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RESEARCH ARTICLE

Dental caries experience using the Significant Caries Index among 12 year old school children in Karnataka, India

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Abstract

Objectives: The present study was done to describe the dental caries experience using the Significant Caries Index (SiC Index) among 12 year old school children in Karnataka, India. **Methods**: Individuals were sorted according to their DMFT values. The one third of the population with the highest caries score was selected and the mean DMFT for this subgroup calculated. **Results**: A total of 837 school children in 9 schools were examined. The mean decayed teeth were 1.07, the mean missing teeth 0.02 and mean filled teeth 0.01. The overall SiC Index score was found to be 2.85 ± 1.18. **Conclusion**: This study has shown that groups of individuals suffer from a high prevalence of dental caries even if the mean DMFT for that population is low. SiC Index is therefore an useful indicator and helps in targeting preventive programs to the at-risk groups in the community.

INTRODUCTION

In 1979, the most important goal ever to be formulated for global oral health was announced: in the year 2000, the global average for dental caries will be no more than 3 decayed, missing or filled permanent teeth (DMFT) at 12 years of age. Seen in a long term perspective, the '3 DMFT' goal became widely accepted by the profession, as well as by various governing bodies in the global community.[1] During this period nearly 70% of the countries in the world have succeeded in achieving this goal, or have never exceeded this borderline value.[2] Certainly these facts reflect a great achievement in the improvement of oral health.[1,2] However, when analyzing caries prevalence data in detail from successful countries or areas, one can question if we in reality have reached 'health for all'. A low mean caries level such as DMFT 3 still includes a number of individuals having considerably higher DMFT values in the same population. In fact, there seems to be a significant fraction of such individuals in all populations. This is true also for many countries that have never exceeded the 3 DMFT level.[1] Clearly, the mean DMFT value leads to incorrect conclusion that the caries situation for the whole population is controlled while in reality several individuals still have caries.[2] Therefore it is important to look not only into the mean values, but also into the frequency distribution of caries in a population. In 2000, Brathal introduced the significant caries index to draw the attention of policy makers to those children with highest caries scores in each population.[1]

Studies have shown decreasing DMFT values in 12 year old school going children of South India. In the year 2009[3] the DMFT among 12 year old children in Kerala was 0.15 whereas in 2005[4] it was 0.5. Yagnavajhala et al [5] reported that the mean DMFT and SiC was 1.11 (± 1.38); 2.59 (±1.34) in males and 1.06 (± 1.23); 2.50 (± 0.97) in females respectively. The National Epidemiological Oral Health Survey and Fluoride Mapping conducted by Dental Council of India in 2002-2003 showed that the mean DMFT of 12 year old children in Karnataka was 2 and the SiC index score was found to be 2-3 times higher than the mean DMFT.[6] The present study was done to describe the dental caries experience using the Significant Caries Index (SiC Index) among 12 year old school children in Karnataka, India.

Materials and method

The study was conducted in Puttur, an agriculture based town in Dakshina Kannada district, in the Indian state of Karnataka. It is situated in the Coastal region surrounded by several hillocks with lush green forest belt of the Western Ghats. It has a population of about 48,000 with a male to female ratio of 1:1. The average literacy rate is 79%, which is higher than the Indian national average of 59.5%: male literacy is 83%, and female literacy is 75%. About 11% of the population are under 6 years of age[7].

A pilot study was conducted on 15 children to get a dental caries prevalence of 73%. Using the data obtained, the sample size of 824 was calculated using the formula $4pq/ L^2$ where p= estimated prevalence (66%), q= 1-p, L = error (5%). Random sampling of the schools was done to select 9 schools which participated in the study. A total of 837 students with informed consent, present on the days of examination were included in the study.

The examination procedure was standardized. The WHO criteria[8] were used to identify dental caries with the help of a mouth mirror and a CPI probe. Children were examined seated in a chair, using natural light.

Dental caries was calculated according to the method described by Brathall D[1]. Individuals were sorted according to their DMFT values. The one third of the population with the highest caries score was selected and the mean DMFT for this subgroup calculated. Statistical analysis was carried out using SPSS (Statistical Package for Social Sciences) version 11.5. Frequencies were determined and Chi-square test (Fischer exact test) was used to determine the caries prevalence among males and females.

Results

A total of 837 school children in 9 schools were examined. Males totaled 403 and females 434. The mean decayed teeth were 1.07, the mean missing teeth 0.02 and mean filled teeth 0.01. The DMFT score varied from 0 to 8 with 51.5 % of the children with zero DMFT and only 2 children with a DMFT of 8. The decayed component contributed the most (95.48%) to the caries prevalence whereas only 1.66% of the teeth were filled. The mean DMFT of the study population was 1.1 ± 1.45 with males having a lower DMFT score of 0.99 compared to females with 1.2. Similarly, more number of females (224) had zero DMFT compared to males (207). However the two children with a high DMFT score of 8 were both females (Table 1).

