

Incidence of Dental Caries in Relation with Cariogenic food and Socioeconomic Status among Pediatric Patients

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ABSTRACT

Background: One of the most prevalent oral health conditions in children around the world is dental caries, which has painful and distressing effects. The purpose of this study was to investigate the relationship of dental caries and the utilization of cariogenic food among children aged 5 to 10 years old in private and public schools.

Study design: The study was conducted in the Department of Community Dentistry, Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University, Karachi, from June 2022 to December 2022.

Methods: The total participants of this study were 150 child both male and female who suffered tooth decay or caries and mouth cavity. The age range was 5 to 10 years. A self-structured questionnaire about eating habits, caries status, socioeconomic status, and an oral cavity assessment was used during the study. The children divided into two groups, private and government school related to the specific areas of food habit. The data was analyzed by SPSS 21 software.

Results: Participants had dental caries in 87% of cases. More than 80% of people with low socioeconomic status had multiple caries. In 80% of the participants, who regularly ate the cariogenic food, multiple caries were discovered. Cariogenic foods and tooth decay were found to be significantly correlated, $p < 0.05$.

Conclusions: Children under the age of 10 years had a high prevalence of dental caries in the study. Children from lower middle class families were more likely to have dental caries. In patients with a high prevalence of caries, frequent consumption of sweetened beverages and medications as well as a lack of regular use of fluoridated rinses were all positively correlated with an increased number of teeth. These findings imply that in order to increase oral hygienic and awareness of dental care and evaluate on the basis of school child to promote oral health and protection.

Keywords: Dental caries, cariogenic food, Tooth decay, Socioeconomic status.

INTRODUCTION

The key component of overall health and happiness is oral health. Plaque reduction through conventional oral health education was successful. There isn't any long-term proof that these interventions are effective at preventing plaque buildup, gingivitis, and dental caries in an educational setting.^{1,2} Even though tremendous efforts have been made to make people aware, dental caries keeps impacting a huge number of individuals worldwide, regardless of the fact that the trend is on the increase. Dental caries is identified as an ancient disease. It can affect anybody at all, no matter their age, gender, or socioeconomic status.³ Latest scientific and methodological advances in social epidemiological data, including the implementation of an intersectionality structure, upgrades in reporting, and causal modelling approaches, have the potential to significantly improve the relationship between income and oral health.⁴ Dental caries was a complex, severe, bacterial disease that was not contagious and influenced by a number of factors such as biological and ecological and removal of tooth minerals brought on by the metabolism of dental biofilm formed by a diet high in carbohydrates.^{5,6} Without any treatment, the cumulative effects of alternating demineralization and re-mineralization cycles cause a clinically visible lesion to develop. As the lesion progresses, defensive reactions like increased intra-tubular dentin formation and initial pulpitis may occur in the dentin-pulp complex. Caries lesions can slowly advance into the deep dentin and pulpal tissue if left untreated and negative impact on the patient's overall health and quality of life. The main global contributor to oral pain and tooth loss was severe.^{7,8} According to the WHO, dental caries affects 60-90% of children. Dental caries affects people of all ages, though children are more affected than adults. Accurately estimating the current burden in a specific area and developing robust dental health education programs are two aspects of the solution to this conundrum. According to WHO database contains information on the prevalence of caries but there are few constraints: not provide all age group data. The tooth decay and caries was the important issue in every country.^{9,10} In healthy

saliva and plaque, cariogenic bacteria are typically present in trace amounts. However, some biological as well as environmental disorders, such as overconsumption of complex sugars and limited pH levels, will encourage the development of acid-tolerant bacteria.¹¹ The addition of sugar to food for a wide range of purposes, such as fermentation, preservation, physical and chemical properties, and to fulfil the sweet flavor of the customer. Sugar intake, admittedly, is a major contributor to the risk for tooth decay.^{12,13} The purpose of this study was to investigate the relationship of dental caries and the utilization of cariogenic food among children aged 5 to 10 years old in private and public schools.

METHODS

From June to December 2022, the study was carried out in the Department of Community Dentistry, Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University, Karachi. This study included 150 children, both boys and girls, who had tooth decay or caries and a mouth cavity. The children ranged in age from 5 to 10 years. During the study, a self-designed questionnaire about eating choices, dental health, socioeconomic status, and the oral cavity was observed clinically. The children were divided into two groups of schools (private and government) according to their distinctive eating habits. Following the selection of schools, food habits with age groups of 5 and 10 years were chosen, and their ages were confirmed using school records. The questionnaires were distributed, and the investigator conducted personal interviews in either Urdu or English. According to the criteria for inclusion: The age range of children was from 5 to 10 years students. Exclusion criteria: chronic diseases, medication use, physical and medical issues. SPSS 21 was used to analyses the data. The significance of all statistical tests was determined at a probability value of 0.05 or less.

RESULTS

The total participants was 150 which include n=40 of them belong to the age group of 5 years and n=110 belong to the 10 years. The

children age group 5 to 10 years were divided into private and government schools due to food habit.

