

PHYSICAL FITNESS LEVEL OF 1st YEAR MEDICINE AND PHYSIOTHERAPY STUDENTS OF LUBLIN MEDICAL UNIVERSITY

Physical fitness of UM Lublin students

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Abstract

Introduction. The development of civilization is leading to lifestyle changes and diminishing physical activity as well as various types of sicknesses caused by a lack of movement. In order to reduce these negative effects we should maintain a proper level of physical activity, which is often regarded as a contributing factor to positive health levels. **Material and methods.** The aim of this report is the assessment of physical fitness levels of 1st year male and female students of medicine and physiotherapy faculties at Lublin Medical University. The test was conducted on a group of 103 female and 52 male students of medicine as well as 50 female and 11 male students of physiotherapy. The survey was based on the Pilcz motor skills test and Denisiuk endurance test. **Results and conclusions.** The analysis of results showed differences in physical fitness between sexes while there were hardly any differences between the students of the two faculties. The overall level of physical fitness has been specified as the lower limit of the average level.

Key words: physical fitness, Pilcz test, motor abilities

Introduction

Nowadays, physical culture is a part of human culture. The term refers to a conscious concern for health and physical fitness. The development of civilization introduces intensive development of industry, agriculture, motor transport and urbanization, which make human life increasingly schematic. The lifestyle change diminishes levels of physical activity as well as increasing various sicknesses caused by the lack of movement. It has been proven that changes in motor abilities, as well as levels of physical competence are important for contemporary man. In order to mitigate the effects of technical progress we should take care of our physical fitness, which is essential for human health [1, 2]. Physical fitness and strength are believed to be positive since they encourage physical activity, increase tolerance to exertion and help people to adapt easily to new situations [2, 3, 4, 5, 6]. A modern adult, regardless his job, faces a number of situations in which physical fitness is the crucial condition for success and self confidence [4].

Researchers have tested physical fitness for a number of years. There are various definitions concerning its attributes. Demel and Skład defined human motoricity as “the whole of human physical activity” [7 p.101]. Pilcz believes that physical fitness in Poland is most often understood as “the current ability to perform activities requiring the involvement of motor strength, speed, endurance, agility and other motor features” [8 p.304].

Human development is highly influenced by the surrounding environment. The highest level of physical fitness is achieved

in adolescence, being stimulated by genetic, environmental and cultural factors [9, 10]. The motor skills of an adult do not change as rapidly or naturally. They can easily deteriorate unless we care for them. Unfortunately, it is widely known that young people whose physical culture level is low do not care about their motor skills and forget the importance of movement in human life [10, 11].

Some dimorphic differences between boys and girls are visible quite early (as early as at the age of 5). The differences are similar to those occurring in later periods of ontogenesis. They are caused by distinctive features of psychology and physiology [5, 10, 12]. Men display superior at motor skills that require high level of strength and endurance while women are better at those that require accuracy and practice [5, 9]. We can measure them and express the results in physical units. There has been many years of debate concerning the measurement and evaluation of physical fitness. The aim of measurement is definition by means of comparison and drawing conclusions [8, 13].

The works mentioned above were used when analyzing various tests, standards and evaluations. They were the basis for the introduction of physical development standards. It is thanks to these works that we can make comparisons and develop proper attitudes towards our own body and health [4, 6, 9].

In some countries first evaluations of physical fitness were introduced as early as in the 19th century. But it was only after World War I that dynamic development of this sphere started. Professor Jan Mydlarski (1934 – “Mirmik Mydlarskiego”) was a pioneer in Poland. After World War II a new wave of physical fitness measuring methods occurred. The best known researchers

Table 1. Physical fitness results of male and female students

Tests ability-impaired users	Female results					Men results					The significance of the differences (p)
	N	Average	Standard disparity	Min.	Max	N	Average	Standard disparity	Min.	Max	
Agility run (seconds)	153	29.4	±2.5	22,6	36,1	63	26.3	±2.2	22.9	32.6	0.000
Long jump (centimeters)	153	163.6	±22.4	106	225	63	215.6	±24.1	135	270	0.000
Medicine ball throw(centimeters)	153	605.7	±97.3	410	950	63	799.0	±153.2	550	1170	0.000
Burpee test (number of repetitions)	153	13.8	±1.9	7	19	63	26.5	±4.2	17	35	0.000

in Poland were: L. Denisiuk, R. Trześniowski, S. Pilicz, Z. Chromiński [8, 13].

