QUANTITATIVE DIFFERENCES IN MORPHOLOGICAL AND POSTURAL STATUS BETWEEN GIRLS AND CHILDREN OF PRIMARY UPBRINGING AND EDUCATION

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ABSTRACT

On a sample of 405 examinees, males and females from the first to the fifth grade of elementary school, a system of sixteen variables (8 morphological and 8 variables for assessing postural status) was applied to determine the differences between boys and girls. The results have shown that there are statistically significant differences in body weight and body mass index between boys and girls of the second, third, fourth and fifth grade among the examined samples. The differences in variables for the evaluation of skin folds exist, but not as much as in these two previous variables. The most pronounced differences in body holding are presented in the variable shape (development) of the thorax and are recorded among the first, second, third and fifth-grade subjects. There are differences in the grade of the head in the first grade and in the evaluation of blades holding in the first and fourth grade. The obtained information on the differences in treated variables should provide a basis for the application of certain motor and functional tests to an optimal plan, program, and operationalize the teaching of physical and medical education, as well as to control the development of primary anthropological features under the influence of the standard programmed gender content.

INTRODUCTION

Growth and development phenomena and their specificity are conditioned by exogenous and endogenous factors. Morphological features vary in the time-dependent, not only from endogenous factors but also from ethnic, socio-economic and other exogenous factors (Zsidegh et al., 2007; Jones et al., 2009). The research has shown that the period of younger school age is a relatively stable phase with no significant changes and large differences in gender-based growth but with possible individual differences (Malina, Bouchard, 1991). Also, in recent decades, many studies have found an increasing phenomenon of overweight and obesity among children worldwide (Reilly, Dorosty, 1999; Ogden et al., 2006). During the period of younger school age, good posture has a good bearing on preventing certain deviations and possible deformations of the bone system (Džibrić I sar., 2011). Proper posture of the body is a starting point for a good health condition in general, good muscular control, adequate strength and elasticity of the muscles, and favorable psycho-social factors (Bala, 2007). Irregular body postures due to the weakened postural muscular structure that has been established during the growth and development, especially those found in early ages, can be corrected by additional physical exercise programs. Early diagnosis is the most important element of successful treatment (Pausic, 2007). The main purpose of this research was to determine the differences in morphological and postural status between girls and boys in primary education.

METHODOLOGY OF WORK

Sample of respondents

The population from which a sample of 405 respondents was drawn was defined as a population of students from the 1st to the 5th grade of certain elementary schools in Tuzla ("Mejdan", "Novi Grad", "Shopping", "Centar"), 6-10 years old. Of the population so defined, two sub-actions were formed: (a subset of 202 male and 203 female subjects).

Sample of variables

For the set of variables in the area of morphological characteristics, the measurement instruments described in the Eurofit program (Hadžikadunić and all. 2000) were used in this study, namely: Anthropometric characteristics: AVISTJ-height height and ATJMAS - body mass; Subcutaneous fatigue variables: AKNTRI - triceps skin wrinkles, AKNSUP - skin folds back, AKNBIC - skin folds of biceps, AKNSUP - skin folds of the thighs and AKNLIS - skin folds of the skull; Exposed variable: BMINDX - body mass index.

The method of Napoleon Wolansky (1975), which provides an analysis of 8 parameters: ODGLA1 - head hold, ODRAM2 - shoulder support, ODLOP3 - blade hold, ORGRK4 - shape (development) of the chest, OKSFR5 was used to assess the

postural status or status of individual body segments - deviation of the spinal column in the frontal plane, ODPTZ6 - front abdominal wall posture, OBLNO7 - legform and OSVST8 - foot of the foot.

Data processing methods

In order to determine differences in the applied morphological variables between the sexes of the different sexes, the T-test for independent samples was used, and to determine differences in postural status among the subjects of the different sex, the nonparametric Mann-Whitney U test for independent samples was applied.

