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AN EXPLORATORY STUDY TO ASSESS PREVALENCE OF DENTAL CARIES USING AN INNOVATIVE INDEX: CARIES ASSESSMENT SPECTRUM AND TREATMENT (CAST) INDEX IN SLUM CHILDREN, INDIA

Dental Science

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ABSTRACT

Introduction- The Caries Assessment Spectrum and Treatment (CAST) Index - Frencken JE et al. (2011) records all the clinical stages of caries spectrum under 9 codes. Objectives- Measure caries via CAST index in slum children. Method- Cross sectional study was done on 151 slum children in Udupi, by a single trained examiner using CAST index. Most severe condition was considered and the percentage of children with that score were calculated. Primary and permanent dentition analyzed separately. Results: CAST index - codes 0 in 54% in primary & 77% in permanent, CAST code 3 in 7% - primary & 5% - permanent, CAST codes 4, 5 in 21% - primary & 9% - permanent; CAST codes 6, 7: in 14% primary & 9% in permanent and lastly CAST- code 8 in 4%- primary and 0%- permanent dentition. Conclusions- None of the slum children had undergone any restorations even though treatment need was high.

KEYWORDS:

Caries assessment spectrum and treatment, caries index, slum, children

Introduction: One of the most fundamental causes of health disparities is socioeconomic inequality[1].Even though Socioeconomic status has been linked with mortality and morbidity, the mechanism by which it occurs are still obscure[2]. Globally, the poorest children are nearly twice as likely to die before the age of five as compared to the richest[3]. According to the 2011 national census: A slum was defined as a settlement of at least 60 households deemed unfit for human habitation there are around urban slums in around 4,000 towns across the country. This report does not cover every town and city in this vast country. The real numbers could surpass the official count.[4] Various studies in India have reported poorer oral health, knowledge, attitude and practices of slum dwellers in comparison to the normal population[5,6].

Classical caries indices are used since decades to record dental caries such as Decayed, Missing and Filled teeth (DMFT) index[7]. The disadvantage of this caries index is that it is unable to record the entire spectrum of dental caries and underscoring of lesions are done. To overcome these drawbacks International Caries detection and Assessment system (ICDAS)[8] and Pulp, Ulcer, Fistula and Abscess (PUFA)[9] indices were developed. ICDAS records the early carious lesions in enamel, whereas PUFA records the consequences of untreated caries. Only use of both indices together would yield the entire caries spectrum. Therefore, to overcome this a comprehensive index was done to gather full data of the caries spectrum: Caries Assessment Spectrum and Treatment (CAST) Index - Frencken JE et al. (2011) was developed which assesses all the clinical stages of caries spectrum under 9 codes[10].

To the best of our knowledge, hardly any literature exists assessing the entire caries spectrum in a socioeconomically deprived child population. With this background, the objective of this study was to evaluate the entire caries spectrum using CAST index of slum dwelling children in Udupi Taluk.

Materials and Methods: A Cross sectional study was conducted on 151 slum children in Udupi Taluk by a single trained examiner using CAST index. Ethical approval was obtained prior to commencement of the study. Informed consent was taken from the guardians of the children prior to examination. Convenience sampling was done. The examination was carried out on all children of ages from 6-15 years except those having any systemic diseases, syndromes or tooth associated with developmental anomalies. The examination was done as per CAST index by Frencken JE et al. (2011).[10] The examination was done under natural light, with sterilized mouth mirrors and probes. Before scoring the teeth were wiped with a cotton wool roll to dry its surface.

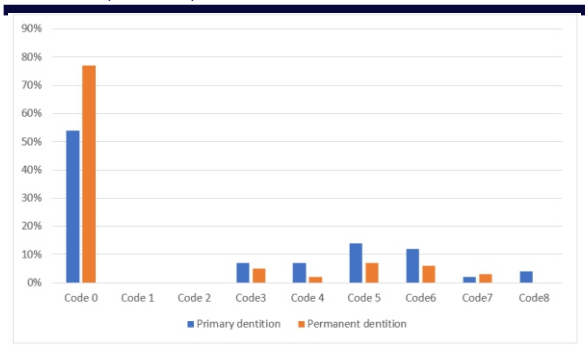
The most severe condition was considered for each participant and was recorded. Along with this other demographic data like name, age, gender was also recorded for each study participant. Then descriptive statistics were done to calculate the percentage of children with the highest CAST score. Primary and permanent dentition were analyzed separately.