Many tests and methods of measuring physical fitness concerned children up to 18 years old. S. Pilcz, using the Barrow test, has created a test that evaluates the general physical fitness of university students, those of 1st year in particular. The test is easy to conduct and requires little time [14].

At Lublin Medical University the testing of students' physical fitness has been carried out for many years. The above-mentioned test was used for this purpose, which was additionally extended by the anaerobic endurance tests taken from Ludwik Denisiuk. Different analysis and comparisons have been performed among various age groups and faculties. A determination of the level of individual physical fitness of students was treated, among others, as an evaluation of the effectiveness of physical education program.

The goal of every university is to educate the best experts and make them ready for creative participation in the modern world. The contemporary lifestyle requires health, energy, physical and psychological resistance. Therefore, it seems unavoidable to imply healthily and physically focused habits which will bring benefits for the rest of one's life [3, 15].

The aim of this report is to assess the physical fitness of male and female 1st year medical and physiotherapy students at Lublin Medical University. The results were analyzed for men and women and the differences between the faculties were noted.

Material and methods

The study included 216 students (male and female) of 1st year of medicine and physiotherapy faculties at Lublin Medical University. This group was chosen because of the role and nature of their future work. The research included 103 females and 52 male medical students and 50 female and 11 male of physiotherapy students. The difference in numbers was a result of the number of people admitted to the faculties. The research was carried out by staff of College of Physical Education and Sport at Medical University in Lublin, in January, i.e. at the end of the first semester, in which both groups were subject to the same physical education program. This program was aimed at the general development of physical fitness.

The research tool was the Stefan Pilcz test of motor skills extended with endurance test (Burpee task) taken from the Ludwik Denisiuk test. This modification increased the area covered by the study of motor skills. The test evaluated four motor features: endurance, agility, strength, and power. All tasks were carried out according to the test requirements. Power was tested by means of long jump from a standstill position. Subjects took their position behind a line, 100 cm from a mattress, and jumped forward with both feet as far as possible throwing arms out. The task was conducted 3 times and the longest distance was measured to 1 cm. Agility was measured by means of an envelope run within dimensions of 3 m by 5 m. The run began with standing start and students ran round the poles three times

continually. The time was measured to 0.1 sec. The task was done once. The strength test included a medicine ball throw with both arms above head (female – 2 kg, male – 3 kg). Subjects stood behind a line with both legs apart, lifted the ball above the head with both arms and threw the ball forward as far as possible (it was forbidden to cross the line or to jump). The task was repeated three times and the best result was measured to 10 cm. The last task was endurance (Burpee task). The student took a standing position, bent the knees, threw both legs backwards, came back to knee bend and again to standing position, clapping both hands above the head. The test was assessed on the basis of the number of completed circles within a definite time (female – 30 sec and male – 1 min). Before the test, participants had been shown how to perform every task and were given a warm up activities.

All results were collected and analyzed according to Statistica software using suitable statistic functions, arithmetic standard deviation calculations, minimum and maximum values, Student's t-test for independent trials. Statistical significance was considered at $p \leq 0.05$.

Results

After statistical analysis of the results obtained by testing women and men it was found that in each trial there were statistically significant differences ($p \leq 0.000$).

Comparing the arithmetic mean of the results it was noted that in any attempt of the test male students achieved better results than their female colleagues. The biggest differences, as expected, were observed in challenge and the smallest in a test of agility. The results prove women made a more homogeneous group than men, especially in the medicine ball throw. Standard disparity in this task was 97.3 cm for females and 153.2 cm for males (Tab.1)

After the conversion of data into points (according to Pilicz classification standards) it was found that women received higher scores, and thus their physical fitness had higher evaluation level. (Tab. 2, Fig. 1).

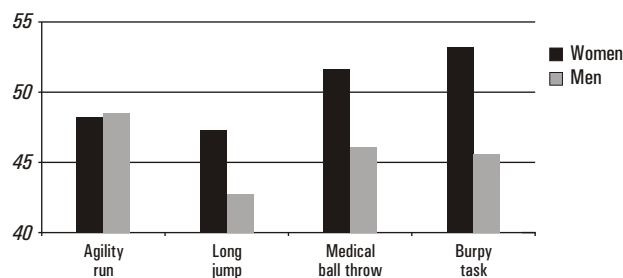
**Figure 1.** Physical fitness results expressed in points

