

Original Article

General Motor Performance Level of Slovak University Students Determined by Selected Physical Activity Factors

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Abstract

In this research authors evaluate general physical fitness level of 606 Slovak universities students (344 boys and 262 girls). Physical fitness was evaluated with reduced Eurofit battery tests. We have available students from the Faculty of physical education and sports and from 8 different faculties. We compared these measured parameters with former Slovak population norms. With questionnaire we learned used forms of student physical activities. Differences were evaluated with parametric un-pair t-test; we used * $p < 0.05$, ** $p < 0.01$ significance levels. In the contribution is shown that students of the FSPORT reached higher level of general motor performance with regard to other faculties or former populations. It seems that compulsory physical and sport education subjects on universities do not influence significantly positively physical fitness level; the same is watched with unpaid physical activities forms. Decisive role in general motor performance level increase have forms of practising physical activities in individual leisure time.

1. Introduction

Influence of movement activity on human health is one of the most important themes of last time not only in sport and in medical sciences, but it starts to be also universal social problem in advanced countries.

The life of present generation can be characterized like hypokinetic. There is prevailing sedentary way of living, passive and consumer leisure time spending, reduction of heavy work; these are often courses of hypokinetic formation. The era we live in brings changes in living style mainly in young generation that thanks to

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achievements of modern technology performs movement activities in lower scale like their parents did. It is manifested by lowering physical fitness level, this leads to increase so called civilization diseases, at children it is connected mainly with overweight and obesity. It can be stated, that lack of movement activity negatively influences not only health, but also functional and psychological fitness of human being. At present occurs more and more intensively the need to care and make more qualitative individual health and physical fitness increase, too.

The purpose of any recreational movement activity is to increase individual health and prolong active life. From the point of the view the childhood and adolescent age are the decisive periods for performing movement activities and its integration into life of each man. In this period are formed basis for the whole life movement activity, the positive relationship towards them, to their firm integration into living style, adequate attitudes and motivations to act. Movement activity should be stable component of health living style of each human being. Sport helps to improve life, makes it happier, more successful and more balanced. To maintain himself needed health and physical performance level is in each man life very important and a challenging task that should belong among the primary duty of every person. It requires self-discipline, strong will and systematic and permanent effort. Simonek (2000) stays that for keeping health and prolongation of active age play significant role mainly three factors:

- Everyday intense mental activity (it keeps CNS tonus: self-education, language studies, chess playing, crossword puzzle interest etc.
- Interest activities (gardening, fruit and medicinal plants, etc.)
- Directed physical and sport movement activities.

The fundamental aim of recreational movement activity is to strengthen health and prolong of active life. The way of life (living style) influences health and life length from approximately 50%. From this follows that man is not so helpless in his struggle for his health and his life length. In our lives movement activities are irreplaceable for us.

University students are specific and numerous social groups; at present about 40% of youths in Slovakia enter universities. Their age is from 18 to 25. For performing recreational activities the first few years of productive age are critical. Difficulties are dealt with: leaving of parents, entrance into occupation, finding life partner, marriage entrance, starting their own family lives, becoming parents (Sedlacek et al., 2007). Many authors point out the weak physical fitness level of university students (Lednický & Doležalová, 2006; Pistlová, 2010; Bendiková, 2015). Very often it is caused by lack of physical education lessons, insufficient material conditions, but here also plays the role their former education, experience with movement activities, psychological and personal qualities including attitudes towards performing physical activities continuously.

Study (Trudeau & Shephard, 2008) shows that increase of PE lessons at the expense of other subjects does not decrease quality of academic education, but paradoxically the quality of education does not increase after adding hours to academic subjects at the expense of physical activity; more or less in this case are

stressed negative influences on health.

At present the introduction of subject physical and sport education in Slovak universities curricula is inconsistent (except Faculties of Physical Education and Sports). Many faculties have this subject compulsory 1 – 2 semesters in 1st, maximally 2nd year of studies. Later there is sometimes only voluntary possibility to join some courses. But there are also many universities, where this subject is not among compulsory lessons.

