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STUDY ON THE BMI STATUS OF SECONDARY SCHOOL CHILDREN IN THE SOUTH-EASTERN PART OF ROMANIA

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SUMMARY

The study is based on the body mass index of students between the ages of 10 and 14. The body mass index of 5043 students was tested in order to bring out the fact that the degree of obesity is not as high as health representatives claim. By means of this research we found that a percentage of 49% of the tested children were normal weight and only 2.31% were obese. The causes of obesity in these subjects may be metabolic disorders. The existence of obesity cannot be attributed only to eating habits, lack of physical activity or a sedentary lifestyle.

Key words: secondary school children, body mass index, obesity

INTRODUCTION

The age, weight and height are indicators that can be used to assess the nutrition and/or health status, both individually and collectively. The combination of these indicators can identify the category of children who had certain nutritional problems, as well as the type and duration of these problems.

The individual anthropometric characteristics of a child population are simple predictors of future health events reflected, most of the time, by obesity.

Obesity is a disease characterized by weight gain due to adipose tissue, gain which can be caused by some genetic, metabolic, cellular, psychological or social factors (Coşoveanu & Bulucea, 2011).

Studies have concluded that it is easier to prevent childhood obesity than to treat it. Parents allow their children to spend too much of their free time in front of televisions and computers, schools have a reduced number of classes allocated to physical activity, and many children are exempt from physical activity for medical reasons, which are more or less real. Walking is a rarity, schools have no sports facilities, and parents are sometimes too busy with daily worries.

Most international research shows that a large percentage of the school population has a tendency towards obesity or is obese. In Romania, too, such research highlights the tendency towards obesity within the school population due to physical inactivity and inadequate nutrition. That is why the present study aims at finding out whether the tested school population has this tendency towards being overweight and obese.

METHOD

Subjects

The research was conducted in the period 2018-2019 on a group of 5043 students in grades 5-8, aged 10-14 years, from rural and urban areas of Galați, Bacău and Vrancea counties. The distribution of students that participated in the research is presented in table 1.

Table 1. *The distribution of the students included in the research by grade, gender and age group*

Grade	Gender		Total
	Boys	Girls	
5 th	918 (51.5%)	864 (48.4%)	1782 (35.3%)
6 th	495 (46.7%)	564 (53.2%)	1059 (20.9%)
7 th	540 (49.5%)	549 (50.4%)	1089 (21.5%)
8 th	558 (50.1%)	555 (49.8%)	1113 (22%)
Total	2511 (49.7%)	2532 (50.2%)	5043 (100%)

Measure

The body mass index is used to determine the excess weight. It does not directly measure the adipose tissue in the body, but by interpreting the BMI we get information about body weight. The determination of the BMI is performed by using the following formula:

$$\text{BMI} = \text{Weight (kg)} / \text{Height (m)}^2$$

The classification of the resulted values in order to determine the nutrition status of the children was performed according to table 2.

Table 2. *Body mass index and nutrition status of children*

Definition IOTF - BMI (kg/m ²)
< 18 - underweight
18.5 - 24.99 - normal weight
25 - 29.99 - overweight
30 - 34.99 - obesity
>35 - morbid obesity

The body mass index was calculated using the EXCEL program.

Ethical considerations

The students participated voluntarily in the study after having received a detailed explanation of the objective and implications of the research. Written informed consent was provided by the parents as well as by the participants. The study was approved by the Research Ethics Committee of the "Dunărea de Jos" University, Faculty of Physical Education and Sport.

RESULTS AND DISCUSSION

Obesity represents a global problem, affecting a fairly high percentage of children on all continents. In the general context of the increasing global trend in the frequency of obesity, this topic has aroused more and more interest, representing the research topic of extensive studies.

The results of our study show that the majority of students in the investigated group, 49.61% (2502) are normal weight, 38.37% (1935) of them are underweight, 9.63% (486) are overweight, and a small percentage, 3.36% (120) is obese (Figure 1).

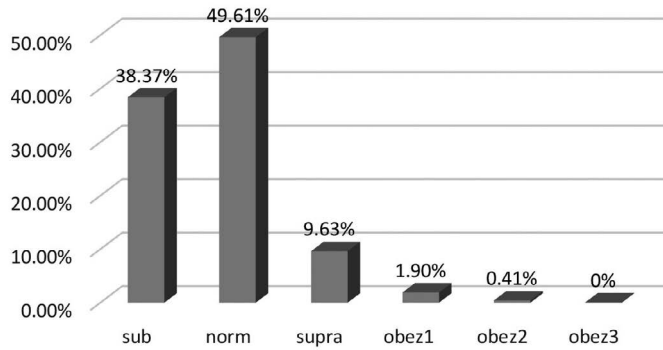


Figure 1. The percentage distribution of students in the investigated group according to their BMI

Underweight students, 49.50%, and normal weight ones, 41.24%, prevail in the age period 10-11 years, as compared to overweight children, 7.57%, and obese ones, 1.69%. Thus, we can see that at this age, children are not overweight but malnourished (Figure 2).

