ORIGINAL ARTICLE

PREVALENCE OF DENTAL CARIES AMONG SCHOOL CHILDREN ACCORDING TO THE CONTENT OF THE LUNCH BOX

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ABSTRACT:
Objective: Sugars are the most imperative cause of dental caries. Frequent consumption of carbohydrate rich diet increases the chances of dental caries. The present study was planned to determine the prevalence of dental caries and its relation to the lunch diet in school-going children. **Methods**: The study was conducted in two schools in different regions of the city and a total of 485 students participated in the study. Before the beginning of lunch break time, each student's lunch box was viewed to identify the main foods and beverages. Clinical assessment of caries status was done according to the criteria of decayed, missing and filled teeth (DMFT) index and decayed filled (df) index. SPSS version 16.0 was used for the analysis of the data using ANOVA test ($p \leq 0.05$). **Results:** The most frequently consumed foods were chapatti (49%), vegetables (42%), bread (38%), snacks (26%) and rice (21%). Drinks such as coffee/tea and cold beverages were the least common findings during lunch times. DMFT and DMFS scores for all the school children came out to be 0.32±0.768 and 0.42±0.765 respectively. Similarly overall deft and defs was found as 2.44±2.434 and 5.42±7.654 respectively. When the caries status was compared according to sugar exposure, there was an increase in the mean DMFT, DMFS, deft and defs scores. **Conclusion**: It was concluded that the level of caries index in children increased with each year of class and the frequency of sugar exposure.
Keywords: Children; DMFT; DMFS; deft; defs; Lunchbox

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INTRODUCTION

The rising prevalence of obesity and overweight has significant short and long term health implications. Various environmental and social factors related to diet and physical activity could contribute to obesity. One such parameter, having exorbitant consideration, is the consumption of sugar-sweetened snacks and drinks.[1] Over nutrition is normally linked to the substitution of low nutrient- dense foods such as snacks that contain excessive quantities of sugar, salt, and fat for lower energy. Moreover, increased occurrences of physical and metabolic abnormalities are also demonstrated in obese children.[2,3] Analysis of data from National Health and Nutrition Examination Survey (NHANES) III mentioned that 8- to 18-year old Americans consuming excessive numbers of low nutrient foods are more likely to report less than estimated average

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daily requirements of nutrients necessary for finest health.[4]

In addition, consumption of sweets and beverages also affect the oral environment by acting as substrates for fermentation by the plaque micro flora. Carbohydrate diet such as starchy foods, savoury snacks, and foods containing sugars such as biscuits, cakes, honey, jam and fruit juices can be used by bacteria to forms the organic acids, thus encouraging demineralization of tooth surface and leading to dental caries progression.[5,6]

Schools settings are well placed to influence the food environment and learning opportunities about nutrition. Students spend approximately six hours per day at school and this place has an authoritative influence on student's eating patterns. By promoting healthy diet, schools can play a vital part in reducing the risk factors for general and dental health.[7]

So, this research was conducted to determine the chief foods and beverages consumed at school level and their involvement with caries.

METHODOLOGY

This epidemiological study was conducted to assess the cariogenic effect of the lunch box contents among school children. Before the commencement of the study, official permission was obtained from the institutes. The study was organized among two schools located in different regions of the city and selection of the sample was done by random technique. Total number of students participated in the study were 485.

A written informed consent was obtained from the guardians of the children. Only those students bringing home-made foodstuff in the lunch box were included in the study. Before the start of lunch break time, each student's lunch box was observed to identify the main foods and beverages in order to determine the difference in the consumption pattern between children. The procedure was regularly performed for 2-3 weeks in a month for six months to evaluate the eating trends and patterns of diet. At the end of the study, a range of sugar exposure per week was calculated as 5 to 10 times, 10 to 15 times and 15 to 20 times. Every food and beverage item was categorized and tabulated to identify the carcinogenicity of food.

