COMPARATIVE CHARACTERISTICS OF CHANGES IN THE COMPONENT COMPOSITION OF THE BODY MASS OF YOUNG PEOPLE, RURAL AND CITY RESIDENTS DURING EDUCATION IN A HIGHER EDUCATIONAL INSTITUTION

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Annotation. Reforms and the integration of our Country into European standards led to changes in medical control and provision of conditions for obtaining education and emphasized the importance of preserving the health of students, one of the monitoring methods of which is control over indicators of physical development. The purpose of our study is to determine changes in the component composition of body weight during 2 academic years in rural and urban residents under the education. We used J. Matiegka’s formulas for the research. We determined the component composition of body mass in 200 practically healthy men (100 residents of the village, 100 residents of the city) in the 1st, 2nd and 3rd years of study at the Higher Professional School of Civil Defense of the Lviv University of Life Safety (Vinnytsia). Statistical processing of the obtained results was carried out in the package “STATISTICA 6.1” using parametric and non-parametric methods of evaluating the obtained results. Analysing the obtained results, it can be concluded that at the beginning of the study, there was no significant difference in the indicators of the component composition of the body mass of young men from the village and the city, although the bone and fat indicators of the components were higher in the residents of the village, and the muscle component was higher in the city dwellers. During education, the indicators of muscle and bone components increased in both groups of young men, and the increase prevailed in the first year of training; the indicator of the fat component decreased during the education of rural and urban youth, mainly in the first year. The intergroup annual change of all indicators of the component composition of body weight in the first year of education of the village residents were greater compared to the city residents’ ones, and the indicator of the annual fat component change had significant differences. In the second year of study, the intergroup annual change of all indicators of the component composition of body weight was again greater among the residents of the village, but there were no significant differences.

Keywords: young age, component composition of body mass, rural residents, urban residents.

Introduction

The youth period of life is considered as a stage of anatomical and physiological “tension”, which begins in high school, continues in adolescence and passes into adulthood, when a person studies in senior courses of higher education. This is the exact time that growth processes are completed, an important stage of formation of physical development indicators takes place. The process of "tension" can be explained by changes in exogenous factors, such as: the area of residence and climate features, socio-cultural conditions, increased educational workload, daily routine, features of nutrition and physical activity. Most often, the reason for these changes is finishing school and studying at a higher education institution [2, 6, 11].

Social, economic, natural and ecological, etc. factors are classified as exogenous and have a great impact on the human body. Among them, a special place is occupied by the daily routine and nutrition, the regime of physical activity, emotional tension, which is an integral part of the educational process. Acquiring an education is a complex process that combines educational and practical activities, determined by work programs, syllabi, and curricula, which clearly state the purpose, tasks, competencies, program results, assessment methods, and the number of seminar, practical, and laboratory classes. In addition, the process of obtaining an education is impossible without scientific research activity, sports competitions, excursions, etc. With the influence of such a large number of exogenous factors on the body of a young person, it is necessary to remember the active continuation of physical and psychological development [5, 18]. Therefore, taking into account the complexity of the educational process in combination with the peculiarities of physiological development in the youth period, the specifics of personality development and the formation of mental processes, the harmonious formation of a modern specialist, in any field, is impossible without a clear comprehensive study and, subsequently, taking into account the uniqueness of the ontogenesis of the individual precisely in the youth period. When researching this topic, we drew attention to the fact that education seekers differ not only in age and development, but also in belonging to the place of residence (city/village), which, in our opinion, is of great importance [1, 19].

Thus, after analysing the data of the literature, it can be concluded that the influence of exogenous and endogenous factors on the anthropometric parameters of young men is widely studied and is relevant [3, 7, 14]. However, there are no works that determine and compare the annual changes in the component composition of body mass, namely the muscle, bone and fat components of rural and urban residents during education.
The aim of the study - to determine the peculiarities of annual changes in the components of the somatotype of rural and urban youth in the conditions of the educational process.

