

PHYSICAL DEVELOPMENT AND FITNESS OF FEMALE STUDENTS WITH DIFFERENT LEVELS OF ADIPOSITY

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Obesity in the modern world became a social problem. The researches done by numerous research institutions simultaneously show that excess of fat tissue or its specific situation in a man's body substantially increases the risk of developing such illnesses as ischaemia, diabetes, hypertension or also different types of cancer (Tatoń 2001). It goes without doubt that the factor that is connected with adiposity the most - beside nourishment - is physical activity (Williams 2002). The low level of it has close connection with excess adiposity and also consequently with low level of physical fitness. Paying particular attention to the lastly mentioned problem we undertook an attempt to define the connections between the level of adiposity and physical development and fitness of female physical education students.

Materials and research methods

72 female students of the Filial of Physical Education in Biala Podlaska were examined. In the research there were used the results of measurements of height and body mass, body mass indicator (BMI), adiposity and results received in the motorial attempts doing tests according to Pilicz (1971). Additionally there was done a dynamometrical measurement of the palm strength. The amount of fat tissue was evaluated using the method of Piechczek (1975). The material compiled was analyzed in three groups of students. The differentiating criterion was the average percent of fat tissue in the overall body mass $\pm 0,5$ of standard deviation. To the first group there were qualified females that were characterized by low level of adiposity (L), with the percentage of fat tissue lower than 21,94%. The second group was made of female students with average level of adiposity (M), with the percentage of fat tissue from 21,94% to 24,21%. To the most obese group (F) there were enrolled female

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students with whom the percentage of fat tissue exceeded 24,21%. Essentiality of differences in somatic and motorial traits between groups of extreme level of adiposity (with high level and with low level) was defined by means of the test of t Student. Using the coefficient of simple correlation of Pearson there was evaluated the strength of connections between the level of adiposity and morphological traits as well as motorial attempts.

The research results

The level of physical development of female studying physical education was close to the one of youth from institutes not connected with sports (Piechaczek 1998). The female students from Biala Podlaska were 0,46 cm shorter from their mates from Polytechnic University in Warsaw but surpassed them 1,73 kg in body mass. However the percentage of fat tissue in their body structures was 0,43% lower.

On the basis of the arithmetical means of somatic traits it was stated that the female students with high percentage of fat tissue were characterized by the average body height comparing to people of the same age. However, they were distinguished by quite a big body

mass and high body mass indicator. Females that were characterized by low adiposity belonged to short, had little body mass and low body mass indicator. Females with average adiposity were high while had average body mass and average body mass indicator. Essential statistic differences between female students that were characterized by low and high adiposity were stated in body mass and its indicator (Tab. I).

Tab. I.

The arithmetic means and standard deviation of somatic and motorial traits of female and male students with differentiated levels of adiposity.

	All (n 72)		Gr. L (n 23) Lower than 21,94 %		Gr. M (n 25) From 21,66 until 24,21 %		Gr. F (n 24) Higher than 24,21 %		Value of t Student test
	x	SD	x	SD	x	SD	x	SD	
Body height	165,77	5,65	163,80	5,04	166,72	5,57	166,65	6,03	1,75
Body mass	59,14	6,28	55,31	5,00	58,63	3,99	63,33	6,93	4,53**
BMI	21,50	1,71	20,59	1,29	21,12	1,54	22,75	1,53	5,22**
Long jump	196,51	13,89	201,22	14,50	197,52	10,66	190,96	14,85	2,40*
Zigzag run	21,68	1,24	21,17	1,47	21,72	1,15	22,13	0,89	2,72*
Pediatrician's ball throw	701,85	97,90	723,61	93,42	689,20	107,17	694,17	92,43	1,09
Palm strength	37,50	5,05	36,22	4,90	38,44	4,51	37,73	5,64	0,98

* the difference is statistically essential on the level of $p < 0,05$

** the difference is statistically essential on the level of $p < 0,01$

Analyzing the influence of adiposity on the level of the results received in motorial attempts it was stated that females with exceeding adiposity belonged to those of low level of fitness. They achieved the lowest results in the attempts of power and nimbleness. However in the attempts of arm strength and palm strength the group mentioned above achieved the average results. Better results in the attempts of power, nimbleness and shoulder strength comparing to the people of the same age were stated with the females with low adiposity. The only attempts in which females with low adiposity had low results were those of palm strength. Females with average adiposity dominated over their mates only in the attempt of palm strength. In the attempt evaluating shoulder strength they achieved the lowest results among the compared groups. The results in the attempts evaluating the power of lower limbs and nimbleness in the examined group were arranged on the average level. The essential statistic differences between thin and obese female students were stated in the attempts of power and nimbleness (Tab I).