Clinical assessment of caries status of the students was done by two examiners with a mouth mirror and number 23 explorer following the criteria of decayed, missing and filled teeth (DMFT) index and decayed filled (df) index. A tooth was considered decayed (D) if there was visible evidence of cavitation (i.e. involving dentine), including untreated dental caries and filled teeth with recurrent caries. The missing component (M) included only those missing teeth believed to have been lost through caries. Filling component (F) included only if teeth were filled due to caries.

Data Analysis

A master chart was developed in Microsoft Excel (2007) for analysis. The Statistical software namely SPSS version 16.0 was used for the analysis of data using ANOVA test respectively at $p \leq 0.05$.

RESULTS

The final study sample consisted of 485 subjects out of whom 137 were in first standard, 122 in second, 108 in third and 118 in fourth standard. It was observed that 54 students had 7 to 9 times sugar exposure, 65 had 10 to 12 times and 31 had 13 to 15 times exposure.

Graph 1: Different variety of foods consumed by the school children
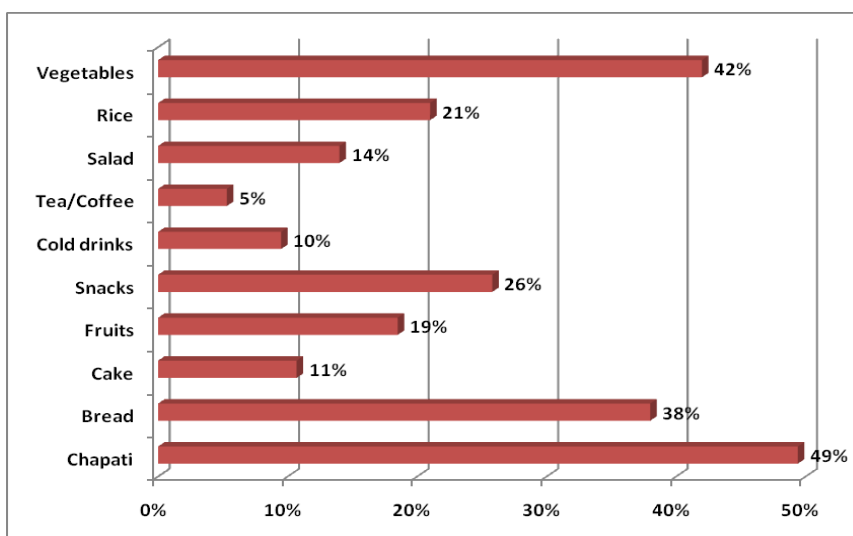
Table 1: Dental caries index among school children by their classes

Indices	Class	No	Mean	SD	F value	p value
DMFT	First	137	.13	.428	11.803	.000
	Second	122	.37	1.196	.656	.418
	Third	108	.45	.577	3.273	.071
	Fourth	118	.48	.884	16.067	.000
	Total	485	.32	.768		
DMFS	First	137	.37	.755	7.641	.000
	Second	122	.57	1.196	5.682	.018
	Third	108	.55	.577	2.808	.094
	Fourth	118	.61	.608	10.057	.000
	Total	485	.42	.765		
deft	First	137	1.55	3.051	11.597	.000
	Second	122	2.04	2.878	15.549	.000
	Third	108	3.65	2.400	19.407	.000
	Fourth	118	3.23	1.788	23.191	.000
	Total	485	2.44	2.434		
defs	First	137	2.63	9.674	7.006	.000
	Second	122	4.62	10.380	12.001	.000
	Third	108	5.57	7.813	18.703	.000
	Fourth	118	6.50	4.094	21.658	.001
	Total	485	5.42	7.654		

Table 2: Dental caries index among school children in relation to exposure of sugar

Indices	Sugar exposure (6 days)	No	Mean	SD	F value	p value
DMFT	5-10 times	196	.08	.359	9.976	.002
	10-15 times	151	.26	.695	7.102	.008
	15-20 times	138	.44	.889	4.989	.007
	Total	485	.32	.768		
DMFS	5-10 times	196	.13	.414	5.603	.018
	10-15 times	151	.35	.761	5.526	.019
	15-20 times	138	.45	.812	3.033	.049
	Total	485	.42	.765		
deft	5-10 times	196	1.32	1.726	20.136	.000
	10-15 times	151	2.67	2.659	18.948	.000
	15-20 times	138	3.39	2.863	10.674	.000
	Total	485	2.44	2.434		
defs	5-10 times	196	3.50	5.574	1.558	.213
	10-15 times	151	6.33	9.394	3.625	.058
	15-20 times	138	6.32	7.287	2.006	.136
	Total	485	5.42	7.654		