RESULTS AND DISCUSSION

Table 1 shows the differences in morphological characteristics between treated groups of girls and boys from the first to the fifth grade. Only those values of morphological measures that show statistical significance among the investigated groups are shown. In the first grade, there are no statistically significant differences between the examined groups or in one applied morphologic variables. The lack of difference can also be attributed to the chronological age, because in this period the growth is somewhat slow, but stable and the children grow annually by 5-6 cm, and very little is gained on the body mass. The results obtained are somewhat similar to the results obtained by Eiben et al., 2004; Tomljenović B and Tomljenović F, 2005; (ATJMAS, AKNTRI, AKNBIC and BMINDX), third grade in five (AVISTJ, ATJMAS, AKNSUB, AKNSUP and BMINDX), and in the second grade in four (ATJMAS, AKNTRI, AKNBIC and BMINDX), Ozdirenc et al. fourth grade in two (ATJMAS and BMINDX) and fifth in five (ATJMAS, AKNBIC, AKNSUP, AKNLIS and BMINDX). Larger numerical values in the variables that show statistical significance have a group of examined boys. The exception is two variables in the second grade (AKNTRI and AKNBIC) where the examined group of girls has higher mean values. Similar results were obtained in the research (TroštBobić, T., Nimčević, E., Bobić, G. 2008).

Table 1. The arithmetic mean differences in variables for the evaluation of morphological characteristics between examined boys and girls of 1 - 5 grade

CLASS	VARIABLE		Levene's Test for Equ. of Var.		t-test for Equality of Means					Boys	Girls
			F	Sig.	t	df	Sig. (2-t)	Mean Diff.	Std. Error Diff.	Mean / *(SD)*	Mean / *(SD)*
SECOND (II)	ATJMAS	Equal variances assumed	21,24	0,00	5,83	74	0,00	7,22	1,23	33,26 *(6,85)*	26,04 *(3,50)*
		Equal variances not assumed			5,74	52,99		7,22	1,25		
	AKNTRI	Equal variances assumed	2,50	0,11	-1,95	74	0,04	-2,18	1,11	10,52 *(4,34)*	12,71 *(5,33)*
		Equal variances not assumed			-1,96	72,35		-2,18	1,11		
	AKNBIC	Equal variances assumed	10,97	0,00	-1,97	74	0,04	-1,37	0,69	4,39 *(1,78)*	5,77 *(3,86)*
		Equal variances not assumed			-2,01	54,08		-1,37	0,68		
	BMINDX	Equal variances assumed	24,39	0,00	6,71	74	0,00	3,75	0,55	18,64 *(3,14)*	14,89 *(1,47)*
		Equal variances not assumed			6,59	50,38		3,75	0,56		
THIRD (III)	AVISTJ	Equal variances assumed	0,24	0,62	5,05	82	0,00	5,85	1,15	141,48 *(5,49)*	135,62 *(5,11)*
		Equal variances not assumed			5,04	79,74		5,85	1,16		
	ATJMAS	Equal variances assumed	12,99	0,00	7,54	82	0,00	11,05	1,46	38,89 *(8,74)*	27,73 *(4,03)*
		Equal variances not assumed			7,31	53,74		11,05	1,51		
	AKNSUB	Equal variances assumed	11,83	0,00	9,19	82	0,03	2,63	1,18	11,06 *(6,37)*	8,43 *(4,33)*
		Equal variances not assumed			8,93	67,82		2,63	1,2		
	AKNSUP	Equal variances assumed	7,66	0,00	2,05	82	0,04	2,79	1,36	12,15 *(7,25)*	9,35 *(5,13)*
		Equal variances not assumed			2,02	69,47		2,79	1,38		
	BMINDX	Equal variances assumed	14,55	0,00	9,19	82	0,00	4,82	0,52	19,84 *(3,09)*	15,02 *(1,51)*

		Equal variances not assumed			8,93	55,51		4,82	0,54		
FOURTH (IV)	ATJMAS	Equal variances assumed	16,65	0,00	4,86	81	0,00	9,63	1,98	42,14 *(11,00)*	32,50 *(5,98)*
		Equal variances not assumed			5,03	67,91		9,63	1,91		
	BMINDX	Equal variances assumed	30,51	0,00	5,69	81	0,00	3,93	0,69	20,14 *(3,96)*	16,20 *(1,80)*
		Equal variances not assumed			5,92	61,67		3,93	0,66		
FIFTH (V)	ATJMAS	Equal variances assumed	9,56	0,00	3,5	81	0,00	6,96	1,99	48,05 *(11,05)*	41,09 *(6,79)*
		Equal variances not assumed			3,4	61,6		6,96	2,04		
	AKNBIC	Equal variances assumed	0,72	0,40	3,78	81	0,00	1,85	0,49	6,96 *(2,54)*	5,10 *(1,91)*
		Equal variances not assumed			3,72	70,17		1,85	0,49		
	AKNSUP	Equal variances assumed	11,04	0,00	3,21	81	0,00	3,95	1,23	12,36 *(6,83)*	8,41 *(4.19)*
		Equal variances not assumed			3,12	61,55		3,95	1,26		
	AKNLIS	Equal variances assumed	7,46	0,00	2,24	81	0,02	1,79	0,8	8,92 *(3,12)*	7,12 *(4,05)*
		Equal variances not assumed			2,27	79,52		1,79	0,79		
	BMINDX	Equal variances assumed	17,96	0,00	4,36	81	0,00	2,93	0,67	20,80 *(3,84)*	17,87 *(2,14)*
		Equal variances not assumed			4,22	57,92		2,93	0,69		

