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A STUDY ON THE DIETARY BEHAVIOR IN SCHOOL-AGED CHILDREN

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Abstract

Adopting a balanced and healthy diet is a public health system priority. The aim of this study is to identify dietary behaviors (consumption of fruit, vegetables, dairy products, pasta, meat, sweets, fast food) of a sample of pupils and whether there are significant differences in terms of demographic variables, such as age, gender and weight. In order to obtain data on the dietary behavior, a questionnaire containing 14 items was applied to a total of 234 schoolchildren, between 12 and 15 years. The field work was conducted between April and June 2014. Participation in this study was completely voluntary and the participants' anonymity was guaranteed. There were identified significant differences of dietary behavior by gender ($F_{(5, 228)} = 4.38$; $p < 0.001$; $\eta^2 = 2.25$), respectively ($F_{(4, 229)} = 2.58$; $p < 0.05$; $\eta^2 = 2.41$). As regards age, no significant differences were found ($F_{(5, 228)} = 1.95$; $p > 0.05$), respectively ($F_{(4, 229)} = 1.14$; $p > 0.05$) and weight ($F_{(5, 228)} = 1.97$; $p > 0.05$), respectively ($F_{(4, 229)} = 1.03$; $p > 0.05$). Analyzing the post ad-hoc Bonferroni tests, significant differences were identified between dietary preferences, depending on age, gender, and weight. The consumption of sweets and fast food is high. An unbalanced diet can have severe consequences on the health condition of the school population, leading to chronic diseases, like arterial hypertension, type 2 diabetes mellitus, etc.

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Keywords: Dietary behaviour, fast food, students, demographic variables, health condition.

1. Introduction

Adopting a balanced healthy dietary behaviour represents a priority of the public health system. Both children and young people are a very important target group because the early adoption of healthy dietary habits is the most effective method of maintaining long-term health condition. Society, family, education organizations, the media, as well as food industry, are focused on the improvement

of the dietary behaviour. The aim is to maintain an adequate nutritional balance as required by a normal body growth and development and avoid the occurrence of excess body weight. Diet imbalance and overeating can lead to an excessive energy intake in children and adolescents favouring the apparition of obesity (Krebs et al., 2007). The current dietary habits have an obesogenic character due to their high fat and carbohydrate content. A mismatch between caloric intake and energy consumption can bring about disturbances of the individual's energy balance (Donald, 2002).

Most cases of overweight are the result of a caloric intake that exceeds the individual's energy consumption (Beers, 2006). The global increase of excess weight prevalence is generated by the energy intake, especially due to high calorie foods rich in fats, sugars as well as reduced physical activity as a consequence of increased sedentarism.

The frequent consumption of fast-foods has been associated with the increase of the body mass index (Rosenheck, 2008). In the USA, both children and adult diets increasingly include fast-foods meals (Guthrie, Biing-Hwan and Frazao, 2002). As regards children (Bowman et al., 2004), adolescents (Bauer et al., 2009), as well as adults (Bowman and Vinyard, 2004), their consumption has been associated, on the one hand, with increased caloric intake, based on saturated and trans fatty acids (Asgary et al., 2011), sodium, sugar and acidulated beverages and, on the other hand, with a low consumption of fruits, vegetables and milk. Moreover, fast-foods tend to have high energy value and low nutritional quality in contrast with home-prepared foods and dietary recommendations (Guthrie, Biing-Hwan and Frazao, 2002). Previous studies showed that the availability of these foods near schools is associated with an increased body mass index in schoolchildren (Chiang et al., 2011), while the consumption rate has increased over the last years in both children and adolescents (Demory-Luce, 2005).

As regards children with overweight in the first years of life, the risk for them of becoming obese adults is 80% if both parents are obese and 40% if only one parent is obese (Arion et al., 1983; Nader et al., 2006). Overweight occurring both during childhood and adolescence, increases the risks of developing cardiovascular diseases (Ogden et al., 2002, Isganaitis and Lustig, 2005), depressions (Hedley et al., 2004), arterial hypertension (Summerbell et al., 2005), several forms of cancer (Kelishadi, 2006), type 2 sugar diabetes (Kelishadi, 2007), sleep apnea syndrome, orthopedic diseases, as well as diseases of psychological and social nature (Lobstein, Baur and Uauy, 2004, Reilly et al, 2003, Bayer et al, 2011). Adolescent overweight can produce negative long-term effects on adults' health, regardless of the ponderal status (Must et al, 1992, Bayer et al, 2011).

