RESEARCH ARTICLE

Eating Behaviour and Food Preferences of Tîrgu Mures High School Students

Maria Salcudean[1], Victoria Rus[1*], Florina Ruta[1], Catalin Moise Dogar[2], Iustinian Simion[1], Levente Nemes[1]

1. Department of Community Nutrition and Food Hygiene, University of Medicine and Pharmacy of Tirgu Mures, Romania
2. Department of Information and Public Relations, University of Medicine and Pharmacy of Tirgu Mures, Romania

Introduction. Due to a busy and exhausting urban lifestyle parents do not always have the necessary time to pay sufficient attention to the quality of the dietary habits of their children. **Objective**. Starting from the premise that teenagers have insufficient information about healthy eating, the present study aimed to highlight eating behaviours and nutrition knowledge deficits in a group of 427 high school students from Tîrgu Mures. **Methods**. An observational study based on lifestyle and food frequency consumption was conducted. In 2017, students in fifteen classes from several High School Institutions from Targu Mures, Romania, were asked to complete a questionnaire with questions relating to the current state of health, lifestyle characteristics, anthropometric indicators, frequency of daily meal consumption, significance and intake of food additives, leisure activities performed and also teenagers' preferences for food products. **Results**. The average age of the respondents was 16.1 years old, 72.6% were boys, and 82% lived in the city. 43.6% of respondents stated that food is a necessity, while 22% asserted that food characterizes a pleasure for them. Concerning the calorific value of foods, 32.8% stated that they have no interest in the calorie content of different food products while only 26%, mainly girls, took notice of these. 31.10% of respondents indicated that they include the recommended amount of vegetables in their daily diet, 22% prefer to eat preserved foods while increased consumption of sweets was observed in 39.80%. 55.50% of respondents ate breakfast on a regular basis, and 37% read food labels. **Conclusions**. The results emphasise the necessity to develop more effective educational programs designed to create necessary background information for a young generation, change adolescent dietary behaviours for the better, and thus prevent dietary related diseases.

Keywords: teenagers, nutrition, behavior, food habits

Introduction

Various factors, such as physical activity, obesity, or stress, are related to school performance and health status [1].

Academic achievement and children's eating habits can be influenced by parental factors such as levels of parenting, children's school performance and family income. Also, nutrition behaviour is one of the most relevant characteristics that can be taken into account when analysing a child's performance levels [1,2].

Neuroendocrine disorders with serious health consequences can results if a child's nutritional needs and daily activities are not properly monitored [3,4].

Nutrients and the derived energy are essential in maintaining the structural and functional integrity of an organism, and their deficiency is reflected in the growth and development of children and adolescents. Children and adolescents require special nutritional needs especially in the full height-weight development stages, which occur from birth to three years of age, pre-puberty and puberty. For example, proteins are the primary plastic factor for cells, carbohydrates also have a plastic role, but they are the primary source of energy for nerve cells and red blood cells. Lipids represent a higher source of energy, with phos-

pholipids being involved in the structure of the cell's membrane and are essential to a cell's function [3,5].

Several studies have highlighted that skipping breakfast has become a habit among adolescents and that it may result in short-term memory [6,7]. This is corroborated by other studies which highlighted the importance and effects of breakfast on school performance în which it has been shown that eating breakfast may be beneficial for normal brain functioning due to the gradual release of energy and the intake of micronutrients, especially iron, iodine and vitamin A.

The daily habit of eating breakfast daily is decreasing among young girls and boys, and Romania students have been shown to eat breakfast on a regular basis much less frequently than students from the US and UK [6,7].

The present study aimed to analyse the risk profile of Tîrgu Mureş teenagers regarding eating behaviours based on dietary habits, frequency of daily meal consumption, significance and intake of food additives, leisure activities undertaken by teenagers, and opinions regarding fast food products versus healthy foods.

