Nutritional Status of Young School Children in a Rural Environment in Srem District

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Abstract

This research was primarily focused on examining the nutritional status of boys and girls of the young school age. The research was conducted in the rural environment in Srem district and it was based on the Body Mass Index (BMI). This was a transversal research, and the sample included 71 students (34 boys and 37 girls) from the first to the fourth grade of the two primary schools in villages Budjanovci and Nikinci. Measurements included height and weight, and based on them, Body Mass Index (BMI) was calculated. The results of the study showed that the number of underweight children was 1 (1.4%), with normal weight 52 (73.2%), preobese 11 (15.5%) and there were 7 obese students (9.9%). There are no statistically significant differences in the frequency of obesity in all four grades. Considering that obesity at a young school age has a significant effect on obesity and the development of many illnesses in an adult life, it is important to understand this problem in order to do prevention more effectively.

Keywords: *Nutrition, Rural Environment, Students, Body Mass Index*

Introduction

Anthropological status depend on the socioeconomic conditions of the environment in which an individual or a group lives, social standard, the social status of the students' parents, the cultural level of the environment, the basic residential status of an individual and many other factors. The nutitional status is an indicator of the physical ability and health of an individual and an entire population.

Nutritional disorders are one of the most serious health problems. Insufficient nutrition has multiple negative effects on growth and development. Preobesity, as a social health problem, in the period of the young school age, is a predictor of obesity. It shows the risk of appearance of chronic non-communicable diseases and disabilities in later life (Jagodic-Torbica, Ostojić, & Petrović, 2006). For this reason, it is necessary to pay attention and react in time, in order to neutralize these negative effects.

The research that was based on the assumption, that the students living in different environments (urban and rural) have a different degree of development of morphological dimensions and motor abilities, demonstrates the unevenness in terms of the results (Lukić, 2015). Many scientific papers wanted to determine the differences between children from urban and rural environment, between 7 and 14 year-olds in terms of morphological characteristics, motor abilities, degree of nutrition, physical activity, the influence of environmental factors and eating habits. The research about the nutritional status of young school children in urban areas in Vojvodina based on BMI, showed that there are between 11.6 and 35% of preobese and obese children (Obradovic & Srdic, 2007; Lepes, 2009).

Monitoring the nutritional status of the young school children has multiple benefits, because it shows the process of growth and development of the children, it helps to understand the current state, monitoring the effectiveness of Physical Education program and it is an important prognostic factor of health in later life (Pokos, Lauš, & Badrov, 2014; Masanovic, 2019).

The problem arised from the uneveness of the results obtained so far and the lack the research about this topic in Serbia. The aim of this research is to determine the nutritional status of young school children in the rural environment in Srem district based on the body mas index (BMI).

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Method

Sample of respondents

The research was conducted on children of the young school age from the first to the fourth grade in the two primary schools in the villages in Srem district in the municipality of Ruma: „Nebojsa Jerkovic" in Budjanovci and „Branko Radicevic" in Nikinci. The sample include 71 students in both schools: 34 boys and 37 girls. The participants were 11 students of the first (5 boys and 6 girls, 7 years old), 17 of the second (9 boys and 8 girls, 8 years old), 20 of the third (11 boys and 9 girl, 9 years old) and 27 students of the fourth grade (9 boys and 14 girls, 10 years old). All students, including their parents and teachers, were fully informed about the test itself, its purpose and methods. They voluntarily took part in the experiment.

Sample variables

Anthropometric measurements of body height expressed in meters (m) and body mass expressed in kilograms (kg) were used in this study. The measurement was carried out in accordance with the recommendations of International Biological Program (IBP) (Weiner & Lourie, 1969). Nutritional status of young school children was assessed by the dependent variable of the Body Mass Index - BMI, which was calculated as the body mass ratio and body height squared according to formula $BMI=BM (kg)/BH(m^2)$ (WHO, 1997). The classification of subjects was done by BMI cut-offs that are used to assess the prevalence of child obesity and skinniness (Cole, Bellizi, Flegal, & Dietz, 2000).

Methods of data analysis

All statistical procedures were performed using the statistical program IBM SPSS Statistics (Statistical Package for the Social Sciences), version 24.0 for Windows. The analysis of nutrition status was done based on school age (grades) and body mass index (underweight - normal weight – preobese - obese). Descriptive statistical parameters were calculated: measures of central tendency and measures of variability - arithmetic mean, standard deviation, coefficient of variation, standard error of arithmetic mean, range of results, minimum and maximum value of measurement results, skewness and kurtosis. Analysis of variance (ANOVA) was used to determine the significance of the differences between the groups of subjects, in grades, in the applied variables system.

Results

In the Table 1, descriptive statistics of body height, body mass of the students from the first to the fourth grade is displayed. It can be concluded that the average results go within the limits of the expected values. Based on the arithmetic mean (AM) for each class, it can be noticed that the difference between 1st and 2nd, 2nd and 3rd, and 3rd and 4th class vary between 4 and 8cm in body height, 0.81 and 6.64 kg in body mass.