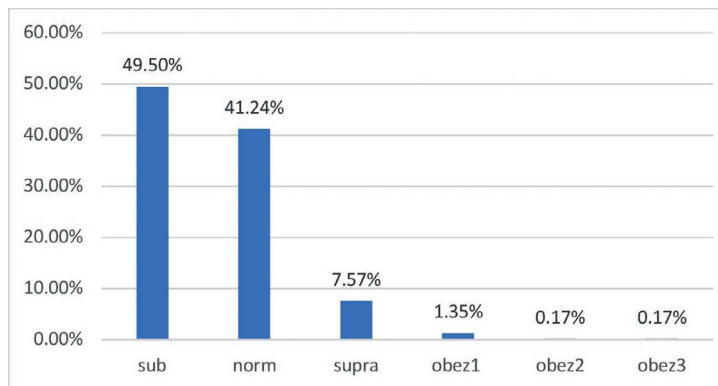


Figure 2. Percentage distribution of 5th grade students according to BMI

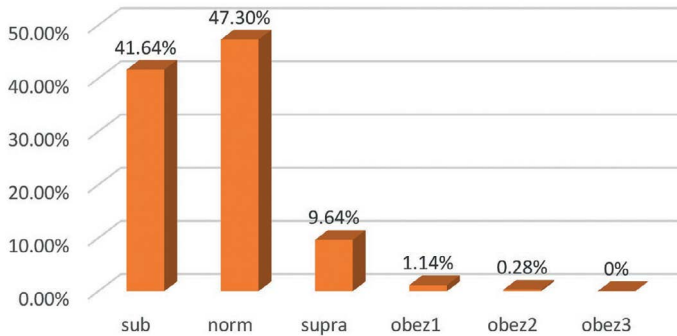


Figure 3. Percentage distribution of 6th grade students according to BMI

In the sixth grade there is a change in the predispositions regarding the body mass index. As a result, a percentage of 47.64% of the researched group were classified as underweight, 47.30% were normal weight, 9.64% overweight and 1.42 % obese (Figure 3). Moving to a higher age category, 11-12 years of age, we notice the tendency towards an increase in the percentage of overweight children as compared to those in the age group 10-11 years and a decrease in the percentage of obese children.

The subjects included in the research group, aged 11-12 years obtained the following results: 30.02% were underweight, this percentage decreasing as compared to the previous age ranges, 54.54% were normal weight, this percentage increasing as compared to the previous age ranges. On the other hand, the percentage of overweight children increased to 11.84% and that of obese children to 3.6% (Figure 4). We may notice a decrease in underweight subjects but also an increase in the overweight and obese ones.

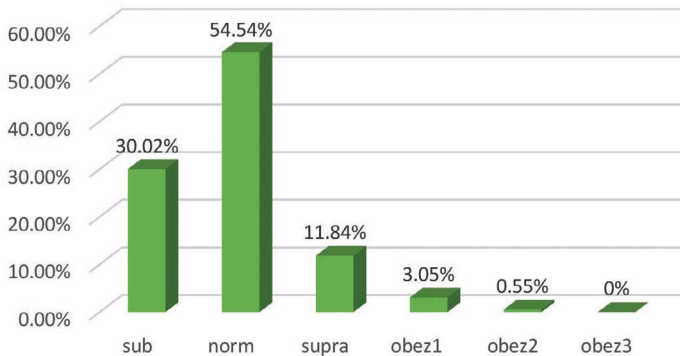


Figure 4. Percentage distribution of 7th grade students according to BMI

After analysing figure 5 we note that, at the age of 13-14, the percentage of underweight children decreases by 25.60%, the number of normal-weight students increases by 60.37%, the percentage of overweight pupils decreases slightly by 10.78% and of obese children by 2.5%.

