DIFFERENCES IN MORPHOLOGICAL AND POSTURAL STATUS BETWEEN PRIMARY SCHOOL MALES AND FEMALES

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Abstract

Determining the status of morphological features and postural status in working with young students is an important task so that we can monitor their growth and development. The main aim of this research was to determine the differences in morphological and postural status between boys and girls of the fifth grade of primary school. The study was conducted on a sample of 39 boys and 44 girls of the 5th grade of elementary school "Novi Grad" from Tuzla, age 10 years ± 6 months. Eight morphological and eight variables were applied in the study to assess postural status. The results obtained show that there are statistically significant differences between the treatment groups of different sex in five morphological (body mass, skinfold of biceps, skin set of thighs, skin set of leaves and body mass index) and three variables for postural status assessment (head posture, shoulder blades and Proper physical activity can facilitate the developmental process in children and young people by improving the body's resilience, correcting postural disorders and developing positive motor habits. forming proper posture in children.

Keywords: students, differentiation, anthropometry, body posture, t-test, Mann-Whitney U test

INTRODUCTION

Monitoring the growth and development of children plays an important role in the study of the overall anthropological status of children, both from the aspect of biological anthropology, as well as from the aspects of medical sciences, physiology, psychology, and kinesiology (Duraković & Mišigoj-Duraković, 2006). The processes of growth and development of children are interacting, so it is necessary to know not only the quantitative levels, but also the nature of the relationships of morphological and functional maturation of children, at a certain age and in relation to gender (Bala, Jaksic, & Popovic, 2009). Most anthropometric measures are, to a greater or lesser extent, heritable. However, how children develop physically depends largely on physical exercise and lifestyle (Sabo, 2006).

Poor posture is an indicator of health problems that can become very serious if poor posture is not corrected on time. However, it is often the case that problems like this are not noticed on time manner. Ideally, early adopters will notice the first signs of poor posture (Brower, 1979).

Body posture disorders in children generally occur due to muscle weakness in the back, chest or abdomen region. From this, the weakness of the pelvic floor and lower extremity muscles can lead to a secondary disorder in the upper parts. Primary changes usually occur first on the muscles and then on the ligaments and bone system (Babiak, 1984).

Automation and computerization in all walks of life lead to hypokinesia, which is one of the primary prerequisites for poor posture. Also, poor habits, improper posture, improper seating, the inadequacy of the school bench, school chairs, and the overweight of the school bag all influence the appearance of various forms and an increasing number of postural disorders.

The primary aim of this study was to identify differences in morphological and postural status between primary and secondary school boys and girls.

RESEARCH METHODOLOGY

Sample of respondents

The population from which a sample of 39 boys and 44 girls was drawn was defined as the population of students of the 5th grade of elementary school "Novi Grad" from Tuzla, aged 10 years ± 6 months.

Sample variables

For the set of variables in the space of morphological characteristics in this study, the measuring instruments described by the Eurofit program were used (Hadžikadunić et al. 2000), namely: Anthropometric characteristics (body height - AVISTJ, bodyweight - ATJMAS); Variables for evaluation of subcutaneous adipose tissue (triceps skin set - AKNTRI, back skin set - AKNSUB, biceps skin set - AKNBIC, thigh skin set - AKNSUP, lower leg skin set - AKNLIS); Derived variable (body mass index - BMINDX).

Body mass index is an indicative indicator of obesity and obesity, used as a good statistical measure of nutrition. It is calculated by dividing the bodyweight of the person in kilograms by the square of the height in meters: BMI = m / h¿. A different categorization applies for children under the age of 20, given that children have different proportions and different height to mass ratios

than adults. Also, the degree of development varies among different age and ethnic groups. Therefore, the determination of obesity in children is based on benchmarks and tables (Must, Dallal & Dietz, 1991). Below 5 percentile (<5) indicates malnutrition, 5-15 percentile indicates increased risk of malnutrition, 15-85 percentile indicates normal nutrition - adequate weight, 85-95 percentile indicates increased risk of overweight - a propensity to grow and over 95 percentile (95>) indicates overweight - obesity.
Napoleon Wolanski's (1975) method was used to estimate postural and / or individual body segments, which provides for the analysis of 8 parameters: D1 - head posture (ODG), D2 - shoulder posture (ODR), D3 - shoulder blade (ODL), D4 - shape (development) of the chest (ODGR), D5 - deviation of the spine in the frontal plane (ODK), D6 - holding the anterior abdominal wall (ODTR), D7 - shape of the legs (ODN) and D8 - arch of the foot (ODS).