Methods

This observational study was conducted between 06.02.2017- and 29.05.2017, in fifteen classes from several High School Institutions from Tîrgu Mures, Roma-

* Correspondence to: Victoria Rus
E-mail: victoriarus91@yahoo.com

nia. The sample consisted of 427 students of which 72.6% were boys, aged 15 to 20, with an average of 16+/-2,5, and 27.4% girls, aged 16 to 21, with an average of 16+/-2,5. In the case of some students, the High school normal age of 14-18 years is exceeded by 1-3 years because they have interrupted their studies.

Data collection was carried out by applying a validated multiple-choice questionnaire containing 56 questions, in which respondents could choose from two to six possible answers. Each respondent gave written consent to complete the questionnaire.

By completing the questionnaire, participants had to give information regarding the importance of food in their lives, current state of health, lifestyle characteristics, anthropometric indicators, the frequency of daily meal consumption, the significance and intake of food additives, the leisure activities performed and also their preferences for food products.

Anthropometric measurements were collected and were performed by trained dietitian students using the Tanita Scale (Model: BC 1000) and Seca Portable Stadiometer, and Body Mass Index was calculated by weight(kg)/height(m)^2.

The statistical analysis was carried out using GraphPad Prism V6. Chi-square test was used to determine if there is a difference between categorical variables. Continuous variables are presented as mean±SD, while categorical variables as absolute frequencies.

The level of significance was set at $\alpha = 0.05$.

Results

Body mass index (BMI) measurements showed that 11% (no=47) of the respondents were underweight, 6.2% (no=27) overweight and 2.5% (no=11) were obese of 1st grade. (Figure 1)

The results showed that 32.8% of those surveyed were not at all interested in the number of calories they consume, 41.2% were not familiar with the number of calories foods contain, and only 26% are concerned about this issue. (Figure 2)

Gender differences in adolescents were statistically significant (X^2=3.56, $p<0.05$), 72.6% were boys. (Table II)

A significant proportion (63.90%) refuse to eat extra fatty foods, 27.6% said they were accustomed to avoiding tempting meals, and 40.3% do not have a problem with their consumption. Most of the teenagers prefer sweet drinks, coffee, energy drinks even alcoholic ones (63.4%), and 38.7% were drinking sugary drinks day-to-day.

8.7% consumed fast-food products once a month, while 7% of them eat such products 2-3 times a month (Figure 3), statistically insignificant by gender (X^2=5.67, $p>0.05$) (see Table I).

More than half of pupils (63%) stated that they do not read food labels before buying a product. Concerning buying food, students' families (35.1%) buy them food prod-

Table I. The anthropometric characteristics of studied sample

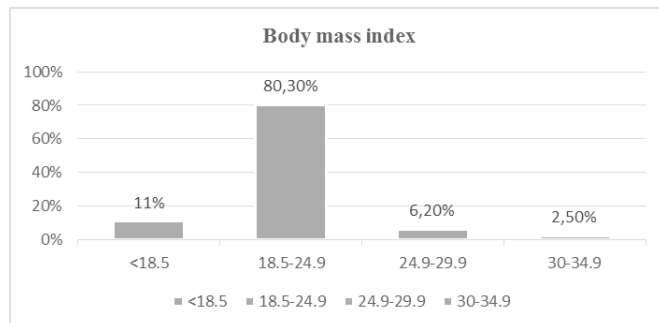| Parameters	Girls	Boys
Total, n(%)	117(27.4%)	310 (72.6%)
Age (years), mean ± SD	16.78±1.05	16.54±1.09
Weight (kg), mean ± SD	65.21±13.11	66.2±13.62
Height (cm), mean ± SD	171.3±11.4	172.2±11.9
BMI, kg/m², mean ± SD	22.9±2.5	23.1±2.8

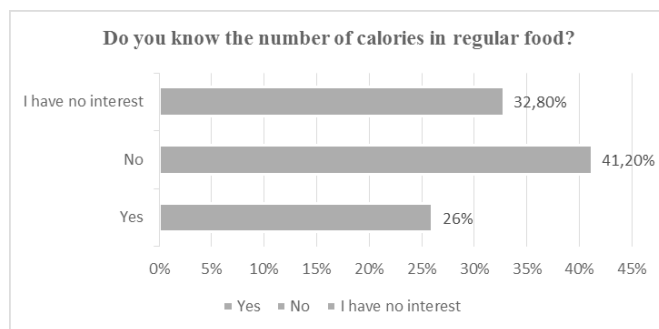Fig. 1. Body mass index of the studied group

