 738-743. doi: 10.29309/TPMJ/2020.27.06.3633
41. AlYafei NA, Jaleel BN. Preparing to meet the oral health needs of the elderly in Qatar—a model for domiciliary oral health care services. *N.J. Adv. Res. Rev*. 2020;8(3):184-91. doi: 10.22270/njar
42. Al-Darwish MS, Abuhassna M, Al-Thomairy SA. Oral health knowledge and sources of oral health information among school children in Qatar. *J. Dent Health Oral Disord. Ther*. 2015;2(3):1-11. doi: 10.25141/2470-0886-2015-3.0001
43. Al Thani MH, Al Thani AA, Al Emadi AA, Al Chetachi WF, Akram H, Poovelil BV. Oral health status of six year old children in Qatar: findings from the national oral health survey. *Int. J. Dent. Hyg*. 2018 May;16(2):225-32. doi: 10.1111/idh.12298
44. Alyafei NA, Gibreel S. Exceptional Design for an Adult Oral Health Screening Program, Qatar. *Med. Clinica. Resear*. 2020 Nov 23;5(10):272-9. doi: 10.15344/2394-7500/2020/330
45. Alyafei N. The Development of School Oral Health Programs in Qatar. *Interact. J. Méd. Sci*. 2021;8(308):1-9. doi: 10.3999/ijms.v8i308.19318
46. Al-Darwish MS. Oral health knowledge, behaviour and practices among school children in Qatar. *Dent Res J (Isfahan)*. 2016 Jul-Aug;13(4):342-53. doi: 10.4103/1735-3327.187893
47. Alkhtib A, Morawala A. Knowledge, Attitudes, and Practices of Mothers of Preschool Children About Oral Health in Qatar: A Cross-Sectional Survey. *Dent J (Basel)*. 2018 Oct 1;6(4):51. doi: 10.3390/dj6040051
48. AlKlayb SA, Assery MK, AlQahtani A, AlAnazi M, Pani SC. Comparison of the effectiveness of a mobile phone-based education program in educating mothers as oral health providers in two regions of Saudi Arabia. *J Int Soc Prev Community Dent*. 2017 May-Jun;7(3):110-115. doi: 10.4103/jispcd.JISPCD_138_17
49. Al-Jaber A, Da'ar OB. Primary health care centers, extent of challenges and demand for oral health care in Riyadh, Saudi Arabia. *BMC Health Serv Res*. 2016 Nov 4;16(1):628. doi: 10.1186/s12913-016-1882-8
50. Quadri FA, Jafari FA, Albeshri AT, Zailai AM. Factors influencing Patients' Utilization of Dental Health Services in Jazan, Kingdom of Saudi Arabia. *Int J Clin Pediatr Dent*. 2018 Jan-Feb;11(1):29-33. doi: 10.5005/jp-journals-10005-1472
51. Kotha SB, Alabdulaali RA, Dahy WT, Alkhaibari YR, Albaraki ASM, Alghanim AF. The influence of oral health knowledge on parental practices among the Saudi parents of children aged 2-6 years in Riyadh City, Saudi Arabia. *J Int Soc Prev Community Dent*. 2018 Nov-Dec;8(6):565-571. doi: 10.4103/jispcd.JISPCD_238_18
52. Togoo RA, Yaseen SM, Zakirulla M, Nasim VS, Al Zamzami M. Oral hygiene knowledge and practices among school children in a rural area of southern Saudi Arabia. *Int J Contemp Dent*. 2012 Apr 26;3(1):57-62. doi: 10.5005/jp-journals-10024-1064
53. Khalifa N, Allen PF, Abu-bakr NH, Abdel-Rahman ME, Abdelghafar KO. A survey of oral health in a Sudanese population. *BMC Oral Health*. 2012 Feb 24;12:5. doi: 10.1186/1472-6831-12-5

