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SOMATIC PARAMETERS AND GENERAL PHYSICAL FITNESS LEVEL OF SCHOOL CHILDREN (7–10 YEARS) IN TOWN RUZOMBEROK IN SLOVAKIA

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Abstract

The purpose of this process is to monitor not only real present situation from the point of view of physical fitness level, but potentially also try to find gifted individuals for sports activities and enable them to develop their talent. The name of this town project is BUBO. There are involved several schools, from kinder garden to primary and secondary schools, too. The base of used tests is reduced Eurofit test battery: body height (BH), body weight (BW), standing broad jump (SBJ), sit and reach (SR), 10 x 5 m shuttle run (10x5), bent arm hanging (BAH), sit – ups (SU) and endurance shuttle run (ENDU). Results are comparing with norms of Slovak population from 1993/4 years. In this contribution are presented first results of 137 children, 82 girls and 55 boys from primary schools. Comparison of somatic parameters shows that differences between our boys and girls are not so great. In physical fitness tests can be seen that boys reach better results except test SR. BH of our groups is slightly lower like are former population norms, while BW is mainly in groups of boys in age 9 and 10 years higher like these population norms.

1. Introduction

Nowadays population perform far less movement activities like it was in the past. General change in movement habits courses many problems with health. Negative trends and changes can be seen in somatic parameters as well as in general fitness level. These factors influence directly health status of each individual, not only physical, but also psychological and that results to lower work activity and men are not able to live in the society as actively as it could be (Simonek, 2000).

The adequate whole life regular movement activity is by present knowledge one of the most important factor which can help each individual to live useful and fruitful life. Fundamentals for this movement activity life integration must be

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created in children and youth age. That is why family and school are two institutions that have in this sphere decisive responsibility.

In former Czechoslovakia, as well as in Slovakia there were watched somatic parameters with physical fitness performance level of school children since 60-iest of the last century. So we have relatively good possibilities for comparing present and former population samples of school children and youths. Since 60-ties there were found trends that each 10 – 15 years younger generation was taller and heavier. This also influenced regular positive increase in physical fitness level. This secular trend had been watched both in groups of boys and girls till 90-ties. At this time are several measurements and research works (Moravec et al., 1990; Moravec et al., 1996; Moravec, 2008) which inform us about slowing down these positive trends, even some authors point out on stopping or decrease in several somatic (Cacek et al., 2014; Kunesova, 2006) and motor parameters. Man especially children possess inside themselves natural need to move, play, or exercise. Present negative influence of mass media means and computer technologies course loose of this need. In this context there is not surprising permanent increase of overweight and obese children and numbers of various so called civilisation diseases are tremendously high and extreme.

Parents, teachers and other adults should know that children and youths need regular and daily movement activities in order to secure their not only physical development, but through these activities to gain many further inevitable benefits for the whole productive and post-productive life. In this sense physical activity cannot be substituted with anything else.

Period of younger school age (6 – 10/11 years) is considered like the most proper time for general motor development and is presented by the level of motor abilities. They form dispositions for movement activities familiarization. The basic objective of school physical and sport education is to increase functional and motor performance level of pupils and to form their positive and long-term relationship towards movement activity. Dominant role by this aim realization have movement games. They contribute to harmonic development of individual and to general skills and customs improvement and in large scale by playing form they develop children motor abilities and their creative thinking in permanently changed situations (Krska & Adamcak, 2008).

2. Material and methods

Objectives. The aim of this research is to monitor physical development and motor performance levels of school children in town Ruzomberok at age 6 – 10 years, compare sexual and former Slovak population differences.

Methods. Measurements were done in March 2014 in Ruzomberok primary school Klacno. Average decimal age and numbers in single classes can be seen in table 1.

Table 1 *Decimal age and number of tested boys and girls in single classes*

	Boys		Girls		
Class	Age	N	Age	N	Total
1st	7.16	12	7.16	23	35
2nd	8.18	15	7.69	16	31
3rd	9.30	15	8.98	19	34
4th	10.17	13	10.08	24	37
Total	-	55	-	82	137

We applied reduced test battery Eurofit. There were measured these tests: Body height (BH), Body weight (BW), Sit and reach (SR), Standing broad jump (SBJ), Shuttle run 10 x 5 m (10x5), Bent arm hang (BAH), Sit-ups in 30 s (SU) and Endurance shuttle run (ENDU). Pupils performed tests in stated sequence. Gained results were basis for our further statistic work. Comparison between groups of boys and girls and population were evaluated by parametric in-pair t-test. Results can be seen in tables 2a, 2b, 3 and 4. Pedagogical interpretation with description was done by fundamental logical methods, mostly comparison and generalization

3. Results and Discussions

Age comparison that can be seen from tables 1 – 4 shows slight differences. Generally our boys and Slovak population are slightly older. Greater differences are watched between girls and population in the 2nd class; other differences are within 0.5 year.

