



## STUDY OF THE NUTRITIONAL BEHAVIOR AS A RISKY HEALTH FACTOR OF ADOLESCENTS FROM DIFFERENT ETHNIC GROUPS IN THE MUNICIPALITY OF PLOVDIV, BULGARIA

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### ABSTRACT:

**Purpose:** The present study examines nutritional behavior as a risky health factor for adolescents from different ethnic groups in the Municipality of Plovdiv, Bulgaria.

**Material and methods:** This cross-sectional study was carried out with three different ethnic groups (Bulgarian, Turks, and Roma) in Plovdiv Region in Bulgaria. The study was conducted with a total of 185 middle or high school students. For the purposes of the study original semi-structured questionnaire was developed. Statistical analyses were performed using SPSS Statistics v. 26 software (IBM Corp. Released 2019. Armonk, USA).

**Results:** The daily consumption of meat and fish is highest among boys of Bulgarian origin 10 (19.23%). In the consumption of meat and fish 2-3 times a week, the leading place is occupied by the children of Roma origin. The results of the weekly consumption of milk and dairy products show that 74 (40%) of all respondents consume them every day. Approximately 1/4 of all respondents always add salt to food, and the same share are those who never do that.

**Conclusion:** The results obtained by us do not show large deviations in terms of recommendations for the consumption of meat and fish among the studied groups. Unfortunately, the recommendation made by experts for daily consumption of milk and dairy products is valid for less than half of the studied adolescents, which carries some risk because eating habits and eating behaviors formed in childhood and adolescence are preserved in the future in adulthood.

**Keywords:** nutritional behavior, risky health factor, adolescent's health, ethnic groups.

### INTRODUCTION:

Healthy eating habits are the key to good health and success in school. A varied, balanced and regular diet is healthy [1].

In recent years, not only in Bulgaria but also in Europe and in the world in general, there has been an increase of interest in ethnic communities and in particular in their number, demographic development, spatial mobility, and territorial location. In our country, this interest can be said to be the greatest in relation to the Roma ethnic group. There are large discrepancies between the number of Romas reported in the official censuses and scientific, empirical research in this direction. Although the Roma ethnic group in Bulgaria is the second largest after the Turkish, there have been very few studies among this ethnic group [2].

According to Rathi N et al. 1. 2020, adolescents develop food habits that affect both their present and future health [3]; at the same time, a lot of authors said that when children are 10-11 years old, they grow rapidly. Qualitative changes occur in the development of their organs and systems, limbs lengthen, body weight changes rapidly, and the ossification of cartilage tissues accelerates [4].

### PURPOSE:

The present study examines nutritional behavior as a risky health factor for adolescents from different ethnic groups in the Municipality of Plovdiv, Bulgaria.

### MATERIAL AND METHODS:

This cross-sectional study was carried out with three different ethnic groups (Bulgarian, Turks, and Roma) in Plovdiv Region in Bulgaria. The study was conducted with a total of 185 middle or high school students. For the purposes of the study original semi-structured questionnaire was developed. Descriptive statistics was applied to summarize demographic characteristics. Quanti-

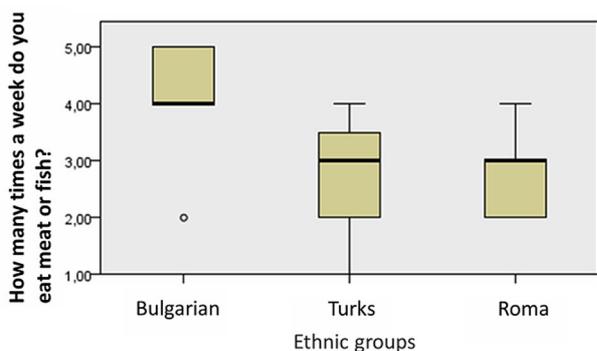
tative variables were presented by the mean and standard deviation (mean±SD), and qualitative variables were presented as absolute/relative frequencies (n / %). The Chi-square test was employed to analyze the association between two categorical variables, and if proven z-test was applied to test for the difference of relative parts between the groups. Comparisons between groups were carried out with the use of the Jonckheere-Terpstra rank-based nonparametric test. A 2-sided p-value <0.05 was considered statistically significant. Statistical analyses were performed using SPSS Statistics v. 26 software (IBM Corp. Released 2019. Armonk, USA).

