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RESEARCH ARTICLE

THE PREVALENCE OF EARLY CHILDHOOD CARIES AND ORAL HYGIENE STATUS OF ORPHAN CHILDREN BETWEEN THE AGE GROUP OF 6 MONTHS TO 6 YEARS IN CHENNAI, TAMILNADU

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ABSTRACT

To determine the prevalence of early childhood caries [ECC] and oral hygiene status of orphan children between the age group of 6 months to 6 years, a cross sectional study was conducted in thirteen different orphanages, located in four different areas of Chennai city, Tamilnadu. Diagnosis of dental caries was done based on National Institute of dental and craniofacial Research (NIDCR-1999) criteria and a modified version of the OHI-S (Greene and vermillion-1967) was used to record debris and calculus. The data was collected and analyzed using the SPSS package. A total number of 318 children participated in the study, out of which 155(48.7%) were males and 163(51.3%) were females. It was concluded that caries prevalence and severity are high in infants and preschoolers residing in orphanages.

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INTRODUCTION

Chronic diseases and injuries are the leading health problems in all but a few parts of the world. The rapidly changing disease patterns throughout the world are closely linked to changing lifestyles, which includes diets, rich in sugars, widespread use of tobacco, and increased consumption of alcohol. In addition to socio-environmental determinants, oral disease is highly related to these lifestyle factors, which are risks to most chronic diseases as well as protective factors such as appropriate exposure to fluoride and good oral hygiene. Dental caries has qualified as major public health problems owing to their high prevalence and incidence in all regions of the world and as for all diseases the greatest burden is on disadvantaged and socially marginalized children. (Rao *et al*., 1999) The severe impact in terms of pain and suffering and effect on quality of life must also be considered. Traditional treatment of oral diseases is extremely costly in several industrialized countries, and not feasible in most low-income and middle-income countries. Local data from the centre for Oral Health strategy indicates that despite water fluoridation, dental caries is a major public health problem particularly in disadvantaged areas. (Sullivan, 2003) Dental caries is one of the most, chronic childhood diseases prevalent worldwide and is a major problem for health perspective and for individual families who have to deal with a young child suffering from toothache. Children suffer from many infectious diseases during the first three years of life around the time of eruption of deciduous teeth. The basic reasons for tooth demineralization in children are extensive exposure to a cariogenic diet and infection with cariogenic bacteria while the main source of Mutans streptococci is the mother. (Michele Samuel, 2003) The early diet of an individual is a determinant of the later dietary habits, and the dietary habits of mothers are associated with those of their offspring, atleast during the first five years of life. Moreover, research has shown that socioeconomic and demographic factors influence the caries experience of the children. High parental educational attainment and income are related to lower caries in their primary dentition are more likely to have dental caries in their permanent dentition. (Celia Regina *et al*., 1996) Early Childhood caries (ECC) is a major public health problem over many years and still continues today, affecting in many ways normal growth and development as well as social adaptation of young children. ECC is a form of severe dental caries that affects the primary teeth of infants and toddlers before the age of 72 months. The pattern of caries development is distinctive and many teeth may be affected as caries develops rapidly, soon after the teeth erupt and it develops in the tooth surfaces that usually are at low risk of

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dental caries, such as the labial surfaces of maxillary incisors and the lingual and buccal surfaces of the maxillary and mandibular molars. (Howard, 1993; Ipseeta Biswali *et al*., 2010) There are number of Government-authorized orphanages in Chennai city, for children from 0 to 6 years of age. These orphanages care for abandoned or orphan children and for physically or psychologically battered, all from very low income families subject to the social assistance programs. Very limited studies are available on the oral status of orphan children residing in orphanages under the supervision of caretaker, who are being considered as parents by the orphans. Keeping the above mentioned factors in mind, the present study was conducted to assess the prevalence of ECC and the OHI of orphan children between the age group of 6 months to 6 years in Chennai.

