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Impact of Socioeconomic Status on Oral Health and Oral Health Practices among Patients of 5-12yrs of Age – An Institution Based Study

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Abstract

Background: Among the many factors that influence oral health, socioeconomic status is a major factor. Research revealed a direct and inverse association between children's dental caries prevalence and socioeconomic status.

Aim: The aim of this study is to evaluate the effects of parents' socioeconomic position on oral health and oral health practices in children aged 5 to 12 who visit the Pediatric and Preventive Dentistry outpatient clinic at Government Dental College in Kozhikode.

Materials and Methods: In an institution-based cross-sectional study, 700 children between the ages of 5 and 12 who visited the Department of Pediatric and Preventive Dentistry at Government Dental College in Kozhikode for treatment were evaluated over the course of five months. The WHO Oral Health Assessment Form 2013 for children and the WHO Oral Health Questionnaire for children were used by the principal investigator to assess and interview the study population. Based on their socioeconomic status as determined by the Modified Kuppuswamy socio-economic scale revised for 2019, dental caries were clinically examined using the decayed, missing, filled teeth (DMFT) index.

Results: The overall mean DMFT and deft value observed was 0.95 ± 1.52 and 4.99±4.02 respectively. The highest mean deft value was of SEC II (5.86 ± 4.55). It was observed that the amount of sugar consumption as biscuits, cream cakes, sweets etc. was high in children of high socioeconomic status which was statistically significant.

Conclusion: The study revealed a direct correlation between children's caries prevalence and their parents' socioeconomic position. The finding highlights that

knowledge gaps and poor oral hygiene practices can exist even in higher socioeconomic groups.

Clinical significance: Dental caries in children, causes pain and discomfort which affects their physical growth and also places a financial burden on parents. These highlights need for comprehensive, well-structured oral health education and promotion programs in schools.

Keywords: Community Periodontal Index, Dentition, DMFT, Oral Health Education

Introduction

Oral health is an integral part of general health and it has a direct impact on general health.[1] Dental caries and periodontal diseases are pandemic diseases that impact all people, regardless of gender, age, or socioeconomic level, according to the World Health Organization's 2003 oral health report.[2,3] In addition to causing pain and discomfort, dental caries in children also costs parents financially.[4] Among the various determinants of oral health, socioeconomic status (SES) plays a particularly significant role, as highlighted by compelling evidence of a negative correlation between SES and the prevalence of caries in children under the age of twelve. The connection between SES and oral health has been a subject of extensive research, as understanding the social determinants of oral health is crucial for developing effective public health interventions. Numerous studies have demonstrated a strong association between lower SES and a higher incidence of caries. Individuals from lower SES backgrounds are often less likely to have access to fluoridated water, toothpaste, and dental care, which are essential for preventing dental caries. Furthermore, oral hygiene practices tend to be poorer in these populations due to a lack of awareness and limited access to oral health education(OHE).[5] The validated Kuppuswamy's socioeconomic scale, which includes three crucial factors—education, income, and occupation—is used in India to determine a family's socioeconomic status.[6-7] It is strongly recommended for use in hospital and community-based research.[6-7] With the growing incidence of dental caries, the efforts to improve the overall situation are still highly indicated. Therefore, the purpose of this study was to determine how parents' socioeconomic level affected their children's oral health and oral health habits between the ages of 5yrs and 12yrs.

Materials and Methods

In the Department of Pediatric and Preventive Dentistry at Government Dental College in Kozhikode, a cross-sectional study was carried out. Based on the prevalence of dental caries experience of 81 in the Moses J et al. [8] study, a sample size of 700 children was calculated at a 95% confidence level with a 3% allowable error. The Institutional Ethical Committee provided ethical clearance before the study (IEC no: 244/2022/ DCC, dated 04-05-2022). The children who came to our department for treatment were assessed over five months. The parents of the children provided previous written informed consent for the study. The study did not include siblings from the same family or children with exceptional health care requirements.

Using the 2019 Modified Kuppuswamy's Socio-economic Scale, parents' socioeconomic status and demographic information about each kid was documented, including name, age, sex, location.[9] The principal investigator examined and interviewed the study population using the WHO Oral Health Assessment Form 2013 for children and WHO oral health questionnaire for children.[1,10] Using a mouth mirror, a CPI probe, and suitable lighting, an intraoral examination was performed in accordance with the fundamental techniques of the WHO Oral Health Surveys. The kids were sitting on the dental chair throughout the

examination. For every examination day, an adequate quantity of tools was packed and sterilized. The dental caries status for primary dentition was assessed using deft (decayed, extracted, filled tooth), for permanent dentition DMFT (decayed, missing, filled tooth) and both deft and DMFT indices for mixed dentition. Test of statistical analysis was done using chi square test with the SPSS version 17.0. Differences were considered significant at the level of $P < 0.05$. Continuous variables were expressed as mean and standard deviation (SD). The prevalence of categorical variables was expressed as a number and percentage.

