

ASSOCIATION BETWEEN SUGARY FOOD AND DRINK CONSUMPTION AND CARIOUS EXPERIENCES AMONG SCHOOLCHILDREN FROM IASI, ROMANIA

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Abstract

Dental caries is the most prevalent oral disease and is caused by a complex interaction of tooth susceptibility, nutrition, and oral environment. **Aim:** Aim of this study was to determine the association between the consumption of sweetened foods and beverages and its relation with the experience of dental caries among schoolchildren in Iasi, Romania. **Material and methods:** A specially designed questionnaire was used to collect information regarding type of sugar intake, frequency of sugar consumption. All the children were examined clinically to assess their dmft/DMFT score. **Results:** Over 70% of the children in this study had dental caries. The percentage of subjects free of dental caries was 49.8% for boys and 46.4% for girls. Female subjects stated consume sweetened foods to a greater extent than male subjects (67.6%). Consumption of sweetened foods between meals or at lunch is reported in a higher proportion by female subjects (68.9%, respectively 64.4%). Male subjects consumed a greater number of sweetened drinks a day, while 88.9% of female subjects consume only sweetened drinks once a day. The results of the analysis regarding the association between the frequency of food consumption and sweetened beverages with the dmft scores showed a positive correlation between them, the relation being statistically significant ($r = 0.046$, $p = 0.13$). **Conclusion:** Dental caries is a major public health problem because of the prevalence of dental caries among schoolchildren that has been shown to be high. The study indicated a statistical relationship between the frequency of consumption with the prevalence of dental caries and dmft score and the need to implement dental health and nutrition intervention programs for schoolchildren.

Key words: Dental caries, dmft, frequency of sugar intake.

Introduction

Diet, through its content, plays an important role in the appearance of oral diseases. The increased consumption of sweetened foods causes the chronic demineralization of the dental structure by the action of organic acids produced by the bacteria of the dental biofilm during the fermentation of carbohydrates. The consumption of sugar in small amounts, along with other fermentable carbohydrates consumed frequently during the day will

increase the caries risk. The initial demineralization of the dental structure can be cured by remineralization under the conditions of a low cariogenic diet and good oral hygiene.

Consumption of sugar-containing foods is increased in developing countries, particularly among urban residents from higher socio-economic background and the variation in dietary and oral hygiene habits might influence the regional distribution of caries experience. Research revealed that

children of high social class families experience less caries than those of lower social classes. Diet in general and sugar intake varies from individual to individual and is based on the socio-cultural and geographical location of the individual (1).

A report by United Nations and the WHO from 2003 concluded that there is a clear association between quantity and frequency of sugary foods and dental caries (2)]. The WHO also recommends limiting added sugar intake to less than 10% of total energy (3).

In Romania, the results of studies on eating habits related to dental caries are consistent with those of international studies(4-9). This study aimed to determine the association between the consumption of sweetened foods and beverages and its relation with the experience of dental caries among schoolchildren in Iasi, Romania.

Material and method

A cross-sectional study was conducted in 3 schools in Iasi. A total of 150 schoolchildren aged 6-8 years old were recruited to participate in the study after parents and teachers were informed both verbally and in writing before the data was collected. The data regarding the demographic profile, the dental practices, the consumption of sweetened products were collected through a structured questionnaire. The questionnaire was distributed to the parents before the clinical

examination by the teachers. The parents were asked to complete the questionnaire in one week to complete. The clinical examination was performed by a calibrated examiner using the ICDAS evaluation system, in the dental office within the school with the help of a dental chair consultation kit. Prior to the clinical examination, the children performed the dental brushing necessary to clean the dental surfaces to be examined.

SPSS 20.0 for Windows was used to analyze the data. The categorical variables were expressed by numbers and percentages. Group comparisons of quantitative variables were performed using the Mann-Whitney independent test, and group comparisons of categorical data were performed using Chi-squared tests. The Spearman correlation test was used to analyze the relationship between the frequency of sweetened foods and the consumption of drinks with the dmft score. Significance level was preset to 0.05.

Results

Of the 150 subjects, 58% were male and 42% were female. The children were between 6 and 7 years old, 78% of them being 6 years old. Almost half of the children (47%) come from families with average socio-economic level, followed by those from families with high socio-economic level (35%). Over 80% of parents are employed and 74% are married (tab.1)

Table 1. Demographic characteristics of the group study

Demographic characteristics	%
Sex	
Female	58
Male	42
Age	
6 year - old	78

7 year - old	22
Socio-economic level	
Low level	18
Medium level	47
High level	35
Professional status	
Emploid	82
Unemployed	11
Casnic	7
Parents marital status Status	
Married	74
Divorce	21
Widow	5

Table 2 presents the incidence of dental caries and the mean dmft score among subjects by gender and socio-economic level. Over 70% of the children in this study had dental caries. The percentage

of subjects free of dental caries was 49.8% for boys and 46.4% for girls. The dmft index registered a much lower value in boys than in girls (2.67, respectively 4.12).

