

BODY COMPOSITION OF YOUNG ADOLESCENTS FROM RURAL AND URBAN AREAS

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(Original scientific paper)

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Abstract

The obesity rate among school-age children has been on constant rise for several decades. The lack of physical activity and unhealthy diet exist in both cities and rural areas. The primary aim of this research is to compare body composition between the two groups of adolescents - rural and urban. The sample of 1122 examinees, all elementary school students, aged 10 to 14 (590 boys and 532 girls; 706 urban, and 416 rural area residents) has been subjected to testing and measuring 4 parameters: body mass, body height, Body-Mass-Index (BMI), and body fat percentage. By applying the ANOVA the impact of sex, age, and place of residence on the average values of all 4 parameters was tested. Boys and girls residing both in cities and rural areas did not have significantly different average values of all anthropometric variables. The examinees' age and sex proved to have the greatest impact on the parameters' average values. Due to the natural biological development, the female examinees had lower body mass, yet higher fat than their male peers. The BMI of urban and rural children was not significantly statistically different. 16% of the overall sample was classified as overweight and obese.

Keywords: *obesity, body weight, body height, body fat, overweight, development factors.*

Introduction

Recent studies have shown that a significant number of school children are leading predominantly sedentary lifestyles (Inchley & Currie, 2016; Zegnal Koretić, 2017). Apart from inadequate physical activity, an excessive and inappropriate diet represents the dominant characteristic of modern children's lives (Novak, 2013; Janjić, 2016). These two facts are considered to be the primary reasons for the increasing number of adolescents being overweight (Ostojić, 2011; Styne, 2017). In recent history, it was regarded that the location of the residence (rural/urban) was in direct correlation with a child's physical activity level and that rural children had a higher fitness level, and lower number of overweight individuals (WHO, 2009; Tomac, 2012). The great expansion and evolution of information technology and mobile phones have had a direct impact on the way today's children spend their free time. Further more, the advancement of agricultural machinery and technical appliances directly resulted in a decrease in physical activity. Considering the above-stated facts it is just to assume that nowadays the amount and types of physical activity of urban and rural area children do not significantly differ. The logical consequence of the above-stated lifestyle change would probably be a rise in the number of overweight children from rural areas. In other words, the morphological characteristics differences of urban and rural children have ceased to exist. In accordance with all the above the study's aim is to determine the relationship between the morphological characteristics (body composition) of children from urban and rural areas.

Material & methods

The researchers measured the basic physical characteristics of the Random Sample (N=1122, 590 males and 532 females). The sample group consisted of young adolescents (10-14 years old) attending three elementary schools. The sample divided in two groups, urban (N=706) and rural (N=416), and in a both group were measured 4 variables (morphological space): body height (BH), body mass (BM), body fat percentage (Fat) and calculated the Body mass index (BMI). Omron BF 511 scale was used for measuring body mass and body fat percentage, and Seca 216 stadiometer for body height. The descriptive parameters

(mean and standard deviation) were calculated for the research variables. The individual and interactive impact of sex, age, and place of residence on the average values of all anthropometric variables were tested by the one-way ANOVA.

Results

The results of one-way ANOVA have shown that the place of residence (urban or rural) has no significant impact on any of the anthropometric variables. Therefore, boys and girls from both urban and rural areas did not possess significantly different average values of BM or BMI. As it was anticipated, due to natural human growth, the older children were taller and heavier, their BMI was higher. More over, the difference in height between girls and their male peers (in favor of boys) significantly increased with their age (Table 1)

Table 1. Descriptives for BM (kg)

Age	Sex	Urban Area			Rural Area		
		Mean	Std. Dev.	N	Mean	Std. Dev.	N
10-11	Male	42.77	12.232	100	41.46	10.944	37
	Female	40.78	11.297	89	44.03	14.573	60
11-12	Male	49.49	14.612	93	46.98	12.078	59
	Female	48.19	13.392	79	48.18	12.506	58
12-13	Male	51.28	13.755	94	52.58	13.733	60
	Female	53.40	12.192	87	55.96	14.211	49
13-14	Male	60.96	14.336	87	60.15	13.975	60
	Female	55.99	12.687	77	59.14	12.466	33

The converted figures represent the frequency distribution of body constitution, primarily for different age groups (Table 2),