**RESULTS:**

The study was conducted in the Plovdiv district in the period of May 2019 - to July 2019. The subject of the study has been 185 adolescents from different ethnic groups. The logical units of the study were schools in Plovdiv and the village of Karadzovo, which is part of the Plovdiv municipality. The gender distribution is 101 (56.6%) boys and 84 (45.4%) girls. The study covered mainly 96 Bulgarian children (51.89% ± 3.67), followed by 30 Turkish (16.22% ± 2.71) and 59 Roma origin (31.89% ± 3.43). The group of adolescents has included students aged 11 - 15 years old. At the time of the measurements, there were children who were 15 years old.

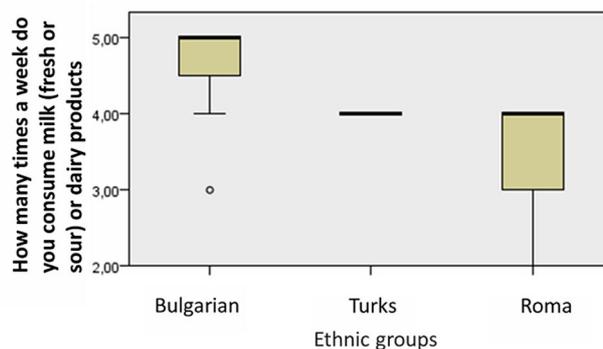
The daily consumption of meat and fish is highest among boys of Bulgarian origin 10 (19.23%), followed by boys of Turkish origin and Roma. In the consumption of meat and fish 2-3 times a week, the leading place is occupied by the children of Roma origin, where in approximately equal shares is the consumption of meat and fish for boys 12 (36.36%) and girls 9 (34.62%). The tendency is the same for the Roma for the consumption of meat and fish 1-2 times a week. In other ethnic groups, 1-2 times a week, meat and fish are consumed by 21 more girls (47.73%) and 5 more boys (31.25%) than Turks. The analysis by gender, age and ethnicity proved a statistically significant difference only in 13 - year - old boys, where a higher weekly consumption of meat and fish has been found among the children of Bulgarian ethnicity J - 16,500; p = 0.034 (Fig. 1). No significant difference had been found in the other statistical groups.

**Fig. 1.** Weekly consumption of meat and fish in 13-year-old boys by ethnicity



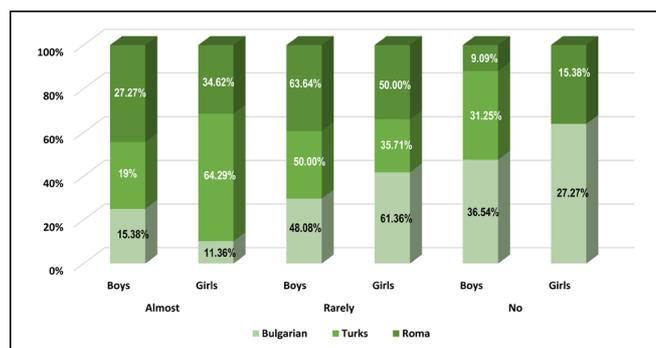
The results of the weekly consumption of milk and dairy products show that 74 (40%) of all respondents consume them every day. In the daily consumption of dairy products, the highest share is among Bulgarians, with equal shares for boys 23 (44.23%) and girls 20 (45.45%), and the lowest share is for Roma girls 3 (11.54 %). When consuming these foods 1-2 times a week, there is no significant difference between the different ethnic groups. In the consumption of dairy foods, 2-3 times a week in almost equal relative proportions are the results for boys and girls, in Bulgarians - boys 16 (30.77%) and girls 14 (31.82%), in Turks respectively boys 4 (25 %) and girls 4 (28.57%). While among the Roma, the relative share of girls 11 (42.31%) consuming dairy products 2-3 times a week is almost twice as high as that of boys 7 (21.21%). Compared to gender, age and ethnicity, the weekly consumption of milk and dairy products is the highest among 13 - year - old girls of Bulgarian origin J - 8,000; p = 0.013 (Fig. 2). No significant difference has been found in the other statistical groups.