Table 1: Demographic characteristics

Variables		Total participants n=150(%)	P=value
Gender	Boys	80(53.3%)	0.065
	Girls	70(47%)	0.069
Age	≥5 years	40(27%)	0.213
	≥10 years	110(73.3%)	0.001**
Types of school	Private school	82(55%)	0.001**
	Government school	68(45.3%)	0.01*
Cariogenic food Habit	Yes	120(80%)	0.0001***
	No	30(20%)	0.277
Tooth decay participants	Yes	130(87%)	0.001**
	No	20(13.3%)	0.33
Socioeconomic class	Lower-middle class	120(80%)	0.001**
	Upper class	30(20%)	0.325

Mean±SEM: ANOVA SPSS 21 Test *p<0.01; **<0.001; ***p<0.0001

Both gender boys and girls were include 80(53.3%) and 70(47%). The age 5 years were 40(27%) and 10 years 110(73.3%) show significantly higher due to tooth caries and tooth decay problem. The participants divided into two types of schools such as private schools 82(55%), p=0.001** and government schools 68(45.3%), p=0.01*. The socioeconomic status of participants were divided into lower-middle class n=120(80%), p=0.001** as compared to upper classes. The habit of cariogenic food was 120(80%), p=0.0001*** show highly significant. The tooth decay was 130(87%), p=0.001** participants this difference was significant were seen in Table 1.

Table 2: Evaluate the tooth caries between 5 and 10 years age group in both gender

Variables	Tooth caries present n=90		P value	Tooth caries absent n=60		P value
	5 years	10 years		5 years	10 years	
Private schools	40 (45%)	60 (67%)	0.001*	10 (17%)	15 (25%)	0.41
Government schools	20 (23%)	22 (25%)	0.21	15 (25%)	20 (33.3%)	0.06

Mean±SEM: ANOVA SPSS 21 Test *p<0.01; **<0.001; ***p<0.0001

The children age 5 to 10 years was 40(45%) and 60(67%) showed significantly p=0.001** higher mean number of tooth caries in the private school child as compared to government schools. The tooth caries was reduced non-significantly included 15(25%) and 20(33.3%), p=0.066 in the government schools. The significantly highest tooth caries frequency was observed in the 10 years old child then 5 years child were seen in Table 2.

Table 3: Reason of tooth decay and caries children by using cariogenic food

Cariogenic food	Cariou lesion n=90		P=value
	5 years	10 years	
Pastries	7(8%)	30(33.3%)	0.05*
Chocolate	8(9%)	45(50%)	0.0001***
Soft drink	5(6%)	5(6%)	0.233

Mean±SEM: ANOVA SPSS 21 Test *p<0.01; **<0.001; ***p<0.0001

The cariogenic food habit linked to the development of tooth decay and caries in the school child. The 5 year child effect of cariogenic food less than 10 year old age child. The pastries and chocolate shows significant effect on teeth 30(33.3%), p=0.05* and 45(50%), p=0.0001*** in 10 year old school child as compared to 5 year child were seen in Table 3.

DISCUSSION

In many developing nations, dental caries remains a significant public health concern. Based on numerous epidemiological studies on children's oral health as well as epidemiological data from

databanks, WHO updated this information. Nevertheless, there have been few studies that detail the causes of pediatric dental caries.¹⁴ Dental caries continues to be one of the most prevalent chronic diseases worldwide and a costly burden on healthcare services and improvement have been seen in some countries as a consequence of political and economical in health care system. These changes in society have also contributed to a rise in the incidence of non-communicable diseases and the persistence of some communicable diseases, like dental caries, as a result of a noticeable change in lifestyle, an increase in food availability, and a noticeable nutritional transition among citizens.¹⁵ The development of immunity against infections and the prevention of caries, proper nutrition is crucial. Boys made up 53.3% of the participants in our study, while girls made up 47%, and their ages ranged from 5 to 10. When compared to a 5-year-old, dental decay was 87% more prevalent in school-age children who were 10 years old. The socioeconomic status of the study has an impact on dental caries. Multiple teeth were found to affect 80% of participants in the low socioeconomic status group, but only 20% of participants in the high socioeconomic status group. It was noted that 20% of participants had dental caries and low family incomes. This finding suggested that socioeconomic status is a important factor in the development of tooth caries in children. Our results concur with those of the prior study.^{16, 17} In the current study, it was discovered that out of 90 caries teeth, children between the ages of 5 and 10 years old made up 67% of the cases (highly significant tooth caries at age 10 year school child). 45% of private school students exhibit significant changes by the time they are 5 years old, but their frequency of tooth decay is lower than that of 10-year-old students. When compared to children attending government schools, children attending private schools had a significantly higher mean number of decayed teeth (p 0.001**). Our results were comparable to those of the prior study.^{18, 19} As 80% of the participants in our study consumed cariogenic foods and beverages on average, we looked into the cariogenic aspect of their diet habits to determine. At the age of 10, it was discovered that 50% and 33.3% of those who participated in the study consumed chocolate and pastries daily, respectively. The easy access to and low cost of chocolate, along with parents' ignorance of dental caries, may be to blame for the higher numbers. Six percent of participants, who consumed soft drinks once daily, a slightly higher rate. The findings show that participants who consumed more foods high in sugar were more likely to experience dental caries. Similar findings were found in a different study where 33% of participants consumed more sweets, and 27.30% of those participants had multiple caries. Children who consumed more sugar had a higher prevalence rate of dental caries. The current study also suggests that avoiding foods high in sugar can help prevent dental caries, which is a similar condition.^{20, 21}

CONCLUSIONS

Children under the age of 10 years had a high prevalence of dental caries in the study. Children from lower middle class families were more likely to have dental caries. In patients with a high prevalence of caries, frequent consumption of sweetened beverages and medications as well as a lack of regular use of fluoridated rinses were all positively correlated with an increased number of teeth. These findings imply that in order to increase oral hygienic and awareness of dental care and evaluate on the basis of school child to promote oral health and protection.

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