

ASSESSMENT OF PHYSICAL HEALTH AND PHYSICAL FITNESS OF STUDENTS OF TECHNICAL SPECIALTIES OF I COURSE

Korol S. A.

Sumy State Pedagogical University

Annotation. *Purpose:* identification and assessment of levels of physical health and physical fitness of first-year students of the main group. *Material:* in the experiment participated 264 students (132 boys and 132 girls). The methods of evaluation: physical health by G.L. Apanasenko and physical preparedness for T. Yu. Krutsevich. *Results:* It was found that more than 75% of the students are low and lower-middle level of physical health. Revealed a level of physical fitness freshmen. 84.8% of boys and 81.1% girls have an average level of physical fitness. This corresponds to a satisfactory evaluation. Found that almost all the students are at risk of development of somatic diseases. *Conclusions:* These results confirm the tendency to deterioration of health and physical fitness of young people. This requires the development of a program of physical education with an emphasis on improving orientation.

Keywords: health, physical, fitness, students, technical, specialty.

Introduction

Health protection, its formation on all stages of human development is a strategic task of any state [6]. Students are social strata of population, which is a reserve of country's labor resources. That is why health condition is regarded as an indicator of their readiness for fulfillment of social and labor functions.

As on to-day there is more than 100 od definitions of "health". The statute of World health protection organization (WHPO) defines health as "state of complete physical, mental and social welfare, but not only absence of diseases or physical defects".

In opinion of M.M. Amosov "health is maximal productivity of organs and systems with preservation of qualitative limits of their functions"[1]. G.L. Apanasenko thinks: "health is harmony, internal systemic order, ensuring such level of energy potential, which permits for a person to feel good and optimally fulfill biological and social functions" [3].

Other scientists regard health as "psycho-physical state of a person, which is characterized by absence of pathological changes and by functional state, which is sufficient for full fledged bio-social adaptation and preservation of physical and psychological workability in conditions of natural environment" [7].

Modern youth's health is influenced by great number of negative factors: hypo-dynamia, nervous-emotional and mental tension of studying functioning, not optimal correlation of work and rest, irrational eating, harmful habits, ecological conditions and other [2, 9].

As per data of WHPO experts approximate correlations of factors, which ensure and form modern person's health are as follows: by 105 they depend on state of health protection, by 20% - on ecology, nearly 20% - on heredity and the most percentage – 50% - on conditions of life and life style.

Basing on above said, human health can be regarded as process of preservation and strengthening of organism's reserve potentials (psychic, physiological, physical), i.e. as dynamic process, which improves or worsens depending on life style [4].

At the same time L.I. Lubysheva stresses that phenomenon of physical culture is one of the most significant, by its valueologic potential and influence on protection and strengthening of human health, as far as it, "works" for human health [12]. In number of dissertations (A.I. Drachuk, 2001; P.M. Gunko, 2008; N.I. Turchina, 2009; O.V. Sokolova, 2011 et al.) it was determined close connection between students' health, physical fitness and organization of physical education in higher educational establishments. That is why great part of responsibility for solution of this problem shall be imposed on physical education process in educational establishment.

For improvement of physical education at HEE it is necessary to work out programs, which would maximally solve both health related and professional-applied tasks of physical education.

Analysis of researches [5, 8, 13, 15-19] permits to say that choice of means and regulation of physical loads at health related physical trainings shall be realized in compliance with levels of students' somatic health and physical fitness.

The research has been fulfilled in compliance with plan of scientific-research works of Sumy state university, named after A.S. Makarenko for 2011-2015, by topic "Improvement of health and physical fitness of different population's strata by means of physical culture" (state registration number 0111U005736).

Purpose, tasks of the work, material and methods

The purpose of the work is determination and evaluation of somatic health and physical fitness levels of first year technical specialties' students of Sumy state university, who are members of main health group.

The methods and organization of the research: we used theoretical analysis, anthropometric and physiological methods, pedagogic testing and methods of mathematical statistic.

Estimation of somatic health was realized with express-evaluation's method, developed by prof. G.L. Apanasenko [3]. It includes using and interpretation of anthropometric indicators (body mass, height, dynamometry), physiological indicators (vital capacity of lungs, HBR, BP) and functional indicators (test of Martine-Kushelevskiy), used for calculation of morphological-functional indices. Evaluation of somatic health was fulfilled by sum of points, which corresponded to calculated indicators; besides, functional classes from "low" to "high" were determined.

