ASSESSMENT OF UNTREATED DENTAL CARIES USING PUFA INDEX IN CHILDREN OF CHENNAI- A CROSS-SECTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Young permanent teeth are often sensitive to dental caries among children which still continues to be the most common childhood disease worldwide, despite improvements in oral health. The aim of this study was to assess the untreated dental caries using the PUFA index among children of age between 6-17 years. A cross sectional survey study of 150 subjects to determine the untreated dental caries using PUFA index was carried out. The investigation was done to find the prevalence of PUFA among the school children in Chennai and to find out if there is any association with age and gender. Pearson Chi - square test was the statistical test used in this study to find the correlation. Among the 150 subjects, 50 were boys (33.33%) and 100 were girls (66.67%); Age 6-10 years (72.67%), Age 11-14 years (24.67%), Age 15-17 years (2.67%); 'p' component of PUFA score prevalence (76%). Thus based on analysis it was found that the overall prevalence rate of PUFA score was 76% and 'p' component was the only component prevalent in our study population. There was no statistically significant association observed between any variables.

INTRODUCTION

Dental caries is a major oral health problem around the world, affecting 60-90% of school children and the vast majority of adults. In many developing countries, access to oral health services is limited and teeth are often left untreated or are extracted because of pain or discomfort. Untreated dental caries is a global public health problem especially among the children. Untreated dental caries have been proven to impact the children's quality of life by causing pain, discomfort and sepsis, problems in chewing and learning behaviour, sleeping and behaviour disturbances, children's nutrition, growth, body mass index, general health, and quality of life [1–8].

For the last 75 years, the data on dental decay have been collected worldwide using the DMFT/dmft index, which only provides information on caries and treatment experiences like extraction due to caries and restoration of decayed teeth but fails to give information on the clinical consequences of untreated dental caries, such as involvement of pulp and dental abscess. Hence there is a need for a diagnostic index that presents the correct data on the consequences of advanced stages of dental caries to the health care professionals and authorities [9]. By exposing decision makers only to DMFT data, leaves them unaware of the high levels of untreated caries lesions, their severity, associated health, and quality of life consequences. It is the ethical responsibility of the dentist to provide relevant information on disease levels and its advanced stages to the health decision makers and policy makers. All these requirements are fulfilled by the PUFA index and this index provides health planners with relevant information on the number of patients who present for treatment with symptoms that reflect the serious consequence of tooth decay [10].

PUFA is an index preferably used to assess the presence of oral conditions resulting from untreated caries. PUFA index stands for :Pulpal involvement, Ulceration, Fistula, Abscess index. P/p: Pulp involvement is recorded when the opening of the pulp chamber is visible or when the coronal tooth structures have been destroyed by the carious process and only roots or root fragments are left; U/u: Ulceration due to trauma is recorded when sharp edges of a dislocated tooth with pulp involvement or root fragments have caused traumatic ulceration of the surrounding soft tissues, for example, tongue or buccal mucosa; F/ f": Fistula is scored when a pus releasing sinus tract related to a tooth with pulp involvement is present; A/a: Abscess is scored when a pus containing swelling related to a tooth with pulp involvement is present [11]. This new index attempts to complement and increase the sensitivity of original DMF (def) index and to record consequences of a carious lesion. Data collected through this index can have an impact on decisions taken by authorities regarding oral care, which is not possible with DMFT index [9].

Our department is passionate about child care, we have published numerous high quality articles in this domain over the past 3 years [12–30]. With this inspiration we planned to pursue research on "Assessment of untreated dental caries using PUFA index - A cross-sectional survey study in Chennai".

The late presentation and symptomatic visits attitude has made untreated carious treatment inevitable among us. Demanding treatment at late stages

may relate to several psychological factors such as dental anxiety, financial costs, perceptions of need and lack of access. Thus there is a need to educate children and their parents on the importance of early presentation of dental clinics and the possible sequel of late presentation in terms of morbidity, cost and time. With this background in mind this study also creates awareness for the dentists and the general population about the untreated carious lesions. Also, since there are no previous studies to encounter the assessment of untreated caries using PUFA index undergone in Chennai, this study was also designed to fulfill this lacunae and leads to implementation of correct preventive strategies.