Worldwide, the prevalence of childhood obesity has increased over the two last decades. At the beginning of 2000, in the European countries the prevalence of childhood overweight varied between 6 and 36% (Lobstein and Frelut, 2003). In some countries an annual increase of up to 1% could be observed (Jackson-Leach and Lobstein, 2006).

2. Materials and Methods

This study was conducted between April and June 2014 at the General School No 30 of Braşov. The study has been approved by the Ethics Commission of the Transilvania University of Braşov. Also, the research on human subjects obtained the informed consent agreement of the participating subjects and

of their parents. Participation in this study was voluntary and the anonymity of the participants was ensured.

The study comprised a number of 234 gymnasium-cycle schoolchildren of which 116 were girls and 118 boys with ages between 12 and 15 years

In order to acquire information regarding food hygiene, a questionnaire containing 14 items was applied, with the title: „Dietary habits and the pleasure to practice physical activities". The questionnaire was set up by the authors in collaboration with the staff members from the Faculty of Physical Education and Mountain Sports of Braşov. In order to find out whether there are significant differences between the dependent variable (dietary behaviour) and the independent variables, the ANOVA 2 test was conducted (age) x 2 (gender) x 2 (weight). Also, in order to find out whether there are differences among the dietary preferences of the questioned schoolchildren, the post ad-hoc Bonferroni test was applied.

Result interpretation, tables, and graphs were performed and created with Microsoft Office Excel 2010.

3. Results

The results obtained after applying the questionnaire indicate that around 50% of the questioned schoolchildren consume fruits, 20.34% of the boys consume meat, and 20.70% of the girls consume sweets. Considering the two groups, the statistical analysis showed a strongly statistically significant difference between them. The significance threshold is $p = 0.0010 < 0.001$ for Chi-Square = 20.50 and df (degrees of freedom) = 5 (Table 1).

Table 1. Response frequency to the question „What kind of food do you like best?" and statistical significance

Group	fruits	vegetables	dairye	pasta	meat	sweetsi	P	Pearson Chi-Square	df
Girls	49.14	5.17	10.30	8.66	6.03	20.70	0.0010	20.50	5
Boys	49.15	5.08	14.41	4.24	20.34	6.78			

Similarly, around 75% of the questioned schoolchildren rarely consume fast-foods, 17% of the boys consume fast-foods once a week, 6 - 7% of them don't eat fast-foods at all, and a very low percentage eat it every day. Considering the two groups, the statistical analysis showed a statistically significant difference between them. The significance threshold is $p = 0.0387 < 0.05$ for Chi-Square = 2.51 and df (degrees of freedom) = 2 (Table 2).

Table 2. Response frequency of schoolchildren to the question „Do you eat fast-foods on a regular basis?" and statistical significance

Group	daily	1x/week	2x/week	rarely	never	P	Pearson Chi-Square	df
Girls	2.59	2.60	4.31	83.60	6.90	0.0387	10.10	4
Boys i	3.39	5.08	16.95	68.64	5.93			