Pedagogic testing permitted to obtain and analyze main quantitative and qualitative indicators of students' physical fitness. Comparison of results with evaluation tables' data, developed by T.Yu. Krutsevych for students, with 10 motion tests for physical skills in the base, permitted to determine level of physical fitness [11].

In our research 264 first year students (132 boys and 132 girls) of Sumy state university – members of main health group- participated.

Results of the research

Present time is characterized by unsatisfactory state of health of Ukrainian youth. Statistical data point at trend to worsening of pupils' and students' health and physical condition with their growing and continuing education [10].

According to results of medical examinations in SumSU quantity of first year students – members of special health group and released from physical education classes is constantly growing (see table 1).

Table 1

Health condition of first year students of SumSU (as per data of medical examinations)

Years of medical examination	Main health group		Special health group		Released from physical culture classes	
	n	%	n	%	n	%
2011	2312	85.3	231	8.5	165	6.2
2012	2120	88.3	193	8.0	87	3.7
2013	1917	77.5	327	13.3	174	9.2

In table we can see that recent years quantity of such students has been within limits from 11.7% to 22.5%. It should be noted that membership of students in main health does not guarantee "safe zone" of their health.

It is also known that exactly level of individual somatic health conditions safe zone of motion intensity while fulfilling physical exercises and is a criterion of effectiveness of such trainings.

Level of somatic (physical) health was estimated by the following indicators: body mass index, vital, power index, Robinson's index, time of heart beats rate restoration (HBR) after 20 squatting during 30 seconds (see tables 2, 3).

Table 2

Indicators of somatic health of first years, technical specialties' students

Indicators	Statistic indicators			
	Boys (n=132)		Girls (n=132)	
	\bar{X}	m	\bar{X}	m
Body mass index, kg/m ²	21.42	0.21	21.38	0.26
Vital index, ml/kg	59.96	0.69	51.88	0.68
Power index, %	60.80	1.07	43.43	0.71
Robinson's index, conv.un.	88.60	0.99	87.65	1.09
Time of HBR restoration during test of Martine-Kushelevskiy, sec.	149.52	3.69	161.07	3.49

Determination of correspondence of body mass and height indicators witnessed that mean of body mass index of students was within standard: boys – 21.42 kg/m², girls – 21.38 kg/m² (standard 18.6–24.9 kg/m²). Though individual analysis of results showed that 11.36% of students have deficit of body mass and 3.79% - excessive weight, though for girl students these indicators correspond accordingly to 14.39% and 10.61%. One boy and two girls from total quantity of the tested had obesity of first stage. High indicator of body mass index is connected with increased risk of cardiovascular diseases and diabetes [14].

Vital index is an important criterion of external breathing functions' reserve and is determined by relation of VCL indicator to body mass. Mean value of vital index is within age standard [11], but 46 students (34.9%) and 44 girl students (33.3%) from total quantity of the tested has this indicator below standard.

Analysis of power index (relation of stronger hand's dynamometry to body mass) showed level of development of muscular system of boys at minimum of low and below middle, while concerning girls this mean value is below middle.

Robinson's index ("double result" in rest) is indicator of reserve and saving character of cardio-vascular system's functioning. Mean value of Robinson's index is 88.4 conv.un. (boys) and 87.65 conv.un.(girls), pointing at middle level of this indicator.

Results of HBR restoration up to initial value after dozed loads (20 squatting for 30 seconds) are given in table 3.

Table 3

HBR restoration for time of fulfillment Martne-Kushelevskiy's test

Time periods of restoration	Boys (n=132)		Girls (n=132)	
	n	%	n	%
Up to 59 sec.	2	1.52	1	0.76
From 1 to 1 min. 30 sec.	8	6.06	4	3.03
From 1 min. 30 sec. to 2 min.	51	38.64	37	28.03
From 2 min. to 3 min.	43	32.58	49	37.12
More than 3 min.	28	21.21	41	31.06

Results of our researches witness that in boys restoration processes go quicker than in girls. More than 60% of the tested students have reduced level of functional potentials of cardio-vascular system. High and above middle level was registered only in 5.68% of cases from total quantity of students.