Table 2. Examinees' nutrition status in accordance with the place of residence

Grade	Dwelling	Underweight	Normal weight	Overweight	Obese	Total
V	Rural	13.4%	72.2%	7.2%	7.2%	100%
	Urban	12.7%	75.1%	8.5%	3.7%	100%
VI	Rural	2.6%	82.1%	10.3%	5.1%	100%
	Urban	5.8%	79.1%	11.0%	4.1%	100%
VII	Rural	3.7%	75.2%	11.9%	9.2%	100%
	Urban	33%	83.4%	6.1%	7.2%	100%
VIII	Rural	1.1%	75.3%	14.0%	9.7%	100%
	Urban	0.6%	81.7%	14.0%	37%	100%
Total	Rural	5.0%	76.4%	10.8%	7.7%	100%
	Urban	5.8%	79.7%	9.8%	4.7%	100%

The original BMI data were converted to percentiles (Figure 1).

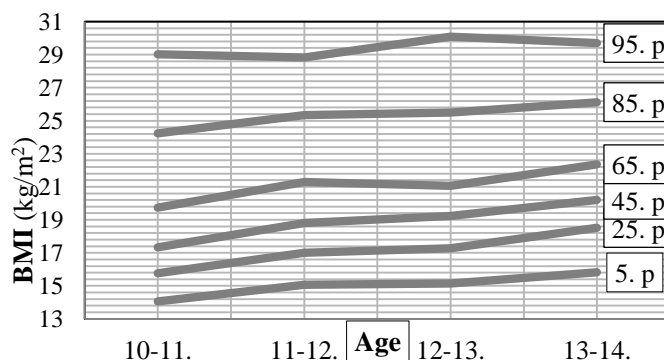


Figure 1 Percentile Values for BMI Variable

Approximately 16% of the total number of examinees (both urban and rural) were classified as overweight (16%).

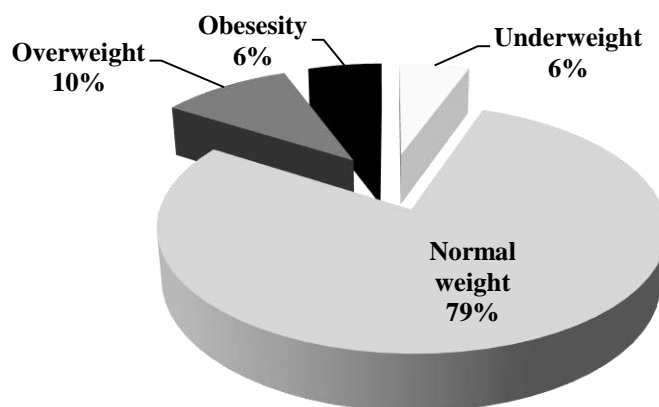


Figure 2 Body mass index distribution for the entire sample

Discussion

The empirical data derived from testing the morphological characteristics of over 1000 Croatian adolescents (10-14 years old students) proved the conclusions drawn in previous related studies, that today almost every fifth student is overweight (Bahreynian 2016; Zegnal Koretić 2017; WHO 2017). Inadequate physical activity, which often coincides with an unhealthy diet, directly leads to metabolic imbalance, a problem detected in a significant number of children (Inchley & Currie, 2016; WHO, 2018). Due to the random and substantial mass sample, the presented results can be generalized. Apart from the increase in overweight and obesity, the results of the study indicate that the lifestyle differences between children living in rural areas and those residing in cities have ceased to exist. The researches have shown that children are ever less involved in active free play and that the natural need for movement is satisfied primarily with the exercise in its institutional form (physical education class), (Karakaš, 2015; Vidaković Samaržija & Mišigoj-Duraković, 2016; Badrić & Ravlić, 2017). Therefore, based on the results of this study, one can conclude that both urban and rural children have the symptoms of metabolic imbalance. 16% of the overall sample was classified as overweight.

Conclusion

By comparing the morphological variables, the basic hypothesis of this research has been confirmed; the place of residence does not have a defining impact on the physical fitness of urban and rural young adolescents. Boys and girls, residing both in rural and urban areas did not have significantly different BM, BMI. As expected, the greatest impact on body dimension average values had two biological variables, subjects' age and sex. Age proved to have a significant impact on BM, and BMI, whereas sex had an impact only on BM. The examinees' BMI did not show a significant statistical discrepancy with reference to their place of residence. The percentage of overweight children was in accordance with the global average. The probable explanation for the lack of dissimilarities between urban and rural children and their morphological characteristics lies in the fact that both groups, due to the advancement in technology, lead a lifestyle with little or no physical activity. This assumption presents the foundation for starting a new research that would analyze the quality and quantity of physical activities of rural and urban adolescents.

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