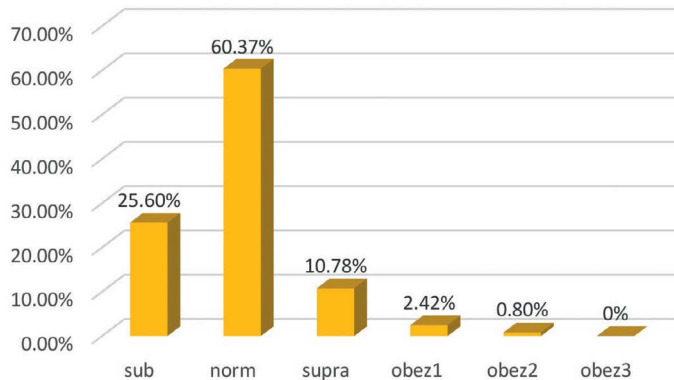


Figure 5. Percentage distribution of 8th-grade students according to BMI

Most of the students who participated in the study are normal weight, with a BMI between the WHO reference values 18.5 - 24.99, their body weight being the normal one for their age. Overweight children represent a small percentage, i.e. their body weight is lower than the normal one for their age.

A multitude of studies have shown an increase in the frequency of overweight and obese children and teenagers. There is also an increase in the risk factors that lead to heart diseases, such as being overweight, obesity, an unhealthy lifestyle, a sedentary lifestyle and unhealthy eating habits. Nevertheless, this is not true for the group of subjects from the south-eastern part of Romania that participated in the research.

In our country, in 2016, studies conducted by the Universities of Medicine in Timișoara, Bucharest, Iași, Târgu Mureș and data from the National Institute of Public Health showed that 19.7% of the girls and 29.2% of the boys were overweight and 5% of the girls and 10.7% of the boys were obese. On the other hand, 15.3% of the girls and 13.3% of the boys were underweight, and 2.8% of the girls and 2.8% of the boys were moderately and severely underweight. As compared to a study conducted in 2006, the percentage of obese boys has doubled in the last 10 years. During this period of economic growth for Romania, there was an unhealthy nutritional transition, with an increase in the consumption of foods with low nutrient content and high energy density (concentrated sweets, juices, fast food, chips), which led to weight gain in children and adults, with important consequences on health throughout life.

Research conducted in 2015 by Kulkarni et al., in India on a group of 4253 children aged 10-14 regarding the BMI, highlighted the following results: underweight children - 1379 (32.5%), normal weight children - 2822 (66.4%) and obese children - 52 (1.2%) (Kulkarni, Nagendra, Kumar, Siddalingappa, & Madhu, 2014).

A study conducted in Greece, in 2016, had the following results: 9.9% of the participants were classified as being normal weight, 23.9% were classified as being overweight and 6.3% as being obese. In particular, for boys and girls respectively, 69.1% and 70.4% had normal weight, 23% and 24.8% were overweight and 7.8% and 4.7% were obese (Michalopoulou et al., 2011).

Becerra et al., conducted research on 12–14 year - old children in Jaen, Spain. The results were as follows: Healthy - 199 (67.2%), Overweight 73 (24.7%), Obese 24 (8.1%). The results of this work show the existence of low self-esteem risk groups. Therefore, it is necessary to plan actions aimed towards reinforcing and increasing self-esteem. Girls and young adults with overweight and obesity problems should perhaps be a main focus of intervention, since these groups have a greater likelihood of demonstrating low self-esteem (Becerra, Muros, Cuadros, Sánchez, & González, 2015).

A study conducted in South Africa on 1,361 children (boys: n = 678; girls: n = 683), aged 9–13, showed the following results: underweight B 69%, F 82%, normal weight B 27, 7%, F 18.1%, overweight B 2.6%, F 1%, obese B 0.7 F 0.6% (Moselakgomo & Van Staden, 2019).

CONCLUSIONS

From the centralized data and their analysis, it can be seen that the weight of children aged 11-14 is mostly normal. A large percentage of the subjects (49%) falls into the category of normal-weight children. The percentage of the school population in the evaluated group that presents obesity is relatively low (11.94%), including the number of overweight children. The results of the study show that, by using the BMI, the percentage of obese people is not as high as health statistics say. The causes of obesity in these subjects may be metabolic disorders. The existence of obesity cannot be attributed only to eating habits, lack of physical activity or a sedentary lifestyle.

We believe that supporting children by means of organized physical activity programs could contribute to their harmonious physical development.

The changes that are observed from one age category to another can also be attributed to the hormonal changes specific to the post-puberty and puberty period, a period in which hormones exert specific effects on the adipose tissue and the muscle mass.

The subjects come from both rural and urban areas, where the standard of living is a different factor that can influence the harmonious growth and development of the body.

The study is a foundation for future research. The authors intend to carry out research through other methods to highlight the level of weight. There will also be research on the comparison between different ways of investigation for the possibility of reflecting this condition for school-age children.

The study is a foundation for future research. The authors also intend to carry out further research with the help of other methods in order to highlight the weight level. The authors also intend to carry out research on the comparison between different ways of investigation regarding the weight of school-age children.

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