Summarizing points for every indicator we received somatic health index, mean value of which (boys) was 3.33 ± 0.33 points that corresponds to level at nearly low and below middle; for girls this value is 2.95 ± 0.31 points that corresponds to low level.

Graphic picture of student's distribution by level of somatic health is given in fig. 1. Levels low and below middle belong to 78.8 % of students and 81.8% of girl students. Only 19.7% of boys and 18.2% of girls have middle level of somatic health. From all quantity of the tested only 2 boys had level higher than middle. G.L. Apanasenko determined that safe level of somatic (physical) health starts at border of middle and above middle levels (by 12 points express methodic) and that is why practically all students are in zone of risk of somatic diseases.

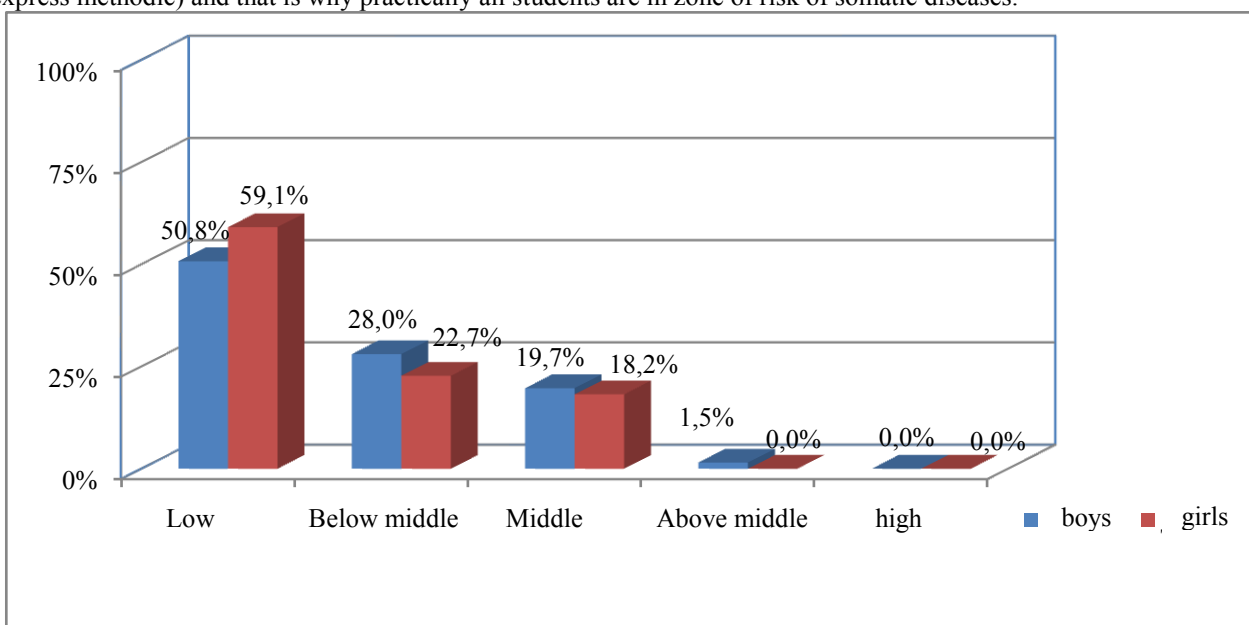


Fig.1. Distribution of first year technical specialties' students by levels of somatic health

Information about students' physical fitness is very important for optimal regulation of physical load in process of physical education. Physical fitness is result of physical functioning of a person, his (her) integral indicator as far as with fulfillment of physical exercises practically all organs and systems of organism interact; thus the level of their functioning increases [11].

Physical fitness was estimated by levels of development of the following qualitative characteristics: general endurance – 3000 meters' run (for boys) and 1000 meters' run (for girls); maximal strength – static hand dynamometry and long jump from the spot (explosive strength); power endurance – hanging on horizontal bar (endurance of arms' muscles) and rising of torso from lying position during 30 seconds (endurance of torso muscles); quickness – cross movements of arms, 100 meters run; dexterity – “shuttle” run 10x5 meters; flexibility – torso forward bending from sitting position; balance – standing on one leg – “Flamingo”.

