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ASSESSMENT OF HEALTH BEHAVIOUR AMONG SCHOOL AGE CHILDREN REGARDING THEIR PHYSICAL ACTIVITY AND EATING HABITS

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Abstract

Proper eating habits and physical activity are important part of healthy lifestyle, therefore they should be adopted in younger age. This study aims to determine representation of physical activity and assesment of eating habits of the school age children regarding their age and therefore suggest proper health improvement measures of the school age children. The instrument of the study was question-naire specifically designed for the research purposes, predicted for AutoFill. Retrospective cross sectional study was carried out on the sample of 150 respondents divided in three groups based on their school age, of which 82 (54,7%) were girls and 68 (45,3%) were boys. Number of students actively involved in sport significantly decreases with older school age (p=0,0001). Furthermore, time spent in walk or bicycle riding is also decreasing with older school age (p=0,006). On the contrary, time spent in front of a TV or com-puter is significantly increasing with age (p=0,0001). There is obvious problem of overweight and obese children and adolescents, affected more than 1/5 of the 3rd grade High school children. Educational and health institutions should be more engaged in resolving this problems, in order to promote health and prevent later diseases and/or complications.

Key words: **dietary pattern, overweight children, adolescents, junk food, sedentary behaviour**

Introduction

School children are representing one third of the popula-tion. Population this large, which represents future, re-quires special attention, especially in the terms of health. With life conditions improvement, raising level of health culture, numerous diseases are vanished. Among this population, age interval from 15 till 18 years is espe-cially critical. There is clear connection between obesity in child age and obesity in later in the adulthood. Even 77% children with body mass index (BMI) equall or higher from 95th percentile has BMI equall or higher than 30 kg/m^2 in the adulthood, although only 7% of children with normal BMI in childhood become obese in the adulthood (Freedman et al., 2001).

There are many convincing evidences that children and adolescents spend majority of the day physicaly inactive (sedentary lifestyle). However, physical inactivity differs among young people regarding their interpersonal skills, personal characteristics and enviromental factors as well (Gomes et al.,2015). Physicall inactivity represent main/leading risk factor for development of coronary disease, it increases risk of cerebrovascular stroke/incident and other major cardiovascular risk factors, such as obesity, high bood pressure, low level of HDL and diabetes.

Proper eating habits are important part of healthy lifestyle, and they should be adopted in younger age as such. Bal-anced diet of youngsters is a foundation for healthy growth, preservation and promotion of health, on the one hand, and could be cause of illness or its complications, on the other hand (Nelms, 2001). Eating habits are mostly adopted in childhood, within circle of family and friends, and they af-fect „junk food" consumption frequency in the adulthood (French et al., 2001).

Significant connection is proved between health behaviour in the youth with lifestyle and health behaviour in the adult-hood. Prevention of negative health behaviour pattern es-tablishment in the early age is considered to be simpler and more effective rather than attempts of alteration already es-tablished patterns in the older age/adulthood.

This study aims to assess health behaviour among school age children regarding their physical activity and eating habits, and, furthermore, to suggest proper health improv-ment measures of the school age children.

Methods

Participants

This study reperesents retrospective cross sectional study carried out on the sample of 150 respondents divided in three groups based on their age, who don't suffer from severe chronical disease and voluntary participated in this study. The first group is consisted of the fifth grade elementary school pupils; the second group is consistent of nineth grade elementary school pupils; the third group is consisted of the third grade high school pupils (50 respondents each group). Interviewed pupils were from Elementary School „Musa Ćazim Ćatić" in Sarajevo, and Catholic High School-Medical School department in Sarajevo.

Variables sample

The instruments of the study was Questionnaire designed for this research purposes, with required measurements by medical professional. Questionnaire is designed and adapted by the Department of Public Health and Preventive Medicine, Faculty of Medicine, University of Sarajevo, based on standardized Food and Frequency Questionnaire „FFQ" (Johansson et al. 2002), Physical Activity Questionnaire for Children „PAQ-C" (Kowalski et al., 1997) and Physical Activity Questionnaire for Adolescents „PAQ-A" (Kowalski et al., 1997).