University students are considered like adult persons that are able to be fully responsible not only for their studies, personal and social life, but they should also have very responsible attitude towards their health and physical fitness level. Entrance on university practically releases previous supervision of parents, teachers, society etc. and thus transforms many decisions on students. It concerns also health care supported with adequate level of motor performance. On universities students have possibility to participate within curriculum in physical and sport education lessons, that can be compulsory or voluntary; but this volume (mostly 90 min per week) is so small that they should perform more physical activities in order to maintain or increase their physical fitness level. So their attitudes towards physical activities performance have important role also in selection which kind of activity (various sports and events) and which forms will be used. Generally they can use activities „unpaid“, „paid“, or even practise sport like a competitive form.

From the beginning of 90ties years many authors in Slovakia draw attention on weak physical fitness level of university students. Reason for this state is often seen in insufficient lessons quantity in curriculum, material-space equipment, but also insufficient student habits to regular recreational movement activities performance.

Objectives. In this contribution we want to reveal mutual determination between physical fitness level and use of movement activities forms of Bratislava universities students

2. Material and methods

In this research were involved randomly selected students of both sexes from some Bratislava faculties (3 universities) with various study orientation (tab 1). From the point of study content and objectives of this research, we used sometimes here also groups of sport study orientation (FSPORT) and other faculties (common faculties, or not sport orientation). Average decimal age of the whole group was 20.73 years (20.85 at males and 20.57 at females). The physical fitness level we were evaluating with battery of 6 tests: Sit and reach (SR), standing broad jump (SBJ), overhead medicine ball (2 kg) throw (MT), shuttle run 10 x 5 m (10x5), sit - ups in 30 s (SU), endurance shuttle run (ENDUR). As population samples we used measurements published by Moravec (1990), and Moravec, Kampmiller and Sedlacek (1996).

For the purpose of our research we prepared questionnaire, in which we asked tested students on kind of activity (compulsory lessons, unpaid, paid, leisure time,

competitive) forms that they use when they practise movement activities.

For motor performance evaluation we used fundamental statistic parameters: arithmetic mean (\bar{x}), standard deviation (s), maximal value (\max), minimal value (\min), variation range (v_r). To learn significant differences among groups we used parametrical un-pair t-test for independent groups. Statistical significance was evaluated on **1 %, or *5 % level.

Table 1. *Students involved in the research*

Faculties	male	female	totally
FSPORT	171	41	212
FMEDC	28	39	67
FCHEM	31	25	56
FMATH	36	41	77
FLAW	27	31	58
FNSCI	32	39	71
FECON	19	28	47
FEDUC	-	18	18
	344	262	606

Legend: FSPORT – Faculty of Physical Education and Sport, FMEDC – Faculty of Medicine, FCHEM – Faculty of Chemical and Nutrition Technologies, FMATH – Faculty of Mathematics, Physics and Informatics, FLAW – Faculty of Law, FNSCI – Faculty of Natural Sciences, FECON – Faculties from Economic University, FEDUC – Faculty of Education (Pedagogical Faculty).

3. Results and Discussions

1. Physical fitness level

We were working with 2 specific student groups. One were students from the Faculty of Education and Sports (FSPORT), in which curriculum logically there were many subjects that positively influenced physical fitness level and also during entrance on this faculty students had to prove their talent from the point of view of movement and motor skills. The second group was created by students of general faculties (OTHER FACULTIES). In table 2 and 3 we can see physical fitness level fundamental statistic parameters of our groups and former population norms both males and females. It is obvious that clearly higher level of motor performance comparing other faculties as well as former populations possess groups of FSPORT both boys and girls. Statistical significance of differences can be seen in tab 4; practically all coefficients overreached 1% statistical level. Different results we can see when we compare other faculties with former populations. In groups of boys are results very similar in 5 tests (SR, SBJ, MT, 10x5, SU); only in test ENDUR can be seen significantly higher level of former population results. In groups of girls we can see that in 2 tests are better present other faculties students (SR and 10x5); in other tests are better girls from former population. In group of girls are differences on 5% statistical level difference in 5 tests (SBJ, MT, 10x5, SU, ENDUR).