54. Ibrahim HM, Mudawi AM, Ghandour IA. Oral health status, knowledge and practice among pregnant women attending Omdurman maternity hospital, Sudan. *East Mediterr Health J.* 2017 Feb 1;22(11):802-809. doi: 10.26719/2016.22.11.802
55. Babiker TM, Osman KA, Mohamed SA, Mohamed MA, Almahdi HM. Oral Cancer Awareness Among Dental Patients in Omdurman, Sudan: a cross-sectional Study. *BMC Oral Health.* 2017 Mar 23;17(1):69. doi: 10.1186/s12903-017-0358-8
56. Khalifa N, Allen PF, Abu-bakr NH, Abdel-Rahman ME. Factors associated with tooth loss and prosthodontic status among Sudanese adults. *J Oral Sci.* 2012;54(4):303-12. doi: 10.2334/josnusd.54.303
57. Jouy E. Syria profile of the epidemiology and management of early childhood caries before and during the time of crisis. *Front Public Health.* 2019 Sep 24;7:271. doi: 10.3389/fpubh.2019.00271
58. Al Bardaweel S, Dashash M. E-learning or educational leaflet: does it make a difference in oral health promotion? A clustered randomized trial. *BMC Oral Health.* 2018 May 10;18(1):81. doi: 10.1186/s12903-018-0554-7
59. Jaghasi I, Hatahet W, Dashash M. Dietary patterns and oral health in schoolchildren from Damascus, Syrian Arab Republic. *East Mediterr Health J.* 2012;18(4):358-364.
60. El-Nadeef MA, Hassab H, Al-Hosani E. National survey of the oral health of 5-year-old children in the United Arab Emirates. *East Mediterr Health J.* 2010 Jan;16(1):51-5. doi: 10.26719/2010.16.1.51
61. Hashim R. Self-reported oral health, oral hygiene habits and dental service utilization among pregnant women in United Arab Emirates. *Int J Dent Hyg.* 2012 May;10(2):142-6. doi: 10.1111/ihd.12000
62. Abu-Gharbieh E, Saddik B, El-Faramawi M, Hamidi S, Basheti M. Oral health knowledge and behavior among adults in the United Arab Emirates. *BioMed research international.* 2019 Oct;2019. doi: 10.1155/2019/6394018
63. Aburahima N, Hussein I, Kowash M, Alsalami A, Al Halabi M. Assessment of Paediatricians' Oral Health Knowledge, Behaviour, and Attitude in the United Arab Emirates. *Int J Dent.* 2020 Sep 22;2020:1-8.7930564. doi: 10.1155/2020/7930564
64. Mahmoud N, Kowash M, Hussein I, Hassan A, Al Halabi M. Oral Health Knowledge, Attitude, and Practices of Sharjah Mothers of Preschool Children, United Arab Emirates. *J Int Soc Prev Community Dent.* 2017 Nov-Dec;7(6):308-314. doi: 10.4103/jispcd.JISPCD_393_17
65. Rahman B, Kawas SA. The relationship between dental health behavior, oral hygiene and gingival status of dental students in the United Arab Emirates. *Eur J Dent.* 2013 Jan;7(1):22-7. doi: 10.1055/s-0039-1698885
66. Halboub ES, Al-Maweri SA, Al-Jamaei AA, Al-Wesabi MA, Shamala A, Al-Kamel A, Alsharani A, Eissa N. Self-Reported Oral Health Attitudes and Behavior of Dental and Medical students, Yemen. *Glob J Health Sci.* 2016 Oct 1;8(10):56676. doi: 10.5539/gjhs.v8n10p262
67. Al-Sufyani GA, Al-Maweri SA, Al-Ghashm AA, Al-Soneidar WA. Oral hygiene and gingival health status of children with Down syndrome in Yemen: A cross-sectional study. *J Int Soc Prev Community Dent.* 2014 May;4(2):82-6. doi: 10.4103/2231-0762.138989