Table 2 shows the differences in the variables for assessing postural status between treated groups of girls and boys from the first to the fifth grade (Mann-Whitney U test), i.e. the level of significance of differences. The level of statistical significance is set at the conclusion level with the error ($p = 0.05$). Only those values of body holding differences that show statistical significance among the investigated groups are shown. In the first class, statistically significant differences between the examined groups exist in three variables (ODGLA1, ODLOP3, and ORGRK4), fourth in one (ODLOP3), and in the second, third and fifth grade in the variables (ORGRK4). Mean rank (Sum of Ranks) with statistically significant differences in the variables for assessing postural status was achieved in the first group (boys). It can also be seen that the variable ORGRK4 - form (development) of the chest has a statistically significant difference between the treated groups of examinees in all classes except in the fourth. A proper body posture is a balance between the muscular and the bone system, which protects the supporting structure of the body from injuries or progressive deformities irrespective of the position of the body (standing, sitting, chasing, lying) in which these structures are active or passive. Under such circumstances, the muscles will work most efficiently and the optimal position will allow the normal functioning of the organs of the chest and abdomen (Kendall et al., 2005).

Table 2. Differences in variables for the assessment of postural status between examined boys and girls of 1 - 5 grade (Mann-Whitney U test)

CLASS VARIABLE		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)	Mean Rank	Sum of Ranks	Median	N boys / girls
FIRST (I)	ODGLA1	714	1617	-1,87	**0,04**	41,7	1617	0	1 (b) = 42
						38,5	1543	0	2 (g) = 37
	ODLOP3	536,5	1239,5	-2,74	**0,06**	45,73	1920,5	1	1 (b) = 42
						33,5	1239,5	0	2 (g) = 37
	ORGRK4	703	1406	-1,91	**0,04**	41,76	1754	0	1 (b) = 42
						38	1406	0	2 (g) = 37
SECOND (II)	ORGRK4	604,5	1384,5	-2,601	**0,00**	41,66	1541,5	0	1 (b) = 37
						35,5	1384,5	0	2 (g) = 39
THIRD (III)	ORGRK4	746	1736	-2,36	**0,01**	45,85	1834	0	1 (b) = 40
						39,45	1736	0	2 (g) = 44
FOURTH (IV)	ODLOP3	609,5	1389,5	-2,638	**0,00**	47,65	2096,5	0	1 (b) = 44
						35,63	1389,5	1	2 (g) = 39
FIFTH (V)	ORGRK4	688	1634	-2,885	**0,00**	45,36	1769	0	1 (b) = 39
						38	1634	0	2 (g) = 44

CONCLUSION

From a kinesiologic point of view, the knowledge of the anthropological status of a child is essential in the qualitative planning and programming of physical activity and the choice of content that should be consistent with the function of growth and development. The basic starting point in programming any exercising process in kinesiology is anthropological features, including morphological. These characteristics are an important indicator of the state of growth and development of students. As each managed child training process focuses on their development, their knowledge of teachers is basic information for planning and programming of work (Findak, 2001).

The appearance of obesity and bad posture, especially the spinal column and chest, itself becomes a threat to the health of children, it also has negative consequences on mental health in the later period of growing up. Children usually start with poor posture in the pre-puberty and puberty stages, i.e. the stage of intense growth. This is the time when we find the greatest deviation from the physiological curvatures of the spinal column in clinical findings and status. The sudden growth of children at puberty has a negative impact on the development of spinal column deformity. In order to prevent and cure the deformities successfully, it is the most important to find out early. Disorders can be observed on regular systematic reviews, but changes should also be presented to parents and teachers in time.

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