

Prevalence of Dental Caries among Children in Jeddah - Saudi Arabia -2015

Hamza Abdulkareem Al Zahidy^{1*}, Khaled Ahmed Bafail², Khadijah Mustafa Saidi², Aseel Saleh Fairag², Sara Khalid Enayah², Ali Sulaiman Alsayegh², Noof khalid Abdullah², Sultan Mohammed Alwah², Abdulaziz Saleh Alharthi², Naser Sameer Sindi², Faisal Mohammed Alyahya³ and Alfuways Faisal Saleh⁴

¹IbnSina National College, Jeddah, Saudi Arabia

²Batterjee Medical College, Jeddah, Saudi Arabia

³King Saud Dental College, Saudi Arabia

⁴Riyadh College for Dentistry and Pharmacological studies, Riyadh, Saudi Arabia

*Corresponding Author: Hamza Abdulkareem Al Zahidy, IbnSina National College, Jeddah, Saudi Arabia.

Received: February 08, 2017; Published: February 14, 2017

Abstract

Background: Dental caries is the most prevalent chronic disease in early childhood in most communities worldwide. To ensure the oral health of a population, clinicians must deliver appropriate dental services, and local communities need to have access to dental care facilities. However, establishment of this infrastructure must be based on reliable information regarding disease prevalence and severity in the target population.

Methods: A cross-sectional study was conducted in Saudi Arabia from December 2014 to April 2015. A total of 2113 children aged 12 - 14 were randomly selected from 16 schools located in different geographic areas. Three calibrated examiners using World Health Organization (WHO) criteria to diagnose dental caries performed the clinical examinations. Data analyses were subsequently conducted.

Conclusion: Results indicated that dental caries prevalence among school children in Saudi Arabia has reached critical levels (89.2%) and is influenced by socio-demographic factors. Overall 15.6% of the examined children had ECC and 73.6% had severe ECC. The mean decayed, missing, and filled teeth values obtained in this study were the second highest detected in the Eastern Mediterranean region.

Keywords: Dental carries; Awareness spreading; Saudi Arabia

Introduction

Dental caries affecting children 71 months or younger is referred to as early childhood caries, and this condition can develop as early as the eruption of the primary teeth [1]. The disease is diagnosed as Severe Early Childhood Caries in children aged three to five years, where there is one or more decayed, filled or missing (due to caries) lesions in a maxillary anterior tooth or dmft of ≥ 3 (at age 2), ≥ 6 (at age 3), ≥ 8 (at age 4)" [2].

It is known that dental caries can affect the general health and wellbeing of affected individuals, especially children. Many studies have revealed the negative impact of dental caries on the quality of life of children ranging from being ashamed to smile and speak, to difficulty in eating and malnutrition [3-6]. Further to this, research proves that untreated tooth decay in children causes pain and infection that leads to more missed school days and lower academic performance compared to students who have good oral health [7,8].

Whilst it is recognized that dental caries is caused by a multiplicity of factors including frequent consumption of fermentable carbohydrates, a less well recognized cause may be that the presence of enamel defects contributes to increased caries risk by making teeth more susceptible to post-eruptive breakdown and subsequent lesion development [9-11]. A defective tooth surface may provide a suitable site

for the adhesion and colonization of cariogenic bacteria, and due to cleaning difficulties may cause the bacteria to be retained at the base of the defect resulting in a more rapidly developing carious lesion than otherwise would occur on a sound tooth surface [12,13].

Developmental defects of enamel (DDE) are variations in quality and quantity of the enamel, resulting from disturbances in amylogenesis [14,15]. Enamel hypomineralisation is a qualitative defect presenting alterations in enamel translucency and opacity. The defective enamel is of normal thickness and opacities can be diffuse or demarcated with white, yellow, or brown color. The enamel is soft and porous and can chip off easily, leading to unprotected dentine and also an unexpectedly rapid caries development. On the other hand, Enamel hypoplasia is a quantitative enamel deficiency that may present as pits, grooves, or generalized lack of surface enamel [16,17].

Dental caries is a disease which is totally preventable with simple measures including appropriate diet and good oral hygiene [18]. However, dental caries remains the most prevalent chronic disease in early childhood [19]. It can be seen from Table 1 that studies on the prevalence of ECC globally and regionally reported great variation. While developed countries have low prevalence, countries in the GCC and the Middle East region demonstrate high prevalence of ECC [19,20].

