

Full Length Research Paper

Prevalence of untreated dental caries among the preschool children of Western Maharashtra

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Optimum oral health is required to eat, socialize without discomfort or embarrassment. Untreated dental caries is a common problem faced by the population in developing countries affecting the development of the child. A cross sectional study was conducted among 3 to 5 years old preschool children to evaluate the prevalence of dental caries and consequences of untreated dental caries. Dental caries was measured using 'dmf' and 'pufa' index. Descriptive statistics was computed to assess the prevalence of the untreated dental caries. Chi square test and z test were used to assess the statistical difference among the variable means in between the groups. Data was analyzed using SPSS ver 20.0. The prevalence of dental caries in the study population was 32% and that of the untreated dental caries with clinical consequences was 24%. There was no statistically significant difference between the genders for prevalence of untreated dental caries. The mean 'dmf' and 'pufa' scores increased over the ages of 3, 4 and 5 years in the study sample. 'pufa' index can be used as a useful epidemiological tool to assess the prevalence of untreated dental caries. Proportion of untreated dental caries was substantial which points to the need for diverting attention to care of deciduous dentition.

Key words: Untreated dental caries, 'pufa', preschool children.

INTRODUCTION

Despite the developments in the field of caries prevention and treatment, dental caries continues to remain a frequent phenomenon in the infants and children of developing countries (Kim, 2012). Dental caries causes pain, impairs eating, sleeping, local and systemic infections and affects the quality of life of the affected individuals (Chu, 2000; Bönecker et al., 2012).

Many studies have reported with varying caries

prevalence in the 3 to 5 year old preschool children, ranging from 40% to as high as 90% in various countries. In India, National Oral Health Survey conducted in 2004 reported 51.9% prevalence of caries in 5 year old children (Bagramian et al., 2009). A study conducted by Mahejabeen et al. (2006) in Hubli and Dharwad city, India reported the caries prevalence in children of 3, 4 and 5 year old as 42.6, 50.7 and 60.9%, respectively. Similarly,

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a study by Simratvir et al. (2009) in Ludhiana city showed a dental caries prevalence of nearly 51% among the 3 to 5 years old children.

The Federation Dentaire Internationale World's Dental Federation's Oral Health Atlas recently estimated that untreated dental caries affects more than half of the children in most South East Asian countries (Beaglehole et al., 2009).

During the last decade, dmf index has been the index of choice in the epidemiological surveys to assess the caries burden and restorative needs of various populations, but has been found to be incapable of diagnosing all stages of caries (Frencken et al., 2011; Ismail, 2004; Honkala et al., 2011). To overcome this drawback, various indices like International Caries Detection and Assessment System, Caries Assessment Spectrum and Treatment Index and PUFA/pufa index have been developed (International Caries Detection and Assessment System, 2005; Monse et al., 2010).

PUFA/pufa index by Monse et al. (2010) measures the consequences of untreated caries process and helps in quantification and communication of the untoward outcomes of oral diseases. The PUFA/pufa index comprises P/p denoting the pulpal involvement, U/u the ulceration of soft tissues, F/f the presence of fistula and A/a the abscess as a measure of advanced carious lesions (Pine et al., 2006).

Such advanced carious lesions or odontogenic infections influence the state of general and oral health of the child. Pine et al. (2006) suggested that by non-treatment of dental caries in deciduous teeth, particularly where many teeth are affected, the risk of occurrence of dental sepsis is increased (Bönecker et al., 2012).

The studies assessing the prevalence and consequences of untreated decay in the pre-school children are few. Few studies have reported caries prevalence among the preschool children in India (Mahejabeen et al., 2006; Mahejabeen et al., 2012; Priyadarshini et al., 2011; Tyagi, 2009; Sachit et al., 2012). Hence, this study was conducted with a dual aim to assess the prevalence of carious lesions and prevalence of clinical consequences of untreated carious lesions among the preschool children of Karad city, western Maharashtra, India.