MATERIALS AND METHODS

A cross sectional survey study was conducted among 150 school children in Chennai aged between 6-17 years of age. All the children within the age group of 6-17 years in a randomly selected school in Chennai and who were willing to take part were included for this study. Information about oral examination was given to the children and their consent was obtained. Those children, who were not willing and whose parents did not allow their children to participate, were excluded from the study. Clinical examination was conducted in the premises of school under natural daylight. The assessment is made visually without the use of an instrument except gauze pads. Gauze pads were used only to remove food debris from the surface of the teeth. Barriers like gloves and masks were also used for personal protection.ThePUFA∕pufa score per person is calculated in the same cumulative way as for the DMFT∕ dmft and represents the number of teeth that meet the PUFA∕ pufa diagnostic criteria. The PUFA for permanent teeth and pufa for primary teeth were reported separately. Thus, for an individual person the score can range from 0 to 20 pufa for the primary dentition and from 0 to 32 PUFA for the permanent dentition. Upper case letters are used for permanent dentition, and lowercase letters are used for primary dentition.

In case of doubt concerning the extent of odontogenic infection, the basic score (P∕p for pulp involvement) is given. If the primary tooth and its permanent successor teeth are present and both present stages of odontogenic infection, both teeth were scored. Data collected were entered into a spreadsheet and analysed subsequently using the Statistical software SPSS (Version 20). Frequency and percentage were calculated from the study variable. Descriptive statistics was used to summarise the variable in the data set. Chi square test was employed to test the association involving discrete data with the level of significance set at $p<0.05$.

Overall PUFA/pufa prevalence was calculated as percentage and the results were tabulated.

