



Fitness in Young Women: A Series of Anatomical and Anthropological Indicators and Morphofunctional Values

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Received: August 09, 2023

Published: August 27, 2023

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Abstract

The article presents the results of a study devoted to the study of the values of a number of anthropometric and morpho-functional indicators in young women of youthful and first adulthood, regularly engaged in recreational fitness. It was found that among the values of the morphological index among female students engaged in recreational fitness, the dolichomorphic type prevails - in 32 (66.67%) girls, and in the group of young women of the first mature age, brachymorphs dominate - 16 (41.03%). In the group of women of the first mature age, negatively altered types of values of the trochanter index dominate - in the vast majority of young women of the first mature age - in 37 (94.87%), and in 45 (93.75%) female students there are various types of violations of individual evolution, not corresponding to their biological sex/gender.

Keywords: Young Women; Adolescence; First Reproductive Age; Health-Improving Fitness; Anthropometric Values; Morphological Parameters; Motivation

Abbreviations

SW: Shoulder Width; PW: Pelvic Width; SDI: Sexual Dimorphism According to J. Tanner; BMI: Body Mass Index; RWSI: Relative Width of the Shoulders; TrI: Trochanter Index; CMC: Candidate for Master of Sports; MS: Master of Sports

Introduction

The priority direction of physical culture is to improve the health of the population. Today, this direction is characterized by a rapid increase in various forms of physical exercise [2,4,6,10,11,14,15]. Among them, the so-called "health fitness" has become quite widespread in recent years. Translated from English, "fitness (fitness)" means suitability, conformity [2,4,6,10,11,14,15]. In the modern world, with its intensity of psycho-emotional and physical stress, taking care of one's own health and maintaining it by means of physical culture and sports is very relevant and in demand. Hundreds of thousands of young women visit gyms and fitness centers in pursuit of a slim figure, wanting to strengthen and/or maintain

health, often without any regard to their initial indicators of the level of physical condition, fitness, existing contraindications and a targeted, balanced exercise program [2,4,6,10,11,14,15]. Among today's variety of different types of "fitness", we made a choice on such a form as "health fitness", which, according to E. Hawley, B. Don Franks, 2004 and a number of authors promoting it, "is aimed at achieving and maintaining physical well-being and reduce the risk of developing diseases" [2,4,6,10,11,14,15]. Health fitness, first of all, is aimed at maintaining the physical condition of the whole organism in good shape, and involves an average or low level of intensity of physical activity used during training [2,4,6,10,11,14,15]. The bulk of the visitors to various modern fitness centers and wellness sections are young women, mostly of adolescence and the first reproductive age. Motivation in both groups is often radically different. If young women come to practice in order to gain a slender figure through intensive training, then women of the first mature age, having behind them the experience of family life, pregnancy, bearing and giving birth to a child, feeding him and already

a number of acquired health disorders, first of all, want to recover after the “hardships” associated with the pregnancy, to remove excess weight, restore the lost shape, return to the mainstream and rhythm of today’s life, strengthen and maintain the level of health that they have [5,12,14,15]. Therefore, almost all of them consider health-improving fitness classes to be the best way out in this situation [5,12]. At the same time, for each of them, taking into account their anthropometric parameters, morphotype and existing level of physical health, a fitness instructor must select an individual volume of loads, create a lesson plan for the short and long term, systematically monitor the state of the vital systems of young women, take into account their individual characteristics of both somatic and reproductive health. And this is not always carried out in full and at the proper level [5,12,14,15].

Today, in the available popular scientific literature and on the Internet portal, you can find a lot of diverse, often superficial, general information about health fitness for different categories of women. There are a number of voluminous, reference and information publications, literature and methodological manuals for coaches and instructors on health fitness and its varieties. Sufficient attention to health-improving fitness as well as fitness motivation was paid by such domestic and foreign authors as E. Hawley, B. Don Franks, 2004; V.Yu. Davydov, A.I. Shamardin, G.O. Krasnova, 2005; L.Ya. Ivashchenko, A. L. Blagiy, Yu. A. Usachev, 2008; N.V. Yaruzhny, 2008; A. V. Giptenko, 2009; V.B. Mandrikov, M.P. Mitsulina, V.O. Aristake-syan, I.A. Ushakova, 2010; D.I. Smirnov, 2011.

