ORIGINAL ARTICLE

Frequency of sweet and salty snack consumption among children in relation to their mothers' education level

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ABSTRACT

Aim To investigate the frequency of consumption of sweet and salty snacks among children aged 2-18 years in relation to their mothers' education level.

Methods A descriptive epidemiological study was conducted in five dental practices at the School of Medicine of the University of Mostar from May to October 2022. The data were collected from medical records.

Results: Out of a total of 477 children, 172 (36.1%) had mothers with a high school education, while 305 (63.9%) had mothers with a university degree. In the group of preschool children (aged 2-6 years), there were 42 mothers with high school education and 105 with university degree. In the group of school children (age 7-18 years) there were 130 mothers with high school education and 200 with university degree. The difference in the consumption of sweetened beverages among children of mothers with high school and university was not statistically significant. Similar results were found for the consumption of salty snacks, lollipops, caramels and candies. The frequency of the consumption of biscuits, chocolate and cakes (several times a day) was statistically significantly higher among the children of mothers with high school education (p=0.04), especially among school children. Eating habits of children, regardless of the level of education of their mothers, differed significantly only in the consumption of lollipops, caramels, and candies (p=0.03), which were consumed once a day by 79 (63.7%) schoolchildren and 45 (36.3%) of pre-schoolers.

Conclusion A higher level of education among mothers does not necessarily equate to proper nutritional knowledge.

Key words: child, eating habits, family, snacking

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Original submission:
24 April 2023;
Revised submission:
04 June 2023;
Accepted:
07 June 2023
doi: 10.17392/1618-23

Med Glas (Zenica) 2023; 20(2):282-287

INTRODUCTION

Proper nutrition is essential for normal growth and development of children. Inadequate nutrition can lead to serious diet-related diseases later in life (1). Children's eating habits develop under the influence of the environment in which they grow up, primarily the family environment and the eating habits of the family (2). Parents and family environment should set a positive example for adopting healthy eating habits that can be maintained later in life.

Awareness of healthy eating requires certain knowledge. Developed countries have educational programs on healthy nutrition for all socioeconomic categories (3). Several studies have described the association between low socioeconomic status (SES) and unhealthy diets that lead to diseases such as cardiometabolic disease, obesity, and caries (4-6).

Healthy eating habits in children can be related to the level of education of parents, especially mothers (7-10). However, general education of mothers does not necessarily mean proper nutritional knowledge. Some studies have shown no significant relationship between mother's education and children's nutrition outcomes (11,12). Certain studies have shown that infants are more likely to accept certain foods if the mother consumed them during pregnancy and breastfeeding because the sense of taste develops in utero (13,14). In developed countries, programs have been designed to provide all mothers with information on healthy eating habits from pregnancy to the end of the second year of child's life (15).

Excessive intake of salt and sugar is among the preventable risk factors for obesity and chronic diseases (16). Many studies worldwide discuss factors that influence children's dietary habits (4-7). A survey study among adolescents in Mostar city, Bosnia and Herzegovina (B&H), conducted in 2020, showed a significant deviation in eating habits (17). Studies linking risk factors, including the level of mother's education, with obesity and dental caries in children have been published in B&H (5,18). However, studies examining the relationship between children's dietary habits and the level of mother's education or her nutritional knowledge have not been published.

The aim of this study was to investigate frequency of the consumption of sweets and salty snacks among children aged 2-18 years in relation to the mothers' education level, based on data from the city of Mostar, B&H.

PATIENTS AND METHODS

Patients and study design

This descriptive epidemiological study included 477 children aged 2-18 years. Data on the frequency of consumption of sweets, sweetened beverages, and salty snacks among preschoolers (aged 2-6) and school children (aged 7-18), whose mothers had either a high school or university degree, were collected from medical records in five dental practices, which are commonly used as teaching bases of the School of Medicine of the University of Mostar, during the period from May to October 2022.

All mothers voluntarily participated in the study and gave their consent.

Research was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of the School of Medicine of the University of Mostar.

Methods

The medical records used in this study consisted of three parts. In the first part, there were data collected from mothers prior to the dental examination of their children. The collected data were about socioeconomic status, including the level of mothers' education, and children's eating habits (frequency of consumption of healthy and unhealthy food).The second part contained data on physical and oral health, and the third part contained data on periodontal status. For this research data were used from the first part of the medical records, specifically on the frequency of consumption of sweet and salty snacks in relation to the mother's education level, with answers categorized as "once a week," "once a day," or "several times a day." The data were analysed in accordance with the recommendations of the American Academy of Pediatric Dentistry (AAPD) (1).