Questionnaire is consisted of general informations (school age, sex) and chapters related to the eating habits (number of meals, eating speed, frequency of eating breakfast, sweets righ after waking up, type of snacks and beverages in schools, frequency of eating fruits, vegetables, fish, meat, candies, milk and dairy products, type of beverages in general) and phyisical activity/inactivity (time spent in sport activities, walk, bicycle riding, in front of a TV or computer). Body weight and height were measured and BMI calculated on site by medical professionals.

Statistical analysis

Statistical analysis was performed using SPSS software (version 23.02., SPSS Inc, Chicago, Illinois, USA). Values were expressed as frequency and percentages. Analysis of associations of the outcome and risk factors was performed by Pearson Chi-square test for independent samples. Results of the analysis were considered statistically significant with p-value less than 0.05 %.

Results

The study included 150 patients, of which 82 (54,7%) were girls and 68 (45,3%) were boys. According to our research activity plan, respondents are divided in 3 groups, based on a school age. The first group is consisted of the fifth grade elementary school pupils, the second group is consistent of nineth grade elementary school pupils, the third group is consisted of the third grade high school pupils.

Gender distribution analysis shows that in the 5th grade Elementary school (ES) there was 56% of boys and 44% of girls. In the 9th grade of Elementary School (ES), boys and girls were equally represented (50%), and and in the 3rd grade of High School (HS), ¨girls were dominant (70%) over boys (30%).

Number of students actively involved in sport significantly decreases with older school age (p=.0001), with 84% pupils in the 5th grade ES, 56% pupils in the 9th grade ES and 28% pupils in the 3rd grade HS (Table 1).

Table 1. Distribution of the respondents in relation to school age and sport activity

			Class			Total
			5th ES	9th ES	3rd HS	
Actively involved in sport	Yes	N	42	28	14	84
		%	84,0	56,0	28,0	56,0
	No	N	8	22	36	66
		%	16,0	44,0	72,0	44,0
Total		N	50	50	50	150
		%	33,3	33,3	33,3	100,0
χ^2=31,818; df=2, p=.0001						

Furthermore, time spent in walk or bicycle riding is also statistically significantly decreasing with older school age (p=.006) (Table 2).

Table 2. Distribution of the respondents in relation to school age and time spent in walk or bicycle riding

			Class			Total
			5th ES	9th ES	3rd HS	
Time spent walking or riding bicycle (daily)	Less than an hour	N	9	16	26	51
		%	18,0	32,0	52,0	34,0
	1-3 hours	N	35	26	21	82
		%	70,0	52,0	42,0	54,7
	More than 3 hours	N	6	8	3	17
		%	12,0	16,0	6,0	11,3
Total		N	50	50	50	150
		%	33,3	33,3	33,3	100,0
χ^2=14,506; df=4, p=.006						

On the contrary, time spent in front of a TV or computer is significantly increasing with age (p=.0001) (Table 3).

Table 3. Distribution of the respondents in relation to the school age and time spent in front of a TV or computer

			Class			Total
			5th ES	9th ES	3rd HS	
Time spent in front of a TV or computer (daily)	Less than an hour	N	27	7	11	45
		%	54,0	14,0	22,0	30,0
	1-3 hours	N	19	24	24	67
		%	38,0	48,0	48,0	44,7
	3-5 hours	N	4	14	14	32
		%	8,0	28,0	28,0	21,3
	More than 5 hours	N	0	5	1	6
		%	0,0	10,0	2,0	4,0
Total		N	50	50	50	150
		%	33,3	33,3	33,3	100,0