In this study, the most frequently consumed foods examined were chapatti (49%), vegetables (42%), bread (38%), snacks (26%) and rice (21%). Drinks such as coffee/tea and cold beverages were the least common findings during lunch times.

The overall mean for DMFT and DMFS scores for all the school children came out to be 0.32±0.768 and 0.42±0.765 respectively (Table 1). Similarly overall deft and defs was found as 2.44±2.434 and 5.42±7.654 respectively (Table 1). It was also observed that the level of all the indices almost significantly increased with every class.

When the caries status was compared according to the sugar exposure there was an increase in the mean DMFT, DMFS, deft and defs scores. Children who consumed sugar 15 to 20 times had more number of decayed, missing and filled teeth as compared to the frequency of 5 to 10 times (Table 2).

DISCUSSION

Dental caries is an important dental public health problem and is one of the most prevailing dental diseases in developed and underdeveloped countries

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particularly among children.[8] Many factors influence caries development, including the presence of plaque- producing bacteria, innate susceptibility of tooth surfaces, frequency of eating, snacking behaviour, oral hygiene practices, fluoride availability, and salivary flow and composition. The present study endeavours to elaborate the relationship between carbohydrate diet and severity of caries in school going children.

In this study, foods consumed largely during lunch time by the students in school setting were chapatti, vegetables, bread and snacks. However drinks such as coffee/tea and cold beverages were the least common. This finding was in contrast to the study by Sanigorski et al who noticed that the key contents in a lunch box were sandwich, a piece of fruit, several snacks and a drink among Australian school children.[9] Furthermore, snack foods and drinks were consumed by a high percentage of school children according to a study by Iftikhar et al.[10] This disparity in the pattern of food consumption could be due to the different dietary habits among different countries.

The prevalence of dental caries index in permanent as well as deciduous dentition was more in senior classes. The reason behind this could be that the teeth of older students are more exposed to oral environment and they even get more number of filled teeth. In addition, carbohydrate rich sticky meals were consumed with a high frequency among children studying in higher classes.

The present study examined that those children who were more exposed to sugar showed a higher incidence of caries, which was in accordance with the studies by Gangwar SK et al in rural area of Lucknow (1990)[11], Rahmatulla and Guile in Tamilnadu (1990).[12] However, this is in contrast with the other studies conducted by Chawla et al in Lucknow (1979)[13] and Sarvanan et al in Pondicherry (2003).[14]

It is advocated that less frequent consumption of sucrose diet may render some advantage in the reduction of caries level, as the development of dental caries is often associated with recurrent intake of sugar-containing food or drinks, as per the survey conducted by Chen.[15] Many studies refer to the consumption of whole grains and dairy products that tend to decrease an individual's appetite,[10,16] while diets rich in sugar cause people to feel hungry and seek more calories.[17] Missed meals could have a direct influence on consumption of refined carbohydrates, and skipping meals such as breakfast could even lead to increased sugar consumption.[18,19]

Some of the earliest investigations regarding milk and dental caries were carried out by Oho et al, who concluded that milk improved oral health.[20] These findings recommend that the schools ought to promote the consumption of cariostatic meals and compel students to trim down the sweetened beverages.

CONCLUSION

The discrepancy in caries status of school-going children is mainly owing to their diverse dietary patterns. Predominantly, the meals consumed by children were of low nutritional value and frequently higher in sugar products. Henceforth, a high score of caries index was seen among those who were more exposed to sucrose. It is elementary for the dental health professionals and school teachers to discourage the kinders to consume high-fat, high-sugar foods and create awareness among them regarding a healthy diet.

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