Quite interesting studies on the effect of body fitness on the health of young women were carried out by such Ukrainian researchers as V.O. Kotov, I.P. Maslyak, 2008; O.M. Shishkina, 2012. The issues of anthropometric and morpho-functional indicators and somatotypes in women engaged in physical activity in physical culture and sports were given in their studies by such specialists as N.A. Dardanova, 2007; A.A. Shchankin, O.A. Kosheleva, 2010; E.G. Martirosov, S.G. Rudnev, D. V. Nikolaev, 2010; T.B. Kukoba, 2011; L.A. Lopatina, N.P. Serezhenko, Zh.A. Anokhin, 2013; D.B. Nikityuk, V.N. Nikolenko, S.V. Klochkova, T.Sh. Minnibaev, 2015; K. A. Bugaevsky, 2014-2023. When analyzing the available scientific and scientific-methodical literature, we practically did not find research papers on the accounting and influence of morphotypes and anatomical and anthropometric indicators and morphological index values on the state of physical health and reproductive indicators in young women of adolescence and first adulthood. Their number

is not enough. The data presented in these works cover only certain aspects, mainly related to the functioning of the cardiovascular and respiratory systems. The individual morpho-functional features of these groups of young women involved in fitness are practically not taken into account. No research papers were found regarding their menstrual cycle, endocrine and reproductive disorders, manifestations of sexual dimorphism. This work is an attempt to partially fill the existing gap in such studies and has the prospect of expanding the scope of ongoing research related to the study of the structural features of the bone pelvis, the menstrual cycle.

Aim of the work

The aim of the study is to study the revealed anthropometric and morphological index values, as well as motivation in the groups of youthful and first reproductive age in young women intensively engaged in recreational fitness.

Object, Material and Methods of Research, and Organization of the Study

The study was conducted in 2021-2022, on the basis of a number of fitness centers in Nova Kakhovka, Kherson region. We formed 2 groups of young women who voluntarily agreed to participate in the study. The first group included young women referred to adolescence (n=48), who are all students of various universities of the city; the second - the first mature age (n=39), of different social status. The average age in the group of female students of youthful age was 19.29 ± 0.23 years, and 23.14 ± 0.73 years in the group of women of the first mature age. The terms of health-improving fitness classes in the youth group vary from 1.4 years to 3.5 years, and in the group of young women of the first reproductive age from 1.7 to 3.9 years, with the duration of classes per week from 6 to 9 hours.

A number of anthropometric indicators were determined - body length, body weight, shoulder width, pelvic width, body mass index (BMI), sexual dimorphism index (SDI) were determined with the allocation of sexual somatotypes according to J. Tanner’s classification, a number of morphofunctional index values were determined, such as an index of the relative width of the shoulders (RWSI), or an index of morphine, a trochanter index (TrI). In order to study the features of the constitutional type of age-related evolution of the organism in female students in the study group, the values of the trochanter index (TrI) were determined according to the method of V. G. Shtefko [1, p. 117-121; 8; 13, p. 138-140].

Results of the Study and Discussion

The distribution by types of age evolution was determined as follows - Indicators of the values of the trochanter index in the group of female students of youthful age

- Disevolutive type of evolution - 5 (10.42%) female students.
- Hypoevolutionary type of evolution - 3 (6.25%) female students.
- Norm-evolutionary type of evolution - 3 (6.25%) female students.
- Hyper-evolutionary type of evolution - 2 (4.1%) female students.
- Pathological type of evolution - 35 (75.92%) female students.
- MI - morphological index.