Ethical codex

All students, including their parents and teachers, were fully informed verbally and in writing about the test itself, its purpose and how it was conducted. Only those respondents whose parents gave their consent to do the same were subjected to the survey. A T-test for independent specimens was used to determine differences in applied morphological variables between boys and girls, and a non-parametric Mann-Whitney U test for independent specimens was used to determine differences in postural status. Data processing was performed at the Faculty of Physical Education and Sports in Tuzla. For this purpose, Statistica 5.0 for Windows and SPSS 12.0 were used.

RESULTS AND DISCUSSION

To determine the potential partial quantitative differences between boys and girls of grade 5 in the space of morphological characteristics, a t-test for independent samples was used. Analyzing the results from Table 2, we can see that there is a statistically significant difference between the examined boys and girls of the fifth grade in five of the eight morphological variables used. Variables that statistically distinguish the two groups are ATJMAS - body weight, AKNBIC - biceps skin fold, AKNSUP - thigh skin fold, AKNLIS - leaf blade, and BMINDX - body mass index. IN
In Table 1, we observed that the examined group of boys compared to the examined group of girls had higher numerical values of the arithmetic mean in all five variables in which a statistically significant difference was obtained. Table 3 presents the percentile values of body mass index (BMI) of the examined groups of boys and girls of fifth grade. Body mass index (BMI) was calculated as follows: BMI [kg / m2] = weight [kg] / (height [m]) 2. Given that BMI is age and gender-dependent, so absolute BMI in children is not a good indicator of overweight classification. Therefore, for children, relative BMI or the use of percentiles given in the form of growth curve tables (Must, A., Dallal, GE, Dietz VH. 1991), as recommended by NHANES I (National Health and Nutrition Examination Survey I). Based on the results of percentile values, we can see the following: A higher percentage of percentile values tend to grow and obesity as in the previous classes was expressed in the tested group of boys. Obese boys (overweight) (95>) accounted for 33%, while there were no obese girls in this cohort. Also, 23% of boys tested have an increased risk of obesity (85-95) compared to 16% of girls tested. There is a difference in the percentage ratio when it comes to adequate body weight (43%), increased risk of malnutrition (34%) and malnutrition (5%), with a higher percentage of girls. Similar results were obtained in the study (Trost Bobic, T., Nimcevic, E., Bobic, G. 2008).

Table 1. Group Statistics

	group	N	Mean	Std. Dev.	Std. Error Mean
AVISTJ	1- (m)	39	151,5051	7,13121	1,14191
	2- (f)	44	151,3455	7,14063	1,07649
ATJMAS	1- (m)	39	48,0590	11,05602	1,77038
	2- (f)	44	41,0909	6,79606	1,02454
AKNTRI	1- (m)	39	13,1256	5,24167	,83934
	2- (f)	44	13,2614	4,97174	,74952
AKNSUB	1- (m)	39	11,8103	6,36102	1,01858
	2- (f)	44	9,8727	5,19818	,78366
AKNBIC	1- (m)	39	6,9667	2,54262	,40714
	2- (f)	44	5,1091	1,91637	,28890
AKNSUP	1- (m)	39	12,3641	6,83934	1,09517
	2- (f)	44	8,4114	4,19885	,63300
AKNLIS	1- (m)	39	8,9282	3,12527	,50044
	2- (f)	44	7,1295	4,05615	,61149
BMINDX	1- (m)	39	20,8099	3,84885	,61631
	2- (f)	44	17,8711	2,14512	,32339

Table 2. *Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Differen.	Std. Error Differen.	95% Confidence Interval of the Difference	
									Lower	Upper
AVISTJ	Equal variances assumed	,38	,537	,102	81		,16	1,56	-2,96	3,28
	Equal variances not assumed			,102	79,8	**.91**	,16	1,56	-2,96	3,28
ATJMAS	Equal variances assumed	9,56	,003	3,502	81		6,96	1,99	3,00	10,9
	Equal variances not assumed			3,407	61,6	**.00***	6,96	2,04	2,87	11,0
AKNTRI	Equal variances assumed	,09	,757	-,121	81		-,13	1,12	-2,36	2,09
	Equal variances not assumed			-,121	78,5	**.90**	-,13	1,12	-2,37	2,10
AKNSUB	Equal variances assumed	3,79	,055	1,526	81		1,93	1,27	-,58	4,46
	Equal variances			1,508	73,5	**.13**	1,93	1,28	-,62	4,49

	not assumed									
AKNBIC	Equal variances assumed	,72	,398	3,784	81		1,85	,49	,88	2,83
	Equal variances not assumed			3,721	70,1	.00*	1,85	,49	,86	2,85
AKNSUP	Equal variances assumed	11,04	,001	3,212	81		3,95	1,23	1,50	6,40
	Equal variances not assumed			3,125	61,5	.00*	3,95	1,26	1,42	6,48
AKNLIS	Equal variances assumed	7,46	,008	2,241	81		1,79	,80	,20	3,39
	Equal variances not assumed			2,276	79,5	.02*	1,79	,79	,22	3,37
BMINDX	Equal variances assumed	17,96	,000	4,360	81		2,93	,67	1,59	4,28
	Equal variances not assumed			4,222	57,9	.00*	2,93	,69	1,54	4,33