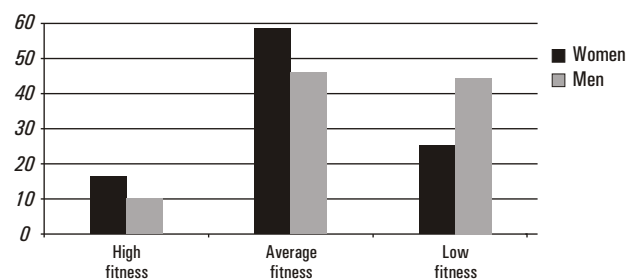
Table 2. Physical fitness results obtained by the test expressed in points

Tests ability-impaired users	Female results					Men results				
	N	Average	Standard disparity	Min.	Max	N	Average	Standard disparity	Min.	Max
Agility run (seconds)	153	48.2	± 11.8	16	75	63	48.5	± 11.0	16	66
Long jump (centimeters)	153	47.3	± 12.5	15	82	63	42.7	± 12.5	2	71
Medicine ball throw (centimeters)	153	51.6	± 9.7	32	86	63	46.1	± 11.3	27	73
Burpee test (number of repetitions)	153	53.2	± 7.6	24	76	63	45.6	± 9.9	24	65
Total points	153	200.3	± 30.6	130	279	63	182.9	± 31.5	96	262
Grade	153	3.7	± 0.7	2	5	63	3.3	± 0.8	2	5

Trials in which the highest average scoring was obtained: women – anaerobic endurance, men – agility. The lowest scoring motor skill in both groups was strength. In this attempt there were two lowest-rated performances. Among the women for the long standing jump a distance 106 m (15 points) and men with jump of 135 m (only 2 points). The best scoring performance in both groups, was obtained in challenge (women 86 points, men 73 points). The results achieved by students prove the general opinion. According to Table 3 and Figure 2 males and females gathered the most points for average physical fitness (females 58.8%, males 46.1%), however, women received more good grades – 36.6% while men more upper satisfactory grades – 28.6%. In the range of very good and more than good ratings again dominated women – 16.3%, and the group of low rating was clearly dominated by men – 44.4%.

Table 3. Quantitative and qualitative analysis of physical fitness of tested subjects

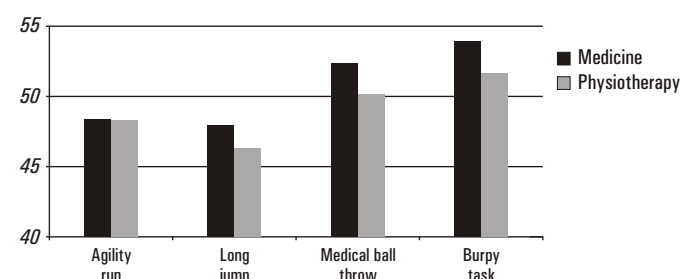
		High fitness		Average fitness		Low fitness	
		5	4.5	4	3.5	3	2
F	N	8	17	56	34	27	11
	%	5.2	11.1	36.6	22.2	17.7	7.2
		16.3		58.8		24.9	
M	N	1	5	11	18	16	12
	%	1.6	7.9	17.5	28.6	25.3	19.1
		9.5		46.1		44.4	

**Figure 2.** Comparison of physical fitness as a percentage

The data presented above proves differences between sexes, which had been expected. However, it does not mean that, while comparing motor skills of the sexes, men will always be better than women.

The comparison of results achieved by female students of medicine and physiotherapy faculties did not show any significant differences. The results are very similar. Among women in both departments the highest rated attempt was: endurance and

strength. Female students of medicine got the best results at Burp task – 14 circles (53.9 points) and medical ball throw – 612.8 cm (52.3 points). The worst average result – 161.7 cm (46.3 points) was achieved by physiotherapy female students performing the power task (Fig. 3).

**Figure 3.** Female students' results, expressed in points

The table below shows minimum and maximum results and point amount achieved by women in the test. There are hardly any noticeable differences there, either. The highest point result – 86 – was achieved by a medicine faculty female student performing the medicine ball throw, achieving a distance of 950 cm. The lowest point result – 15 – was achieved also by a future medicine doctor who jumped 106 cm. In summary, medical students got 6.3 points more than physiotherapy students, that is, their physical fitness was assessed higher. These data are presented in Table 4.