Results

In table 1 demonstrate the socio-economic variable which presented 1123 (53.16%) of the participant were Boys while 990 (46.85%) were Girls. Also show the frequencies of caries according to the teeth type, Molars has been reported the most followed by premolars, incisors, and canine (31%, 28%, 25%, and 16% respectively).

Socio-demographic variable		Number	Percentage
Gender	Boys	1123	53.15%
	Girls	990	46.85%
Teeth type	Molars	651	31%
	premolars	588	28%
	Canine	336	16%
	Incisors	525	25%

Table 1: Socio-demographic variable.

In Figure 1 Caries distribution was higher in the maxillary jaw (62.4%) than in the mandibular jaw (37.6%).

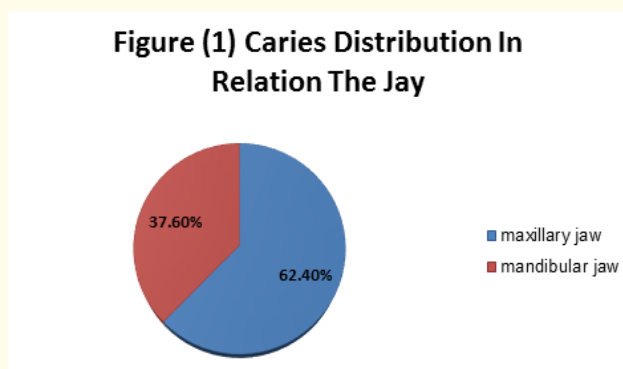


Figure 1: Caries distribution in relation the jay.

Figure 2 show Distribution of examined caries teeth according to jaw (Percentage of total caries surfaces); Mesial surfaces of the maxillary central and lateral incisors had the highest caries rates at 62.2% and 81.3%, respectively. Distal surfaces of mandibular central and lateral incisors demonstrated highest caries frequencies at, respectively, 45.5% and 69.1%. In addition, distal surfaces of maxillary canines and of the first and second premolar teeth showed the highest caries rates, with 65.2%, 58% and 49.1%, respectively. Likewise, the highest prevalence of caries experience was observed on the distal surfaces of mandibular canines and the first and second premolar teeth (56.6%, 47% and 52.9%, respectively). On the other hand, occlusal fissures on the first and second maxillary molars demonstrated highest caries frequencies at 50.7% and 70.9%, respectively. Similarly, in the first and second mandibular molar teeth, occlusal fissures showed the highest caries rates (55.6% and 70.3%, respectively).

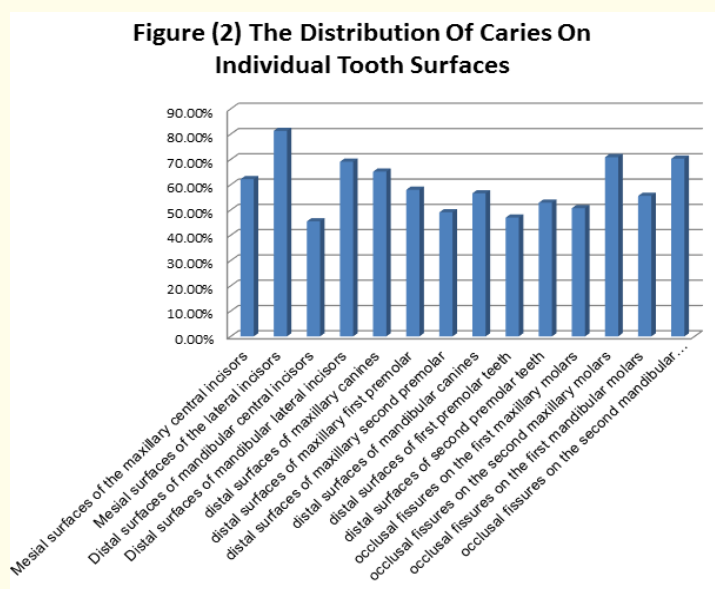


Figure 2: The distribution of caries on individual tooth surfaces.

As shown in Figure 3 Prevalence of Caries according to the gender; show lower incidence (46.94%) in women than in Boys (53.06%).