$\chi^2 = 28,930$; df= 6, p=.0001

Analysis of the number of the meals shows that most of respondents consume 3 or 4 meals per day in all interviewed groups, with non-significantly decrease in older age (p=.094). Most of the respondents in all 3 groups eat with moderate speed, although it's observed that speed of eating is significantly increased with older school age with 6% in the 5th class of ES, 18% in the 9th class of ES and up to 30 % in the 3rd grade of HS, with statistically significant difference (p=.003). All of the 5th graders in our study eat breakfast (100%), while 88% of the 9th grade ES pupils and 80% of the 3rd grade HS pupils do so. This difference is statistically significant (p=.005). Even though percentage of the respondents who eat sweets right after awakening increases with older age, from 4% in the 5th grade up to 14 % in the 3rd grade, this is not statistically significant (p=.211). The 5th grade ES pupils mostly eat sandwich or fruit as a snack, 9th grade ES pupils pastry and sandwich, the 3rd grade HS pupils mostly pastry or nothing at all, which shows statistical significance (p=.0001). Mostly drunk beverage with snack is water in all grades, although there is significant difference when it comes to percentage of those who drink water with older school age, which decreases in older grades, and, respectively, percentage of those who drink sodas, juices and yogurt increases with older school age (p=.023).

Furthermore, frequency of vegetable consumption decreases with aging with statistically significant difference in relation of school age, therefore, 58% of 5th grade ES pupils, 46% of the 9th grade pupils and 26% of the 3rd grade pupils eat vegetable every day (p=.001). Even though frequency of fish consumption decreases with older age, this differences are not statistically different (p=.667). Most of the 5th and the 9th grade ES pupils eat fish once a week, and 3rd grade HS pupils mostly once in two weeks.

Frequency of meat consumption is mildly increasing with age; most of the respondents in all 3 groups eat meat every other day. Those results are without statistical significance (p=.388). Frequency of consumption of the sweets increases with school age, without statistical significance (p=.233). Frequency of the milk and dairy products consumption significantly decreases with age (p=.001), in a way that daily consumption of milk and dairy products was in 80%, 54% and 42% of the 5th, 9th and 3rd grade pupils, respectively. Water is shown as main beverage during the day in all groups, but statistically significant difference is reported in a way that percentage of those who drink mainly water decreases, and, respectively, number of those who consume juices and milk as main beverage during the day increases with older school age (p=.018).

Discussion

Some of the major factors which affect increase of mortality and morbidity rate in the general population and which could be influenced upon are irregular eating habits, physical inactivity, smoking, sleeping habits. Reduction of exposition to those factors is one of the principle assignments of Primary Health Carte and society, as well.

Obesity is predisposing factor for appearance and development of many chronic non-contagious diseases, for example: cardiovascular diseases, hypertension, early atherosclerosis, diabetes mellitus type 2, endocrinological, orthopedic, psychosocial disorders etc. representation of obesity among school age children is steady growth. (Džubur et al., 2012). Children's body weight is affected with numerous factors, such as: high calorie diet, excessive food intake, lack of physical activity, increased time spent in sedentary activities. (Džubur et al., 2009).

In our study, there was 15, 3% overweight and obese respondents, 83, 3% of normal weight respondents, and 1, 3% of underweight respondents. In the 5th grade of elementary school, 92% of children had normal weight, 2% were underweight and 6% were overweight and obese. In the 9th grade of elementary school, there was 80% of normal weight pupils, percentage of the underweight pupils remain the same (2%), and 18% of the respondents were overweight or obese. In the 3rd grade of high school, there were no underweight respondents, 78% had normal weight and 22% were overweight or obese children. These results clearly show that number of overweight children is increasing with their age.

Available assessments for time period of 1980's and 1990's point out increase of obesity in the developed countries even two to five times more (e.g. from 11% up to over 30% in boys in Canada) and almost four times in the developing countries (e.g. from 4% up to 14%) in Brazil (Flynn et al., 2006). Study carried out in the Australia demonstrates a „plateau" or just mild increase in the percentage of the boys and girls classified as obese, almost without any change during last 10 years.

Prevalence is 21-25% for both overweight and obese boys and girls, respectively 5-6% for obese boys and girls itself. (Olds et al., 2010). Top two countries with the highest prevalence of overweight and obese youth are Malta (25,4% and 7,9%) and United States of America (25,1% and 6,8%), while two countries at the bottom of the list, with the least prevalence are Lithuania (5,1% and 0,4%) and Latvia (5,9% and 0,5%). Prevalence of overweight and obesity is significantly high in the North America, United Kingdom and southwest Europe (Janssen et al., 2005). Prevalence of obesity among our respondents increases with age. It is also confirmed with other studies, such as study of Kyungwon et al. (2008) carried out in Korea, and study of Cynthia et al. (2012) carried out in the USA.

