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GENDER DIFFERENCES IN SOME ANTHROPOMETRIC MEASURES IN ADOLESCENTS FROM THE REPUBLIC OF KOSOVO

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(Original scientific paper)

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Abstract

The main purpose of this research is to determine gender differences in some anthropometric measures among Kosovo adolescents. The research was carried out on a sample of xxx adolescents, from xx primary schools in the Republic of Kosovo. The sample is divided into two subsamples according to gender, namely 500 respondents are boys and 500 respondents are girls. The average age of the respondents of both sexes was 14-15 years old. To realize the objectives of the research were taken 12 anthropometric measures (IBP methodology). The results were statistically processed with SPSS, v. 26.0 for WINDOWS (basic statistics, Student's t-test). The results are generally indicative that boys have greater body height, foot length and lower leg circumference compared to girls. On the other hand, girls have a larger thigh circumference and skin folds on the triceps, thigh and lower leg. The results of this research represent a small contribution to clarifying the problem of growth and development of anthropometric measures and body composition among students from the Republic of Kosovo.

Keywords: *adolescents, anthropometric characteristics, students*

Introduction

Physical development refers to the process of growth, differentiation of tissues and functional maturation. All these processes in the general development of the individual do not always go parallel to the pace of change, which conditions with a different structure of the anthropometric dimensions. Hence it can be concluded that the anthropometric dimensions of an adult are not simply increased dimensions of a child. All the processes that characterize the physical development, including the period development, are conditioned by the correlative action of various endogenous and exogenous factors. Among the endogenous factors, the genetic factor, that is disposition, as well as the related factors - race, sex, endocrine system and effector tissues and organs, have a special place.

Among the exogenous factors, socio-economic conditions, geographical - climatic conditions, seasonal conditions, as well as physical activity can be mentioned in addition to the others. Although the influences of these factors are present throughout the life, they are especially more obvious in the first year of life and in the phase of pre-puberty and puberty.

Activities in general and systematic physical exercise in particular, sports training and physical activity through play, in accordance with age characteristics play an important role in the human development. Research show that the efforts of the muscles within these activities affect the bone, muscle, cardiovascular, respiratory and other systems, while the correct relation between these efforts, rest and sleep, as well as optimal nutrition, is also important enables better physical development.

The anthropological view posits that endogenous and exogenous factors of development, with mutual effects, regulate human characteristics, development, and behavior. Similarly, favorable conditions from the external environment, including physical activity, can, to a certain extent, enhance the developmental traits of the individual. However, the impact on some traits may be relatively small.

Growth and development should be viewed as dynamic processes that occur continuously from conception to full maturity. The term "aerobic capacity" means the total volume of aerobic metabolic processes in the human body and represents a large portion of the total human energy capacity. Unlike the term "aerobic capacity", the term "maximum oxygen intake" (VO2max) or according to some Anglo-Saxon

authors "maximal aerobic power" refers to the intensity of aerobic processes and in fact represents the body's ability, , which in certain cases consumes the largest amount of oxygen Rashiti, V. Rashiti, N.(2013). Athletic operates on the basis of a particular system of knowledge that has in its content the theoretical and methodological foundations of sport training (Rashiti, N. Ibri, L. Pireva, A. Shala, S. Maliqi, A. 2010)

Although the laws of growth and development are generally the same for each individual, the results of numerous studies indicate individual variations and deviations (Katić, 1995; Kosinac, 1992; Mikić, 1999; Zrnzević, 2010). A significant amount of previous research in this anthropological field has focused on monitoring body height and weight across different age periods in children and adolescents (Medved et al., 1987; Zdravković, 1978; Pavlović, 1999; Božić-Krstić et al., 2004), albeit in other geographical environments and socio-economic conditions. Therefore, the aim of this research is to determine gender differences in certain anthropometric measures among Kosovo adolescents.

Materials and Methods

The research was carried out on a sample of 504 adolescents , from 5 primary schools: SHFMU "Abaz Ajeti" in Gjilan, SHFMU "Rasim Kiqina" in Drenas, SHFMU "Abaz Ajeti" in Prishtina, SHFMU "Abaz Ajeti" in Viti, SHFMU "Abaz Ajeti" in Kamenic, namely students aged 14 - 15 years old from the Republic of Kosovo. The sample is divided into two subsamples according to gender and 304 respondents are boys and 200 respondents are girls. The average age of the respondents of both genders was 14 - 15 years old.

The study included all students whose parents gave consent to participate in the research, who were psychophysically healthy, and who regularly attended physical and health education classes. The respondents were treated in accordance with the Helsinki Declaration.

The measurements were carried out in the months of September, October and November of the year 2022 - 2023, in standard school conditions during the regular physical and health education classes.

Measuring of the anthropometric measurements was realized at the recommendations given by IBP-International Biology Program. For estimation of the morphological characteristics the following anthropometric measures have been applied : body height (AVISTE), leg length (ADOLNO), foot length (ADOLST), upper arm circumference (AOINAD), body mass (ATELMA), chest circumference (ASROGK), thigh circumference (AOBNK), lower leg circumference (AOBPK), triceps skinfold (KDTR), abdomen skinfold (KDAB), upper leg skinfold (KDPK) and lower leg skinfold (KDPK) .

The measurement was carried out in standard school conditions during regular physical and health education classes. The measurement is carried out by experts in the field of kinesiology, who were previously trained to measure a certain anthropometric measure. The rooms in which the measurements were performed were clean, sufficiently warm and adequately lit. During the measurement, the respondents were barefoot and minimally dressed in sports equipment. During the realization of measurements, certain anthropometric points and levels are also marked.