According to the data and results place both groups of female students at the average level of physical competence, as presented in Table 5 and Figure 4. The analysis of grades shows that in the section of grades between 4 and 3.5 medical students got 24.9% of them more than physiotherapy students. In the other sections, physiotherapy students were better. They achieved 5.4% of high physical competence grades more but at the same time they have 19.5% of low physical competence grades more. These results show the medical students to be a more homogenous group in most analyzed data (Tab. 5, Fig. 4).

Analyzing the results obtained by students of medical and physiotherapy faculties there were no statistically significant differences between them.

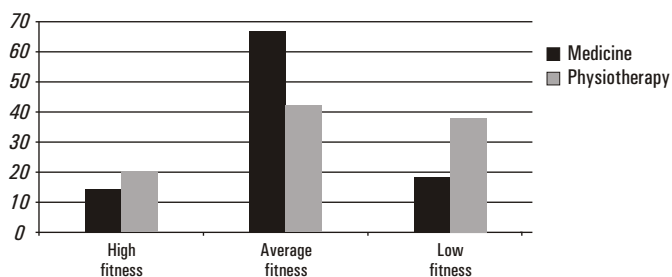
General physical competence of male medical and physiotherapy students is presented in the table below (Table 4).

Table 4. Female students' results

Females	Fac- ulty	N	Average	Standard disparity	Min.	Max	The significance of the differences (p)
Agility run (seconds)	L F	103 50	29.5 29.4	±2.3 ±2.7	25,5 23,8	36,1 35,0	0.874378
Points	L F	103 50	48.3 48.2	±11.2 ±12.9	16 21	67 75	0.979492
Long jump (centimeters)	L F	103 50	164.5 161.7	±20.2 ±26.5	106 116	225 219	0.466784
Points	L F	103 50	47.9 46.3	±11.3 ±14.7	15 21	82 78	0.459671
Medicine ball throw (centimeters)	L F	103 50	612.8 591.2	±99.5 ±91.8	450 410	950 850	0.198324
Points	L F	103 50	52.3 50.1	±10.0 ±9.2	36 32	86 76	0.194763
Burpee test (number of repetitions)	L F	103 50	14.0 13.4	±1.8 ±1.9	9 7	19 17	0.088001
Points	L F	103 50	53.9 51.6	±7.5 ±7.7	33 24	76 66	0.845572
Total points	L F	103 50	202.4 196.1	±28.0 ±35.4	130 136	262 279	0.232581
Grade	L F	103 50	3.7 3.6	±0.6 ±0.9	2 2	5 5	0.194595

Table 5. Female students' results (percentage)

Females		High fitness		Average fitness		Low fitness	
Medicine	N	3	12	43	26	14	5
	%	2.9	11.7	41.7	25.2	13.6	4.9
		14.6		66.9		18.5	
Physiotherapy	N	5	5	13	8	13	6
	%	10	10	26	16	26	12
		20		42		38	

**Figure 4.** Female fitness (percentage)

Analyzing the results obtained by students of medical and physiotherapy faculties there were no statistically significant differences between them.

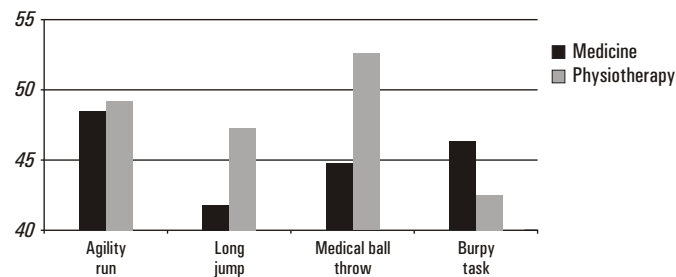
General physical competence of male medical and physiotherapy students is presented in the table below.

Table 6. Male students results

Male	Fac- ulty	N	Average	Standard disparity	Min.	Max	The significance of the differences (p)
Agility run (seconds)	L F	52 11	26.3 26.1	±2.2 ±1.8	22.9 24.5	32,6 30.4	0.794432
Points	L F	52 11	48.4 49.2	±11.5 ±9.1	16 27	66 57	0.825797
Long jump (centimeters)	L F	52 11	213.8 224.5	±24.7 ±19.7	135 182	270 260	0.183818
Points	L F	52 11	41.8 47.2	±12.9 ±10.3	2 25	71 66	0.198886
Medicine ball throw (centimeters)	L F	52 11	789.4 844.6	±143.7 ±193.2	550 550	1090 1170	0.281768
Points	L F	52 11	44.7 52.6	±10.7 ±12.3	27 35	67 73	0.032689
Burpee test (number of repetitions)	L F	52 11	26.8 25.1	±4.1 ±4.8	19 17	35 33	0.241258
Points	L F	52 11	46.3 42.5	±9.6 ±11.1	28 24	65 61	0.247244
Total points	L F	52 11	181.8 190.6	±31.6 ±29.7	96 129	262 234	0.375031
Grade	L F	52 11	3.2 3.6	±0.8 ±0.7	2 2	5 4.5	0.413525