Results of our study points that 56% of the respondents are actively involved in some sport. However, data showed that among them, there is very small part of the 3rd grade high school pupils, which is quite disturbing. Videlicet, in the 5th grade of elementary school even 84% of pupils were actively involved in sport, in the 9th grade 56%, and just 28% in the 3rd grade high school pupils. Similar results are reported in Sherar L. et al. research carried out in 194 boys and 207 girls. Their results demonstrate that physical activity rapidly decreases during childhood and adolescence (Sherar et al., 2007). Decrease of the physical activity with age was also a conclusion of study carried out in youth sample of 238 boys and 265 girls from age 6 till 18 years old divided in 4 groups based on age (Lopes et al., 2007), and study from 2011. year carried out among pupils from 10 till 19 years old. (Dumith et al., 2011). Children and adolescents should be engaged in one or more hours daily. Physical activity should be adjusted according to the age, pleasant and versatile. (Landry et al., 2012). According to the results of our study, the most pupils from the 5th grade of the elementary school (70%), spends 1-3h engaged in moderate, which includes walking, riding a bicycle, and 18% of them spends less than one hour to do so. With age, number of children spending less and less time in moderate physical activities is increasing, therefore, most of the 3rd grade high school pupils spend less than an hour in moderate physical activities (52%). Studies conducted in Canada indicates that 9% boys and 4% girls spend 60 minutes of moderate to intense physical activity at least 6 times a week, with boys being more active than the girls. Canadian children spent 8,6h per day (62% of their wake hours) accustomed to their sedentary activities. Based on results of that study it's shown that level of physical activities of Canadian children is very low (Colley et al., 2011). *National Health and Nutrition Examination Survey* show that children aged 6-11, 12-15, and 16-19 spend sitting approximately 6.1, 7.5 and 8.0 hours, respectively. It implies that there is higher level of physical inactivity in older age, which is complementary with results in our study (Pate et al., 2011).

In our opinion, reason for decreased level of physical activity in older age is multifactorial. It is noticeable that in past decades with rise of digital era, media is targeting children and adolescents, providing variety of interesting content. Children and adolescents are spending most of their time on line, watching TV, playing games, social networking, and numerous other digital stimuli which are very available and accessible. Older children are more submissive to those trends, but it is general concern that age limit for the virtual experiences is dropping low.

On the other hand, there is lack of infrastructure for the variety of sport activities that school aged children would find interesting. Even those who enjoy sport activities, face other obstacles, since active involvement requires a lot of expenditures, starting from the memberships and mandatory equipment to the travel costs, and even time for their parents to drive them back and forth to the practice, which is not always possible, in terms of parent's working hours or even possession of the vehicle. In the socio-economic matter of speaking, online activities and screen time are affordable alternative for the sports in the parent's eyes.

Children and adolescent are subjected to various social factors-socioeconomical status, culture, tradition, industrialization itself; thus, that group of population spends more and more hours in sedentary conditions (TV, videogames, and computer). In terms of spending time watching TV, 30% of the commercials shown are about food and other alimentary products, and 80% of those commercials is about unhealthy „junk food". Regarding unawareness' and lack of self-consciousness of this particular group of population about what this food does, there is bigger chance and probability that they will buy the food that was suggested via commercials on TV (Crowle and Turner, 2010). Boys and girls who are spending less time in front of a TV or at the computer has less chance to be obese, regardless the level of physical activity (Eisenmann et al., 2008). Time respondents spent in front of the TV or computer is statistically significantly bigger in relation to the age, according to the results of our study. Results of the study conducted in Romania on children aged 11-18 years show that high school pupils spend over 3h daily in front of their computers. Furthermore, the study among the young aged 2-18 years indicates that they spend 2-4h daily watching TV or at the computer, and even 5-10h sedentarily (Chiriţă, et al. 2006). Ethnicity, sociodemographics, parental behavior, whether they have TV or computer in the room, it all affects time period spent on watching TV (Salmon et al., 2011).

