

ORAL AND FOOD HYGIENE HABITS OF SCHOOLCHILDREN IN IASI, ROMANIA

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ABSTRACT

The **aim** of the present study was to assess the oral and food hygiene habits of school children in Iasi in order to establish the necessary preventive measures. **Material and methods:** The study was cross-sectional and included 533 children aged between 7 and 12 years in Iasi. For the assessment of food hygiene habits, a questionnaire was used to record food consumption over a 4-day period. For oral hygiene assessment, the Silness-Löe bacterial plaque index was used. **Results:** the highest percentage of the children (43.71%) declared a moderate consumption of carbohydrates. Most of the investigated subjects (61.16%) declared a high frequency of sugar consumption. 45.59% of the children in the study had a less good oral hygiene. **Conclusion:** The results of the study highlight the need for effective oral health education, addressed not only to children but also to parents and teachers.

Key words: diet, oral hygiene, schoolchildren.

INTRODUCTION

The role of sugar consumption and bacterial plaque in dental caries development is well-known and highlighted in the literature (1), and interventions on food hygiene and oral hygiene behaviors are two of the main measures recommended by the World Health Organization for dental caries primary prevention.

Dental caries progresses with age, and the effects of sugars on the dentition are lifelong. Even low levels of caries in childhood are of significance to levels of caries throughout the life-course. Analysis of the data suggests that there may be benefit in limiting sugars to < 5% of the energy intake to minimize the risk of dental caries throughout the life course (2, 3).

In this context, the aim of the present study was to assess the oral and food

hygiene habits of school children in Iasi in order to establish their involvement as risk factors and, subsequently, the necessary measures for dental caries primary prevention.

MATERIAL AND METHODS

The study was cross-sectional and included a sample of 533 children aged between 7 and 12 years in Iasi, attending schools in different neighborhoods of the city, schools presenting dental offices. 50.47% of the subjects were male, and 49.53% were female.

The evaluation of oral hygiene and diet was done for the purpose of further enrolling children in caries risk groups, which was why the determination was made according to the protocols of the cariogram and the data was recorded according to its scores (4).

For the assessment of food hygiene habits, a questionnaire was used to record food consumption over a 4-day period, including the end of the week. Children were asked to write in the form, during the 4 days, each time they consumed food or drinks, the amount consumed (in units of households) and the corresponding time. When two intakes of food containing carbohydrates were found at less than 20 minutes, they were recorded cumulatively. At the end, the consumption average of 4 days was calculated as the content and frequency of consumption of carbohydrates. The following scores were available for assessing the carbohydrates content of food: score 0= very reduced consumption of fermentable carbohydrates; score 1 = reduced consumption; score 2 = moderate consumption; score 3 = high consumption of fermentable carbohydrates. The available scores for recording the frequency of the carbohydrates consumption were: score 0 = very low frequency of carbohydrates consumption, maximum 3 times in 24 hours; score 1 = low frequency of carbohydrates consumption, maximum 5 times in 24 hours; score 2 = high frequency of carbohydrates consumption, maximum 7 times in 24 hours; score 3 = very high frequency of carbohydrates consumption, more than 7 times in 24 hours.

For oral hygiene assessment, the Silness-Löe bacterial plaque index was used.

Children participation in the study was conditioned by parental written consent. Children also had the opportunity to accept or refuse participation.

Data privacy as well as the impossible identification of subjects in the case the results are published were guaranteed.

SPSS 17.0 was used for the statistical analysis of data. The statistical significance threshold p was set at 0.05; chi-square test was used for data comparison and correlation analysis was performed using Spearman test.

RESULTS

The analysis of data from food questionnaires indicated that the highest percentage of the children included in the study declared a moderate consumption of carbohydrates (43.71%), 30.21% declared an increased consumption of carbohydrates and only 26.08% had a low consumption. According to age group, it was found that in most 7 to 8-year-old children the consumption of carbohydrates was increased, while in children aged 9 to 12 the moderate consumption predominated and increased consumption was encountered to the smallest extent (Table 1).