**Fig. 2.** Weekly consumption of milk and dairy products in 13 - year - old girls by ethnicity



About 43 (23.2%) of all respondents always add salt to the food, and 43 (23.2%) never do the same. Compared to gender and ethnicity, the largest relative share of girls of Turkish origin adding salt to food is observed (almost always) (Fig. 3).

**Fig. 3.** Distribution of respondents, answered to the question “Do you add salt to food” by gender and ethnicity



An association has been established between the ethnic group and the additional salting of food. In the case of boys, a statistically significant difference was proved only in those who did not add extra salt to the food, as significantly less salt was added to the food by the Bulgarian boys compared to the Roma boys. In girls, a statistically significant difference has been found  $\chi^2 = 17, 390$ ;  $df = 4$ ;  $p = 0.002$  as significantly more salt to the food add girls of Turkish origin 9 (64.3%) compared to Bulgarian girls 5 (11.4%).

## DISCUSSION:

Experts from the National Center for Public Health (NCPHP) develop recommendations for healthy eating for students aged 7-19 years old in Bulgaria. According to these recommendations, milk and dairy products should be consumed daily, meat should be selected without fats and more often replaced with fish, and consumption of salt and salty foods should be reduced [1]. Adherence to these recommendations for healthy eating is a preventive measure to build eating behavior in children and adolescents.

Animal foods - meat and fish are rich in protein and are very important for health and growth. Meat and fish also contain easily digestible iron - an important element for building red blood cells, resistance to infections, and improving the attention and strength. Fish contains valuable fats that are good for the brain and heart [1].

A number of studies highlight the importance of research into aquaculture food systems, linking aquatic food production systems with nutritional status, health and socioeconomic prosperity, which would help to develop more integrated and relevant food policies [5].

Seafood consumers had a healthier diet, as seafood consumption was related to a higher intake of key nutrients and a lower intake of total sugar and saturated fatty acids. Therefore, fish consumption should be promoted among Canadians [6].

The results of studies show that age, gender; ethnicity; the locality of schools; frequency of eating out per week; imbalanced intake of cereals or grains, meat, poultry or eggs, and inadequate vegetable intake were significantly associated with fast-food consumption among adolescents in Malaysia [7].

Yogurt, milk and dairy products (cheese, yellow cheese, cottage cheese) are valuable food for children. Milk and dairy products are the best sources of easily digestible calcium, and they are rich in protein and vitamins that ensure the growth and strength of bones and teeth. Yogurt, a traditional Bulgarian food, is a particularly good choice because it has a special effect on health - it improves digestion and increases protection against disease [1].

Although studies have suggested that milk and dairy product consumption may influence growth during childhood and puberty. Children and adolescents aged 6-18 y consuming milk and dairy product are more likely to achieve a lean body phenotype [8].

The results obtained by us are confirmed by T. Popova and staff, who found that only half of the students

consume daily milk and dairy products [9].

The frequency of breakfast, the quality of breakfast, fresh vegetables, milk and products, and the frequency of meat/egg/fish have been the main influencing factors of malnutrition. The frequency and quality of breakfast are important influencing factors of malnutrition [10].

According to Givens DI 2020, low milk consumption during adolescence, particularly by girls, may contribute to suboptimal intake of calcium, magnesium, iodine, and other important nutrients [11].

The median consumption of milk/dairy products among adolescents in Germany was below the recommendation. The median consumption of both meat/meat products was about 1.5 times the recommended amount. The results indicate the need for an improvement of dietary habits among adolescents in Germany [12].