MATERIALS AND METHODS

The present study was conducted in thirteen different orphanages and the study population consisted of 6 to 72 months old orphan children. Three hundred and eighteen children were selected for the study within four different areas of Chennai. The survey commenced after a letter of information regarding objective, time, date, and procedure of the study was given in advance to the concerned authority of the orphanages. The clinical examination was carried out with the infants having their heads placed on the examiner's lap(knee to knee examination). A seated position was preferred for the older children. Examination was carried out with the help of Mouth mirror and Williams probe. Dental caries diagnosis was based on NIDCR criteria. A modified version of the OHI-S (Greene and vermillion-1967) was used to record debris and calculus of upper second primary molar(55 and 65),the lingual surfaces of lower second molars (75 and 85) and one upper and lower central incisors were taken as index teeth (51 and 71). The teeth were scored based on the presence of calculus and debris. Sillness and Loe index was used to record plaque present on the labial surface of anterior teeth and all the surfaces of primary dentition were considered, the scores were given based on the amount of plaque visible on probing. A specially structured questionnaire was completed by interviewing the caretaker. The questionnaire collected data on the oral hygiene practices of the children, feeding patterns, sugar consumption, dental visit pattern, attitude and oral health knowledge of the caretaker. The data was collected and analyzed using the SPSS package and 't' test was done for the level of significance.

RESULTS

A cross sectional study was conducted in thirteen different orphanages within Chennai city. The total number of children examined were 318, out of which 155(48.7%) were males and 163 (51.3%) were females. Female children were more in numbers than males. About 36.5% had dmft score of o and 63.5% had dmft score of 1 or more. The highest score of 19 was recorded in one patient and the lowest score of 1 was noted in 35 children (11.0%). The score recorded were from 1-19, frequency was 1-116 and percentage ranged from 3 to 37.1. The results showed the correlation or significance between male/female ratio and the dmft/dmfs/p-score/OHI-score. Mean dmft value was 2.45 for boys (p<045) and 1.91 for girls (p<047). The mean dmfs value for boys was 2.97 (p<079) and the mean dmfs value for girls was 2.35 (p<081). Significant results were seen in dmft score between male and female children. The Mean plaque score were 0.340 (p<719) and 0.325 (p<716) respectively and the mean OHI –value was 0.484 (p<901) and 0.49 (p<901) for boys and girls individually. Out of the 318 children examined, 228 children were bottle fed at least once daily and 90 were not. The Mean dmft/dmfs score for children who were bottle fed was 2.30/2.86, (p<115), (p<059) respectively. The Mean plaque score/OHI score for children who was 0.360(p<040) and 0.432 (p<008) respectively.

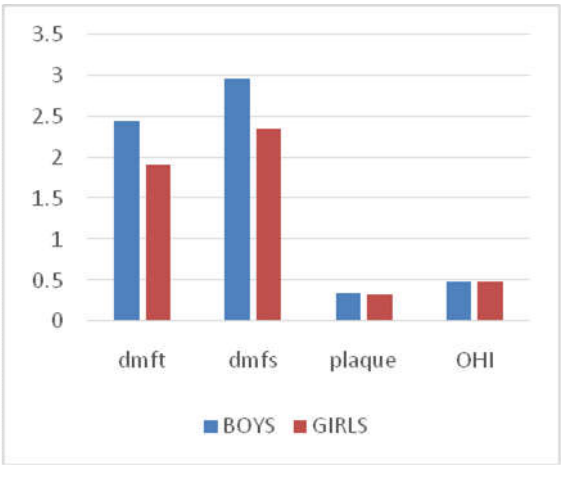
Table 1. NIDCR classification (1999)

Proposed Case Definitions of Early Childhood Caries (ECC) and Severity of Early Childhood Caries