Statistical analysis

Standard descriptive statistical methods were used for data analysis. The χ^2 test and Fisher's exact test were used to determine statistically significant differences according to mother's educational level. The level of statistical significance was $p < 0.05$.

RESULTS

Out of the total of 477 children aged 2-18 years, the mean±standard deviation (SD) of age was 8.79±3.61 years. There were 172 (36.1%) mothers with high school education and 305 (63.9%) mothers with a university degree. The difference in the consumption of sweetened beverages among children (2-18 years) of mothers with high school and university degree was not statistically significant (p=0.56). Similar results were found for the consumption of salty snacks (p=0.11) and lollipops, caramels, and candies (p=0.63). However, the frequency of the consumption of biscuits, chocolate and cakes (several times a day) was statistically significantly higher among the children of mothers with high school education (p=0.04) (Table 1).

In the group of preschool children (aged 2-6 years) the mean±SD of age was 4.53± 0.84 years, with 42 (28.6%) mothers having high school education and 105 (71.4%) university degree. In the group of school children (aged 7-18 years) the mean age was 11.01±3.19 years, with 130 (39.4%) mothers having high school education and 200 (60.6%) having university degree. Comparing results of eating habits among preschoolers and schoolchildren in relation to the education level of mothers, the data showed a significant difference only in the consumption of biscuits, cakes and chocolate (p=0.04) (Table 2).

School children with mothers having high school education consumed biscuits, chocolate, and cakes (several times a day) significantly more often than those with mothers having university degree.

The eating habits of preschool and school children, regardless of the level of education of the mothers, differed significantly only in the consumption of lollipops, caramels and candies (p=0.03). The frequency of consumption of lollipops, caramels, and candies was once a day for 79 (63.7%) school children and 45 (36.3%) pre-schoolers. In our study 24 (32.9%) preschool children and 49 (67.1%) school children consumed sweetened beverages several times a day, regardless of the level of education of their mothers; 91 (31.7%) preschool and 196 (68.3%) schoolchildren consumed biscuits, chocolate and cakes daily.

Table 1. Frequency of the consumption of sweet and salty snacks among 477 children aged 2-18 years

Variable	Frequency	No (%) of mothers with education		p
		High school	Faculty degree	
Overall poor eating habits		172 (36.1)	305 (63.9)	
Consumption of juices, sweetened tea, sweetened milk	Once a week	46 (26.7)	91 (29.8)	0.56
	Once a day	96 (55.8)	171 (56.1)	
	Several times a day	30 (17.5)	43 (14.1)	
Consumption of salty snacks (chips, etc.)	Once a week	72 (41.9)	145 (47.5)	0.11
	Once a day	82 (47.6)	143 (46.9)	
	Several times a day	18 (10.5)	17 (5.6)	
Consumption of biscuits, chocolates, cakes, etc.	Once a week	43 (25.0)	72 (23.6)	0.04
	Once a day	93 (54.1)	194 (63.6)	
	Several times a day	36 (20.9)	39 (12.8)	
Consumption of lollipops, caramels, candies	Once a week	117 (68.0)	214 (70.2)	0.63
	Once a day	45 (26.2)	79 (25.9)	
	Several times a day	10 (5.8)	12 (3.9)	

DISCUSSION

Children's eating habits are influenced by various factors, such as genetic predispositions, family environment, socioeconomic status, social environment, media influences, gender, birth weight, early eating styles, and flavour experiences (2,19,20). Our study has shown increased consumption of sweet and salty snacks among

Table 2. Frequency of the consumption of sweet and salty snacks among preschool (aged 2-6) and school children (aged 7-18) in relation to mother's education level