Fig. 2. Knowledge about the number of calories in different foods

ucts according to their preference, while 29.6% were buying based on a shopping list. (Figure 4)

Concerning the consumption of sugar-sweetened beverages and energy drinks, 55.30% respectively 47.70% of the high school students stated that they consume the products mentioned above (Figure 5).

A share of 52% of high school students stated they do not live a sedentary life, most of them used to do physical education and sports at school with a frequency of just 3-4 hours per week. (Table II)

Half of the high school students believe that they need more information about healthy eating, and 44.7% saying they are not being offered enough nutrition information/advice at school.

Discussion

According to the study "Health Behaviour in School-aged Children", 14% of 11-year-old girls and 21% of 11-year-old boys are overweight or obese. The same situation has been observed in 13-year-old teenagers, but in a slightly different proportion, with 15.8% of girls and 20% of boys suffer from being overweight or obese. In 11-year-olds, 20% of girls and 18% of boys "perceive" themselves to be too fat, whereas in 15-year-olds, 27% of girls and 18% of boys "perceive" themselves to be too fat. In 11-year-olds,

Table II. The relationship between students gender and determinants of food preferences

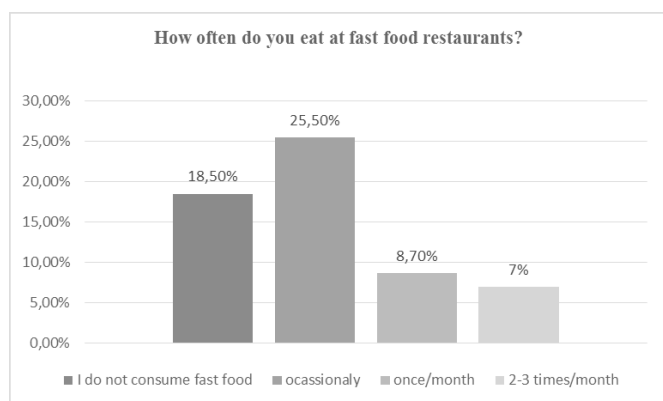| Question		Girls	Boys	Total	Chi square, p - value
Do you know the number of calories in regular food?	Yes	15.0%	11.0%	26.0%	X2=3.56, p<0.05
	No	20.0%	21.2%	41.2%	
	I have no interest	17.0%	15.8%	32.8%	
How often do you eat at fast food restaurants?	I do not consume	3.0%	16.1%	19.2%	X2=5.67 p>0.05
	Occasionaly	19.8%	25.0%	44.9%	
	Once/month	17.7%	9.13%	26.9%	
	2-3 times/month	4.18%	4.72%	8.9%	
By which criteria your family is buying food?	By price	12.6%	11.7%	23.8%	X2=9.92 p<0.05
	By label	3.98%	7.49%	11.5%	
	Based on a list	5.85%	23.1%	29.6%	
	By preferences	4.91%	30.2%	35.1%	
Do you think that school is providing enough information about nutrition?	Yes	8.43%	28.8%	37.2%	X2=2.3 p>0.05
	No	13.34%	31.38%	44.7%	
	I do not know	5.6%	12.4%	18.0%	
Do you drink sweet beverages?	Yes			55.3%	X2=2.1 p>0.05
	No			44.7%	
Do you consume energy drinks?	Yes	12.17%	35.59%	47.7%	X2=1 p>0.05
	No	15.22%	37.0%	52.3%	