Materials and methods
A comprehensive anthropometric study was conducted using V.V. Bunak's method modified by P. P. Shaparenko of 200 young men (100 city residents, 100 rural residents) who studied at the Higher Professional School of Civil Defense of the Lviv University of Life Safety (Vinnytsia) [16]. All young men were 17-18 years old at the time of the study. Special formulas according to J. Matiegka [13] were used to determine the fat, bone, and muscle components of body weight. The study is longitudinal in nature and was conducted three times one month after the beginning of the first, second and third year of study. The statistical processing of the obtained results was carried out in the "STATISTICA 6.1" package using parametric and non-parametric methods of evaluating the obtained results [12].

The study was conducted within the framework of the research program of Vinnytsia National Pirogov Memorial Medical University "The influence of exogenous factors (socio-economic, ecological, geological, territorial) on anthropometric parameters and physiological indicators of persons of youthful age" (state registration number: 0114UV00990) and meets all ethical and moral and legal requirements according to the order of the Ministry of Health of Ukraine № 66 from 13.02.2006 (protocol of the commission on bioethics VNMU № 8 25.05.2018).

Results. Discussion
The indicators of fat, bone and muscle components of the body mass of rural and urban youths during their studies at the Higher Education Institutions were determined. The mean of the muscle component of the body weight of rural youths at the beginning of their studies was (31.02±0.43) kg, for urban youths this indicator was greater in the first year and was equal to (32.85±1.70) kg. In the second year, the indicator of the muscle component of body weight in rural residents increased to (32.74±0.46) kg, in urban residents to (32.94±0.53) kg. In the 3rd year of study, this indicator in young men from village increased again and amounted to (33.31±0.49) kg. The mean of this indicator for urban residents also increased to (33.39±0.55) kg. The mean of the change in the index of the muscle component of body weight in the first year of study of rural residents increased to (0.19) kg, in urban residents the average figure was (0.02±0.01) kg, the minimum index was equal to (-0.01) kg, and the maximum was (0.43) kg. Thus, the indicator of the bone component of body weight in the first year of study of rural residents was greater by (1.63) kg compared to urban residents; while in the second year of study, this indicator among villagers was higher by only (0.12) kg. It should be noted that the annual change in the index of the muscle component of body weight in the first and second year of study when comparing groups of young men did not have a significant difference.

The average value of the bone component of the body weight of rural boys at the beginning of their studies was (10.03±0.12) kg, for boys from the city this indicator was lower in the first year and was equal to (9.96±0.14) kg. In the second course, the indicator of the bone component of body mass in rural residents increased to (10.18±0.12) kg, in urban residents to (10.08±0.14) kg. In the 3rd year of study, this indicator in young men from village increased again and amounted to (10.22±0.12) kg. The mean of this indicator for urban residents also increased to (10.10±0.14) kg. The mean of the change in the index of the bone component of the body mass of rural boys in the first year of study was (0.15±0.03) kg, the minimum indicator was equal to (-0.40) kg, the maximum was (1.10) kg. In urban residents, it was equal to (0.12±0.02) kg, the minimum and maximum indicators were (-0.35) kg and (0.84) kg, respectively. In the second year, the mean of the change in the index of the bone component of the body mass of young men from the village was (0.04±0.01) kg, the minimum index was equal to (-0.39) kg, the maximum was (0.81) kg. In the residents of the city, the average figure was (0.02±0.01) kg, the minimum figure was equal to (-0.01) kg, and the maximum was (0.43) kg. Thus, the indicator of the bone component of the body weight of the villagers increased by (0.19) kg during the training, and the predominant increase occurred in the first year. Whereas among the townspeople it became larger by (0.14) kg, and the increase occurred mostly also in the first year of study. The annual change in the index of the bone component of body mass in the first year of study of rural residents was greater by (0.03) kg compared to urban residents; while in the second year of study, this indicator among villagers was higher by only (0.02) kg. It should be noted that the annual change in the index of the bone component of body mass in the first and second year of study, when comparing groups of young men, did not have a significant difference.