Table 3. Percentile values of body mass index of the examined groups of boys and girls

	< 5		5 - 15		15 - 85		85 - 95		95>	
Group N	freqv.	%	freqv.	%	freqv.	%	freqv.	%	freqv.	%
1 - (m) - 39	*3*	**7,7**	*5*	**12,8**	*9*	**23,1**	*9*	**23,1**	*13*	**33,3**
2 - (f) - 44	*2*	**4,5**	*15*	**34,1**	*19*	**43,2**	*7*	**15,9**	*/*	*/*

Table 4 shows the differences in the variables for postural status assessment between the examined boys and girls of the fifth grade (Mann-Whitney U test), ie the level of significance of the differences. The level of statistical significance was set at the inference level with error (p = 0.05). The results obtained show that there are statistically significant differences in 3 of the 8 variables used for postural status assessment between the examined boys and girls of the fifth grade.

Higher values (Mean Rank, Sum of Ranks) with statistically significant differences in postural status variables were achieved in the first group (boys). These are the variables: D1-ODG - head posture, D3-ODL - shoulder blades and D4-ODGR - chest shape.

Better posture in boys may perhaps be explained by the fact that girls in this period, ie already starting to enter puberty earlier than boys. As girls begin to reach puberty during this period, height begins to rise rapidly and the muscular system is not sufficiently developed to maintain a proper relationship between body segments, which is the beginning of postural disorders.

The results obtained show similarity and compatibility with research (Džibrić et al., 2012; Nikšić, Mahmutović, and Rašidagić, 2015).

Table 4. Differences in variables for the assessment of postural status between examined boys and girls of fifth grade (Mann-Whitney U test)

Variable	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2t)	Mean Rank	Sum of Ranks	Med	Group N
D1 - (ODG)	714	1617	-1,87	.04*	41,70	1617,0	0	1 (m) = 39
					38,50	1543,0	0	2 (ž) = 44
D2 - (ODR)	807	1753	-0,49	.62	42,31	1650,0	0	1 (m) = 39
					40,77	1753,0	0	2 (ž) = 44
D3 - (ODL)	536,5	1239,5	-2,74	.04*	45,73	1920,5	1	1 (m) = 39
					33,50	1239,5	0	2 (ž) = 44
D4 - (ODGR)	688	1634	-2,88	.00*	45,36	1769,0	0	1 (m) = 39
					38,00	1634,0	0	2 (ž) = 44
D5 - (ODK)	824,5	1770,5	-0,19	.84	41,86	1632,5	0	1 (m) = 39
					41,17	1770,5	0	2 (ž) = 44
D6 - (ODTR)	785,5	1731,5	-0,80	.42	42,86	1671,5	0	1 (m) = 39
					40,27	1731,5	0	2 (ž) = 44
D7 - (ODN)	808,5	1588.5	-0,42	.66	40,73	1588,5	0	1 (m) = 39
					42,20	1814,5	0	2 (ž) = 44
D8 - (ODS)	777,5	1557,5	-0,69	.48	39,94	1557,5	1	1 (m) = 39
					42,92	1845,5	0	2 (ž) = 44

CONCLUSION

The obtained results confirm the importance of determining the levels and differences of anthropological characteristics of children (morphological characteristics and postural status), optimal programming of physical activities, individual approach to work, all with the aim of harmonious growth and development of children and preservation of health, both in early school and later and adulthood. Systematic monitoring of the anthropological characteristics of children and young people should be an integral part during the growth and development of children, as this may at an early stage detect deficiencies in growth and development that may be affected either by preventive, adequate kinesiological programs, from a kinesiological perspective or in terms of medical intervention from a clinical point of view.

Also, the results obtained can be explained by improper posture, lack of exercise, lack of environmental impact and malnutrition. The consequence of this is today's lifestyle, that is, daily activities with too little movement and with excessive and inappropriate diet. This leads to an unhealthy lifestyle, which indicates the need for intervention to change behavior and to lead a healthy lifestyle to protect and promote health, based on healthy eating, drinking, and movement. The number of these children is projected to increase unless the importance of physical exercise in school, which has a major impact on the overall health of the children, is realized. Sport and play at school are of great importance because in addition to maintaining health, preventing improper posture, it supports and assists in natural growth and development, following their capabilities and interests, to guide them into a healthy lifestyle, and to create a habit of daily use of the value of moving activities. Prevention of postural disorders is a very important element in maintaining the health of children since spinal column disorders themselves can later lead to complete deformity, the consequences of which are far more difficult.

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