Results

Among the 700 study participants, 49.3% (n = 345) have been boys and 50.7% (n = 355) have been girls with minimum age of 5yrs and maximum age of 12yrs with a mean of 8.35.

There were 3.7% (n= 26) participants in SEC I, 16.0% (n=112) participants in SEC II, 31.4% (n=220) participants in SEC III, 48.6% (n= 340) participants in SEC IV and 0.3 (n= 2) participants in SEC V. 37.9 % (n= 265) were from urban area and 62.1% (n= 435) from rural area.

The mean dt ranged from 0.00 ± 0.00 - 4.08 ± 3.31, mean et ranged from 0.00 ± 0.00 - 1.15 ± 1.46 and mean ft ranged from 0.00 ± 0.00 - 0.46 ± 1.17 among children of socioeconomic classes I -V. The mean deft value obtained was 5.38 ± 3.75 (SEC I), 5.86 ± 4.55 (SEC II), 4.98 ± 3.85 (SEC III), 4.72 ± 3.95 (SEC IV), and 0.00 ± 0.00 (SEC V). The highest mean deft value was of SEC II.

It was observed that of the 700 children, 294 brushed their teeth twice daily, 405 once and 1 child brushed his teeth only 2-6 times in a week. Of the total, 698 used toothpastes for brushing, 2 used charcoal and 16 children used a combination of toothpaste and toothpowder for cleaning teeth.

On a question on sugar consumption habit, 11.6% of children from SEC II consumed biscuits, cakes, cream cakes, sweet pies, buns etc. several times a day and 48.2% of SEC II every day, 25.9% of SEC II consumed sweets/candy several times a day and 54.1% of SEC III every day and 34.6% of SEC I consumed fresh fruits every day, 11.5% of SEC I consumed milk with sugar every day. These results were statistically significant.

Discussion

In the Malabar region of Kerala, Government Dental College Kozhikode is a tertiary care facility that provides care to people from all socioeconomic background without requiring any kind of referral. According to the WHO's index age groups, the 5–12 age range was chosen for this study in order to evaluate the prevalence of caries in the primary and permanent dentition.[11-12]

Socioeconomic Status and Oral Health

One of the key elements influencing a person's or a family's health is their socioeconomic status. Poor health literacy, unhealthy eating behaviors, and limited access to oral health care are all associated to lower socioeconomic status and impair oral health outcomes.[5] It is explicitly evident from numerous systematic reviews and meta-analyses that lower socioeconomic status is consistently associated with greater dental caries experience in both adults and children.[13] Nearly half of the children seen during the study period belonged to the IVth class, which is the upper socioeconomic level, according to the current study. The high expense of treatment in the private sector or the group's awareness of oral health care may be the cause of this. Contrary to the above facts[13], in the current investigation, the highest mean deft value was observed in upper middle class (SEC II- 5.86 ± 4.5) to upper class (SEC I -5.38 ± 3.75) followed by lower middle (SEC II-

4.98 ± 3.85), upper lower (SEC II- 4.72 ± 3.95) and lower class (SEC II- 0.00 ± 0.00) while at the same time the mean DMFT was higher in lower class.

Similar findings of higher dental caries in the primary dentition were noted by Jindal et al., 2020 among schoolchildren aged 6 and 12 in Paonta Sahib, Himachal Pradesh, where the upper-middle class had the highest caries frequency, followed by the lower-middle class. [14]

Additionally, students from mid- to high- to low-SES schools had greater dmft, according to the Soares et al. (2016) study. [14-15] In another study by Popoola et al, 2013 children from high and intermediate socioeconomic classes had a higher frequency of dental caries, whereas children from lower socioeconomic classes had a lower prevalence.[4] According to Amudha S et al, 2021, dental caries is more common in upper-class subjects' deciduous dentition.[11]

This may be explained by the fact that higher disposable incomes allow for more frequent purchase and consumption of sugary foods and drinks including snacks, soft drinks, and packaged sweets. This suggests that while high-income families can afford dental care, dietary habits can counteract this advantage in some cases.[11] Additionally, when both parents are working, they rarely have time to devote to their children's general health, including dental care.[16] Dental caries was more common in the primary dentition (mean deft 4.99±4.02) in the current study than in the permanent dentition (mean DMFT 0.95 ± 1.52).

