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Analysis of the somatic status of elementary school students.

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Abstract

Background. *Very often the anthropometric parameters (height and mass) are primarily used in the assessment of the morphological status of an individual. Morphological, space is often the subject of a research in the field of physical education and sports. Their analysis can detect certain psychosomatic changes, the trend of their development and possible differences.* ***Purpose.*** *The aim of the research was to analyze the somatic status of students of middle primary school age.* ***Methods.*** *The sample has included a population of 68 primary school students from primary school "Serbia" in East Sarajevo (Bosnia and Herzegovina), aged 11*±0.5*. Two variables body height (AVIS) and body mass (AMAS) have been used to analyze the morphological area.* ***Results.*** *The results of the study have shown that boys and girls are identical in height and weight.* ***Conclusion.*** *Results in the field of physical education become negligible if monitoring and control of anthropological status is not performed.* , [Joksimović Marko , Bjelica Bojan, D'Onofrio Rosario Šljivić Miloš , Jeremić Stefan Analysis of the somatic status of elementary school students. Ita. J. Sports Reh. Po.; 2020; 7; 1; 1421 – 1430 ; ISSN 2385-1988 [online] IBSN 007-111-19 - 55 ; CGI J OAJI : 0,101).]

.***Key words:*** *Longitudinality, growth, gender, menarche*

Introduction

An expert interested in assessing the physical development of one or more persons has two anthropological methods - antroposcopy and anthropometry. Antrospcopy is a method based on observation of the human body, while anthropometry is a method for measuring the human body, that is, some parts of the body, which quantitatively determine the morphological properties and gives the objective picture of the state of growth of the examinee[9]. Data on the growth and development of children can be obtained by measuring and testing the relevant anthropometric characteristics[2,23,12]. Measurement of the morphological characteristics of the human body, processing and analysis of the obtained data are an integral part of a number of basic applied researches, primarily in the field of sports medicine, military and industrial medicine, as well as in the field of physical education and sports[11,9,15]. Anthropometric measurements and data processing of larger groups of respondents are performed within scientific research and allow obtaining the average values of individual anthropometric parameters in observed populations[22]. With the so-called longitudinal research method, i.e. monitoring and measuring the same group of people over the course of many years, an insight into the dynamics of the development of children and youth in a certain area and in certain conditions of life is obtained[7]. With transversal method of research, i.e. by a one-time measurement of a larger number of respondents of a particular population, an insight into the average state of physical development is obtained. Health workers and experts in the field of physical culture, are able to use anthropometric measurements for practical purposes, in order to assess the individual anthropometric status of the examinees. Morphological characteristics represent the primary information on the psychosomatic status of a person which determine the system of basic anthropometric latent dimensions, regardless of whether these dimensions are developed under the special influence of the external environment (ie. training), or not[25]. Growth and development are dependent on biological laws, which is an important limiting factor, although the influence of exercise on growth and development can not be neglected, since exercise is a

significant factor in the realization of a particular genotype in the corresponding phenotype. The concept of growth implies anatomic-physiological changes, and under the concept of developing psychological events and the development of sensory and motoric abilities[13,17]. The growth of children in the population reflects their nutritional status and indirectly determines their standard of living. Studies on the growth and development of a child have always taken a significant position in the scientific research curriculum and are interesting for researchers and for medical sciences as well as for physical anthropology[21,28]. In connection with the above mentioned, this research has been carried out with the aim of diagnosing the somatic status of students of middle primary school age and possible differences in quantitative indicators of somatic status, depending on gender.

Material and Methods

Population

The survey has included the population of elementary school students of primary school "Serbia" in East Sarajevo (Bosnia and Herzegovina). The sample consists of 68 students, aged 11 ± 0.5 years old. The study has included 34 boys (average height 155.15 ± 8.03cm, body weight 47.19 ± 9.55 kg) and 34 girls (average height 154.26 ± 9.20cm, body weight 44.47 ± 11.68kg), who had regularly attended physical education classes. It is important to note that the students havr volunteered to participate in the research. Measuring has been carried out at the physical education Hall of primary school "Serbia".

Measurements and data collection

Variables that have been used for somatic status analysis:
Body height (AVIS-cm),
Body weight (AMAS-kg).
The body height has been measured by an anthropometer. While measuring the examinee, bare foot and wearing sport clothes, stands in an upright position on a solid horizontal surface. The head of the respondents is in such position that the Frankfurt plain is horizontal. The respondent straightenes his/her back as far as he/she can and put his feet together. The examiner stands on the left side of the examinee and controlles whether the anthropometer is positioned directly along the back of the body and vertically, and then lowers the metal ring-slider to make the horizontal crosspiece come to the head.
Body weight has been measured with digital scale. Examinee, bare foot and in wearing sport clothes, stands still in the middle part of the digital scale in an upright position.