Variable	Frequency	No (%) of mothers with education of preschool children (age 2-6)		p	No (%) of mothers with education of school children (age 7-18)		p
		High school	Faculty degree		High school	Faculty degree	
Overall poor eating habits		42 (28.6)	105 (71.4)		130 (39.4)	200 (60.6)	
Consumption of juices, sweetened tea, sweetened milk	Once a week	14 (33.3)	33 (31.4)	0.23	32 (24.6)	58 (29.0)	0.68
	Once a day	18 (42.9)	58 (55.3)		78 (60.0)	113 (56.5)	
	Several times a day	10 (23.8)	14 (13.3)		20 (15.4)	29 (14.5)	
Consumption of salty snacks (chips, etc.)	Once a week	19 (45.2)	47 (44.8)	1.00	53 (40.8)	98 (49.0)	0.06
	Once a day	21 (50.0)	52 (49.5)		61 (46.9)	91 (45.5)	
	Several times a day	2 (4.8)	6 (5.7)		16 (12.3)	11 (5.5)	
Consumption of biscuits, chocolates, cakes, etc.	Once a week	8 (19.1)	23 (21.9)	0.65	35 (26.9)	49 (24.5)	0.04
	Once a day	25 (59.5)	66 (62.9)		68 (52.3)	128 (64.0)	
	Several times a day	9 (21.4)	16 (15.2)		27 (20.8)	23 (11.5)	
Consumption of lollipops, caramels, candies	Once a week	27 (64.3)	64 (60.9)	0.96	90 (69.2)	150 (75.0)	0.19
	Once a day	12 (28.6)	33 (31.5)		33 (25.4)	46 (23.0)	
	Several times a day	3 (7.1)	8 (7.6)		7 (5.4)	4 (2.0)	

preschool and school children comparing to the evidence-based dietary recommendations for children (1). The frequency of consumption of biscuits, chocolates, and cakes (several times a day) was statistically significantly higher among the children of mothers with high school education, especially among school children.

A study from Brazil, involving 599 children between the ages of 6 months and 2 years, showed that 79.4% of children consume ultra-processed foods, including treats, artificial sweeteners, and sugar-sweetened beverages. These eating habits were correlated with a lower level of education of parents and persons who took care of children's nutrition (21). Research from primary schools in the southern part of the Netherlands included 1318 parent-child dyads. The results showed that children of mothers with a high education level had better eating habits, consumed more pieces of fruit per day, more grams of vegetables per day, and were more likely to have breakfast on a daily basis than children of mothers with a low education level (9).

In recent years, excessive salt and sugar intake has been observed in all age groups worldwide. Genovesi et al. (22) literature review showed recommendations for salt and sugar intake in accordance with the age of children (1,23). However, data from the United States and Italy have shown that the intake of sweets and salt in children under the age of 5 exceeds the upper level (24-26). Similar data were presented by a survey in six secondary schools in Mostar in 2020: the study involved 482 adolescents (279 boys and 203 girls) aged 17 and 18, and showed that 47.7% of boys and 44.3% of girls consumed sweetened beverages every day (17). The study from the city of Osijek in Croatia, including 117 high school students (72 girls and 45 boys), showed that 15.9% of boys and 26.4% of girls consumed sweets and soft drinks daily (27). In our study 32.9% preschool children and 67.1% schoolchildren consumed sweetened beverages several times a day.

Excessive consumption of sweetened beverages can contribute to obesity, insulin resistance and fatty liver disease (16). Data on children's poor eating habits from our and similar studies around the world are worrying.

A study from Banja Luka (Republika Srpska, B&H), conducted on a group of 119 adolescents, showed that the frequency of consuming sweets and cakes was once a day in 32.8% and more than 3 times a day in 14.3% cases (28). A survey of 229 high school students aged 15-18 years in the municipality of Travnik (B&H) conducted in 2016, showed that 44.6% of girls and 34.4% of boys consumed sweets and snacks every day (29). In our study 31.7% preschool and 68.3% schoolchildren consumed biscuits, chocolate and cakes daily. Excessive consumption of salt and sugar can lead to metabolic disorders and obesity (30,31), poor dietary habits, especially frequent consumption of sweets, are also associated with dental caries (32,33).

Recent studies have shown that eating habits do not depend solely on formal education but are influenced by social and environmental factors, availability of certain foods, and nutritional literacy (12). It has been found that many mothers are not aware of the actual amount of salt and sugar in certain foods (34).

The main limitation of this study is that the data collected from medical records in dental practices were not linked to data from paediatric practices. In this study, there were more mothers with a university degree than with a high school degree, which may indicate that highly educated mothers may be more concerned about oral health. In our sample, there were no mothers with primary education or without education, although we know that they are present in practice. Further research may focus on a correlation between poor eating habits and certain diseases, such as caries and obesity.

In conclusion, there is a clear increase in the consumption of processed food in B&H and around the world. While mothers' education can have influence on children's eating habits, nutritional literacy is more crucial. Healthy eating habits should be an integral part of the educational program for pregnant women, parents, and caregivers. Nutritional education programs should also be integrated into preschools, schools, and children's groups. Inadequate nutrition and unhealthy lifestyles can lead to a wide range of metabolic and health problems in the adult population later on.

FUNDING

No specific funding was received for this study.

TRANSPARENCY DECLARATION

Conflicts of interest: None to declare.

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