Table 2. The carious experience of the children in the study group

Variable	%	Sex distribution		Socio-economic level		
		Female	Male	Sex feminin	Sex masculin	Sex feminin
Caries-free	26,4	46,4%	49,8%	24.5%	38.7%	36,8%
Prevalence	73,6	53,6%	50.2%	75.5%	61.3%	63.2%
dmft	3.39±2.743	4,12±1.23	2,67±2.34	4,34±1.33	3.395±1.423	2,45±1.654

$P=0.534$

Table 3 presents the schedule of consumption of foods sweetened by gender. Female subjects stated that they like to consume sweetened foods to a greater extent than male subjects (67.6%). Consumption of sweetened foods between meals or at lunch is reported in a higher proportion by female subjects (68.9%, respectively 64.4%) while male subjects prefer to consume sweetened foods at dinner. Most of those who consume

sweetened foods come from families with high socioeconomic status.

Regarding the frequency of consumption of sweetened beverages, it is observed that male subjects consumed a greater number of sweetened drinks a day, while 88.9% of female subjects consume only sweetened drinks once a day. The frequency distribution of sweetened beverages is relatively balanced in terms of socio-economic level.

Tabelul 3. Time and frequency of sugary food and drink consumption by gender

Variables	Sex distribution		Socio-economic level		
	Female	Male	Low level	Medium level	High level
Do you eat sweets?	67.6%	32.4%	11%	29.7%	59.3%
Time of sugary food consumption					

Between meals	68.9%	31.1%	10.5%	29.3%	59.9%
At lunch	64.4%	35.6%	5.9%	32.4%	61.8%
At dinner	35.9%	64.1%	23.1%	28.2%	48.7%
Frequency of sugary drink consumption					
Once a day	88.9%	11.1%	29.8%	26.7%	43.5%
Twice a day	42.4%	57.6%	36.8%	30.5%	32.7%
More than three times a day	27.5%	72.51%	30.9%	29.5%	39.6%

The results of the analysis regarding the association between the frequency of food consumption and sweetened beverages with the dmft scores showed a positive correlation between them, the relation being statistically significant ($r = 0.046$, $p = 0.13$).

Discussions

Dental caries is one of the most prevalent chronic diseases of the childhood. Many studies identify the prevalence of caries in different parts of the world, dmft values varying according to age, eating habits and hygiene. The diet, especially sweetened foods and drinks, has a major influence on the appearance of dental caries because today's diet contains an increasing range of fermentable carbohydrates, including highly processed starch-containing foods and foods that contain novel synthetic carbohydrates such as oligofructose, sucralose, and glucose polymers. Research continues to identify foods and factors that protect against dental caries and those that have a practical dietary application in order to reduce the carious experience (10-16).

Besides the quantity and frequency of sugar consumption, the consistency of consumed foods is important. There are studies that incriminate the stickiness of foods as a factor in the initiation of caries (17,18) and others have shown that semisolid and even liquid sugar-containing foods can be very cariogenic (19).

The frequency of teeth exposure to sugar-containing foods is also a critical

factor in the promotion of caries (20,21). The results of the Vipeholm study (17) have indicated a positive correlation between the frequency of consumption of sugary food and the DMF rate in the sense that a higher frequency of consumption of sweetened foods increases the value of the DMFT index. Against the general perception that frequency of intake is more important than the amount of sugars eaten, two longitudinal studies reported the amount of sugars intake to be more important than frequency. The results of our study are similar to those of previous studies, the prevalence of caries being higher in children who have an increased frequency of consumption of sweetened foods (22).

There are systematic reviews that found a weak association between caries risk and sugar consumption, the authors suggesting that controlling for sugar is good, but it may not be the most important preventive measure (23,24). The study of Stephen and Millet suggested that the local side effects of dietary habits are modified by the thickness of plaque (25). Studies on percentage of caries free children in Basel, Switzerland revealed an increase in the percentage of caries free 7 year old children from 2-3 % to 65% with the introduction of fluoride tablets, fluoride toothpastes and increased awareness, education programs, the caries free percentage of 7 year old children increased to 65% despite substantial increase in sugar consumption

post world war two. Hence our results in this analysis examining the changes in odds of dental caries experience, or changes in the odds of severity of dental caries with the changes in total sugar consumption as percentage of daily calories intake from sugar confirms historical evidence of poor association between total sugar consumption and dental caries experience(26).

Conclusions

Dental caries is a major public health problem because of the prevalence of dental caries among schoolchildren that has been shown to be high. The study indicated a statistical relationship between the frequency of consumption with the prevalence of dental caries and dmft score and the need to implement dental health and nutrition intervention programs for schoolchildren.

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