Slightly better results were achieved by physiotherapy students. The best results were achieved in the strength task. They threw the ball a distance of 1170 cm and received 73 points for it. Their average result was 55.2 cm longer and graded 7.9 points more than the average result achieved by medicine male students. The weakest results future physiotherapists gained in endurance test, and future doctors in power test (see Figure 5).

In this task the future doctor achieved the lowest test result – 2 points – for long jump of 135 cm. While analyzing the data of the standard deviation it was found that physiotherapy students were more homogeneous group.

**Figure 5.** Male students' results, expressed in points

The average of the sum obtained in the test points (190.6 points) and evaluation of 3,6 indicates the average level of physical fitness of the students of physiotherapy, and note 3,2 and the average of the sum obtained points – 181.8 points for students majoring in medicine, classifying them as having low physical fitness.

The data mentioned above is presented in Table 7 and Figure 6. It is explicitly visible that the medical students' results belong mainly to the group of low 46.2% and average 46.1% physical fitness grades while the high grades covered only 7.7% of achieved results. It is alarming that these students made only one very good grade and three good grades but as much as eleven unsatisfactory and thirteen satisfactory grades. The results of physiotherapy students are not as disparate, however, low ratings is two times more than high ratings.

Table 7. Male students' results (percentage)

Male		High fitness		Average fitness		Low fitness	
		5	4.5	4	3.5	3	2
Medicine	N	1	3	10	14	13	11
	%	1.9	5.8	19.2	26.9	25	21.2
		7.7		46.1		46.2	
Physiotherapy	N	0	2	1	4	3	1
	%	0	18.2	9.1	36.6	27.3	9.1
		18.2		45.4		36.4	

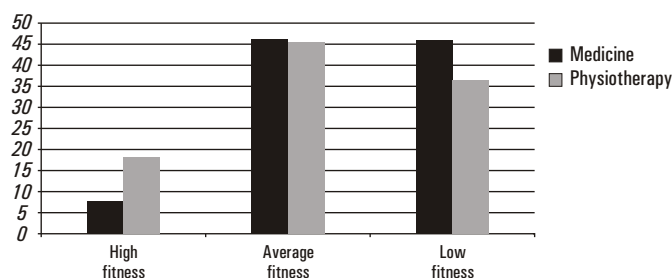


Figure 6. Male fitness (percentage)

The above analysis of the data indicates a satisfactory level of development of motor skills of tested female and male students. The effectiveness of physical education program shall be considered.

Discussion

The analysis of the test results shows:

1. There are significant differences in the level of motor skills between the tested men and women.
2. The level of physical fitness test according to Pilicz's classification can be assessed as medium or low in many cases.
3. The men tested performed better in each trial of the test but, according to Pilicz's classification, women's physical fitness was rated higher than men's.
4. The biggest differences between tested men and women were observed in the challenge and the smallest in the test of agility.
5. Strength was considered the weakest motor ability in both sexes.
6. Women were a more homogeneous group than men.
7. There are no statistically significant differences in motor skills between the faculties tested for both women and men.
8. Students majoring in medicine achieved slightly better results than physiotherapy students. In the male group, the majority were students of physiotherapy.
9. Among women in both departments, abilities with higher

rates were: anaerobic endurance and force; power was rated the lowest.

10. In the male group from the physiotherapy faculty, the higher rated of motor skills was strength, and the lowest rated was anaerobic endurance. The medical students' best results were gained in the agility test, the weakest in a strength test.

Conclusions

Physical fitness can be seen in different categories. In the category of care, as a positive measure of health or social, as physical resourcefulness of man.

In both cases, a high level of physical fitness means an appropriate preparation of the individual for life. Unfortunately, the young people that we tested have medium or even low levels of physical fitness and thus may have difficulty in adapting to the conditions offered by the surrounding biogeographic and socio-economic environment.

Furthermore, these students are future doctors and physiotherapists – people whose attitudes and beliefs should convince their patients to healthy, that is, to engage in an active lifestyle.

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