AGE (Months)	Presence of ECC	Severe ECC
<12	1 or more dmf surfaces	1 or more smooth dmf surfaces
12-23	1 or more smooth dmf surfaces	1 or more smooth dmf surfaces
24-35	1 or more smooth dmf surfaces.	1 or more smooth dmf surfaces
36-47	1 or more dmf surfaces	1 or more cavitated, filled, or missing (due to caries) smooth surfaces in primary maxillary anterior teeth OR dmfs score._>4.
48-59	1 or more smooth dmf surfaces	1 or more cavitated ,filled or missing (due to caries) smooth surfaces in primary maxillary anterior teeth OR dmfs score_>5
60-71	1 or more smooth dmf surfaces	1 or more cavitated, filled, or missing (due to caries) smooth surfaces in primary maxillary anterior teeth OR dmfs score._>6.

Table 2. The mean values and different variables

Variables and sex	Number	Mean	T-value	Significance
Dmft				
Female	163	1.91	1.999	0.047
Male	155	2.45	2.013	0.045
Dmfs				
Female	163	2.35	1.751	0.081
Male	155	2.97	1.764	0.045
P-score				
female	163	0.325	0.364	0.716
male	155	0.340	0.360	0.719
Ohi-score				
Female	163	0.492	0.124	0.901
Male	155	0.484	0.124	0.901



Graph 1. The mean values between the sex and different variables

Good significance was seen between bottle feeding and other variables. In the present study 37 caretakers of the 13 orphanages responded for various questions. The results showed the educational status of the caretakers 48.6% of them had undergone elementary education, 43.2% of them had undergone education up to middle school and only 8.8% had studied up to graduation.

DISCUSSION

ECC is one of the most severe dental problems of children. The etiology for dental caries are mostly pathogenic bacteria, fermentable, carbohydrates, susceptible tooth surfaces and time. The major causative factors in nursing caries are the addition of sweeteners to feeding bottles, the use of sweetened pacifiers, and prolonged unrestricted bottle or breast feeding, particularly at bedtime. (John J Warren *et al*., 2008) ECC is a virulent type of dental caries that can destroy the primary dentition of babies and pre-school children. It is considered as a severe and rampant disease of the primary teeth that begins immediately after tooth eruption. ECC is a particular virulent form of dental caries that is characterized by overwhelming infectious challenge and is associated with unusual dietary practices. ECC initially presents with smooth-surface carious lesions affecting the primary maxillary incisors. As the disease progresses decay appears on the occlusal surfaces of the primary maxillary first molars, with subsequent spread to other primary teeth, resulting in the eventual destruction of the primary dentition. It is disconcerting to see rampant caries in young children. (Ana Paula Pires dos Santos *et al*., 2009) The pattern of decay is typical as many teeth are affected with caries developing rapidly, often soon after the teeth have erupted. Surfaces usually at low risk of developing caries are affected such as the buccal surfaces of maxillary incisors with the obvious consequence of affecting the child's facial appearance. It is this pattern of caries that has been labeled variously as Baby bottle tooth decay', 'nursing caries' and 'night bottle mouth'. However, since these terms suggest that the prime cause of such caries is inappropriate bottle feeding and current evidence suggests that although use of a sugar containing be an important etiological factor, it may not be the only or the most important factor. (Fatemah mazhari *et al*., 2007; Dinesh Raao *et al*., 2005) The present study was targeted at orphan children residing within Chennai-city, out of the 318 children, who participated in the study, 51.3% were male and 48.7% were females. The prevalence of ECC was found to be 63.5% with the mean dmft being 2.17 and the mean dmfs was 2.65.Which almost coincides with the study conducted by Robert *et al*. (2007) on dental caries prevalence in Karnataka State, India in which the prevalence of dental caries was found to be 76.9% and mean dmfs was 2.74. In a study conducted by Babujose *et al*. (2003) the prevalence of ECC was as low as 44% which clearly contradicts the present study. This study revealed that the mean dmft value was 2.45 for males and 1.91 for females, which showed that the males had significantly higher value when compared to females. Study also showed significant results within sexes (p<045). This study contradicts with the findings of the study done by Chandranee *et al*. (1998) and Fatemahmazhari *et al*. (2007) in which the prevalence of caries was found to be high in girls.