Significant differences were identified as regards the dietary behaviour depending on gender ($F_{(5, 228)}$ = 4.38; $p < 0.001$; η^2 = .088) and ($F_{(4, 229)}$ = 2.58; $p < 0.05$; η^2 = .043), respectively. This situation indicates that girls (DS =19.55) are more careful when choosing the types of food, in contrast with boys (DS =20.15) (Figure 1). Also, girls consume much less fast-foods (DS =41.29) than boys (DS (Figure 2).
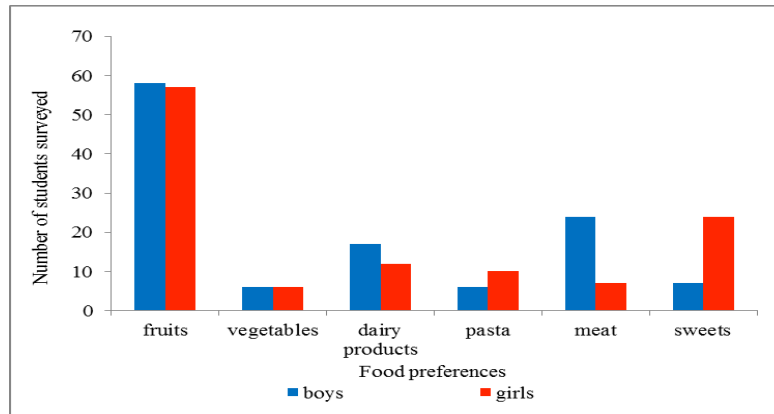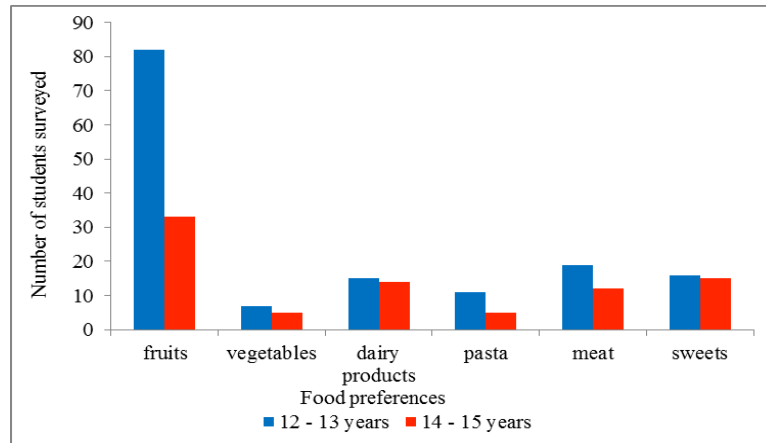

Figure 1. Dietary habits by gender
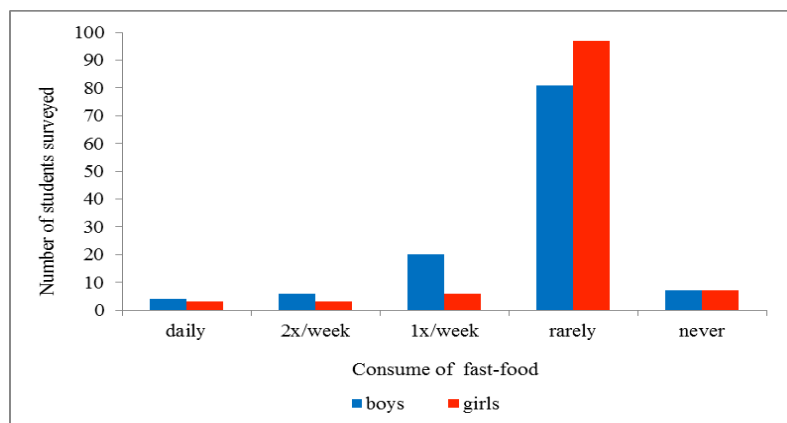
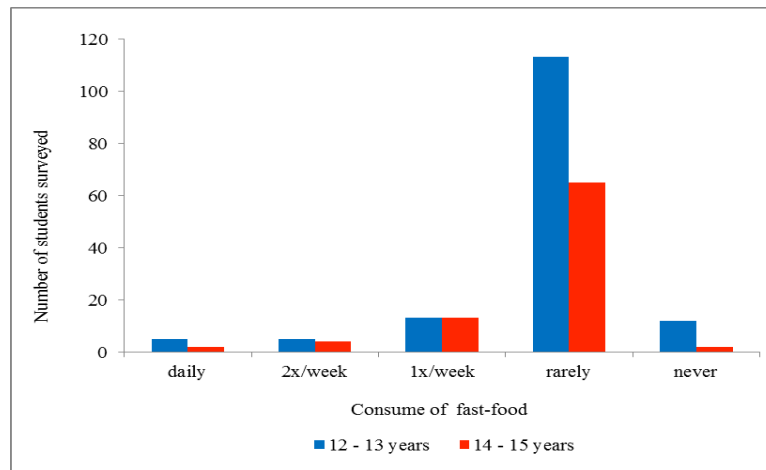**Figure 2.** Fast-foods preferences by gender

It can be ascertained that boys are less preoccupied with dietary hygiene in contrast with girls. Thus the size of the effect (η^2 = .088) explains a difference of 14.31% as regards the boys' preference for meat consumption (Table 1).

