



Dental caries prevalence status in Saudi Arabia and neighboring eastern countries in the last decade-a review

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Abstract

The global prevalence of dental caries and decayed, missing and filled teeth (dmft) is variable in developed and developing countries. Reviews show that dental caries is also adversely affecting the oral health of children in Arab countries. The present review was planned for the data published from 2011 to 2021 to know the status of the caries prevalence and dmft among children. The review showed an overall prevalence rate of 65.24% in a total of 15319 children with a mean-dmft score of 3.81 ± 2.97 . Four prevalence studies showed average dmft of 5.21 ± 4.01 and 5.29 ± 4.09 for males (988) and females (1060) respectively. The mean dental caries prevalence for the last decade was found to be decreased compared to the previous two decades but there is no variation in the prevalence rate.

Introduction

Dental caries is regarded as one of the most prevalent chronic microbial disease worldwide; its identification remains critical in dental clinical practice. Clinical examination with probes and explorers, visual assessment along with intraoral radiographic films along with digital radiography are various methods used for detection of carious lesions. The present understanding of biological model of dental caries involves new techniques in caries diagnosis and management (1, 2, 3). The prevalence of dental caries is very high with some studies showing the rate of 71.35–74.8% (4, 5).

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At global level, the dental caries scenario is also varied across underdeveloped, developing, and developed countries with a lot of discrepancies. However, there is no evidence that caries prevalence is decreased in developed countries or industrialized countries (6). Likewise, there is a noticeable variation in Gulf Cooperation Council (GCC) states concerning the prevalence of dental caries, the number ranges from there are 20.8 to 96 (7). World Health Organization (WHO) has recommended estimating caries in the form of prevalence and recording of decayed, missing, and filled teeth (DMFT) index for permanent and dmft deciduous dentitions. In addition, according to the WHO guidelines (2000) for basic global indicators of oral health, a DMFT/dmft target is to be achieved from 1.2 to 2.6 (low) by 2020 (8).

In the Arab population, the foremost public health problems in terms of oral maladies and orofacial health are caries, gingival-periodontal conditions, oral cancer, and dento-facial traumatic injuries, all of which significantly influence the quality of life. Dental health is a sizeable component of public health and affects the overall outcomes of general health. As the rate of oral and dental diseases in the Middle East countries has surpassed because of the global situation, it is needed to join hands and exert every effort in curbing the incidence of these diseases, namely dental caries (7, 9). With this overview, the present review was considered to evaluate the present scenario in pattern and prevalence of dental caries in the region for the last decade among children.

Method

The present review was planned using key terms such as “Dental caries”, “Arab” and “middle east” combined with Boolean “and” in Medline through Pubmed advanced search only, however, no specific articles were retrieved. Further, using of terms “Dental caries” and “Arab” for general search in Pubmed, Google Scholar, and Google search procured 122 articles in the last ten years. A total of 28 articles were finalized for review after careful screening of the title and abstract for the prevalence of dental caries in Arab population. Articles with caries prevalence in medical orofacial conditions like diabetes mellitus, Down syndrome, autism, and facial clefts were excluded from the review. Thus, the final selection of 25 articles was made to be included in the study consisting of 17 prevalence studies and 8 review articles eliminating 3 publications which were qualitative studies.

The data collected from articles were tabulated for authors, year of publication, country of origin participants, and prevalence age and dmft scores in excel sheet. The data was subject to calculation means and averages for age, mean dmft, and prevalence revealed in each study.

Result

All the 17 prevalence studies were published during the span of 2011 to 2021 while 8 review articles were published between the periods 2014 to 2021. Prevalence studies included in this review were from four countries: Kingdom of Saudi Arabia (KSA, 7), United Arab Emirate (UAE,

6), Kuwait (2), and Qatar (2) as no prevalence study for dental caries was published from Oman and Bahrain in last decade. All the articles included children with mixed dentition for the analysis, while no study was found for adult population. The overall prevalence rate of 65.24% was calculated from the articles that provided the prevalence rate. A total of 15319 children in the age range from infants to 17 years were evaluated through these studies with mean dmft score of 3.81 ± 2.97 (Table 1). Four prevalence studies showed average dmft of 5.21 ± 4.01 and 5.29 ± 4.09 for males (988) and females (1060) respectively (Table 2).