In table 4 we present mean indicators of development of first year technical specialties' students' physical skills.

Table 4

Indicators of physical fitness of 1st year technical specialties' students of SumDU

Physical skills and tests for their evaluation	Statistic indicators ($\bar{X} \pm m$)	
	Boys (n=132)	Girls (n=132)
General endurance	850.79±4,60	-
3000 meters run, sec. (boys)	-	328.90±3.11
1000 meters run, sec., (girls)		
Maximal strength	40.97±0.65	25.12±0.38
Hand dynamometry, kg		
Long jump from the spot, cm	226.17±1.75	166.41±1.20
Quickness	14.52±0,10	17.47±0.11
100 meters run, sec.		
Time of upper limbs' movement, sec.	12.34±0.16	12.91±0.11
Dexterity	17.93±0.18	20.19±0.16
Shuttle run 10x5 meters, sec.		
Flexibility	9.27±0.55	15.70±0.54
Torso forward bending from sitting position, cm.		
Power endurance	24.62±1.15	7.73±0.62
Hanging on horizontal bar, sec.		
Rising of torso from lying position for 30 sec., times	23.00±0.42	20.83±0.33
Balance	6.86±0.28	7.33±0.31
Test “Flamingo”, sec.		

Comparing received results with evaluation tables we come to conclusion that level of certain physical skill is at below middle and middle levels that corresponds to 2-3 points by 5 points system (see fig.2). Boys have relatively higher indicator of long jump from the spot, characterizing explosive strength of legs (mean mark – 3.7), while girls have best of all developed flexibility (torso forward bending from sitting position) – middle mark – 3.39.

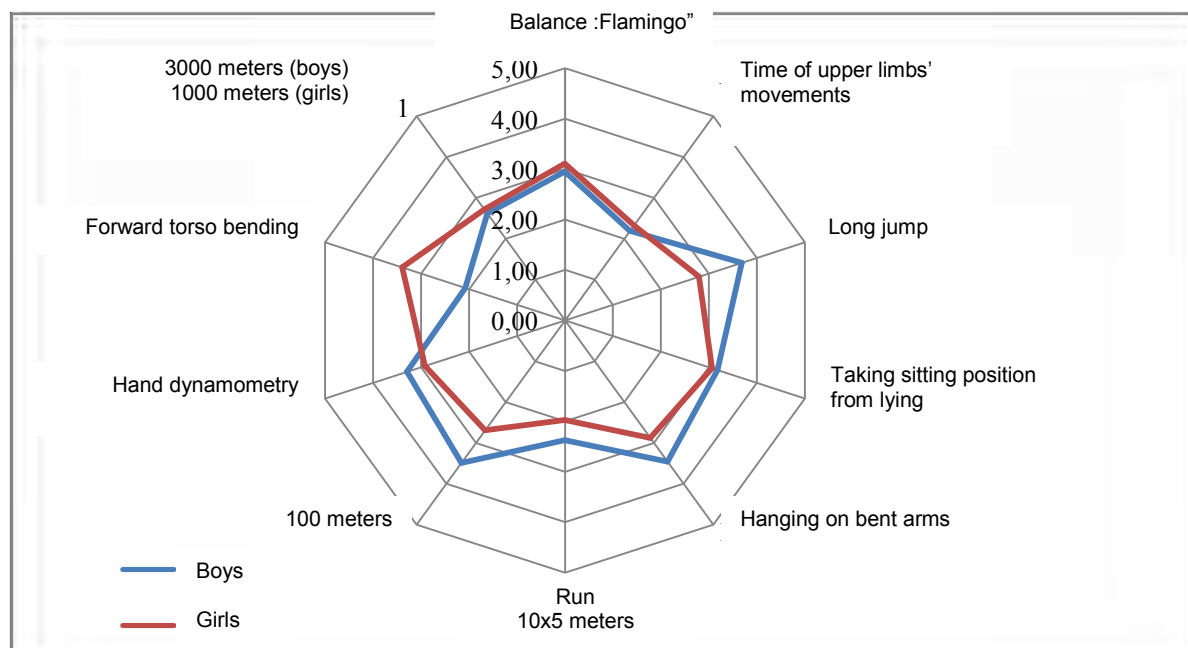


Fig.2. Mean marks in points for every motion test

By results of all motion tests we determined students' physical fitness. Mean value of general quantity of points, taken in all motion tests was 29.3 for boys and by 1.5 points less for girls that corresponds to middle level of physical fitness, i.e. mark "satisfactory". Individual analysis of students' physical fitness is given in fig. 3.