According to the data obtained, only 3 (6.25%) had a norm-evolutionary constitutional type of their age evolution, and 45 (93.75%) female students have various variants of individual evolution disorders, with the formation of somatotypes that do not always correspond to their biological sex [1,8,13]. The body length in the group of young athletes corresponded to the average height and amounted to 165.56 ± 0.30 cm [1,8,9]. The average body weight was 57.45 ± 1.18 kg, and BMI was 20.94 ± 0.42 kg/cm², which corresponds to the normal values of this indicator [1,8,9].

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In the course of the study, in both groups, the morphine index was determined, or somatotyping according to the method of B.A. Nikityuk - A.I. Kozlov, with the definition of two values that are compared and interconnected in somatotypes with each other - the relative shoulder width index (RSWI), or the morphological index for women [1, p. 117-121; 3, p. 77-82; 7, p. 504-508; 8]. MI (morphological index) was determined by us as the ratio of shoulder width to body length, multiplied by 100 [1, p. 117-121; 8; 13, p. 138-140]. The obtained values of MISI in the group

- Brachymorphic body type - 4 (8.33%) female students.
- Mesomorphic body type - 12 (25.00%) female students.
- Dolichomorphic body type - 32 (66.67%) female students.

The values of the morphодоршсфд index (MI) in the studied group of female students of youthful age - its average value in the group was 20.27 ± 1.00 cm, which corresponds to the values of dolichomorphic physique. The average value of shoulder width (SW) - biacromial size in female students was 31.48 ± 0.62 cm, pelvic width (PW) - intercrest size (distancia cristarum) - 26.67 ± 0.30 cm. Attention is drawn to the fact that in the group the average dimensions of the width of the shoulders significantly exceed the values of the width of the pelvis.

Girls of adolescence group engaged in health-improving fitness have broad shoulders and a narrow pelvis - a type of figure characteristic of the male body type [1,7,8]. The number of female students in whom the width of the shoulders exceeded the width of the pelvis in the entire study group was 42 (87.5%), and with a width of the pelvis greater than the width of the shoulders - only 6 (12.5%) female students. In young athletes, when determining the values of the index of sexual dimorphism according to J. Tanner, the following indicators were obtained: the average value of shoulder width or biacromial size (cm) in the entire group was 31.48 ± 0.62 cm ($p < 0.05$), and the average value of the pelvic width indicators - biacromial size (dis. cristarum) (cm) was 26.67 ± 0.30 cm ($p < 0.05$), which is less than the average physiological norm for girls of this age group, which corresponds to 28-29 cm and is an indirect criterion for an anatomically narrow pelvis [1,3,8].

This ratio of the dimensions of the width of the shoulders in relation to the width of the pelvis, in which the shoulders are wider than the pelvis, does not correspond (in a large number of the studied students) to the criteria of a feminine constitution [1, p. 117-121; 3, p. 77-82; 7, p. 504-508; 8]. Taking into account the measurements of the width of the shoulders and the width of the pelvis, the average value of the sexual dimorphism index (SDI) in the group was 68.00 ± 1.83 ($p < 0.05$).

As can be seen from the data of the study, reflected in the above diagram, the number of non-physiological for female students of sexual somatotypes - mesomorphic (transitional) - 8 (16.67%) and andromorphic - 6 (12.50%), together determined in 14 (29.17%) female students. In the group of young women of the first mature

age (n=39), who are engaged in recreational fitness and referred to the first mature age, we also conducted similar studies. When determining the values of the index of sexual dimorphism according to J. Tanner, the following indicators were obtained: the average value of the shoulder width or biacromial size (cm) in the entire group was 30.09 ± 0.85 cm ($p < 0.05$), and the average value of the width indicators pelvis - biacromial size (dis. cristarum) (cm) was 24.95 ± 0.39 cm ($p < 0.05$), which is less than the average physiological norm for girls of this age group, which corresponds to 28-29 cm and is an indirect criterion anatomically narrow pelvis [1,3,7,8]. This ratio of the size of the SH in relation to the SH, in which the shoulders are wider than the pelvis, does not correspond (in a large number of the studied female students) to the criteria of a feminine constitution [1, p. 117-121; 3, p. 77-82; 7, p. 504-508; 8]. However, taking into account the measurements of ST and ST, the average value of the sexual dimorphism index (SDI) in the group was 65.32 ± 2.61 ($p < 0.05$). This corresponds to the values of the gynecomorphic somatotype [1,3,7,8]. The distribution of sexual somatotypes in the study group of young women of the first mature age

- Gynecomorphic sexual somatotype - 27 (69.23%) female students.
- Mesomorphic sexual somatotype - 7 (17.95%) female students.
- Andromorphic sexual somatotype - 5 (12.82%) female students.