Table 1 (Demographic data from prevalence articles)

No.	Author	Year	Country	Participants	Mean	SD	Prevalence (%)
1.	Al-Majed IM 12	2011	KSA*	522	4.69	3.03	86.2
2.	Hashim R 18	2012	UAE#	1037	NA	NA	31.1
3.	Alkarimi HA 13	2014	KSA	417	5.7	4.2	NA
4.	Nazer H 26	2014	Kuwa it	336	NA	NA	3
5.	Farooqi FA 14	2015	KSA	711	3.66	3.13	73
6.	Alkhtib A 24	2016	Qatar	250	4.8	4.7	89.2
7.	Gopinath VK 19	2016	UAE	403	7.11	4.99	58.8
8.	Al-Meedani LA 15	2016	KSA	388	3.4	3.6	69
9.	El Batawi H 20	2017	UAE	348	NA	NA	67
10.	Kowash MB 21	2017	UAE	540	3.07	0.13	74.1
11.	Khadri FA 22	2018	UAE	803	3.19	2.9	75
12.	Elamin A 23	2018	UAE	186	1.7	2.81	41
13.	Quadri MFA 16	2018	KSA	500	0.74	0.6	NA
14.	Al-Thani MH 25	2018	Qatar	1124	4.2	4.2	71.4
15.	Al-Rafee MA 5	2019	KSA	1986	1.72	0.49	85.77
16.	Al Malik M 17	2019	KSA	312	5.63	3.86	88.8
17.	Alqaderi H 27	2020	Kuwa it	5456	NA	NA	NA
*KSA – Kingdom of Saudi Arabia							
#UAE – United Arab Emirate							

Table 2 (Studies showing details of males and females with mean dmft)

Author	Males	Mean	SD	Females	Mean	SD
Farooqi FA 14	218	3.56	3.09	179	3.78	3.17
Alkhtib A 24	127	7.5	4.9	123	7.6	5.3
Al-Thani MH 25	533	4.1	4.3	591	4.2	4
Al Malik M 17	110	5.71	3.78	167	5.58	3.92
Total	988	5.21	4.01	1060	5.29	4.09

Seven studies conducted in Saudi Arabia included 4836 children with 86.55% prevalence with mean dmft of 3.65 ± 2.7 . A total of 3317 children from UAE were assessed for average caries prevalence of 57.83% and mean dmft 3.77 ± 2.71 . Further, two studies on Qatari children (1374) exhibited mean dmft as 4.5 ± 4.45 and prevalence of 80.3% while two studies from Kuwait provided only prevalence (3%) that included 5792 children (Table 3). Eight review articles published were evaluated for the involved population, duration, prevalence, and age groups. Four reviews were found to be involving the individual counties. Two reviews included GCC, and one was done on the Middle East and North Africa (MENA) region. The range of dental caries prevalence in these reviews was from 17.2 to 99.4% (Table 4).

Table 3 (Country wise details of the prevalence studies)

Country	no. of studies	Participants	Mean dmft	SD	Prevalence%
KSA*	7	4836	3.65	2.7	80.55
UAE#	6	3317	3.77	2.71	57.83
Qatar	2	1374	4.5	4.45	80.3
Kuwait	2	5792	-	-	3
*KSA – Kingdom of Saudi Arabia					
#UAE – United Arab Emirate					

Table 4
Demographic and prevalence data from review articles

Authors	Year	Country/s	Duration of review	Age group	Prevalence %
Al-Ansari AA 30	2014	KSA*	1982 to 2012	3–7 years	95
				12–19 years	91
				30–45 years	98
Al-Bluwi GSM 31	2014	UAE#	1991 to 2011	4–6 years	78.85
Alayyan W 8	2017	GCC@	1992 to 2016	6–16 years	64.7
AlAyyan W 28	2018	GCC	1992 to 2016	-	80.95
Al Suwyed AS 7	2021	-	-	-	20.8 to 96
Elamin A 6	2021	MENA [¶]	2000 to 2019	-	17.2 to 88.8
Alshammari FR 29	2021	KSA	1999 to 2019	-	70–80
Al Anouti F 32	2021	UAE	2011–2021	-	22-99.4
*KSA – Kingdom of Saudi Arabia, #UAE – United Arab Emirate, @GCC – Gulf Countries Council					
[¶] MENA- Middle East North Africa					

Discussion

Dental caries, a disease caused by oral microbial flora, is prevalent in most countries. WHO (2003) has issued a project “Global Goals for Oral Health by 2020 for all” to improvement in the oral health status of the world population. WHO proposed a scale based on the DMFT values to classify the severity of dental caries through DMFT (decayed, missing, filled teeth) index ranging between 0.0 and 1.1 (very low); 1.2–2.6 (low); 2.7–4.4 (moderate), 4.5–6.5 (high), and values exceeding 6.6 considered to be very high (10,11).