MATERIALS AND METHODS

This was a descriptive cross-sectional study conducted from January to March, 2014 among 3 to 5 years old preschool children of Karad city, Maharashtra, India. Prior to the initiation of the study, ethical approval was obtained from institutional ethics committee and the study was conducted according to the ethical guidelines.

Study settings

Karad is a town situated in Satara district, western Maharashtra,

India with an average population of around 75,000. Children below 6 years constitute 11% of this population (Census of India, 2001).

The present study was conducted in randomly selected pre-schools of this area and the total participants of the study were 300 children between the ages 3 and 5 years. The sample size was computed to be 260 based on the prevalence of 50%, precision of 90% and error of 5%.

List of pre-schools in the study area were obtained from the Department of School Education office. From the list of pre-schools, two schools were selected by systematic random sampling, from which children were selected by simple random sampling technique.

Inclusion and exclusion criteria

Informed consent was obtained from parents and permission was sought from concerned authorities. Children present on the day of examination, with positive parental consent and who were co-operative for clinical examination were included in the study. Medically compromised children and those who were absent on the day of examination were excluded from the study.

Clinical examination

A trained and calibrated examiner measured the caries using dmf index and pufa index. To measure dental caries dmf was used (Gruebbel, 1944) and to measure untreated dental caries pufa index was used by Monse et al.¹¹. Examiner was trained and calibrated at the dental unit of Department of Public Health Dentistry, India and kappa was calculated to be 0.8 and 0.86 for both indices indicating high degree of conformity.

'dmf' index includes decayed, missing (missing due to caries) and filled teeth components to assess the caries experience for deciduous dentition. Similarly, pufa index includes the components: pulpal (p), open pulp chamber is visible or the caries process destroyed the tooth crown leaving the roots; ulceration (u), sharp edges of a tooth with pulpal involvement caused a traumatic ulceration of surrounding, e.g. lingual or buccal mucosal tissues; fistula (f), the presence of an active fistula related to a tooth with pulpal involvement; abscess (a), oedema of soft tissues related to a tooth with pulpal involvement.

The clinical examination was carried out on dental chair under adequate illumination. Only a visual assessment, without the use of a dental probe, was carried out to assess 'pufa' index and for 'dmf' assessment mouth mirror and dental explorer were used. In case of the presence of debris which impeded the examination, tweezers and cotton was used to clean the surfaces of the teeth.

Statistical analysis

All the data was compiled and summarized. Descriptive statistics was computed to assess the prevalence of the untreated dental caries and chi square test and z test were used to assess the statistical difference among the variable means in between the groups. The data was analyzed using SPSS ver 20.0 and P value was set at <0.05 as significant.

RESULTS

Of the total sample of 300, 158 were males (52%) and 142 were females (48%). The mean age of the participants was 4.3 ± 0.8 years (Table 1).

Table 1. Distribution of the participants according to the age and gender.

Age (in years)	Male (%)	Female	Total
3	26 (60.4)	17 (39.5)	43 (14.33)
4	98 (50.51)	96 (49.48)	194 (64.66)
5	34 (53.96)	29 (46.03)	63 (21)
-	158 (52)	142 (48)	300 (100)

Table 2. Distribution of the study participants according to the prevalence of dental caries.

Parameter	Male		Female		Total		dmf score [Mean ± SD]	pufa score [Mean ± SD]
	Caries [n (%)]	Caries free [n (%)]	Caries [n (%)]	Caries free [n (%)]	Caries [n (%)]	Caries free n (%)		
3 years	05 (19.3)	21	06 (35.1)	11	11 (25.5)	32	1.9±0.23	0.12±0.00
4 years	26 (26.5)	75	38 (39.5)	63	64 (32.98)	130	2.52±0.48	1.47±0.28
5 years	09 (26.4)	22	12 (41.3)	14	21 (33.3)	42	2.67±0.62	1.64±0.56
Total	44	118	52	90	96 (32)	204	2.57±0.56	1.56±0.40
Mean dmf score	2.45±0.22	-	2.64±0.22	-	2.57±0.56	-	-	-
Mean pufa score	1.42±0.12	-	1.58±0.43	-	1.56±0.40	-	-	-

The mean dmf score for the sample was 2.57 ± 0.56 , the mean d component was 2.57 ± 0.56 and mean m and f component were 0.00. The mean 'pufa' scores and mean 'p' score for the sample was 1.56 ± 0.40 each, 'u' and 'f' scores were 0.00 and 'a' score was 0.11 ± 0.01 .