Table 1. Children distribution according to carbohydrates consumption and age groups (%)

Age group	Carbohydrates consumption		
	<i>Reduced</i>	<i>Moderate</i>	<i>High</i>
<i>7 years</i>	16.9	34.9	48.2
<i>8 years</i>	22.2	35.6	42.2
<i>9 years</i>	31	41.4	27.6
<i>10 years</i>	30.8	53.8	15.4

<i>11 years</i>	28.6	42.9	28.6
<i>12 years</i>	26.5	52	21.4
<i>Total</i>	26.08	43.71	30.21

The chi-square statistical analysis indicated that the differences found among subjects belonging to different age groups in terms of the distribution of the scores of the "carbohydrates content of the food" factor were statistically significant ($p < 0.01$), and Spearman correlation coefficient indicated an inverse correlation, although weak, between age and the consumption of carbohydrates ($r = -0.164$).

More important, for the purpose of assessing caries risk, than the amount of carbohydrates consumed is the frequency of this consumption. After analyzing the data from the questionnaires, it was found that more than half of the investigated subjects

(61.16%) declared a high frequency of sugar consumption, of maximum 7 times in 24 hours (Table 2), and 13.32% consumed carbohydrates with a very high frequency, of more than 7 times / day. Only 0.38% of the children declared a very low frequency of the consumption, of maximum 3 times / day.

Separate analysis by age group showed that the maximum frequency of consumption was most encountered in 7-year-olds group - more than a quarter of them (28.9%) consumed carbohydrates more than 7 times in 24 hours. Instead, the low frequency of carbohydrates consumption begins to be declared more often starting with the age of 9 years.

Table 2. Children distribution according to the frequency of carbohydrates consumption and age groups (%)

Age group	Frequency of carbohydrates consumption			
	<i>Max. 3 times/day</i>	<i>Max. 5 times/day</i>	<i>Max. 7 times/day</i>	<i>>7 times/day</i>
<i>7 years</i>	1.3	21.7	48.1	28.9
<i>8 years</i>	2.2	20	64.4	13.3
<i>9 years</i>	2.4	31	52.8	13.8
<i>10 years</i>	2.1	23.1	67.1	7.7
<i>11 years</i>	2.9	28.6	61.4	7.1
<i>12 years</i>	3.2	26.5	60.1	10.2
<i>Total</i>	2.3	25.1	59.1	13.5

The differences found between age groups were statistically significant ($p < 0.01$) and the correlation between carbohydrates consumption and age was

inverse, weak: the frequency of consumption decreases with increasing age (Spearman correlation coefficient = -0.109).

Evaluation of oral hygiene showed that almost half of the children in the study (45.59%) had a less good oral hygiene and one quarter of them (25.70%) - an unsatisfactory oral hygiene, given by a bacterial plaque index $PI > 2$ (Table 3).

In relation to the age group, the highest percentage of children with unsatisfactory oral hygiene was encountered at the age of 7 - 47%, while at the age of 10, the percentage

of children with good oral hygiene and that of children with unsatisfactory oral hygiene were equal (38.5%).

Chi-square analysis found that the differences in oral hygiene between age groups were statistically significant ($p < 0.01$) and the correlation between oral hygiene and age was inverse, weak (Spearman correlation coefficient = -0.121).

Table 3. Children distribution according to oral hygiene and age groups (%)

Age group	Oral hygiene		
	Good ($PI = 0.4-1.0$)	Less good ($PI = 1.1-2.0$)	Unsatisfactory ($PI > 2.0$)
7 years	20.5	32.5	47
8 years	20	64.4	15.6
9 years	34.5	48.3	17.2
10 years	38.5	23.1	38.5
11 years	28.6	50	21.4
12 years	29.6	54.1	16.3
Total	28.7	45.6	25.7

DISCUSSION

The development of oral diseases is the result of complex interaction of etiological factors and a number of risk factors, modulated by means of protective factors.

Dental caries is caused by a combination of infection and diet. This disease, if left untreated, may lead to pain, and impair the quality of life (5).