Table 2. Statistical parameters of male student physical fitness from FSPORT, other faculties and former Slovak population

male	variables	SR	SBJ	MT	10x5m	SU	ENDUR
FSPORT	x	31.88	243.68	1135.56	16.97	30.16	86.16
n=171	s	6.95	16.96	165.63	0.84	3.80	22.84
OTHER	x	23.49	222.12	983.01	18.61	25.71	61.30
FACULTIES n=173	s	7.46	24.79	169.85	1.84	4.21	20.29
POPULATION	x	21.87	223.80	1039.00	18.47	28.65	74.20
n=201	s	7.95	18.85	194.00	1.91	19.24	22.83

Table 3. Statistical parameters of female student physical fitness from FSPORT, other faculties and former Slovak population

female	variables	SR	SBJ	MT	10x5m	SU	ENDUR
FSPORT	x	31.01	199.00	781.85	17.86	25.76	58.34
n=41	s	5.87	12.17	126.04	0.86	3.23	20.47
OTHER	x	27.15	163.29	614.86	20.90	21.50	33.8
FACULTIES n=221	s	7.08	20.72	120.78	1.75	4.01	13.32
POPULATION	x	26.86	173.77	698.00	21.77	25.10	35.71
n=180	s	6.92	19.71	117.00	1.69	5.59	12.57

Table 4. T-test differences between former population norms and FSPORT and other faculties (not sport faculties) in the level of motor performance parameters

	Gender	SR	SBJ	MT	10x5m	SU	ENDUR
FSPORT	Males	4,16**	7,24**	10,45**	9,31**	11,23**	12,72**
	Females	2,61*	8,86**	7,35**	9,93**	9,83**	9,86**
OTHER	Males	0,71	1,06	0,35	0,45	1,28	4,53**
FACULT.	Females	1,02	1,83*	1,99*	2,10*	2,42*	1,77*

Legend: *p<0,05, **p<0,01

2. Movement activity forms

Compulsory or not compulsory physical and sport education subject on university

In tab 5 can be seen physical fitness parameter differences regarding to compulsory or not compulsory subject. In these groups are not included boys and girls from faculty of sport, for they have logically this type of subjects in curriculum. In group of boys we can see practically same results in five tests (SR, SBJ, MT, 10x5, and SU). Only in test ENDUR we can see differences, when the group of not compulsory boys reach higher level of motor performance that is statistically on 5% level difference. In groups of girls we can see that group of not compulsory subject reach better results in five tests (except SU) and in three of it (SBJ, MT, 10x5) is difference on 5% statistical level. So it is a bit surprising that students who do not have compulsory subject reached higher physical fitness level, though the differences are not so great, more likely it among girls.

Table 5. Differences in physical fitness parameters with regard to compulsory physical education (CPE) subject on university

Boys		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Compulsory PE – YES,	x	23.4	221.8	977.5	18.6	25.5	58.0
	s	7.1	26.0	174.8	1.7	4.3	20.5
n=90							
Compulsory PE – NOT,	x	23.4	222.5	989.0	18.5	25.8	64.8
	s	7.8	23.4	165.1	1.9	4.0	19.5
n=83							
-	t-test	0.00	0.17	0.44	0.48	0.37	2.23*
Girls		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Compulsory PE – YES,	x	26.9	160.5	600.1	21.1	21.6	33.7
	s	6.3	20.9	112.9	1.8	4.0	13.8
n=134							
Compulsory PE – NOT,	x	27.4	167.6	637.5	20.5	21.36	33.9
	s	8.1	19.7	129.5	1.4	4.0	12.4
n=87							
-	t-test	0.53	2.51*	2.26*	2.34*	0.43	0.11

**p<0.01; *p<0.05

Leisure time physical activity practise

In tab 6 we can see results when we demanded on fact, if students in their leisure time practise movement activities. It is positive that only less than 10% both boys and girls stated that they do not practise any activity.