Fundamental statistic parameters (x, s) with values of t-test and statistical 1% and 5% statistical significance levels can be seen in tables 2a, 2b, 3 and 4.

1. Sex differences

In tables 2a and 2b can be seen our comparison between both sexes in all classes.

In somatic parameters reach mostly higher results boys. But in 4th class are girls taller like boys are. This can be coursed by earlier maturation of our girls. In parameter BW reach girls in 1st and 3rd classes higher values. Differences between sexes are not so great; only in two cases were found 0.05% statistical significant differences. Generally we can say that in the groups of girls there is situation rather worse, for the reason that there were found two times higher BW in spite of lower BH in these cases.

In tests of motor performance can be seen (except test SR) higher performance level in groups of boys. Surprizing seem results in 1st class, where girls reach significantly higher results in SU and BAH. In one case are results the same (2nd class in test 10x5). In other tests reach boys better results and differences are very often on 0.05% and 0.01% statistical significance levels. Our motor performance evaluation confirms known fact that boys reach in condition tests better results. On the contrary in test SR reach groups of girls traditionally better results.

Table 2a *Comparison of physical fitness level in 1st and 2nd class between boys and girls*

		1st class			2nd class		
tests	sex	x	s	t-test	x	s	t-test
BH (cm)	boys	124.08	6.11	0.68	130.41	3.99	1.65
	girls	123.80	5.73		122.52	28.24	
BW (kg)	boys	24.33	5.27	2.13*	27.93	3.86	0.77
	girls	26.15	5.2		26.96	6.99	
SR (cm)	boys	16.13	5.99	3.87**	23.07	2.57	0.34
	girls	22.41	4.64		23.78	7.99	
SBJ (cm)	*boys*	*105.45*	*18.8*	*2.68**	*117.53*	*12.36*	*3.48***
	girls	96.04	12.11		99.81	25.92	
SU (1)	boys	11.09	6.98	3.65**	19.40	3.27	4.12**
	girls	14.13	2.91		14.75	4.67	
BAH (s)	boys	14.88	11.92	2.23*	31.35	27.93	6.94**
	girls	16.95	13.52		18.96	16.25	
10 x 5 (s)	boys	25.93	2.31	1.26	25.20	1.73	0.17
	girls	27.09	2.18		25.20	5.82	
ENDU (1)	boys	19.83	8.85	3.55**	26.43	11.65	4.57**
	girls	16.09	4.02		19.37	9.25	

*Legend: xxx – better results of girl groups; * p > 0.05, ** p > 0.01*

Table 2b *Comparison of physical fitness level in 3rd and 4th class between boys and girls*

		3rd class			4th class		
tests	sex	x	s	t-test	x	s	t-test
BH (cm)	boys	139.14	6.17	1.59	141.31	7.17	0.21
	girls	135.71	8.00		141.98	5.79	
BW (kg)	boys	34.07	5.15	0.63	37.22	9.68	2.05*
	girls	34.55	10.37		35.63	8.17	
SR (cm)	boys	22.0	6.61	0.73	18.62	6.17	2.39*
	girls	22.79	6.54		21.02	5.02	
SBJ (cm)	boys	131.40	14.57	3.87**	134.85	21.70	3.74**
	girls	112.95	14.40		117.50	11.96	
SU (1)	boys	20.33	4.29	3.37**	18.54	4.14	3.42**
	girls	16.63	3.73		17.17	4.23	
BAH (s)	boys	17.67	10.35	4.35**	14.72	9.9	7.21**
	girls	13.84	11.98		9.55	5.68	
10 x 5 (s)	boys	23.87	2.06	0.76	22.74	2.54	1.92*
	girls	24.68	2.16		25.11	1.93	
ENDU (1)	boys	27.93	11.96	5.43**	32.64	15.11	8.67**
	girls	20.95	6.56		22.30	5.43	

*Legend: xxx – better results of girl groups; * p > 0.05, ** p > 0.01*

2. Comparison with former Slovak population norms

In tabel 3 and 4 can be seen comparison of our results with former Slovak population.