RESULTS AND DISCUSSION
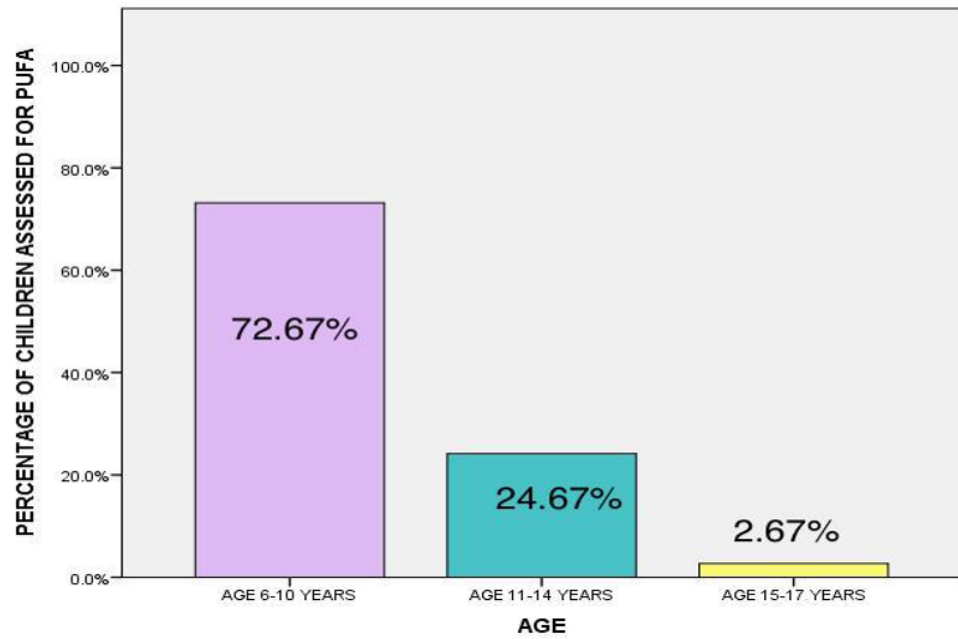
Figure 1 shows the frequency distribution of the different age groups who participated in the study for Assessment of Untreated Dental caries. X-axis shows the age groups while Y-axis shows the percentage of children in that age group. Higher number of children in the age group of 6-10 years (72.67%) participated in this study.
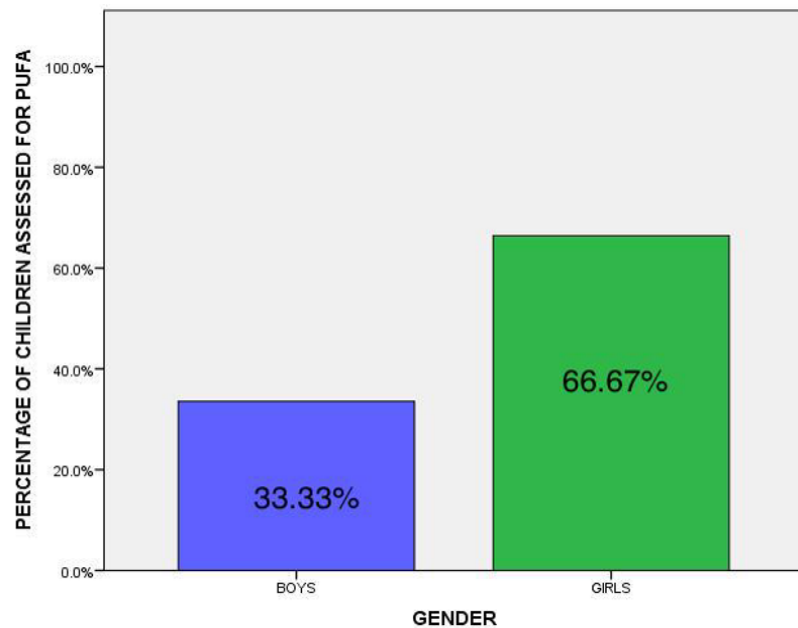
Figure 2 shows the frequency distribution of girls and boys who participated in the study. X-axis shows the gender while Y-axis shows the percentage of children assessed for untreated dental caries. Higher number of girls (66.67%) participated in the study than boys.
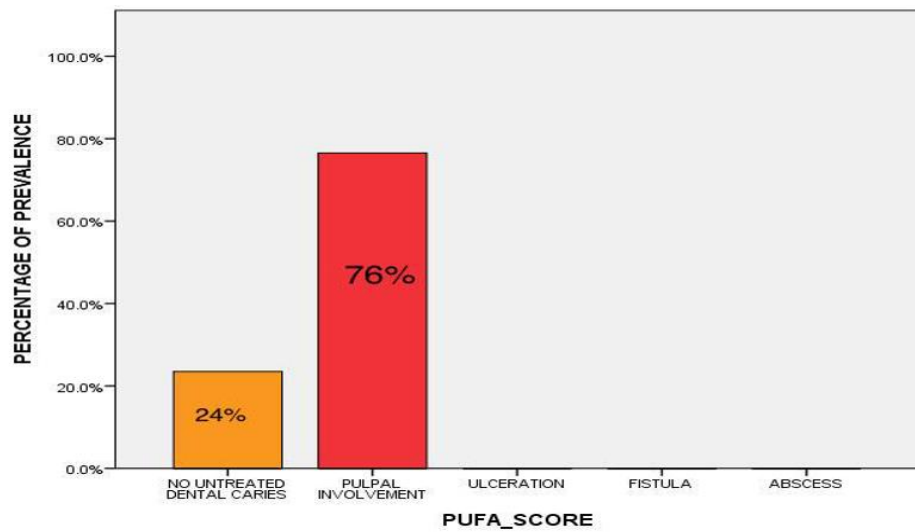
Figure 3 shows the frequency distribution of untreated dental caries found using the PUFA index. X-axis shows the untreated caries lesions and their score and Y-axis shows their percentage of prevalence. Higher number of children (76%) presented with the 'p' component of PUFA index (Pulpal involvement) in this study.
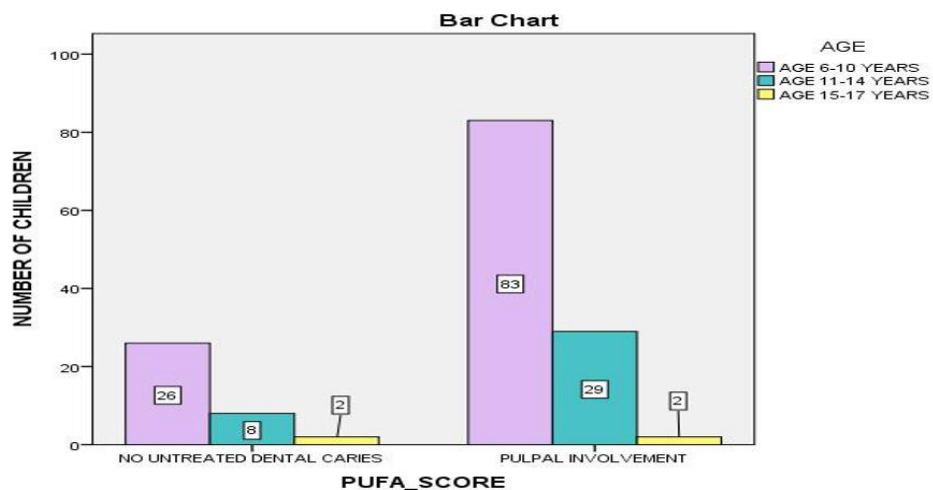
Figure 4 Shows the association between different age groups and the PUFA score. X- axis represents the untreated dental caries prevalence found using PUFA score with age groups in X cluster and Y- axis represents the number of children in that age group. Chi square test was done and the association was found out to be not statistically significant. Pearson Chi-square value: 1.598 , DF: 2 , p value : 0.450 (>0.05) hence not statistically significant, however 6-