In total, 484 children aged between 8 and 13 years old participated in the study (147 in Denmark and 337 in Lithuania). Fruits, vegetables, and highly-processed and animal-based foods were not included in large part of children's most preferred meal composition [13].

Salt contains sodium and chlorine, which are important for many activities of the body, but excessive consumption of salt and salty foods can lead to loss of calcium from the bones and increase blood pressure [1].

Salt contains sodium and chlorine, which are important for many activities of the body, but excessive consumption of salt and salty foods can lead to loss of calcium from the bones and increase blood pressure. In addition to added salt in food preparation, high salt content in processed foods such as chips, sausages, canned meats, canned fish, cheese, pickles, dry soups, salty snacks, ketchup, sauces, such as spices and more. The taste preference for salty foods can be changed by gradually reducing salt consumption.

We would like to emphasize that the results of our study are another confirmation of the fact that the Bulgarian people traditionally consume salty foods to a higher degree than the other Balkan countries. Pasta, another group of foods that should not be overdone, is among the traditional Bulgarian dishes, and it is present daily on the menu of the Bulgarian.

A study by T. Popova and a group of students shows that more than half of the respondents declare that they are aware of the negative health consequences of using unhealthy foods, but a relatively high proportion of 42% do not know what the risks may be that will worsen their heart disease now and in the future [14].

Obesity prevalence has been simultaneously increasing with the high consumption of large food portion sizes (PS). However, there is scarce information on PS of energy-dense (ED) foods as a potential risk factor for obesity in adolescents. [15] Teenagers have been found to be well aware of the ill effects of junk food, but they were found to be happy with their dietary habits and unwilling to change them. [16]

And last but not least, of great importance, according to A. Kanellopoulou and the team, accurate weight perception in conjunction with healthy dietary habits may

play a determinant role in the prevention of obesity. The early identification of children with wrong weight perception, along with the promotion of healthy dietary habits, is of crucial importance from a public health perspective to combat childhood obesity. [17]

The findings presented in the papers demonstrated that it is possible to design environmental-friendly meals from existing school menus. Legumes and pasta are often included, and white meat is selected instead of red meat. [18]

Our research allows us to draw the following more significant **conclusions**:

The daily consumption of meat and fish is highest among boys of Bulgarian origin, followed by boys of Turkish origin and Roma. When consuming these foods 2-3 times a week and once a week, the leading place is occupied by children of Roma origin.

In the daily consumption of dairy products, the relative share of Bulgarians is the highest. When consuming these foods 1-2 times a week, there is no significant difference between the different ethnic groups. The consumption of dairy foods 2-3 times a week in almost equal proportions are the results for boys and girls in Bulgarian and Turkish adolescents. While among the Roma, the relative share of girls is almost twice as high as that of boys.

Approximately 1/4 of all respondents always add salt to food, and the same share are those who never do that. Compared by gender and ethnicity, the largest relative share of girls of Turkish origin adding salt to food is observed (almost always).

The results obtained by us do not show large de-

viations in terms of recommendations for the consumption of meat and fish among the studied groups. Unfortunately, the recommendation made by experts for daily consumption of milk and dairy products is valid for less than half of the studied adolescents, which carries some risk because eating habits and eating behaviors formed in childhood and adolescence are preserved in the future in adulthood. Also worrying is the fact that 1/4 of those covered in the study declare that they add salt the food before eating. The use of salty foods is a proven health risk factor predisposing to the development of a number of diseases in adulthood.

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#### **Conflicts of interest:**

There is no conflict of interest at the realization of this scientific work. The scientific work was presented to The Scientific Ethics Committee on September 21, 2017, which gave its opinion with an order of The Rector of Medical University - Plovdiv No. P-2550 / 12.10.2017. This scientific study has been conducted under the project NO-12/2019 of the Medical University of Plovdiv on the topic: Physical development and health behavior of adolescents (11-14 years old) from different ethnic groups in the Municipality of Plovdiv.

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