The obtained values of the trochanter index in the entire study group were 1.84 ± 0.02 ($p < 0.05$), which corresponds to the pathological type of age evolution in the group of young women of the first reproductive age [1, p. 117-121; 8; 13, p. 138-140]. The obtained values of the trochanter index in this group

- Normoevolutionary type - 2 (5.13%) people
- Hyperevolutionary type - no (0.00%).
- Hypoevolutionary type - 5 (12.82%) people.
- Disevolutionary type - 9 (23.08%) people.
- Pathological type - 23 (58.97%) people.

It was reliably established ($p < 0.05$) that negatively altered types of trochanter index values (hypoevolutionary, disevolutionary and pathological types) dominate in the study group and were detected in the vast majority of young women of the first mature age who took part in our study - in 37 (94.87%). And only 2 (5.13%) had a normal type of age-related evolution, characteristic of persons of this age. When determining the values of the morphological index

(Index of the relative width of the shoulders), it was found that in the group of young women of the first mature age, brachymorphs dominate - 16 (41.03%), mesomorphs - 12 (30.77%), almost the same number of female dolichomorphs - 11 (28.21%).

Also, by means of a questionnaire, we studied the motivation of young women of both groups to engage in health-improving fitness [12, p. 11-113]. The following answers were received, distributed as their importance decreased, in each of the studied groups. In the group of young students (n = 48), the motivation was as follows: 1. "To have a beautiful figure" - 29 (60.42%); 2. "Lose excess weight" - 25 (52.08%); 3. "Improve health" - 21 (43.75%); 4. "New acquaintances, communication" - 18 (37.50%). In the group of young women of the first mature age (n = 39), the motivation was as follows: 1. "Lose excess weight" - 32 (82.05%); 2. "Recover after childbirth" - 23 (58.97%); 3. "Strengthen and maintain health" - 22 (56.41%); 4. "New acquaintances, communication" - 19 (48.72%). The rest of the young women in both groups were not able to clearly indicate their motivation for doing health-improving fitness, answering most often with general phrases such as "It's good for health" or "It's an active holiday", "To change the type of activity".

Conclusions

- When determining the values of the morphine index (MISI) in young female students involved in recreational fitness, the dolichomorphic type prevails in 32 (66.67%) girls, and in the group of young women of the first mature age, brachymorphs dominate - 16 (41.03%), mesomorphs - 12 (30.77%), almost the same number of female dolichomorphs - 11 (28.21%).
- The number of non-physiological for female students of sexual somatotypes - mesomorphic (transitional) - 8 (16.67%) and andromorphic - 6 (12.50%), together determined in 14 (29.17%) female students. In the group of women of the first mature age, the andromorphic sexual somatotype was determined in 5 (12.82%), mesomorphic - in 7 (17.95%), gynecomorphic - in the vast majority of women - in 27 (69.23%) people.
- In the group of women of the first mature age, negatively altered types of values of the trochanter index (hypoevolutionary, disevolutionary and pathological types) dominate - in the vast majority of young women of the first mature age - in 37 (94.87%), and in the group of female students only in 3 (6.25%), the normoevolutionary constitutional type of their

age evolution was determined, and 45 (93.75%) female students have various variants of individual evolution disorders, with the formation of somatotypes that do not correspond to their biological sex/gender.

- Motivation for health-improving fitness differs in young women of youthful and first reproductive age, in conjunction with life priorities and values among the representatives of both studied groups.

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