Table 3 *Comparison of present Ruzomberok school boys with former Slovak (1993/4) population results*

	RK-Age/N	7.16 years/ 12		8.18 years / 15		9.30 years / 15		10.17 years / 13	
	POPUL-Age/N	7.37 years / 73		8.55 years / 54		9.47 years / 74		10.52 years / 108	
Tests	Boys	x	t-test	x	t-test	x	t-test	x	t-test
BH (cm)	RK	124.08	0.92	130.41	1.07	139.14	0.67	141.31	0.49
	POPUL	127.67		133.60		137.81		143.52	
BW (kg)	RK	24.33	2.35*	27.93	2.07*	34.07	2.48*	37.22	1.05
	POPUL	26.29		29.20		31.52		36.35	
SR (cm)	RK	16.13	2.43*	23.07	4.78**	22.00	2.63*	18.62	0.47
	POPUL	19.85		18.85		20.19		18.14	
SBJ (cm)	RK	105.45	5.16**	117.53	4.57**	131.40	3.97**	134.85	4.89**
	POPUL	132.52		136.22		149.30		160.85	
SU (1)	RK	11.09	8.35**	19.40	1.15	20.33	1.37	18.54	5.36**
	POPUL	19.01		20.26		21.28		23.27	
BAH (s)	RK	14.88	10.23**	31.35	16.53**	17.67	2.45*	14.72	7.46**
	POPUL	9.90		13.10		19.17		21.64	
10x5 (s)	RK	25.93	1.43	25.20	2.31*	23.87	0.67	22.74	2.48*
	POPUL	24.20		23.42		22.73		21.17	
ENDU (1)	RK	19.83	5.47**	26.43	4.11**	27.93	7.25**	32.64	6.37**
	POPUL	31.70		33.41		43.88		43.56	

*Legend: xxx – better results of present Ruzomberok boys; * p > 0.05, ** p > 0.01*

Table 4 *Comparison of present Ruzomberok school girls with former Slovak (1993/4) population results*

	RK-Age/N	7.16 years/ 23		7.69 years/ 16		8.98 years/ 19		10.08 years/ 24	
	POPUL-Age/N	7.29 years/ 71		8.57 years/ 60		9.51 years/ 75		10.55 years/ 116	
Test	Girls	x	t-test	x	t-test	x	t-test	x	t-test
BH (cm)	RK	123.80	0.58	122.52	2.17*	135.71	0.69	141.98	1.17
	POPUL	125.83		132.01		138.06		146.03	
BW (kg)	RK	26.15	0.37	26.96	0.89	34.55	1.29	35.63	0.56
	POPUL	25.40		28.23		33.13		36.31	
SR (cm)	RK	22.41	1.92*	23.78	3.25*	22.79	0.17	21.02	0.44
	POPUL	20.83		21.10		22.92		21.89	
SBJ (cm)	RK	96.04	5.75**	99.81	6.47**	112.95	5.92**	117.50	6.15**
	POPUL	123.46		133.05		140.36		150.05	
SU (1)	RK	14.13	4.12**	14.75	5.38**	16.93	5.13**	17.17	6.07**
	POPUL	17.61		19.10		21.17		21.61	
BAH (s)	RK	16.95	14.07**	18.96	11.65**	13.84	8.94**	9.55	5.02**
	POPUL	8.92		10.29		8.93		11.78	
10x5 (s)	RK	27.09	1.32	25.20	1.84	24.68	1.87	25.11	3.47*
	POPUL	26.00		23.73		23.34		22.27	
ENDU (1)	RK	16.09	12.07**	19.37	7.78**	20.95	14.22**	22.30	17.41**
	POPUL	27.31		31.25		36.57		39.97	

*Legend: xxx – better results of present Ruzomberok girls; * p > 0.05, ** p > 0.01*

Comparison of somatic parameters shows that in the parameter BH of our present groups both of boys and girls are smaller like Slovak former population. Only in one case (3rd class) are our boys slightly taller. Differences between population and present Ruzomberok children are mostly without statistical significance; only in one case was found statistical significant difference ($p>0.05$; girls in 2nd class). Parameter BW shows different tendencies; with regard of parameter BH where population reach higher values we would expect also higher values in parameter BW. But we can see that is in this parameter in each group 2 times reach higher values present pupils. Differences are statistically significant on 0.05% level only in group of boys (1st, 2nd and 3rd classes). This confirms that secular trends in parameter BH in our research stops while the parameter BW has still slight tendencies to increase. From this we can say that somatic parameters evaluation in present Ruzomberok pupils is worse comparing former Slovak population results.