Our study analysis of number of the meals per day have shown that most of the respondents in all three groups consume 3 (40%) or 4 (40%) meals per day. Study carried out by Andre et al. (2005) resulted with similar percentage (43, 4%) of the respondents who had 4 meals per day, although the percentage of the respondents who had 5 meals per day (39%) was bigger than in our study (16%). Prevalence of the overweight and obese respondents increases with decrease of the number of the meals, which was also a result of the previously mentioned study (André

et al. 2005). Maruyama et al. (2008) affirms significant relation between eating speed and obesity, in order that persons who eat faster has increasingly higher chances to become overweight (Maruyama et al., 2008). Our study had shown that most of the respondents in all age categories eat with moderate speed, although it is notable that with older age, eating speed rises, from 6% in the 5th grade ES up until 30% in the 3rd grade HS, with statistical significance. Breakfast is the most important meal in the day, which has positive effect to the children's health. Skipping breakfast is common practice in the USA and Europe (even 30%) regarding age and population. Our research showed that all children in the 5th grade ES eat breakfast, and with older age percentage of the children who are skipping it increases (12% in the 9th grade ES and 20% in the 3rd grade HS). Similar results were found in the Netherlands study, with 3-16% of children skipped breakfast at age 4-11 years and 16-20% at the age 12-18 (Vingerhoeds, 2015).

In the study carried out in the USA, 20% of children skipped breakfast at age 9-13 years and 31, 5% at the age 14-18 years (Deshmukh-Taskar et al., 2010). Increased body mass in older grade students can be attributed to the type of food they eat for snack. Results of the our study show that majority of the 5th grade ES students takes fruit as a snack, which isn't the case in the older grades, who mainly eat pastry. Children in the higher grades eat more and unhealthierconducted in the USA (Finkelstein et al., 2008). Mostly used beverage with snack was water in all age groups, with significant difference in relation to the increase of the number of those who also consume sodas. Refreshing drinks with added sugar became a trend and desirable habit among children. Study carried out on 3098 respondents had also pointed out increase usage of the sugar sodas among adolescents regarding the children of younger age (Wang et al., 2009). Results of our study match results of the showing frequency of the fruit and vegetable consumption among children and adolescents decreases with age (Rasmussen et al., 2006). Our research indicates that consumption of meat increases, and consumption of fish decreases with older age, both non-significant. Similar results are acquired in Serbia (Šarčević et al., 2015). Candies were consumed everyday by 28% of the 5th graders up to the 50% of the 3rd grade High School students. German research conducted upon 7186 boys and 6919 girls showed that 16% of the respondents eat chocolate everyday and almost 20% eat other candies as well (Mensink et al., 2007). Everyday milk and dairy products consumption significantly differed among the school age, with total of 58, 7%. Therefore, in the 5th grade ES 80% of the students consumed milk and dairy products everyday, 54% in the 9th grade ES and 42% in the 3rd grade HS. Research conducted in the USA among children and adolescents showed that 77% of boys and 67, 4% of girls daily consume milk and dairy products (Kit et al., 2011). Main beverage during the day was water, in our study, even though part of the students who consumed sodas rises with age, at the expense of the water consumption.

Conclusion.

Based on the result analyses, we conclude that there is obvious problem of overweight and obese children and adolescents, affected more than 1/5 of the 3rd grade High school children. Younger school age children tend to eat healthier and be more physically active then the older ones. Time spent in front of a TV or computer considerably increases with older school age.

Center for disease control (CDC) recommends 30 minutes of moderate physical activity at least 5 times a week, for adults, and daily 60 minutes during whole week for the adolescents. (Buelow and Ngo, 2012). Two hours is a daily maximum for time spent in front of the TV or computer. (August et al., 2008). Eating breakfast gives you smaller chance to become overweight or obese, on the contrary, some studies have shown that skipping breakfast can be related to the body mass increase (Rampersaud et al., 2005). American Heart Association recommends at least two portion of fish per week in order to achieve cardio-protective effect. (Smith and Sahyoun, 2005). Educational and health institutions should be more engaged in resolving this problems, in order to promote health and prevent later diseases and/or complications.

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