10 years is the most common age group in which a higher number of children presented with untreated carious lesions.
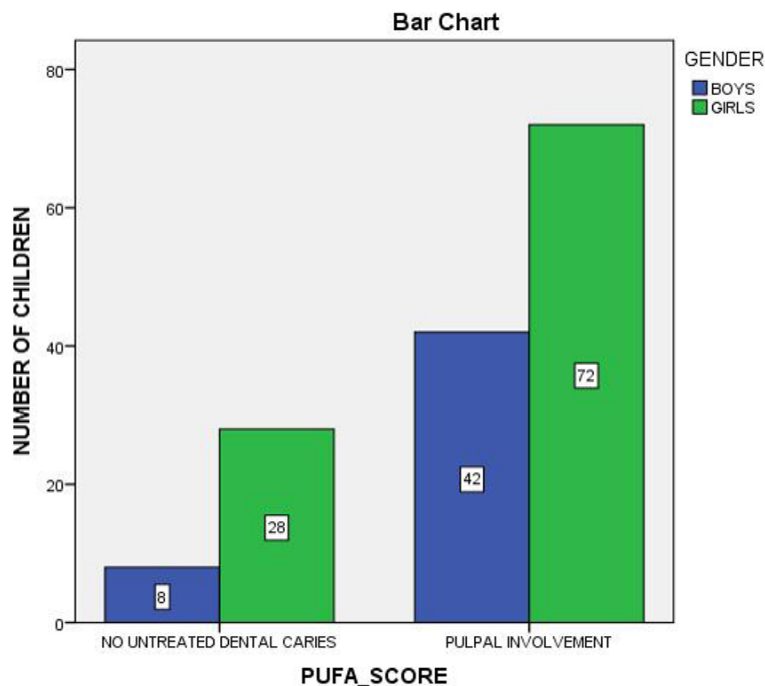
Figure 5 Shows the association between gender and the PUFA score. X- axis represents the untreated dental caries prevalence found using PUFA score with gender in X cluster and Y- axis represents the number of children in that age group: Blue colour represents boys and green colour represents girls. Chi square test was done and the association was found out to be statistically significant. Pearson chi-square value : 2.632, DF:1, p value : 0.105 (>0.05) hence not statistically significant, however a higher number of girls presented with untreated carious lesions.

A total of 150 children aged between 6-17 years of age participated in the study during the study period. Among these fifty were boys (33.33%) and hundred were females (66.67%).