Also, as regards fast-foods consumption, boys consume more than girls. The size of the effect (η^2 = .043) shows a difference of 12.64% regarding the preference of the former for fast-foods of around 2x/week (Table 2).
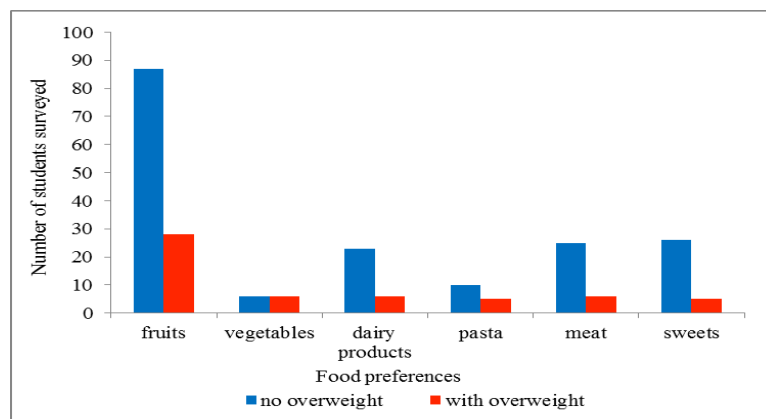
No significant differences were observed in terms of age) = 1.14; $p > 0.05$) (Figure 4) and weight ($F_{(5, 228)}$ = 1.97; $p > 0.05$) (Figure 5), and ($F_{(4, 229)}$ = 1.03; $p > 0.05$) (Figure 6) respectively.
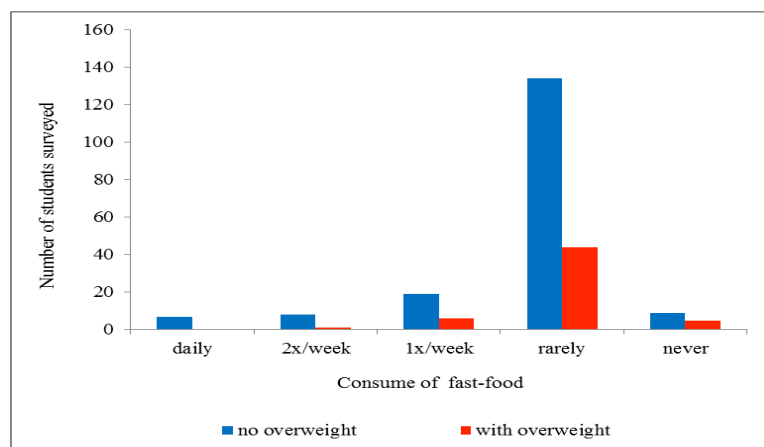
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Figure 3. Dietary habits by age

Figure 4. Fast-foods preferences by age

Figure 5. Dietary habits by weight

Figure 6. Fast-foods preferences by weight

After analyzing the responses obtained from the questioned schoolchildren it was found that there are differences as regards their dietary preferences. For $p < 0.001$, after applying the Bonferroni test, a significant difference was recorded among dietary preferences in terms of gender, as regards meat and sweets. Also, for $p < 0.05$, significant differences were observed among schoolchildren's preference for meat and dairy products, as well as for meat and fruits. No significant differences were observed as regards schoolchildren's dietary preferences depending on age or weight (Table 3).

Table 3. Statistical significance of dietary preferences of the questioned subjects

Response option	M_a	Group		df	F
		Girls	Boys		
6	1.774	A			
4	1.625	A	B		
2	1.500	A	B	5	4.38
1	1.496	A	B		
3	1.414	A	B		
5	1.226		B		

4. Discussions

To the question „What kind of food do you like best?", around 50% of the questioned schoolchildren declared to have a preference for fruits , 5% for vegetables, between 10.30 and 14.41%, for dairy products, 8.66% of the girls prefer pasta, 20.34% of the boys prefer meat and 20.70% of the girls prefer to consume sweets. Although nutrition guides do not specify the dose of sugar that can be consumed per day, these recommend a diminished sugar intake. Children and adolescents tend to have diets rich in carbohydrates with additional sugar of around 18% of the total of daily calories. Acidulated beverages contain a large amount of sugar and contribute with around 8% to the daily caloric intake of children and youths aged between 2 and 18 (Reedy & Krebs-Smith, 2010).