This study found that about 67.6% of the children had plaque score 1 or more, the mean plaque score was 0.332 and the mean OHI score was 0.488 respectively. The mean plaque score was seen to be higher in males than females and significant results were not seen between plaque score, OHI and dmft score. The reason for low oral hygiene in these children can be attributed to the lack of concentration by the caretakers. The findings of our study contraindicates some of recent studies done by Aileen *et al*. (2001) and Benjamin peretz *et al*. (2003), in which the mean plaque score in pre-school children was as low as 0.122. The study done by Goel *et al*. (2003) almost coincides with the findings of the present study, were almost 62.5% of children had plaque score of more than one. The results of this study is similar to a study conducted by Chan *et al*. (2006) in which the mean plaque score in males was about 0.250 and mean OHI score was 0.494 and the prevalence was seen to be more in males than girls. The mean dmft and plaque score of our study was in accordance with the study done by Jaana *et al*. (2005). Whereas the OHI score of the present study was contraindicated by study conducted by Dhar *et al*. (2007) In this study it was found that high level of bottle feeding was evident in about 64.9% and it was interesting to know that not even one child was breast fed. The mean dmft/dmfs score in children who were bottle fed was 2.30/2.86, mean plaque score was 2.86, the mean OHI score was 0.432. The mean dmft and plaque score of our study was in accordance with the study was contraindicated by study conducted by Faiezhattab *et al*. (1999)

Whereas the OHI score of the present study was contraindicated by the study conducted by Joost roeters *et al*. (1995). According to a study done by Kimseow *et al*. (1999), children breast fed beyond the age of two years have been shown to have a very high prevalence of dental caries which clearly contraindicates with our study. In this study about 60% of the children were under severe ECC category. Almost 51.4% were exposed to sweets and carbonated drinks and about 62.2% of children had snacking habits. Results of a study conducted by Malik *et al*. (1998) are in accordance with the study that carbonated drinks and frequent snacking habits are major risk factors for dental caries. In a study conducted by Tyagi (2010) had also coincides the results of the present study, which stated that frequent snacking and drinking carbonated drinks, breast feeding and bottle feeding pose a major risk factor, which clearly contradicts the results of this study. SiminMohebbi *et al*. (2006) and co-workers conducted a study to asses risk factors for ECC and conducted that accumulation of plaque and poor oral hygiene measures attribute to the high dmft than snacking habits, the results do not correlate this study.

If the lesions are diagnosed in its early stages and if causes are identified and modified, then the disease can be arrested and reversed. The use of topical fluoride varnish is recommended in one to two year old children (Vadiakas, 2002). The socio-economic status of government-authorized orphanages in our country is low, with limited money granted for maintenance. These orphanages are sponsored to a large extent by donations and these, cakes sweet beverages etc. Another negative carbonated drinks were a main concern for children. Whereas Wan *et al*. (2001) conducted a study on risk factors for ECC in which the author concluded that, more than snacking factor is that their diet contains a high amount of carbohydrates. The caretakers who take care of them change shifts morning, evening and night resulting in a significant rotation of staff which hinders the children from establishing affective links or trust relationships with them and vice versa. Consequently, there is no one who supervises tooth brushing frequently and

technique, nor the use of fluoride toothpaste, which results in the formation of dental plaque and lead to caries. From the results of the present study, it can be noted that low-income frequency and quality of meals consumed, snacking habits and caretakers knowledge and attitude has a major role in maintenance of oral health status of orphan children. (Wyne *et al*., 2009)

Conclusion

Caries prevalence and severity are high in infants and preschoolers residing in orphanages in Chennai indicating the need for the improvement in the public oral health system, including accessibility to preventive and treatment services for young children. To conclude if oral health promotion efforts are to be effective in improving the oral health of young children, it is essential that there be a good understanding of parental and caregiver's knowledge and attitude is important for eradicating the disease.

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