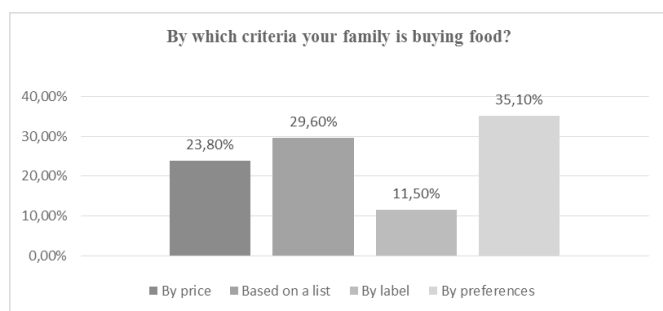Fig. 3. The frequency of eating fast foods

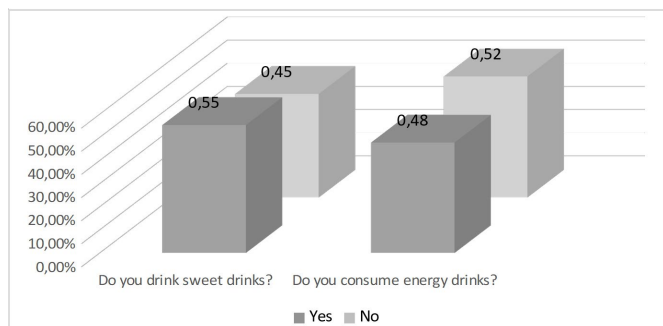Fig. 4. The motivation to buy food products in the family distribution

Fig. 5. The consumption of sweet and energy drinks among high school students

14% of girls and 13% of the boys surveyed were undertaking a weight-loss program, and in the 15-year-old age group, 16% of girls and 10% of boys adopted this behaviour [8,9].

The results of the present study confirmed that 10% of the surveyed teenagers are overweight and 11% are underweight. Self-perception of one's body weight is considered to be an important step towards leading a healthy lifestyle. Body image represents a person's perception of his/her own body, and it is importance increases when children reach puberty and face body development changes. Satisfaction about their bodily appearance decreases with age and children often believe they are overweight [8-10].

The survey intended to shed light on high school students' knowledge regarding the number of calories in common foods, as well as on the type of food they prefer to consume: *cooked, raw, processed, semi-prepared.* As a healthy lifestyle is not just keeping track of adolescents' daily calorie intake, another important aspect that was intended to find answers about, when applying this questionnaire, was the frequency of drinking soft drinks, alcohol, coffee as well as teenagers' smoking habits.

Girls are more concerned with their body image, and increased obesity and overweight in industrialized countries have led to increased dissatisfaction with their bodies. There is a significant downward trend of breakfast eating among pupils from the ages of 11 to 13 years with only 55.5% of students taking breakfast, 63.2% consuming lunch, and 56.7% having dinner on a regular basis [10-12]. A similar trend was reported in the current study.

In agreement with similar recent studies, teenagers are not interested in the information on food labels, and they do not count foods calories. Contrarily, they are receptive to lectures, competitions, applications regarding proper diet and weight maintaining methods [11-14].

In recent years, new health education and prevention programs have been implemented on a national level by the Romanian Ministry of Health and Ministry of Education

in order to reduce the risk of excessive fat and sweet food products together with sweet beverages consumption and also to increase the frequency of physical activity among high school teenagers [15-17], with excellent results.

Conclusion

The increased consumption of fast foods and sugar-sweetened beverages confirmed that half of the high school students have an inadequate diet.

Daily breakfast consumption decreases significantly with age, among both girls and boys.

More than half of the students taking part in the survey do not read food labels before buying a product.

About half of Tîrgu Mures high school students taking part in the survey believed they do not live a sedentary life and most of them do physical education and sports at school with a frequency of just two hours per day during the week.

The results emphasise the necessity to develop more effective educational programs designed to change adolescent dietary behaviours in order to prevent related diseases and create necessary background information for a young generation. More community-based food and lifestyle programs need to be implemented for promoting physical activity and healthy lifestyles among teenagers as well as to offer them the necessary education regarding appropriate caloric intake and health risk behaviours.