Table 6. Differences in physical fitness parameters with regard to practice physical activity (PA) in leisure time

Boys		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Leisure time PA – YES,	x	28.1	234.2	1064.8	17.7	28.1	74.8
	s	8.2	22.9	183.9	1.5	4.5	24.4
n=325							
Leisure time PA – NOT,	x	19.5	209.5	957.4	19.3	24.7	53.0
	s	4.6	26.4	160.3	2.36	4.0	23.6
n=19							
-	t-test	4.46**	4.52**	2.49*	4.28**	3.15**	3.78**
Girls		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Leisure time PA – YES,	x	27.8	170.7	652.0	20.2	22.4	38.5
	s	6.9	23.3	134.6	1.9	4.2	17.5
n=237							
Leisure time PA – NOT,	x	27.3	151.8	537.0	21.66	19.9	28.9
	s	8.0	18.6	98.6	1.8	2.9	9.6
n=25							
-	t-test	0.29	3.93**	4.15**	3.32**	2.86**	2.69**

**p<0.01; *p<0.05

From the point of results we can say that those who practice physical activity in their leisure time reached statistically significant higher level of physical fitness, except one case (SR in girl group); all differences are on 1% statistical level. It means that movement activities in leisure time have substantial influence on motor performance level of universities students.

Unpaid form of physical activity

In tab 7 we can see use of unpaid form of physical activity. It is obvious that results are very similar in both groups (using or not using unpaid form). Among boys are not seen any serious differences; in groups of girls we can see that these who use unpaid form reaches slightly higher physical fitness results. In two tests coefficients overreached 5% statistical level (MT and SU). Here it seems that among girls is small tendency that these who use this unpaid form reach slightly higher motor performance level. Unpaid form use both boys and girls numerically approximately at 80%.

Table 7. Differences in physical fitness parameters with regard to practice physical activity (PA) in unpaid forms (without spending money)

Boys		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Unpaid forms of PA – YES, n=274	x	28.0	233.3	1054.1	17.7	27.9	74.5
	s	8.3	23.8	182.2	1.62	4.62	24.0
Unpaid forms of PA – NOT, n=70	x	26.3	231.1	1077.2	17.8	27.8	70.1
	s	8.3	23.8	191.7	1.7	4.5	27.8
-	t-test	1.49	0.68	0.93	0.30	0.18	1.31
Girls		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Unpaid forms of PA – YES, n=215	x	28.0	170.2	649.1	20.3	22.4	38.2
	s	6.7	22.6	132.8	1.8	4.2	17.2
Unpaid forms of PA – NOT, n=47	x	26.6	162.9	604.1	20.7	21.0	34.7
	s	8.0	26.4	144.2	2.5	3.6	16.3
-	t-test	1.18	1.93	2.06*	1.30	2.04*	1.27

**p<0.01; *p<0.05

Paid form of physical activity

Table 8. Differences in physical fitness parameters with regard to practice physical activity (PA) in paid forms (entrance, fees, couches, etc.)

Boys		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Paid forms of PA – YES, n=189	x	29.1	236.7	1092.7	17.4	29.0	79.1
	s	7.9	22.3	178.5	1.5	4.4	24.2
Paid forms of PA – NOT, n=155	x	25.8	228.2	1017.6	18.1	26.5	66.9
	s	8.4	24.7	182.9	1.7	4.4	24.1
-	t-test	3.64**	3.34**	3.84**	3.83**	5.31**	4.66**
Girls		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Paid forms of PA – YES, n=108	x	28.0	173.1	672.3	20.1	23.9	40.6
	s	7.5	24.5	141.1	1.9	4.1	17.0
Paid forms of PA – NOT, n=154	x	27.5	165.9	619.0	20.5	20.8	35.5
	s	6.7	22.3	127.8	1.9	3.7	16.9
-	t-test	0.63	2.44*	3.18**	1.60	6.32**	2.42*

**p<0.01; *p<0.05

In tab 8 can be seen results of using or not using form of paid physical activity. Here we can see that those who use paid forms reached clearly higher level of physical fitness in all tests both girls and boys. All differences are among boys on 1% statistical significant difference. In groups of girls are two tests on 1% (MT and SU), two on 5% (SBJ and ENDUR) statistical level difference. We can state that the form of paying for possibility perform physical activity influences significantly level of motor performance, slightly more among boys. It is also interested that more often use this form boys (55%) while girls use it less often (41%).