Arithmetic mean (Mean), standard deviation (SD) were calculated for each anthropometric measure in both boys and girls. The significance of the differences of arithmetic means between boys and girls in each anthropometric measure was tested with Student's t-test, and the level of significance was fixed at $p=0.05$.

All the analyzes were performed using the Statistical Package for Social Sciences software (SPSS, v. 16.0 for WINDOWS; SPSS Inc., Chicago, IL, USA), and values of $p<0.05$ were considered statistically significant.

Results and Discussions

Table 1 shows the significance of the differences (t-tests) of the arithmetic means of the anthropometric measures, between boys and girls. The preview in table 1 shows that between boys and girls there are statistically significant differences in 9 out of 12 variables. Intergroup differences were determined in anthropometric measures: body height (AVISTE), leg length (ADOLNO), foot length (ADOLST), upper arm circumference (AOINAD), upper knee circumference (AOBNK), lower leg circumference (AOBPK), triceps skinfold (KDTR), hamstring skinfold (KDPK) and calf skinfold (KDPK). Statistically significant differences between boys and girls were not determined in the anthropometric measures : body mass (ATELMA), chest circumference (ASROGK) and abdomen skinfold (KDAB).

From the value of the arithmetic means and the level of statistical significance, it can be seen that boys have higher body height, foot length and lower leg circumference compared to girls. On the other hand, girls have a larger thigh circumference and triceps, thigh and lower leg skinfold.

Table 1 . Differences in anthropometric measures between boys and girls

	Boys		Girls		t	df	Sig.
	Mean	SD	Mean	SD			
AVISTE	169.86	7.93	162.56	5.40	10,13	336.01	**0.000**
ADOLNO	59,18	13.64	53.79	8.80	4.44	330.80	**0.000**
ADOLST	25.61	1.52	23.70	1.46	11.82	328.40	**0.000**
AOINAD	98.88	5.40	95,46	5.20	5.95	327.64	**0.000**
ATELMA	24.98	3.62	24.59	3.08	1.08	339.52	0.280
ASROGK	81,81	9.40	83,24	6.98	-1.62	341.13	0.106
AOBNK	43.96	5.61	47,12	5.56	-5.22	323.69	**0.000**
AOBPK	34,28	4.12	33.07	3.33	3.03	341.59	**0.003**
KDTR	12.06	6.03	15,32	6.54	-4.74	309.14	**0.000**
KDAB	15.80	10.68	14.95	7.02	0.89	332.71	0.376
KDPK	18.74	8.99	29.06	9.08	-10.51	320.88	**0.000**
KDPK	18.90	6.46	21.99	6.15	-4.52	329.30	**0.000**

Boys aged 14 - 15 years have higher skeletal longitudinal dimensions (body height, leg length and foot length) and show lower values of most skin folds compared to girls. Girls have a larger thigh circumference compared to boys. No gender differences were found in body weight, chest circumference and abdominal skin fold.

Body height and body mass are important indicators of the physical growth, development and maturity. In certain stages of ontogenetic growth and development, the influence and interaction of genetic and environmental factors on the growth and development of children and adolescents is not the same (Božić-Krstić, Rakić & Pavlica, 2003). Regular monitoring of physical growth and development, starting with a diagnostic evaluation (initial monitoring), contributes to the detection of abnormalities in growth and development, early identification of obesity and malnutrition. It enables greater individual access to students and better programming of physical education classes.

Since the genetic factor cannot be greatly influenced, it is important to control the environmental factors that disturb the natural weight gain and the relationship between body height and circumferences and transversal measurements. The influences of environmental factors dominate the period of adolescence and they can be acted upon preventively to eliminate the nutritional excess that threatens to replace the acceleration of growth, where instead of an increase in body height, there is an increase in the body mass index (Gligorijević, 2008). The appearance of increased body mass is also the result of reduced physical activity. Insufficient physical activity with increased calorie intake leads to an increase in body mass above the optimal body height for a person (Maksimović & Matić, 2009). The number of obese people is increasing from birth to old age, both in our country and the whole world (Malina, 2004; Zdravković, Banićević & Petrović 2009). Being these the reasons, it is necessary to involve the largest number of school-age children as early as possible in the work of the sports sections in the school, more precisely in the teams (clubs).

Adolescence is a very sensitive period. Physical activity is of essential importance for the healthy and balanced development of children and young people. Regular physical activity brings many benefits to the physical and mental health and social functioning of children and young people. It is known that physical activity contributes to building and preserving the health of bones, muscles and joints and also helps in controlling body weight, reducing body fat and improving cardiorespiratory functions.

Due to all of the abovementioned factors, we recommend parents, educators, teachers, and children, systemic physical activity, which represents a strong stimulus for the proper development of the entire organism and all major organisms and organic systems, stimulating trophic processes and strengthening the adaptive abilities of the organism.

The results of this research represent a small contribution to clarifying the problem of growth and development of anthropometric measures and body composition among students from the Republic of Kosovo. It is suggested the possibility of comparing the results of this research with the previously established norms for children and youth of the same age and gender, as well as comparing with the corresponding results of other researches.

Conclusion

Based on the obtained results, it can be concluded that boys have a higher body height, foot length and lower leg circumference compared to girls. On the other hand, girls have a larger thigh circumference and triceps, thigh and lower leg skinfold. Statistically significant differences between boys and girls were not determined in anthropometric measures: body mass, chest circumference, and abdominal skinfold.

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