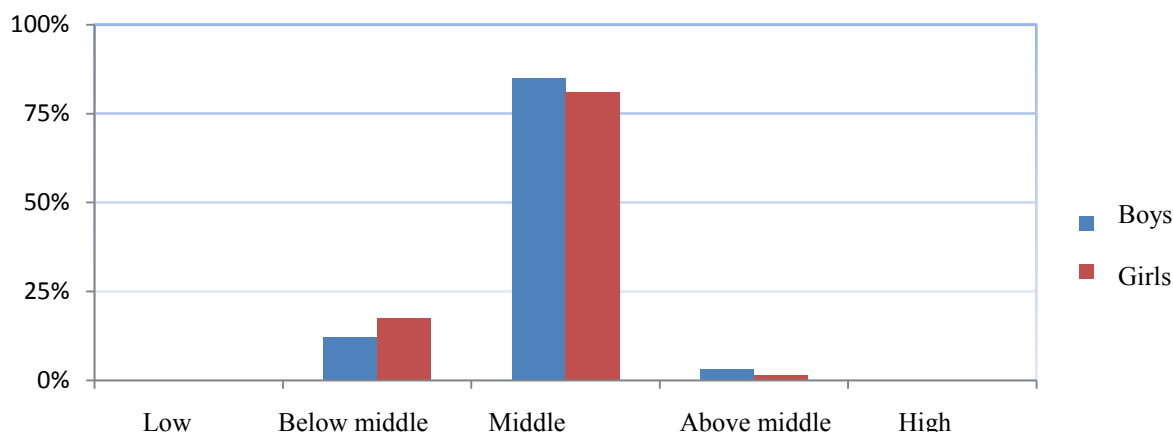


Fig. 3. Distribution of 1st year technical specialties' students of SumDU by levels of physical fitness

84.8% of boys and 81.1% of girls have middle level of physical fitness. Level below middle was registered 12.1% of students and 17.4% of girl students. Only 6 persons from general quantity of the tested had level of physical fitness above middle.

Conclusions

Results of the research prove trend to worsening of students' health that is reflected in increasing of first year students – members of special health groups or released from physical culture classes from 11.7% to 22.5%. We determined that level of somatic health of 1st year students is mainly at low and below middle levels (78.8 % of boys and 81.8% of girls). From general quantity of the tested contingent middle level was reached by 18.9% of students; level above middle – by 1.5%.

Besides, as a result of research we found that 83% of students have middle level of physical fitness that corresponds to "satisfactory" mark. Level above middle was registered only in 2.3% of the tested.

Unsatisfactory state of the above mentioned indicators requires working out of new programs, which would ensure both health related and professionally applied orientation of physical education process at higher educational establishments.

The prospects of further researches: it is stipulated to test effectiveness of physical education program of training circle "Sport orientation" by indicators of somatic health, psycho-physiological and physical fitness of technical specialties' students.

References:

1. Amosov N. M. *Enciklopediia Amosova* [Encyclopedia of Amosov], Donetsk, Stalker, 2002, 590 p.
2. Anikeiev D. M. *Rukhova aktivnist' u sposobi zhittia students'koyi molodi* [Motor activity in the lifestyle of the student youth], Cand. Diss., Kiev, 2012, 20 p.
3. Apanasenko G. L., Popova L. O. *Medicinskaia valeologiia* [Medical valeology], Kiev, Health, 1998, 248 p.
4. Bishaeva A. A. *Professional'no-ozdorovitel'naia fizicheskaia kul'tura studenta* [Professionally-improving physical education student], Moscow, KNORUS, 2013, 304 p.
5. Bodnar I. R. *Pedagogika, psihologia ta mediko-biologicni problemi fizicnogo vihovanna i sportu* [Pedagogics, psychology, medical-biological problems of physical training and sports], 1998, vol.1, pp. 7–9.
6. Bulatova M. M. *Sportivnaia medicina* [Sports Medicine], 2007, vol.1, pp. 3 – 10.
7. Verbliudov I. B., Loza T. O., Cherednichenko S. V. *Organizaciia i metodika ozdorovchoyi fizichnoyi kul'turi* [Organization and methods of physical culture], Sumy, SumDPU, 2011, 244 p.
8. Dolzhenko L. P. *Fizichna pidgotovlenist' i funkcional'ni osoblivosti studentiv iz riznim rivnem fizicnogo zdorov'ia* [Physical fitness and functional features of students with different levels of physical health], Cand. Diss., Kiev, 2007, 22 p.
9. Endal'cev B. V. *Fizicheskaia kul'tura, zdorov'e i rabotosposobnost' cheloveka v ekstremal'nykh ekologicheskikh usloviakh* [Physical culture, health and human performance in extreme environmental conditions], Sankt Petersburg, 2008, 198 p.
10. Zubalij M., Mudrik V., Kubasov V., Leonov O., Mudrik I. *Sportivnij visnik Pridniprov'ia* [Dnipro Sports Bulletin], 2007, vol.1, pp. 8–10.
11. Krucovich T. Iu., Vorobjov M. I., Bezverkhnia G. V. *Kontrol' u fizicnomu vikhovanni ditej, pidlitkiv i molodi* [Control of physical education of children, adolescents and young], Kiev, Olympic Literature, 2011, 224 p.
12. Lubyshva L. I. *Sociologiia fizicheskoi kul'tury i sporta* [Sociology of physical education and sports], Moscow, Academy, 2001, 240 p.
13. Saluk I. A. *Teoriia ta metodika fizicnogo vikhovannia* [Theory and methods of physical education], 2008, vol.11, pp. 48–52.
14. Sergiienko V. M. *Fizichne vikhovannia, sport i kul'tura zdorov'ia u suchasnomu suspil'stvi* [Physical education, sport and health culture in modern society], 2009, vol.2, pp. 79–82.
15. Adashevskiy V.M., Iermakov S.S., Firsova Iu.Iu. Physical mathematical modelling of difficult elements of acrobatic rock-and-roll. *Physical Education of Students*, 2013, vol.3, pp. 3-10. doi:10.6084/m9.figshare.662463
16. Gorelov A.A Kondakov V.L. Rumba O.G. Sport and health-improving technologies as a mean of kinesiotherapy in the educational field of university. *Physical Education of Students*. 2012, vol.6, pp. 47 - 51. doi:10.6084/m9.figshare.96568
17. Il'nitskaya A.S., Kozina Zh.L., Barybina L.N., Kolomiez N.A., Cieślicka Mirosława, Stankiewicz Błażej, Pilewska Wiesława. Author's internet blog as information and communication technologies in the educational space within the physical education students. *Physical Education of Students*, 2014, vol.1, pp. 22-26. doi:10.6084/m9.figshare.903689
18. Sobko I.N., Kozina Zh.L., Iermakov S.S., Muszkieta Radosław, Prusik Krzysztof, Cieślicka Mirosława, Stankiewicz Błażej. Comparative characteristics of the physical and technical preparedness of the women's national team of Ukraine and Lithuania basketball (hearing impaired) before and after training to Deaflympic Games. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2014, vol.10, pp. 45-51. doi:10.5281/zenodo.10490
19. Sobyenin F.I., Dudkina S.G. About a competence and professional trade of specialists in the field of physical culture. *Physical Education of Students*, 2013, vol.1, pp. 68-73. doi:10.6084/m9.figshare.156361

Information about the author:

Korol S. A.: ORCID: 0000-0002-5270-3467 ; korol.svetlana.sumdu@gmail.com; Sumy State Pedagogical University; Romenskaya str.87, Sumy, 40002, Ukraine.

Cite this article as: Korol S. A. Assessment of physical health and physical fitness of students of technical specialties of I course. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2014, vol.11, pp. 23-29. doi:10.15561/18189172.2014.1105

The electronic version of this article is the complete one and can be found online at: <http://www.sportpedagogy.org.ua/html/arhive-e.html>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (<http://creativecommons.org/licenses/by/3.0/deed.en>).

Received: 25.05.2014
Published: 05.06.2014