The review was planned with an insight to identify the current status of dental caries in neighboring countries of Saudi Arabia where most prevalence studies are conducted. The research from four GCC states: Saudi Arabia, United Arab Emirates, Kuwait, Qatar, and Bahrain were explored electronically and published from 2011 to 2021. The appraisal included 26 articles comprising 17 research studies and 8 reviews conducted on the prevalence of dental caries.

In the analysis of 17 studies, 7 from KSA (5, 12–17), 6 from UAE (18–23) and 2 each from Qatar (24, 25) and Kuwait (26, 27) conducted prevalence of dental caries in the primary dentition. These studies showed an overall prevalence rate of 65.24% with mean dmft score of 3.81 ± 2.97 . The

prevalence rate of dental caries ranged from 3 to 89.3% while dmft rate was 0.74 to 7.11 among these studies. Four prevalence studies showed prevalence for boys and girls with average dmft of 5.21 ± 4.01 and 5.29 ± 4.09 respectively. The mean dmft rate among boys ranged from 3.56 to 7.5 and for girls it ranged from 3.78 to 7.6 (14, 17, 24, 25).

The mean dmft rate of KSA and UAE were found to be similar while Qatar showed a higher mean value. A previous review on dmft rate of GCC countries was found to be 5.14 with a prevalence of 80.9%. This suggests that there is a decrease in the prevalence rate of dental caries among children although the dmft rate is unchanged. These findings can be attributed to the variation of sample sizes among cohort studies and changing pattern of awareness of oral hygiene practices among children (8, 28, 29).

According to Al Suwyed AS et al., the dmft among KSA children ranged from 0.9 to 8.6 with a prevalence of 20.8 to 96%; while in UAE mean dmft ranged from 3.07 to 10.9 with a prevalence of 41.5 to 99.4% (7). Thus, the observations of the current review were found in accordance with the previous studies. A study on the Saudi population found a dmft rate of 7.35 and 14.53 among the children/adolescents aged 12–19 years and adults respectively (30). Further, in a review among UAE children, dmft in age between 4 to 6 years was 5.1–8.4 while for the 12-year old group ranged from 1.6 to 3.24 (31). Another review on oral health status conducted in UAE found mean dmft values ranging between 0.75 and 10.9 (32).

The studies from Kuwait conducted on infants showed a prevalence of 3%, however, there was no promising data available for dmft index (26). Nonetheless, a pilot study on the Kuwaiti population has estimated a dmft rate of 2.19 with 53% prevalence (11). Further, a longitudinal study on the relationship between sleep and dental caries reported a 20% increase in caries in two years follow-up among Kuwaiti children (27). There was no prevalence studies conducted in the last 10 years in Oman and Bahrain. However, a Bahraini cross-sectional study conducted among dental practitioners about self-reported knowledge of dental caries mentioned a caries prevalence rate of 86.8% of 6-year-old children (33).

The previous reviews have shown a range of dental caries prevalence from 17.2 to 99.4% while the present review shows an average 65.24% prevalence. An evaluation of the data from 20 countries of the Eastern Mediterranean Region shows wide variations in dental caries with the prevalence of 17.2% and 88.8% (6, 32). The data definitely shows a variation between reviews and prevalence studies. However, the differences in socioeconomic status, education, and quality of life along with recent advancements in oral health care awareness have brought in a sizable variation in dmft (10). Further, most of the published data encompass early and late childhood while very few studies are conducted among adolescents and the elderly Arab population.

Conclusion

The mean dental caries prevalence for the last decade was found to be 65.24% as compared to the duration 1992 to 2016 (80.95%). These findings suggest improvement in the caries index. However, the promotion of oral health awareness and education on regular tooth brushing, flossing, and regular dental visits need to be promoted to reduce dmft. Further, it is recommended to conduct more studies on adolescents and adults factions for estimation of prevalence rate and DMFT in a large sample population. The study indicates further planning for public-oriented oral health promotion agendas.

Declarations

The author has no conflict of interest

The ethical committee of Batterjee Medical College exempted this review article from approval as this review doesn't have a human or animal study.

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