Data analysis

The statistical data packet for PC SPSS Statistic 20.0 has been used for data processing. The results of the research have been obtained by descriptive statistics. The basic central parameters have been calculated: Arithmetic Mean as well as dispersion parameters: Minimum, Maximum, Range, Standard deviation, and Variation Coefficient (CV).

Results

In Table 1. descriptive statistics of morphological characteristics for the sample of students has been shown. By analysing the numerical quantitative indicators of the physical status of the analyzed student sample, the necessary information on their physical status have been provided. The average values of the body height of the boys are (155.15cm), while the girls have a body height of (154.26cm). It is evident that the minimum body height is the same in both, while maximum values of body height are higher in boys. Minimum and maximum values range from 37 to 32cm. The values of CV% show a lower homogeneity of body height in girls (84.80%) compared to boys (64.49%), which proves that this is an extremely heterogeneous set.

Variables	Gender	Mean	Min.	Max.	Rang	Std. Dev.	CV%
Height cm	**M**	155.15	140	177	37	8.031	64.493
	F	154.26	140	171	32	9.209	84.807
Weight kg	**M**	47.19	34	70	36	9.550	91.197
	F	44.47	29	77	48	11.688	136.620

Table 1. Descriptive statistic of boys and girls

The average body mass of the boys is (47.19kg), which is almost 3 kg more than the weight of the girls (44.47kg). Interestingly, the minimum body weight values are greater in boys, while maximum body weight values are greater for girls. The minimum and maximum values range from 36 to 48 kg. The girls have also shown lower homogeneity of the results (CV% 136. 62) compared to boys (CV% 91.19).

Diagrams 1 and 2 show the analysis of body height and weight of boys and girls.