In parameters of general motor performance can be seen that better results reach mostly former Slovak population both in groups of boys and girls. From 24 (6 tests x 4 classes) measurements in each sex were present pupils better only in 5 (girls) resp. in 5 (boys) cases; it is about 20%. It is interesting that these better results were reached only in 2 tests: SR and BAH (in groups of boys and girls, too). These better results of our present Ruzomberok pupils overreach all (except 4th class of boys) statistical significance (either 0.01% or 0.05%). When we also consider parameter BW in which present pupils reach higher (or relatively higher) values like former Slovak population norms, we can deduce that those BW increase can be mostly due to upper extremities contribution and thus can be explained better results in test BAH and also up to certain level in test SR. In other tests SBJ, SU, 10x5 and ENDU we can see better results of former Slovak population. Differences in test 10x5 are relatively small, only 2 times in groups of boys and 1 time in groups of girls are on statistically significant level 0.05%. In tests SBJ, SU and ENDU we can see clear domination of performance level of former Slovak population. In groups of girls all differences are on 0.01% statistical significance level. In groups of boys is situation similar, only in test SU in 2nd and 3rd classes were not found significant differences.

4. Conclusions

1. Comparison between present Ruzomberok boys and girls shows slightly better results in somatic parameters in groups of boys; in age of watched groups are gained results very similar in both sexes. In motor performance parameters reach groups of boys in each class higher level of performance (traditionally except test sit and reach).

2. Comparison in somatic parameters with former Slovak population results shows that former secular growth in parameter body height disappeared. It seems that in this parameter present pupils stagnate or decrease. In parameter body weight is actually stagnation resp. slight increase with regard of body height parameter development, worse result like it was in the past populations.

3. In general motor performance level can be seen decrease of present pupils with regard of former Slovak population. Relatively comparative results reach our Ruzomberok pupils in tests sit and reach and in bent arm hang. In other tests are present Ruzomberok pupils clearly worse like there were former Slovak population results.

4. Also in this contribution are confirmed negative trends in somatic and general physical fitness level performance parameters of present school children.

References

1. CACEK, J., GRASGRUBER, P. HLAVONOVA, D. (2014). *Vybrane aspekty zdatnosti dospele populace Ceske republiky* (*Selected aspects of fitness of adult Czech republic population*). Masarykova univerzita, Brno, 130 p.;
2. KRSKA, P., ADAMCAK, S. (2008). *Pohybové schopnosti a hry na ich rozvoj* (*Movement abilities and their development*). Ružomberok: Katolícka univerzita, Pedagogická fakulta, p. 103 s.;
3. KUNESOVÁ, M. (2006). *Životní styl a obezita– longitudinální epidemiologická studie prevalence obezity v ČR. Česká lékařská společnost ČSL JEP, Česká obezitologická společnost* (*Life style and obesity – longitudinal epidemiologic study of obesity prevalence in Czech Republic*). Praha: Stem/Mark, a.s.;
4. MORAVEC, R. et al. (1990). *Telesný, funkčný rozvoj a pohybová výkonnosť 7 - 18-ročnej mládeže v ČSFR* (*Physical, functional development and movement performance 7 -18 youths in Czechoslovakia*). Bratislava, Šport, 242 p.;
5. MORAVEC, R., KAMPMILLER, T., SEDLACEK, J. et al. (1996, 2002). *Eurofit. Telesný rozvoj a pohybová výkonnosť školskej populácie na Slovensku* (*Eurofit. Physical develpment and motor performance of school population in Slovakia*). Bratislava : SVSTVŠ;
6. MORAVEC, R. (2008). *Sekulárny trend v ukazateľoch telesného rozvoja a pohybovej výkonnosti u školskej populácie na Slovensku* (*Secular trend in parameters of physical development and motor performance of school population in Slovakia*). In: Phys.Educ.Sport no 18, 2008/1, p. 2 - 4;
7. SIMONEK, J. SR. (2000). *Pohybová aktivita v živote súčasného človek* (*Movement activity in life of present man*). In: Hrabkova et al. (2000).: Učebné texty pre študujúcich na univerzite tretieho veku (*Study texts for 3rd age university students*). Univerzita Komenského. Bratislava. p. 76 – 82.