There was no statistically significant difference between the mean dmf and pufa scores for the genders. There was a statistically significant difference between the ages for mean pufa and dmf scores (Table 2).

Nearly 32% of the study sample was presented with carious lesions. Prevalence of clinical consequences of untreated dental caries was 24% of sample as measured using 'pufa' index. Pufa ratio was found to be 34%.

DISCUSSION

In our sample, the prevalence of dental caries was found to be 32%. These findings were comparable with those of studies by Shilpashree and Ramakrishna (2013) in South India which reported prevalence of 31.4%, while Bian et al. (2000) in China reported a prevalence of 36%. On comparison with the results of the National Oral Health Survey, the prevalence reported in this study is considerably lower (Bagramian et al., 2009).

Similarly, caries prevalence reported in this study is less compared to that reported in studies in Penaflo, Chile 56.8% (López et al., 2009), Northern Philippines 59 to 92% (Carino et al., 2003), China 60%, Japan 60 to 77%, and Thailand was 62% and Hong Kong was 63% (Bagramian et al., 2009).

In this study, prevalence of pufa codes was 24%. This

was less than that observed in other studies by Mehta and Bhalla (2014) (38.6%), Monse et al. (2010) in Philippines (85%) and Bagińska et al. (2013) among Polish children (43.4%).

"p" component of pufa formed majority of the total score. These findings are comparable to studies reported earlier (Monse et al., 2010; Mehta et al., 2014; Bagińska et al., 2013; Figueiredo et al., 2011).

In this study, very few cases of other components of pufa like abscess were observed. This further substantiates the need to modify the index by eliminating 'u' and combining 'f' and 'a' components (Figueiredo et al., 2011).

Mean pufa value was reported to be 1.56 ± 0.45 and it was less than that reported by Monse et al. (2010) among 6 year olds, which was 3.4. But the mean pufa value of our study was higher than that reported by Mehta and Bhalla (2014) (0.9) in Chandigarh 2014, Figueiredo et al. (2011) Brazil (0.4) and others.

No statistically significant difference was found between the mean 'pufa' and 'dmf' scores for genders, which is contrary to other studies which observed higher prevalence of 'dmf' scores in females attributing to its early eruption patterns. Yet the mean scores for females were consistently slightly higher as compared to males as observed in various studies by Shilpashree and Ramakrishna (2013), Carino et al. (2003) and Davenport et al. (2004).

On the contrary, the mean 'dmf' and 'pufa' scores increased significantly over the ages of 3, 4 and 5 in the present sample. This can be attributed to the increasing exposure to oral environment and transitioning food

habits.

High prevalence of untreated dental caries was observed in our study. Such untreated dental caries burden among children can lead to pain, sepsis, space loss, disruption to quality of life, disruption of growth and development (failure to thrive), possible disruption of intellectual development, higher incidence of hospitalization and emergency visits, increased treatment costs and treatment time, greater risk of new carious lesions in both primary and permanent dentitions along with secondary effects as increased parental stress, loss of work days, disrupted school learning among others (Finucane, 2012).

Conclusion

In this study, the proportion of untreated dental caries was high which points to the need for diverting attention to care of deciduous dentition. Similarly, the impact of untreated caries on health and missed learning opportunities can be an advocacy talking point for the policy lawmakers and legislators to shed light on the need to prioritize dental care among pre-schoolers and children so that improving children's oral health status may be a vehicle to enhancing their educational experience.

Conflicts of interest

The authors declare that they have no conflict of interest.

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