Characteristic, Code and Description of CAST index by Frencken JE et al. (2011)[10]

Characteristic	Code	Description
Sound.	0	Sound. No visible evidence of a distinct carious lesion is present
Sealed	1	Pits and fissures have been at least partially sealed with a sealant material
Restored	2	A cavity has been restored with an (in)direct restorative material currently without a dentine carious lesion and no fistula / abscess present
Enamel	3	Distinct visual change in enamel A clear carious related discolouration (white or brown in colour) is visible, including localized enamel breakdown without clinical visual signs of dentine involvement
Dentine	4	Internal caries related discolouration in dentine. The lesion appears as shadows of discoloured dentine visible through enamel which may or may not exhibit a visible localized breakdown
	5	Distinct cavitation into dentine No (expected) pulpal involvement is present
Pulp	6	Involvement of pulp chamber. Distinct cavitation reaching the pulp chamber or only root fragments are present
	7	Abscess / Fistula. A pus containing swelling or a pus releasing sinus tract related to a tooth with pulpal involvement due to dental caries is present
Lost	8	The tooth has been removed because of dental caries
Other	9	Does not match with any of the other categories

Results: The study participants consisted of slum dwelling children in Udupi Taluk with mixed dentition. There were 68 males and 83 female participants in an age range of 6 to 15 years. The mean age of the children was 9 years. The primary dentition highest CAST scores were calculated separately for each patient. Similarly, for permanent dentition, highest CAST score was calculated.

Graph 1: Caries prevalence as reported by CAST index in primary and permanent dentition



Discussion:

The CAST index is a new epidemiological tool for caries detection. It evaluates caries in an orderly manner that is from sound teeth, through sealants, fillings, and enamel and dentine lesions, to those progressed into the pulp and tooth-surrounding tissues. [11,12] The CAST index was developed as it was difficult to record and report early enamel lesions using ICDAS 2 and consequences of severe dental caries using PUFA along with DMFT indices. PUFA complements ICDAS 2 as there are no overlapping scores between them. [10] The newly developed CAST index has combined all three indices taking into account Missing (CAST code 8) and Filled Component (CAST Code 2) of DMFT index. Therefore, CAST index has an added advantage over other newer caries indices, that the DMFT/dmft score can be calculated from it, beneficial for universal comparison.

In our study, 54% of individuals with deciduous teeth and 77% with permanent teeth were caries free (CAST Code 0). Since this study was conducted on children between age groups 6-15 years and the mean age was 9 years therefore most permanent teeth had recently erupted into the oral cavity. This maybe the reason for greater percentage of permanent teeth being caries free. The results obtained by this study were similar to other studies done in Asia using CAST index in adults where majority of the teeth 84.8% were caries free. [13]

None of the slum dwelling children had Code 1 or Code 2 of CAST index. This meant that they neither had any preventive treatment done like fissure sealants or restorations. This could be attributed to the poor socioeconomic conditions which they were living in. This highlights the fact that access to healthcare system is unequally distributed in society. This segment of population is unable to avail any kind of preventive procedures or treatment of decayed teeth. The only option they have is extraction when they experience symptoms like swelling, pain or infection. This also reflected as 4% of deciduous teeth were extracted due to caries. (CAST code 8).

A study conducted in India has reported that CAST index was a reasonable and reliable way to record the entire spectrum of caries with a few modifications. [14] In our study, higher incidence enamel and dentin caries 28% primary teeth (CAST code 3, 4 or code 5) and 14% in permanent teeth has been reported which is similar to a study done using CAST index in Pakistan on adults. [13]

14% children had severe untreated dental caries in primary teeth and 9% in permanent teeth (CAST code 6 or 7). The code "U" for ulceration from PUFA index developed by Monse et al.,[9] has been removed in the development of CAST index as it is the least reported finding.[10] Due to this, the recording of CAST index takes into account the clinical consequences of severe untreated caries that is pulpally involved teeth, fistula and abscess (CAST code 6 or 7) which are not recorded by simple DMFT/dmft indices. This is the first study in slum dwelling children of age group 6 to 15 years using CAST index in India. One of drawbacks of this study was the small sample size from which the data were collected due to time constraints. Recomme ndations for the future would be to carry out such a study on a larger population in many slums.

Conclusion: Overall recording the entire caries spectrum using CAST index is beneficial as it sheds light not only on the caries prevalence but also the preventive modalities like fissure sealants, restorations and consequences of severely affected teeth. Since it had taken into consideration all these aspects CAST index' use on a slum dwelling population gives us a broader insight into the existing oral health conditions in India. Also, the data collected via this study can be used to plan and conduct preventive and curative programs in this neglected segment of the population.

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