With regards to Prevalence of untreated carious lesions found out using PUFA score, pulpal involvement is the most common untreated caries lesion prevalent (76%) to get treated (Figure 3)

It was noticed from the results that a greater proportion of children who belonged to the age group of 6-10 years (73.67%), followed by the children in the age group of 11-14 years (24.67%) and the age group of 15-17 years (2.67%) (Figure 1) but there is no statistically significant association between age and the number of children who presented with untreated dental caries in this study (p=0.450) ; however pulpal involvement is the most common dental problem prevalent in all age groups in this study (Figure 4).

 Another finding of this study was that the girls (66.67%) participated more in the study than boys (33.33%) (Figure 2) but there is no statistically significant

association   observed between the gender and PUFA score (p= 0.105); however pulpal involvement is the most common dental problem prevalent in both the sex (Figure 5).

A total of 150 children were examined in the age group of 6-17 years, out of which majority were females (66.67%). This age group covers the effect of adverse oral environment on all primary teeth and permanent teeth. The deciduous teeth are essential in oral cavity up to the age of 12 years for space and function hence, it is important to assess their future prognosis, hence higher number of participants in this study belonged to the age group of 6-10 years and WHO has also recommended this index age group for oral health assessment of primary dentition in their basic oral health survey methodology [31].This is the first study that has been undertaken in Chennai which looked into the clinical consequences of untreated dental decay.

   In our study, sample prevalence of pufa codes was 76%, this percentage is higher when compared to study conducted by Figueiredo et al. [32] on 5-6 years old Brazilian children (23.7%) and Bagińska et al. [33] among Polish children (43.4%); but lesser to the study by Monse et al [11] in Philippines (85%) "p" component of pufa formed majority of the total score, that is, 76.5%, this finding is comparable to other comparable studies [11,32]. No cases of other components of pufa were observed suggesting the agreement to the previously conducted study which suggested the need to modify the index by eliminating u and combining f and a components [34]. This ratio provides an opportunity for the dental healthcare workers to explain to the health authorities about the adverse consequences of dental caries on teeth. We felt further studies are required to substantiate such modifications. However the reason for higher 'p' component prevalence in PUFA index can be attributed to negligence by the parents of their children. Many parents fail to recognise dental caries as vital problems and thus neglect them through bad oral hygiene practices such as ineffective oral hygiene measures [35]. Previously conducted study by Suresh et al, proposed that child dental neglect among caretakers offers a linkage between dental health and socioeconomic factors, attitude toward dental health, and acceptability to dental treatment which have received less attention until now [36]. Another study confirmed the statistically significant prevalence rate of Dental neglect among parents of the Chennai city and the results of that study revealed that the parents/caretakers have not utilized the dental services for more than 3 years in Chennai [37], which can be the reason for higher 'p' component prevalence in our study as well. Thus more investigation about the dental neglect among children would identify the specific reason for the failure to prevent and treat dental caries and thereby, it provides opportunity for the government and health care personnel to address the issue at root level.

   The prevalence of clinical consequences of untreated caries in 11–14 years old schoolchildren in our study was 19%. This finding is similar to the prevalence rate reported by Murthy et al.[38] (19.4%, 12–15 years old schoolchildren in Bangalore city, India) but less than the prevalence rate reported by Monse et al.[11] (56% in 12-year-old Filipino children).

There was no significant association observed between the age groups, gender and PUFA score in our study, the reason for this may be the overrepresentation of age group 6-10 years and females in our study. However this study will shed light for future studies that study an even larger population.

Continued advancements in the field of research can lead to the implementation of correct preventive strategies. It must be noted that it would be more cost effective to implement preventive strategies to reduce caries prevalence, and to avoid the clinical consequences highlighted by PUFA scores. This a baseline study, further studies are required to find out the reasons why there is a high prevalence of 'p' components of PUFA scores in this population.

CONCLUSION

Large majority of untreated carious lesions in the children is evident in the results of present study (76% prevalence of PUFA), suggesting lack of awareness among children, their parents, and teachers regarding the importance of good oral health. Therefore, there is an urgent need to plan a dental caries preventive and curative program for school children in Chennai. This index is relevant and a valuable measurement tool to address the neglected problem of untreated caries and its consequences.

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CONFLICT OF INTEREST

None declared

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