According to a national study „Youth Risk Behavior Survey" (YRBS) conducted in 2009, 22.9% of the schoolchildren from 9th to 12th grade declared consumption of fruits and vegetables at least 3 times per day (CDC, 2010). The study conducted in 2015 indicates that 20% of these declared the consumption of fruits and vegetables. Nutrition guides recommend for youths between 9 and 18 a daily

consumption of three cups of milk or dairy equivalents with low fats content (US Department of Agriculture, Agricultural Research Service; 2010). Around 15% of the 9th-12th grade schoolchildren were consuming in 2009 at least 3 cups of milk per day yet this percentage decreased in 2015, to 10.2% (US Department of Agriculture, Agricultural Research Service, 2010, CDC, 2010, 2016). Between 2007 – 2008 it was found that girls aged between 12 – 19 years showed an insufficient calcium intake, around 878 mg of calcium per day, which is only 67% of the recommended daily dose (US Department of Agriculture, Agricultural Research Service, 2010). Also, since 1970 and until the mid 1990s, milk consumption of female adolescents has decreased by 36% (Sacks et al., 2010).

As regards children and adolescents, nutrition guides recommend a consumption of integral cereals of at least half of the daily intake, depending on age and gender. Children and youths aged between 4 and 18 years do not consume the mínimum daily amount of integral cereals as is recommended. Between 2001 - 2004, the intake of integral cereals for this age group varied between 0.26 oz. and 0.48 oz., much less than the recommended amounts (US Department of Agriculture, Agricultural Research Service, 2010).

When asked „Do you eat fast-foods on a regular basis?” 2.59% of the girls and 3.39% of the boys declared to eat fast foods on a daily basis, 2.60% of the girls and 5.08% of the boys consume fast-foods 2 – 3 times per week, 83.60% of the girls and 68.64% of the boys rarely consume fast-foods, 4.31% of the girls and 16.95% of the boys consume fast-foods once a week, while 6 - 7% of the schoolchildren do not eat fast-foods. Youths who admitted frequent consumption of fast food (at least three times per week) are most likely to maintain that healthy foods taste bad, that they didn't have time to eat healthy foods, and they were not interested in a healthy diet (Neumark-Sztainer et al., 2003; Zabinski et al., 2006). Between 1994 and 1998, about three out of ten children and adolescents have consumed at least one fast-foods meal per day, these having a higher calorie intake than those who did not consume this type of meal (Bowman, 2004).

Empty calories from foods and beverages with added sugars and saturated fats contribute with 40% to the daily calorie intake in children and adolescents aged between 2 and 18 years thus affecting the quality of their diet (Reedy and Krebs-Smith, 2010). Young people consume daily more calories from acidulated beverages than from milk. Boys aged between 12 and 19 years consume on average 22 g of acidulated beverages/day, twice as much than their milk intake (10 g). On average, girls consume 14 g of acidulated beverages and only 6g of milk/day (Forshee et al., 2006).

Between 2007 - 2008, the frequency of calories originating in saturated fats, consumed by children and youths aged between 6 and 19 years, was 33%. Even if this percentage is similar with the value suggested by the nutrition guides for daily fats consumption (25% - 35% of the total amount of calories), persons aged between 6 and 19, consume more than the recommended daily amount of saturated fats (10% of the total amount of calories), varying between 11% and 12% (US Department of Agriculture, Agricultural Research Service, 2010).

Certain behaviours and attitudes encountered in children and adolescents relate with healthy diets. E.g., setting certain goals as regards the consumption of fruits and vegetables or offering rewards for fruits and vegetables consumption as well as the pleasure related to their taste are important predictors for the consumption of such foods (Zabinski et al., 2006). The family environment strongly influences the youths' dietary behaviour. The family's readiness to consume healthy foods is one of the most important

hypotheses as regards the consumption of fruits, vegetables, and dairy products (Larson et al., 2006; Neumark-Sztainer et al., 2003). Menus that are specific to each family, the rules of a healthy diet established in each family as well as the parents' healthy lifestyle influence the youths' consumption of fruits, vegetables, dairy products and fats (Neumark-Sztainer et al., 2003; Zabinski et al., 2006; Larson et al., 2007; Van der Horst et al., 2007).

5. Conclusions

Meat consumption (20.34% of the boys) and sweets consumption (20.70% of the girls) are high in schoolchildren aged between 12 – 15 years.

Vegetables consumption is low in schoolchildren aged between 12-15 years, 5.08% in boys and 5.17% in girls.

A significant percentage of the questioned boys (5,08%) consume fast-foods 2 – 3 times per week.

Significant differences were identified with regard to the dietary behaviour depending on gender, whereas no differences were observed regarding the age and weight of the questioned subjects.

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