Table 1. Descriptive statistics of body height, body mass and body mass index (BMI) for boys and girls, by grade and total

Grade	N	body height AM±SD	body mass AM±SD
1.	11	1.29±0.10	30.56±7.59
2.	17	1.33±0.08	32.21±6.34
3.	20	1.40±0.08	38.15±8.77
4.	23	1.48±0.07	42.82±6.69
Total	71	1.39±0.10	37.07±8.71

Legend: N-number of respondents; AM - arithmetic mean; SD - standard deviation

In Table 2, the descriptive statistics of body mass index (BMI) and the values of the analysis of variance (ANOVA) of students from the first to the fourth grade is presented. It can be concluded that the average results are within the limits of the expected values. Based on arithmetic means (AM) for each class, it can be noticed that the difference between 1st and 2nd, 2nd and 3rd and 3rd and 4th grades by gender and age is between 0.14 and 1.48.

The analysis of variance (ANOVA) shows that the F-test ratio (F = 1.155) of the relationship between the groups (grades) is low and statistically not significant at the locking level (p = 0.000), as we can see it from the result (p = 0.333) of the level of statistical significance for the univariate f test. It can be concluded that the analyzed groups (grades) do not statistically differ from the results in BMI variables.

Table 2. Descriptive statistics of body mass index for boys and girls, by grade and total and analysis of variance (ANOVA)

Grade	N	body mass index AM±SD
1.	11	17.98±2.24
2.	17	18.21±3.62
3.	20	19.22±2.93
4.	23	19.82±3.81
Total	71	18.98±3.34
	F=1,115; p=0,333	

Legend: N - number of respondents; AM - arithmetic mean; SD – standard deviation; F - univariate f test; p - statistical significance for the univariate f test

An overview of Table 3 can be noticed that 1 (1.4%) child belongs to the group of underweight. The total sample of normally weight children is 52 (73.2%). The children with normal weight are 14 (82.4%) in the second grade, and 7 (63.6%) in the first grade. In the total sample, there are 11 (15.5%) preobese children. The most preobese children are in the first grade (18.2%), and the least in the second grade (11.8%). There are 7 (9.9%) obese children in the total sample. The most obese children are in the fourth grade (13.0%), and the least in the second (5.9%). There are 18 (25.4%) preobese and obese children in the total sample. The largest number is 7 (30.4%) in the fourth grade and the lowest number is 3 (17.7%) in the second grade.

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Table 3. Nutrition status by age and total for the whole sample

N=71	1st grade boys and girls		2nd grade boys and girls		3rd grade boys and girls		4th grade boys and girls		Total boys and girls	
	n	%	n	%	n	%	n	%	n	%
Underweight	1	9.1	0	0	0	0	0	0	1	1.4
Normal weight	7	63.6	14	82.4	15	75	16	69.6	52	73.2
Preobese	2	18.2	2	11.8	3	15	4	17.4	11	15.5
Obese	1	9.1	1	5.9	2	10	3	13	7	9.8
Total	11	100	17	100	20	100	23	100	71	100

Discussion

The results of this study show that among young school children in Srem district have 15,5% preobese and 9,8% obese children. Recent studies show that children of the young school age in 4.6 to 8.2% of cases are obese, ie. in 11.3 to 32% cases are preobese (Đokić & Stojanović, 2010; Đokić & Međedović, 2013).

This research found that there are differences in the nutritional status of young school children in the rural environment in Srem district with the results of previous similar researches. It has been shown that children from the rural environment by percentage of obesity are getting closer to the children from urban areas and that there is no significant difference in the percentage of overweight and obesity by gender (male students / female students) and school age (grades).

The limitation of this study is the fact that morphological characteristics correlate with a certain spatial affiliation, and with the cultural and historical heritage of the environment. The lack of research is because the sample is relatively small. There should be a more detailed survey of the impact of family, education, socioeconomic status and other factors on the state of nutrition.

The cause of preobesity and obesity is the cumulative effect of negative habits and other influences. It can be concluded that one of the cause of this problem lies in professionalism and organizations who work with children, from pre-school and school children to adolescents, as well as the of teaching of physical education. There is a need to focus on teaching physical education and the physical development of children, the prevention of preobesity and obesity and the correct posture, from pre-school to the young school age. It should be carried out by professors of physical education instead of insufficiently and inadequately trained people. It is certain that professors of physical education know far better the motor status of the child the and dynamics of their physical development.

Suggestions for the future research are the introduction of quality content in teaching physical education (theoretical and practical), aimed at preventing obesity and correcting the postural status of children. Based on a much larger number of respondents, we should get more concrete conclusions in what way we can prevent the occurrence of obesity with children.

In our country, there is an insufficient number of research of this issue, and they need to be actualized. There are no national standards for assessment of nutritional status (growth and development tables) of children in Serbia (Pajić, Gardašević, & Jakovljević, 2016). Such research should become part of the teaching of physical education and analysis at the end of each school year, in order to have an insight into the morphological development and state of postural status of children at the levels in one country.

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