Competitive physical activity

In tab 9 we can see differences with regard of use form, where the purpose is to compete (mostly be registered in any sport union). On first view it is clear that these who make competitive sport activity reached significantly higher level of motor performance. Among boys as well as girls are differences on 1% (except SR girl is 5%) level. It is obvious that competitive sport practise influences fundamentally and positively level of motor performance. It is interested that more often practises this form group of boys (45%) like it is among girls (only 13%).

Table 9. Differences in physical fitness parameters with regard to practice physical activity (PA) like competitive sport

Boys		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Competitive PA – YES, n=156	x	30.8	241.3	1126.1	16.9	29.8	86.5
	s	7.1	16.8	168.4	0.9	4.0	23.1
Competitive PA – NOT, n=188	x	25.0	225.8	1003.0	18.4	26.2	62.9
	s	8.3	26.3	178.3	1.8	4.4	20.9
-	t-test	6.92**	6.33**	6.53**	9.21**	7.86**	9.68**
Girls		SR (cm)	SBJ (cm)	MT (cm)	10x5 (s)	SU (1)	ENDUR (1)
Competitive PA – YES, n=34	x	30.2	194.0	789.3	18.2	24.2	59.0
	s	4.9	21.2	133.1	1.5	3.7	20.8
Competitive PA – NOT, n=228	x	27.3	165.1	618.9	20.7	21.8	34.4
	s	7.2	21.5	121.8	1.8	4.1	13.9
-	t-test	2.21*	7.30**	7.52**	7.56**	3.18**	8.92**

**p<0.01; *p<0.05

Discussions

Clearly higher level of motor performance comparing other faculties as well as former populations reached groups of FSPORT both boys and girls. Comparison of other faculties with former populations showed that present university populations are of lower physical fitness level. While boys are worse mainly in ENDUR, in case of girls is the difference greater; they are differences on 5% statistical level difference in 5 tests (SBJ, MT, 10x5, SU, ENDUR). These negative results are different comparing former researches (Moravec, 1990, Moravec, Kampmiller, & Sedlacek, 1996).

So it is a bit surprising that students who do not have compulsory subject reached higher physical fitness level, though the differences are not so great, more likely it is among girl groups. From the point of results we can say that those who

practice physical activity in their leisure time reached statistically significant higher level of physical fitness. It means that movement activities in leisure time have substantial influence on motor performance level of universities students.

Using of unpaid physical activity forms shows that results are very similar in both groups (using or not using unpaid form). Among boys are not seen any serious differences, while in groups of girls we can see that these who use unpaid form reaches slightly higher physical fitness results. We can state that the form of paying for possibility perform physical activity influences significantly level of motor performance, slightly more among boys. It is also interested that more often use this form boys (55%) while girls use it less often (41%).

It is clear in this research that these who make competitive sport activity reached significantly higher level of motor performance. Among boys as well as girls are differences mostly on 1% statistical significance level. It is obvious that competitive sport practise influences fundamentally and positively level of motor performance. It is interested that more often practises this form group of boys (45%) like it is among girls (only 13%). Former research comparison confirms that those students who perform competitive sport activities as well as perform physical activities in their leisure time possess higher level of physical fitness. It is more likely in male groups (Moravec, 1990, Moravec, Kampmiller, & Sedlacek, 1996, Merica, 1997).

4. Conclusions

1. The significantly highest level of motor performance reached students of the Faculty of Physical Education and Sports. Other faculties students reached in group of boys approximately level of former populations (except ENDUR, when present faculties are clearly worse). Present other faculties groups of girls are significantly better in 2 tests, but also significantly worse in 4 tests; on this basis we can stay that present university student girls show decrease with regard to former population measurements.

2. Participation in physical activity on the basis of compulsory university subject as well as unpaid forms does not differentiate level of physical fitness very much. Paradoxically it seems among girls that if they do not have compulsory PE lessons in curriculum, the physical fitness level slightly increases.

3. Other three forms of participation in physical and sport activities (leisure time, paid and competitive forms) influence significantly level of general motor performance both in groups of boys and girls, too.

4. We confirm here generally known fact that boys in this age participate in physical activities more often comparing girls. Leisure time and unpaid forms differentiate in this research boys and girls only slightly in favour of boy groups, but differences in paid and competitive forms are significant.

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