The level of adiposity turned out to be the trait very closely connected with morphologic and motorial traits. The somatic traits the most correlated with the percent of fat tissue were body mass and body mass indicator. Among the motorial tests, however, they were the power of lower limbs, nimbleness and shoulder strength. The direction of that dependence was mainly positive, with the exception of the tests evaluating the power of lower limbs and the strength which was measured by the pediatrician's ball throw where the opposite dependencies were stated (Tab II).

Tab. II.

Coefficients value in the correlation of fat tissue with somatic and motorial traits

Body weight	Body mass	BMI	Long jump	Zigzag run	Pediatrician's ball throw	Palm strength
FEMALE STUDENTS						
0,23	0,55**	0,54**	-0,45*	0,24**	-0,25*	0,05

* the difference is statistically essential on the level of $p < 0,05$

** the difference is statistically essential on the level of $p < 0,01$

Summing up and discussion

On the basis of the results of presented researches there can be noticed a connection between the level of adiposity and somatic and motorial traits. The female students that were differentiated by high level of adiposity were characterized by the average height, high body mass, the highest magnitude of the body mass indicator and low results in the attempts of lower limbs power, nimbleness and shoulder strength and average results in the attempts measuring palm strength. With the people of low level of adiposity there were stated the opposite dependencies. The only exception was the palm strength attempt in which females with low level of adiposity achieved low results. Similar results of the researches were presented by Carzanowska (1992) and Zieniewicz with the coworkers (1999) evaluating children and school youth. The above mentioned authors also emphasize that the ascendancy of children with high level of adiposity comparing to their mates of the same age with low level of adiposity has rather transient character and vanishes in young age. That is why, probably, there is a lack of the mentioned above dependences in case of somatic trait in our material. From numerous reports in the scientific literature it arises that the high level of fitness comes with people of low level of adiposity when low level of fitness the most often accompanies high level of adiposity. Those observations were presented by: Milicerowa (1973) while settling the selection criteria in sports, Przewęda (1985) examining children and school youth and Zieniewicz and coworkers (1999) on the basis of examining girls and boys from Warsaw and Southern Podlasie. This thesis was proved in our research examining female students of physical education because the consequences of exceeding adiposity were achieving low results in the fitness attempts.

Summarizing it should be emphasized that the used criteria of female students group division according to the level of adiposity differentiated them regarding somatic and motorial traits. There was observed worsening of the results simultaneously with growth of the level of adiposity. From the observations by Krawczyk and coworkers (1995) it arises that the average percentage of fat tissue in the organisms of sportsmen is in case of females 17,5%. But this percentage is considerably lower than with examined by us female students, which just out from the direction of studies stand out by their enlarged physical activity.

Literature

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The aim of the research was to define the connections between the level of adiposity of body and physical development and fitness of 72 female students of physical education of Filial of Physical Education in Biala Podlaska. In the research there were used the results of measurements of height, body mass, BMI, adiposity and results received in motorial attempts. There was stated the connection between the level of adiposity with somatic traits and worsening of the results in the attempts of physical fitness simultaneously with growth of the level of adiposity.

ЕКСПЕРИМЕНТАЛЬНИЙ АНАЛІЗ ПСИХОФІЗИЧНИХ ОСОБЛИВОСТЕЙ СТУДЕНТІВ АГРАРНИХ СПЕЦІАЛЬНОСТЕЙ

Сергій ХАРЧЕНКО

Сумський державний педагогічний університет ім. А. С. Макаренка.

Прискорений розвиток науки, економічні і технологічні перетворення в народному господарстві потребують значного кількісного зростання висококваліфікованих кадрів [5; С.144]. У зв'язку з цим підвищується соціально-економічне значення якісної професійної, в тому числі фізичної підготовки спеціалістів, чия праця в умовах сучасного науково-технічного прогресу має особливе значення [7; С.543].