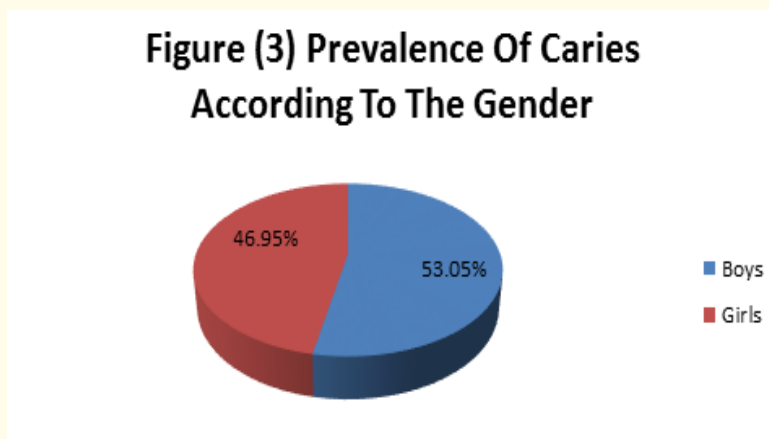


Figure 3: Prevalence of caries according to the gender.

Discussion

The present study documented widespread neglect of the oral health of preschool children in Saudi Arabia. Untreated decayed teeth dominated the dmft score among the children in this study, indicating a high rate of unmet treatment needs. Additionally, this study provided information on the caries status of preschool children in age groups not included in the national surveys. Caries prevalence of the examined population (75 %) was comparable to other studies conducted in regions with socio-behavioral characteristics similar to that of the Saudi Arabian region.

Our study show Lingual surfaces of maxillary central incisors and mesial surfaces of maxillary lateral incisors and of the second premolar and molar teeth contributed significantly more ($P < 0.05$) to caries incidence than the same surfaces of mandibular central, lateral incisor, second premolar and second molar teeth. On the other hand, distal surfaces of mandibular central and lateral incisor teeth, and cervical sites of mandibular lateral incisor and second premolar teeth had significantly more caries than the same surfaces of maxillary incisors, lateral incisors and second premolars. Buccal and lingual surfaces of first premolar teeth and pit sites on the buccal surfaces of second mandibular molar teeth showed significantly more caries than the same surfaces of maxillary first premolars and second molar teeth. When analyzing data aggregated by gender, lingual surfaces and cervical sites of maxillary central incisors, distal surfaces of maxillary lateral incisors, and mesial surfaces of maxillary second molars in women demonstrated significantly higher rates of caries than men, compared to the equivalent surfaces on maxillary central incisors, lateral incisors and maxillary second molars.

The prevalence of caries experience was highest among individuals between the ages of 17 and 25. The first and second maxillary molars were most susceptible to caries at 10.4%, while the mandibular central incisors were least susceptible, at 1.7%. However, caries prevalence for individual tooth surfaces was found to be inversely related to age. Caries prevalence on distal surfaces of maxillary lateral incisors, second premolars, second molars and mandibular second molars significantly related to increasing age groups. Furthermore, mesial surfaces of maxillary second premolars, first molars, second molars and mandibular canines showed significant caries incidence with increasing age. Caries distribution on lingual surfaces of maxillary first molars, labial surfaces of mandibular first premolars, and occlusal surfaces of mandibular second molars was significantly related to increasing age. Similarly, there were statistically significant relationships between age group and the rate of caries found on pits of buccal surfaces of maxillary first molars and of first and second mandibular molars. At this time, caries prevalence on occlusal fissure sites on first and second maxillary premolars, first and second maxillary molars, and first and second mandibular molars was found to be correlated with increases in age.

According to a national epidemiologic survey conducted recently in Kuwait, kindergarten children who are caries-free at the age of 4 - 5 years do not represent more than 24 - 32 % of their population. These findings are higher than what we found here in Saudi children (9.7%). This figure is still significantly lower than figures published by many developed countries such as the United Kingdom, Australia and Sweden where 40 - 60 % of 5 year-old, 66% of 4 to 6 year-old and 69% of 3 year-old children, respectively, were free of dental caries. A possible explanation for this considerable difference between developed and developing countries for this age group could be attributed to the lack of an effective fluoridation policy, an inadequate oral healthcare system, differing dietary habits including high consumption of refined sugars by children, and the absence of oral health awareness among parents in developing countries.

The prevalence of carries in the present study (25%) lies within the ranges previously reported for children in other countries, however the study did not find any statistically significant association between the occurrence dental caries experience. This is in contrast to findings of previous studies which showed a clear association between DDE and caries risk by increasing the susceptibility to breakdown and subsequent cariogenic attack. The high caries trends displayed in the present study could have masked many DDE lesions and render the reported prevalence of the enamel defects lower than the true figure. In particular, the diagnosis of tooth substance loss because of caries as a primary cause was considered pre-eminently, which may underestimate the true number of teeth with breakdown because of DDE as a primary cause.