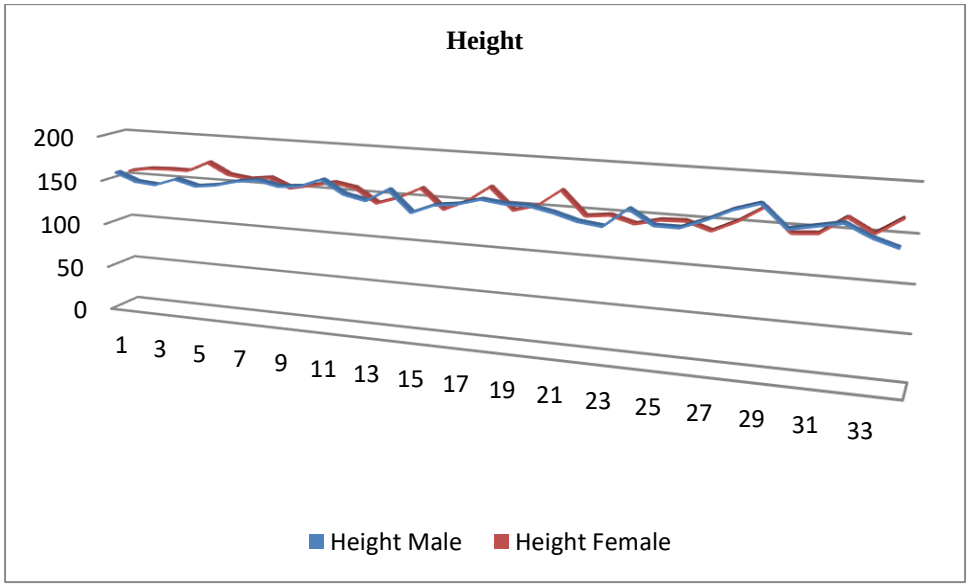

Diagram 1. Body height of boys and girls

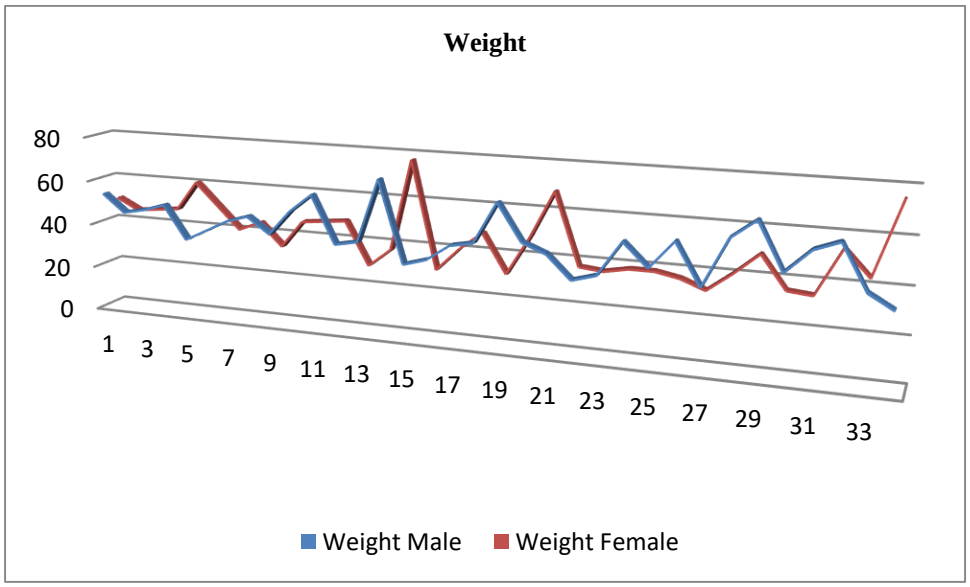

Diagram 2. Body weight of boys and girls

Discussion

The study has analyzed morphological characteristics of students of middle primary school age. When it comes to the school population, body height and body mass are most often used to monitor physical development. Assessment of the body composition of children and adolescents based on body height and body weight allows monitoring of their growth and development in order to determine the correctness, or detection of disorders or the risk of disorders, based on the degree of deviation from the values recommended for a given age[18].Body height, apart from being the best indicator of the general health status of children, is the most reliable indicator of the health status of the population[19,24]. As it has been previously pointed out, girls and boys have had identical body height. It can be confirmed with the facts that girls who have matured earlier had 10.7 years at the time of reaching PHV (the speed of body height increase), and boys had 12.6 years[6,1,15]. All these are good indicators that differences in different sexes are evident and have a corresponding growth trend, as confirmed by the research[10]. Looking at diagrams 1 and 2, it can be noticed that girls are of the same height and weight as boys. We can support the above-mentioned claims with sex biomorphism in the period of growth. At each life stage, the average height of girls is closer to the body height that they reach in the mature age. That situation is not with boys. This phenomenon is especially noticeable among girls who are in older primary school grades and lower secondary school grades. In that period girls are often higher than their classmates, which is because the abrupt puberty development of girls starts two years earlier than boys. A simple conclusion might be that girls are about half their total height they reach in their mature age at the age of two. Boys reach half of the total body height they reach in the mature age only after two and a half years of life. Sex

biomorphism is also noticable in divergences in the average relationship between body height in a sitting and standing position between boys and girls of the same age. During childhood, this relationship is very similar, but from 11 to 12 years of age, this relationship with girls becomes greater[1]. Linear dimensions of the children body and youth dominantly reflect on bone growth[14,28], which means that, linear growth is the most intense in the first year of life, and significant rapid growth is observed in the adolescent age. In boys, under the influence of testosterone, or muscle and bone growth, there is an increase in "massless" body weight, while in girls, due to female sex hormones, the content of fat tissue increases[8], ie the percentage of fat tissue and water of muscle and bone tissue, which are primarily a result of the general biological development of the organism, participate in sex maturation[16,17]. These dimensions are closely related to structural and functional changes. For example, the speed of puberty height is largely related to the time of the menarche and slowing down the growth of the locomotor system with the emerge of respiratory system growth[5]. Menarche, regardless of the age of puberty, is in late for a period of fastest height growth in 11 to 12 months, an average: 12.5-13 years[4]. These thing should be known in the case of strenuous power trainings (in the younger age), because of this unevenness in development and inadequate load result in frequent injuries of the epiphysis[3]. Like any other dynamic system, the bone must maintain the balance of proportions in a constant change in size and structure[27,28]. It seems that this process is different in boys and girls during puberty, although the growth of children is too complex to be described. The research of Šegregur, Kuhar, & Paraďžik[26], showed significant differences in terms of body height and body mass between boys and girls of the first-grade secondary schools. A study by Stupar[25], (meta-analysis), the difference in anthropometric characteristics of children aged seven years found that the results showed that there are statistically significant differences between boys and girls of that age. Here is also evident that, without distinction of sexes, in addition to the medical examination of the individual, it is necessary to monitor and control the physical development in order to prevent the preservation of its health[20].

Conclusion

Very often the anthropometric parameters (height and mass) are primarily used in the assessment of the morphological status of an individual. Morphological, space is often the subject of research in the field of physical education and sports. Their analysis can detect certain psychosomatic changes, the trend of their development and possible differences. Results in the field of physical education become negligible if monitoring and control of anthropological status is not performed.

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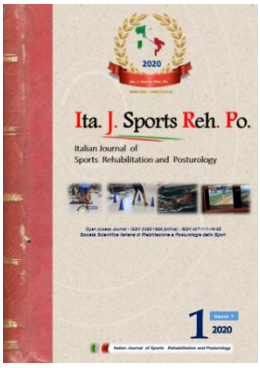

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Declaration of interest

Gli autori dichiarano di non avere relazioni finanziarie, di consulenza e personali con altre persone o organizzazioni che potrebbero influenzare il lavoro dell'autore/i.

Author's Contributions

Tutti gli autori hanno avuto un ruolo significativo in questo progetto. Tutti gli autori sono stati coinvolti nella stesura critica e scientifica del manoscritto ed hanno approvato, prima della pubblicazione la versione finale.

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