The mean of the fat component of the body weight of rural boys at the beginning of their studies was (4.73±0.12) kg, for boys from the city this indicator was lower in the first year and was equal to (4.07±0.11) kg. In the second course, the indicator of the fat component of body weight in rural...
residents decreased to \((3.81\pm0.10)\) kg, in urban residents to \((3.70\pm0.10)\) kg. In the 3rd year of study, this indicator among young men from the village became smaller again and amounted to \((3.80\pm0.10)\) kg. The mean of this indicator of urban residents also decreased to \((3.69\pm0.09)\) kg. The mean of the change in the indicator of the fat component of the body weight of rural boys in the first year of study was \((-0.56\pm0.06)\) kg, the minimum indicator was equal to \((-3.23)\) kg, the maximum was \((0.37)\) kg. In urban residents, it was \((-0.37\pm0.05)\) kg, the minimum and maximum indicators were \((-1.97)\) kg and \((0.85)\) kg, respectively. In the second year, the mean of the change in the fat component of the body weight of young men from the village and the city were the same and amounted to \((-0.01\pm0.01)\) kg; the minimum indicator for the inhabitants of the village was equal to \((-0.29)\) kg, the maximum was \((0.77)\) kg. In the city residents, the minimum indicator was equal to \((-0.41)\) kg, the maximum was \((0.43)\) kg. Thus, the indicator of the fat component of the body weight of the villagers during the training decreased by \((0.57)\) kg, and the predominant decrease occurred in the first year. Among the city residents, this indicator also became smaller by \((0.38)\) kg, again due to the predominant decrease in the first year of study. The annual change in the indicator of the fat component of body weight in the first year of education of rural residents was significantly greater by \(0.19\) compared to urban residents \((t=2.31\) when \(p<0.05)\) (Fig. 1); while in the second year of study, this indicator did not differ among residents of the village and the city.

We are not the only ones who interested in this topic, many scientists were engaged in the study of anthropometric parameters, somatotypes, indicators of the component composition of body mass in the youth period of ontogenesis, which is covered in their publications.

When comparing the information, we received about the indicators of fat, bone and muscle components of body weight with the results of studies by P. P. Shaparenko (1994), Y. Y. Huminsky (2000), I. V. Gunas (2006) on young students and soldiers of the Podilsk and Polissky regions found that there was no significant difference between the results [8, 10, 15]. Comparing the results obtained by us with the data of recent longitudinal studies of indicators of physical development of soldiers, cadets and students, which were carried out on the basis of the Vinnytsia National Pirogov Memorial Medical University, no significant difference was found either [17]. Taking into account the fact that the young men we studied were in unvarying conditions of the influence of the educational process, which was due to the consistency of approaches to organization and the intensity of physical and mental workload, belonging to a rural or urban place of residence becomes the dominant factor. There are quite a lot of works, the purpose of which was to study the influence of habitat conditions and stay on physiological and psychological indicators. Such studies were usually conducted on groups of schoolchildren or students of different educational institutions [4, 9]. In contrast to the above-mentioned works, we obtained the results of the study of indicators of fat, bone and muscle components of body weight in the conditions of the educational process and compared the changes in intragroup parameters during the education. We also determined the intergroup differences of these indicators and the peculiarities of their changes in rural and urban youths during education.

Conclusions and prospects for further development

Therefore, the features of changes in indicators of the component composition of the body weight of rural and urban young men during their studies at a higher educational institution are as follows:

1. at the beginning of the study, there was no significant difference in the indicators of the component composition of the body mass of young men from the village and the city, although the bone and fat indicators of the components were higher in the village residents, and the muscle was higher in the city residents;

2. during education, the indicators of muscle and bone components increased in both groups of young men, and the increase prevailed in the first year of training; the indicator of the fat component decreased during the education of rural and urban youth, mainly in the first year;

3. intergroup indicators of the annual change of all indicators of the component composition of body weight in the first year of education of the residents of the village were greater compared to the residents of the city, and the indicator of the annual change of the fat component had significant differences;

4. in the second year of study, the intergroup annual change of all indicators of the component composition of body weight again turned out to be greater in the residents of the village, but there were no significant differences.

In the future, it is planned to compare physical development harmony indices in rural and urban dwellers in the conditions of the education.
Список посилань - References