Similarly, dentinal caries was more common in primary teeth (95.5%) than in permanent teeth (47.3%) in a research conducted by Singh et al. among 400 schoolchildren in Faridabad city between the ages of 6 and 12.[17] Similar observation was made in studies like Amudha S, Moses J, Vijayakumar M, et al.2021[11], Goenka P et al, 2018[18], Moses et al 2011[8], Reddy et al, 2017 [19]. One of the causes has been identified as the difference in enamel thickness between deciduous and permanent teeth. Compared to permanent teeth, which have enamel that is 2.5 mm thick, deciduous teeth have enamel that is 1 mm thick. The lower calcium content and structural differences of deciduous teeth, along with thin enamel, a diet high in sugars, and difficulty with proper brushing in young children, are all factors that increase their susceptibility to dental caries. [14]

Socioeconomic Status and Oral Health Practices

We found that 99.7% of children of all SEC brushed their teeth with toothpaste once a day (57.9%), which decreases from lower to higher socioeconomic class, and twice a day (42%), which decreased from lower to higher socioeconomic class, which was equivalent and non-significant. Additionally, it was shown that 94.3% of kids were not aware that their toothpaste contained fluoride. About 4.4% of children confirmed using fluoridated toothpaste.

Sugar Consumption

Frequent consumption of fermentable carbohydrates, particularly solid and retentive foods containing sucrose, has been associated with dental caries, especially when fluoride toothpaste is not used and oral hygiene is poor.[7] A dietary assessment of the children of upper SEC in the current study showed a statistically significant daily consumption of sweetened milk and tea, as well as biscuits, cakes, cream cakes, sweet pies, buns, etc. Additionally, there was a statistically significant increase in the intake of easily accessible and affordable candies and sweets. More caries in this SEC may be caused by a dietary pattern that combines daily increasing sugar exposures with a decline in dental care practices. However, because fruits are naturally fibrous, it was found that eating more fresh fruit increased in higher

SEC, which helps to clean the mouth by promoting salivary flow.[7]

Outside food is now easily accessible due to the proliferation of restaurants, fast food chains, and street vendors. For families with working parents who lack time and energy, these quick meal options are more convenient than home cooking.[7] Working parents often serve as role models, and their own busy lifestyles and eating on the run normalize this behaviour for their children. Additionally, parents may be unable to monitor their children's food choices as closely, especially when they eat at school or with friends [16]. The high frequency of dental caries in SEC II may be caused by poor oral hygiene and the frequent consumption of foods high in fat, sugar, and calories, which may outweigh the ingestion of fibre-rich foods.

Conclusion

The study found a direct correlation between children's dental caries prevalence and the parents' socioeconomic position. i.e., children from the upper- middle- class had a higher frequency of dental caries. Additionally, this study indicated that children from upper-middle-class families had a greater prevalence of dental caries in their primary dentition. The finding highlights that knowledge gaps and poor oral hygiene practices can exist even in higher SES groups. This suggests that there is a clear need for comprehensive, well-structured OHE or promotion programs in schools that reach children during their formative years, regardless of their background.

Clinical significance: Dental caries in children, causes pain and discomfort which affects their physical growth and also places a financial burden on parents. These highlights need for comprehensive, well-structured OHE or promotion programs in schools.