Authors' contribution

MS – Conceptualization, study design
VR – Drafting, revision
FR – Drafting, final approval
CMD – Data acquisition, revision
IS – Data acquisition, data analysis
LN – Conceptualization, data analysis, final approval

Conflict of interest

The authors have no conflict of interest to report.

References

1. Institutul Național de Sănătate Publică, București - Ghid pentru alimentație sănătoasă și activitate fizică în grădinițe și școli. Proiect „Intervenții la mai multe niveluri pentru prevenția bolilor netransmisibile (BNT) asociate stilului de viață în România" Programul RO 19 „Inițiative în sănătatea publică", 2015, pag. 29-33.
2. Graur M. - Ghid pentru alimentația sănătoasă. Societatea de Nutriție din România, Ed. Performantica, Iași, 2006, 16-21.
3. Singh A, Uijtdewilligen L, Twisk JW, et al. - Physical activity and performance at school: a systematic review of the literature including a methodological quality assessment. Arch Pediatr Adolesc Med. 2012; 166:49-55.
4. Hollar D, Messiah SE, Lopez-Mitnik G, et al. - Effect of a two-year obesity prevention intervention on percentile changes in body mass index and academic performance in low-income elementary school children. Am J Public Health. 2010; 100:646–653.
5. EU Action Plan on Childhood Obesity (2014-2020), available at http://ec.europa.eu/health/nutrition_physical_activity/docs/childhoodobesity_actionplan_2014_2020_en.pdf.
6. Deshmukh-Taskar PR, Nicklas TA, O'Neil CE, et al. - The relationship of breakfast skipping and type of breakfast consumption with nutrient intake and weight status in children and adolescents: the National Health and Nutrition Examination Survey 1999–2006. J Am Diet Assoc. 2010; 110:869–878.
7. Benton D. - The influence of dietary status on the cognitive performance of children. Mol Nutr Food Res. 2010; 54:457–470.
8. Currie C, Zanotti C, Morgan A, Currie D, et al. - Social Determinants of Health and Well-being among Young People. Health Behaviour in School-aged Children (HBSC) Study: International Report from the 2009/2010 Survey, Copenhagen: WHO Regional Office for Europe (Health Policy for Children and Adolescents), 2012.
9. Sandu P, Baba C, Rus D, Bozdog M. - The Influence of Community-Level Environmental Factors on Physical Activity of Adolescents and Youth. Revista Transilvană de Științe Administrative. 2014; 2(35):130-140.
10. WHO - Health Behavior in School-aged Children: healthy eating habits and physical activity, 2010.
11. Tarcea M, Fazakas Z, Ruta F, Rus V, Zugravu C, Guine R. - Romanian Knowledge and Attitudes regarding Dietary Fibers. Bulletin UASVM Food Science and Technology. 2016; 73(2):123-128.
12. Badau A, Badau D, Serban C, Tarcea M, Rus V. - Wellness integrative profile 10 (WIP10) - an integrative educational tool of nutrition, fitness and health. JPMA. 2018; 68:882-887.
13. Tarcea M, Szavuj J, Toma F, Rada C, Zugravu C. - Sexual maturation amongst adolescents from Mures county. Acta Endocrinologica (Buc). 2010; 6(1):57-72.
14. Simion I, Rus V, Salcudean M, Dogar MC, Tarcea M, Ruta F. A Pilot Study Evaluating Preferences for Caffeinated Drinks Consumption Among Mures Medical Students. Bulletin UASVM Food Science and Technology. 2018; 75(1)15-20.
15. WHO - European Childhood Obesity Surveillance Initiative – COSI, 2014.
16. Romanian Health Ministry – Protocol de diagnostic și tratament în obezitate la copil (Children Obesity Diagnosis and Treatment Protocol), 2011; available at https://iomc.ro/uploads/files/Protocol_de_diagnostic_in_obezitate.pdf.
17. Institutul Național de Sănătate Publică, București – Să prevenim obezitatea la copii (How to prevent children's Obesity), 2016; available at http://insp.gov.ro/sites/cnepss/wp-content/uploads/2016/05/PLIANT_obezitate-copii.pdf