The detailed assessment of caries risk elements showed that most of the investigated children had moderate consumption of carbohydrates, but 30.21% reported a high consumption. These data, along with the prevailing frequency of

carbohydrates consumption of maximum 7 times /day (considered high in terms of caries risk), make the food factor fall in the category of risk factors for dental caries in the examined group. Moreover, 13.32% of the children studied reported a carbohydrates consumption of more than 7 times a day.

In childhood, carbohydrates provide over 60% of the body's energy, which is why their consumption can not be banned or severely restricted. Preventing tooth decay is, however, possible by ordering the consumption timetable, and the fact that more than half of the examined children consumed carbohydrates with high and very

high frequency indicates the lack of awareness, not only by children but also by parents, of the unfavorable effect that this consumption may have on dental hard tissues.

Although the connection between sugar consumption and dental caries has long been demonstrated, the current conditions make this link no longer so obvious. A study carried out in the UK by the Nutrition Foundation shows that the significant decline in dental caries in school-age children in Western European countries is due to increased exposure to fluoride and improved oral hygiene, as sugar consumption has practically remained the same (6, 7). Moreover, many of the studies in the last 10 years found no longer a significant association between sugar consumption and oral health.

In addition, the analysis of this correlation is complicated by the multiple facets of sugar consumption, such as the total amount consumed, the frequency of ingestion, eating between meals or during meals, the variable amount of sugar in the food, the possible interactions between sugar and starch, and the physical form under which sugar is consumed.

Oral hygiene, too, was included in the category of risk factors identified in the examined group, as 45.59% of the subjects presented the score 2 of the Silness-Löe bacterial plaque index, meaning a less good oral hygiene, determined not only by the lack of knowledge about the involvement of the bacterial plaque as the main etiological factor in the development of dental caries and gingivitis, but also by the lack of knowledge on the effective ways of its removal.

The literature suggests that, in the case of children, nutrition and oral hygiene can be counterbalanced so that the development of

caries lesions can be controlled even in the case of a cariogenic diet, provided that rigorous oral hygiene is maintained (8, 9, 10).

The recommendation that sugar intakes should be $\leq 10\%$ of energy intake is no longer acceptable. The much greater adult burden of dental caries highlights the need for very low sugar intakes throughout life, e.g. 2–3 % of energy intake, whether or not fluoride intake is optimum (11).

Few aspects of health are as accessible to personal control as oral hygiene, which can be improved by simple behavioral changes. A dental health education program, which has as its objective, the improvement of the oral hygiene status of the participants would have obvious merits (12, 13).

The mechanical removal of dental plaque, if effectively carried out, can be the most effective method of maintaining good oral hygiene, reducing tooth decay, and promoting better gingival health. Various methods are employed to maintain oral hygiene, of which the most common is toothbrushing. It is an effective way of removing plaque, preventing gingivitis, and also managing dental caries. However, the value of uncontrolled toothbrushing in prevention of dental caries has always been questioned. Effective plaque removal depends not only on the type of toothbrush but also on the proper brushing technique. It is obvious that manual dexterity and motivation of an individual are of paramount importance in maintaining oral hygiene (14).

Beside the mechanical effect of toothbrushing, the use of a fluoride toothpaste may bring the highest benefits, as fluoridated toothpastes are considered to be the main factor that led to the decrease in the prevalence of dental caries in developed countries (15, 16). Laser technology may be also an appropriate alternative for many

conventional procedures in pediatric dentistry, included caries prevention (17, 18).

Of course, the prevalence and severity of oral diseases are influenced by a number of other different variables, such as the implementation of preventive programmes, patients' oral health education and behaviour, patients', dental students' and dentists' attitudes toward oral health, as well as the availability, accessibility and quality of dental care (19, 20).

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CONCLUSION

Most of the schoolchildren in the studied group declared a moderate or high consumption of carbohydrates, with a high frequency of intake. Most of them showed a less good oral hygiene.

The results of the study highlight the need for effective oral health education at all three levels (individual, group and population), addressed not only to children but also to parents and teachers.

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