List of abbreviations

CPI - Community Periodontal Index

deft - decayed, extracted due to caries, filled teeth

DMFT - Decayed, Missing due to caries, Filled Teeth

dt – decayed teeth

et - extracted teeth

ft - filled teeth

n – Number

OHE - oral health education

SD - Standard Deviation

SEC - socio-economic class

SES - socio-economic status

SPSS – Statistical Package for Social Sciences

WHO – World Health Organization

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Legend Figures and Tables

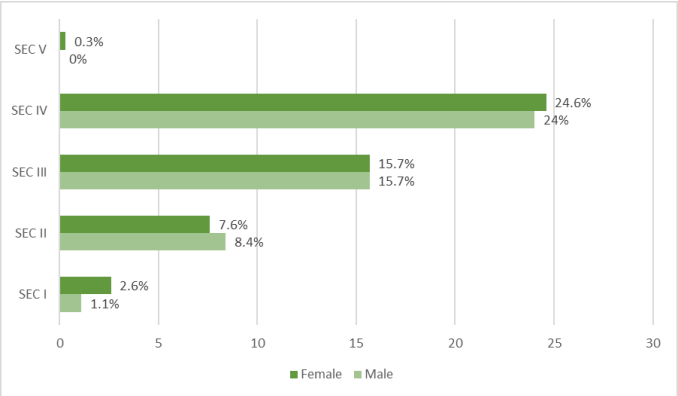

Figure 1: Socioeconomic class wise gender distribution in percentage

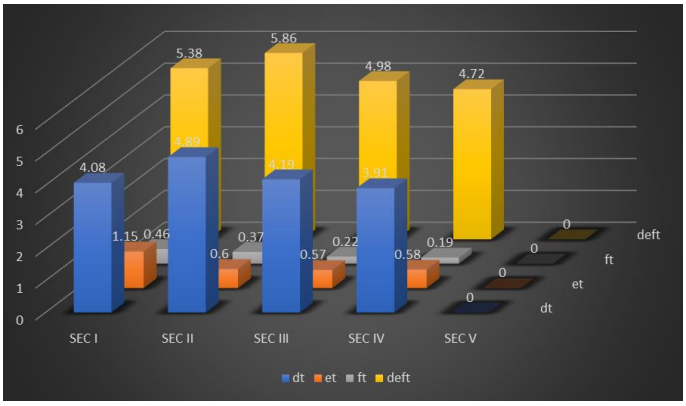

Figure 2: Mean deft components according to Socioeconomic class

Table 1: A comparison of the consumption of food/beverages once a day by children of all SEC

	SEC I *n* (%)	SEC II *n* (%)	SEC III *n* (%)	SEC IV *n* (%)	SEC V *n* (%)	p value
Fresh fruit	9(34.6%)	30(26.8%)	15(6.8%)	20(5.9%)	0(.0%)	0.00
Biscuits, cakes, cream cakes, sweet pies, buns etc.	11(42.3%)	54(48.2%)	100(45.5%)	115(33.8%)	2(100.0%)	0.03
Lemonade, Coca cola, or other soft drinks	0(.0%)	0(.0%)	2(.9%)	0(.0%)	0(.0%)	0.06
Jam/honey	0(.0%)	0(.0%)	2(.6%)	0(.0%)	0(.0%)	0.003
Chewing gum	0(.0%)	2(1.8%)	0(.0%)	12(3.5%)	0(.0%)	0.26
Sweets/candy	8(30.8%)	48(42.9%)	119(54.1%)	141(41.5%)	0 (.0%)	0.00
Milk with sugar	3(11.5%)	8(7.1%)	13(5.9%)	28(8.2%)	0(.0%)	0.001
Tea with sugar	14(53.8%)	53(47.3%)	119(54.1%)	157(46.2%)	2(100.0%)	0.13
Coffee with sugar	0(.0%)	1(.9%)	1(.5%)	1(.3%)	0(.0%)	0.85

Table 2: A comparison of the consumption of food/beverages several times a day by children of all SEC

	SEC I *n* (%)	SEC II *n* (%)	SEC III *n* (%)	SEC IV *n* (%)	SEC V *n* (%)	p value
Fresh fruit	0(.0%)	0(.0%)	0(.0%)	3(.9%)	0(.0%)	0.00
Biscuits, cakes, cream cakes, sweet pies, buns etc.	2(7.7%)	13 (11.6%)	15 (6.8%)	35 (10.3%)	0(.0%)	0.03
Lemonade, Coca cola, or other soft drinks	0(.0%)	0(.0%)	3(1.4%)	4(1.2%)	0(.0%)	0.06
Jam/honey	0(.0%)	0(.0%)	0(.0%)	0(.0%)	0(.0%)	0.003
Chewing gum	0(.0%)	2(1.8%)	4(1.8%)	6(1.8%)	0(.0%)	0.26

Sweets/candy	6(23.1%)	29(25.9%)	27(12.3%)	50(14.7%)	0 (.0%)	0.00
Milk with sugar	0(.0%)	0(.0%)	0(.0%)	5(1.5%)	0(.0%)	0.001
Tea with sugar	0(.0%)	3(2.7%)	25(11.4%)	42(12.4%)	0(.0%)	0.13
Coffee with sugar	0(.0%)	0(.0%)	1(.5%)	3(.9%)	0(.0%)	0.85

According to Table 1 & 2, on a question on sugar consumption habit, 11.6% of children from SEC II consumed biscuits, cakes, cream cakes, sweet pies, buns etc. several times a day and 48.2% of SEC II every day, 25.9% of SEC II consumed sweets/candy several times a day and 54.1% of SEC III every day and 34.6% of SEC I consumed fresh fruits every day, 11.5% of SEC I consumed milk with sugar every day and were statistically significant.