The findings of the present study show a significant oral morbidity in this young age group, despite the preventable nature of dental caries. The high rate of unmet treatment needs observed among preschool children may reflect a lack of community awareness and un-

derstanding that prevention and treatment of caries should begin in early childhood, and parental indifference in association with belief that the primary teeth are replaceable by permanent teeth.

Conclusion

The prevalence of dental caries in this sample of preschool Saudi children was 75 %. Enamel defects were predominantly demarcated opacities (19 %). The proportion of Boys and Girls affected by dental caries were similar with no statistical significant difference. An early intervention program is urgently needed to help control dental defects in Saudi Arabia.

Acknowledgements

The authors would like to thank King Fahad Dental Center for their corporation.

Bibliography

1. Drury TF, *et al.* "Diagnosing and reporting early childhood caries for research purposes". *Journal of Public Health Dentistry* 59.3 (1999): 192-197.
2. American Academy of Pediatric Dentistry. "Policy on Early Childhood Caries (ECC): Classifications, Consequences, and Preventive Strategies". *AAPD Reference Manual* 34 (2011):12-13
3. Barbosa TS and Gavião MBD. "Oral health-related quality of life in children: Part ii. Effects of clinical oral health status. A systematic review". *International Journal of Dental Hygiene* 6.2 (2008): 100-107.
4. Zhou Y, *et al.* "Risk indicators for early childhood caries in 2-year-old children in Southern China". *Australian Dental Journal* 56.1 (2011): 33-39.
5. Bener A, *et al.* "The impact of dietary and lifestyle factors on the risk of dental caries among young children in Qatar". *Journal of the Egyptian Public Health Association* 88.2 (2013): 67-73.
6. Martins-Júnior PA, *et al.* "Impact of early childhood caries on the oral health-related quality of life of preschool children and their parents". *Caries Research* 47.3 (2013): 211-218.
7. Petersen PE, *et al.* "The global burden of oral diseases and risks to oral health". *Bulletin of the World Health Organization* 83.9 (2005): 661-669.
8. Fox J. "The epidemic of children's dental diseases: putting teeth into the law". *Yale Journal of Health Policy Law Ethics* 11.2 (2011): 223-265.
9. Montero MJ, *et al.* "Prevalence of dental caries and enamel defects in Connecticut Head Start children". *Pediatric Dentistry* 25.3 (2003): 235-239.
10. Ghanim A, *et al.* "Prevalence of demarcated hypomineralisation defects in second primary molars in Iraqi children". *International Journal of Paediatric Dentistry* 23.1 (2013): 48-55.
11. Ghanim A, *et al.* "An in vivo investigation of salivary properties, enamel hypomineralisation and carious lesion severity in a group of Iraqi schoolchildren". *International Journal of Paediatric Dentistry* 23.1 (2013): 2-12.
12. Seow WK, *et al.* "Dental health of aboriginal pre-school children in Brisbane, Australia". *Community Dentistry and Oral Epidemiology* 24.3 (1996): 187-190.

13. Caufield PW, *et al.* "Hypoplasia-associated severe early childhood caries - a proposed definition". *Journal of Dental Research* 91.6 (2012): 544-550.
14. Suckling GW. "Developmental defects of enamel-historical and present day perspectives of their pathogenesis". *Advances in Dental Research* 3.2 (1989): 87-94.
15. FDI Working Group. "A review of the developmental defects of enamel index (DDE Index): Commission on Oral Health, Research and Epidemiology". *International Dental Journal* 42.6 (1992): 411-426.
16. Featherstone JD. "The caries balance: The basis for caries management by risk assessment". *Oral Health and Preventive Dentistry* 2.1 (2004): 259-264.
17. Casamassimo PS, *et al.* "Beyond the dmft: The human and economic cost of early childhood caries". *Journal of the American Dental Association* 140.6 (2009): 650-657.
18. Al-Malik MI, *et al.* "The relationship between erosion, caries and rampant caries and dietary habits in preschool children in Saudi Arabia". *International Journal of Paediatric Dentistry* 11.6 (2001): 430-443.
19. Sayegh A, *et al.* "Oral health, sociodemographic factors, dietary and oral hygiene practices in Jordanian children". *Journal of Dentistry* 33.5 (2005): 379-388.
20. Al-Hosani E and Rugg-Gunn A. "Combination of low parental educational attainment and high parental income related to high caries experience in pre-school children in Abu Dhabi". *Community Dentistry and Oral Epidemiology* 26.1 (1998): 31-36.

Volume 8 Issue 1 February 2017

© All rights reserved by Hamza Abdulkareem Al Zahidy, *et al.*