The overall SiC Index score was found to be 2.85 ± 1.18. The SiC Index score among males was 2.67 and among females 2.99. Among the studied subjects, 16.1% had DMFT more than 3. When males and females were compared, DMFT was found to be more among females compared to males with a p value of 0.013, but among one-third of the population with the highest caries, it was not found to be significant (p = 0.119) (Table 2). Histogram of DMFT showed the positive skewness of caries with more than half of the studied population having zero DMFT (Graph 1). Among one-third of the population having highest DMFT, the distribution was positively skewed with more than half of the people having 2 DMFT. (Graph 2)

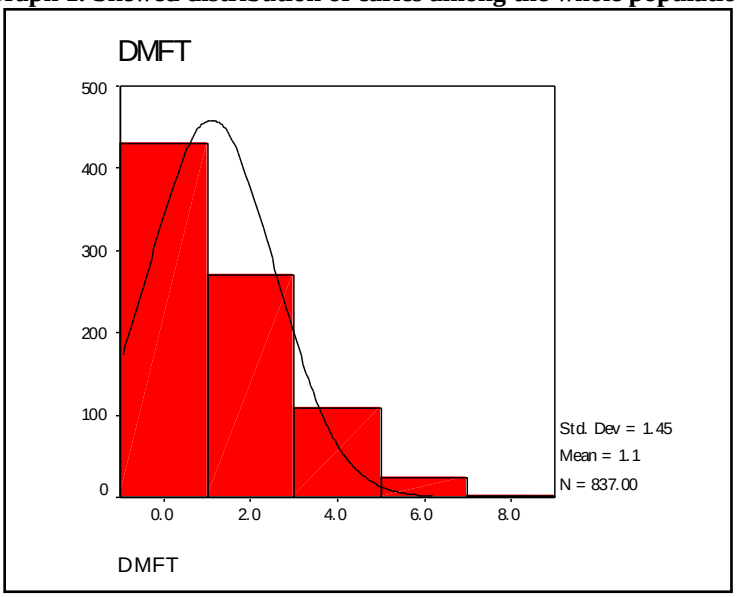
Table 1. Distribution according to decayed, missing and filled component

Carious component	Mean value	Percentage
Decayed	1.07	95.48
Missing	0.02	2.86
Filled	0.01	1.66

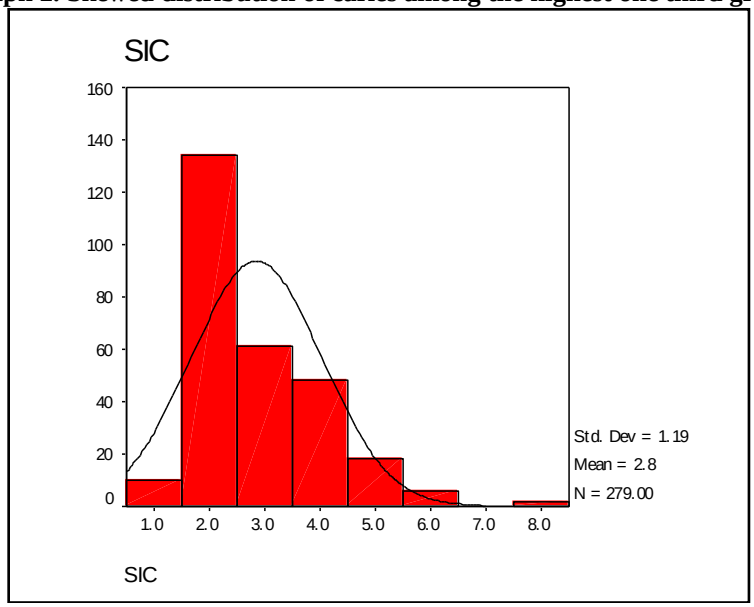
Table 2. Comparison of mean DMFT and SiC

Caries Index	Male	Female	Overall	p Value
DMFT	0.99	1.2	1.1	0.013
SiC	2.67	2.99	2.85	0.119

Graph 1. Skewed distribution of caries among the whole population



Graph 2. Skewed distribution of caries among the highest one third group



Discussion

This study attempted to identify the high caries experience group in Puttur, Karnataka with the help of the SiC index. The mean DMFT score of the 12 year olds was 1.1 ± 1.45 and this finding agrees with several other studies [3,4,5,6,9,10] indicating that various states in South India have achieved the WHO goal for the year 2000 (DMFT = 3). The fluoride level in most part of the Coastal region of Karnataka State varies from 1 to 2 ppm[6] which could be the reason for the low DMFT of this study. Despite the highest number of dental colleges in the State[11], this study population showed very low utilization of oral health care with a mean filled teeth of only 0.01. Similar findings were reported in other studies.[6, 10] The decayed component contributed most to the DMFT and more females than males had higher caries levels and this was in accordance with several studies.[6,10,12]

The feature of present-day caries is the skewed distribution which was calculated in this study by selecting the one third of the studied population with the highest caries score. The range of SiC score was 1.67 to 4.03 which is lower than the data reported earlier.[6] Among the subjects, 50% enjoyed caries free oral cavity, whereas more than 16% had more than 3 DMFT.

Conclusion

It is well documented that the best predictor of future caries is past caries, which means that children with a lot of caries now are likely to have more caries in the future, and this population could be identified for inclusion in caries prevention programs. Despite great improvements in oral health that has been seen over recent years, there are still individuals who, for whatever reason, remain highly susceptible to caries. To eradicate caries, this highly susceptible group should be explored. The mean DMFT score has been masking these highly susceptible groups providing false triumph over caries whereas in reality, studies have shown that twenty-five percent of the children have 75% of all carious lesions.[11] Similar results have been shown by the present study where more than 16% of the individuals had more than 3 mean DMFT score.

In the year 2000, a new goal was proposed: That the Significant Caries Index should be less than 3 DMFT in 12 year-olds by the year 2015.[1] This study as well others [5,6,14,15,16] have observed that groups of individuals suffer from a high prevalence of dental caries even if the mean DMFT for that population is low. SiC Index is a useful indicator and helps in targeting the preventive programs to the at risk population in the community.

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