

# Study of a Number of Anthropometric Values, Morphological Indicators and Motivation in Young Women Engaged in Health Fitness

Konstantin Anatolyevich Bugaevsky

*The Petro Mohyla Black Sea State University, Nikolaev, Ukraine*

**Corresponding Author:** Konstantin Anatolyevich Bugaevsky, The Petro Mohyla Black Sea State University, Nikolaev, Ukraine.

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## Abstract

The article presents the results of a study devoted to the values of a number of anthropometric and morpho-functional indices in young women of adolescent and first adulthood who are regularly engaged in health-improving fitness. It was found that dolichomorphic type prevails among the values of morphic index in female students who do recreational fitness - in 32 (66,67%) girls, while in the group of young women of first adulthood brachymorphs dominate - 16 (41,03%). Negatively altered types of trochanteric index values dominate in the group of young women of the first mature age - in 37 (94,87%), and 45 (93,75%) female students have different variants of individual evolution disorders, not corresponding to their biological sex.

**Keywords:** young women, adolescence, first reproductive age, health fitness, anthropometric values, morphological indicators, motivation

## Introduction

The priority direction of physical culture is the strengthening of public health. Today this direction is characterized by a rapid increase in a variety of forms of physical activity [2, pp. 13-15; 4; 6; 10; 11; 14; 15, pp. 427-431]. Among them fairly widespread in recent years was the so-called "health fitness. In translation from the English language "fitness (fitnes)" means suitability, compliance [2, p. 13-15; 4; 6; 10; 11; 14; 15, p. 427-431]. In today's world, with its intensity of psycho-emotional and physical stresses, taking care of your own health and maintaining it by means of physical culture and sports is very relevant and in demand. Hundreds of thousands of young women attend gyms and fitness centers in pursuit of a slim figure, wanting to improve and/or maintain their health, often without taking into account their baseline indicators of physical condition, fitness, existing contraindications and a targeted, balanced exercise program [2, c. 13-15; 4; 6; 10; 11; 14; 15, c. 427-431]. Among today's variety of different types of "fitness", we made a choice on such its type 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 reducing the risk of disease development". [2, pp. 13-15; 4; 6; 10; 11; 14; 15, pp. 427-431]. Wellness fitness is primarily aimed at maintaining a toned physical state of the entire body, and involves a medium or low intensity level of physical activity used in training [2, pp. 13-15; 4; 6; 10; 11; 14; 15, pp. 427-431].

The main mass of visitors to a variety of modern fitness centers and health clubs are young women, mostly of adolescent and first reproductive age. The motivation in the two groups is often drastically different. If young women come to exercise to get a slim figure through intensive workouts, women of first reproductive age, with experience of family life, pregnancy, bearing and giving birth to a child, breastfeeding and a number of health problems, above all, want to recover from the "burdens" associated with the pregnancy, remove excess weight, restore lost shape, return to the flow and rhythm of today's life, to strengthen and maintain the level of health they have [5, c. 21-24; 12, c. 11-113; 14; 15, c. 427-431]. That's why almost all of them

consider health-improving fitness classes the optimal way out in this situation [5, p. 21-24; 12, p. 11-113]. 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 choose an individual volume of loads, create an exercise plan for the near and distant future, systematically monitor the condition of vital systems of young women, take into account their individual features of both somatic and reproductive health. And this is not always done in full and at the proper level [5, c. 21-24; 12, c. 11-113; 14; 15, c. 427-431].

### Materials and methods

When conducting this study, the author used the method of literature-critical analysis of available sources of information, the method of determining a number of morpho-functional index values, such as morphic index, trochanter index, determination of pelvic and shoulder width in the examined young women, the method of questioning. Conducting this study, was carried out with the voluntary consent of this group of young women engaged in health fitness, with absolute compliance with moral and ethical requirements.

### Aim article

The purpose of our study is to examine the identified anthropometric and morphological index values, as well as motivation in the groups of adolescent and first reproductive age in young women intensively engaged in recreational fitness.

### Results and discussion

Today, in the available popular science literature and on Internet portals, 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 informational publications, literature and manuals for trainers and instructors on health fitness and its varieties. Sufficient attention to recreational fitness as well as motivation for fitness activities has been given by such domestic and foreign authors as E. Hawley, B. Don Franks, 2004; V.Y. Davydov, A.I. Shamardin, G.O. Krasnova, 2005; L.Y. Ivashchenko, A.L. Blagiy, Y.A. Usachev, 2008; N.V. Yaruzhniy, 2008; A.V. Giptenko, 2009; V.B. Mandrikov, M.P. Mitsulina, V.O. Aristakesyan, I.A. Ushakova, 2010; D.I. Smirnov, 2011. Quite interesting studies on the influence of bodyfitness 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 during physical training and sports were studied by such specialists as N. A. Dardanova, 2007; A. A. Shankin, 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. Anokhina, 2013; D. B. Nikityuk, V. N. Nikolenko, S. V. Klochkova, T. Sh. Minnibaev, 2015; K. A. Bugaevsky, 2014-2017.

When analyzing the available scientific and scientific-methodological literature, we found practically no research works on the consideration and influence of morphotypes and anatomy-anthropometric indicators and morphological index values on physical health and reproductive indicators in young women of adolescence and first adulthood. Their number is insufficient. The data given in these works cover only some aspects, mainly concerning the functioning of the cardiovascular and respiratory systems.

The individual morpho-functional peculiarities of these groups of young women engaged in fitness are practically not taken into account. No research works concerning their menstrual cycle, endocrine and reproductive disorders, manifestations of sexual dimorphism were found. 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 concerning the study of pelvic bone structure and menstrual cycle features.

The study was conducted in 2022 on the basis of a number of fitness centers in Novaya Kakhovka, Kherson region. We formed two groups of young women who voluntarily agreed to participate in the study. The first group consisted of young women classified as adolescents ( $n=48$ ), who were all students of different universities in the city; the second group consisted of first mature women ( $n=39$ ) of different social status. The mean age in the group of female adolescent students was  $19.29\pm 0.23$  years, and  $23.14\pm 0.73$  years in the group of women of the first mature age. The duration of health and fitness classes in the adolescent group varies from 1.4 years to 3.5 years, and in the group of young women of first reproductive age from 1.7 years to 3.9 years, with classes per week from 6 to 9 hours.

A number of anthropometric indices were determined: body length, body weight, shoulder width, pelvic width, Body Mass Index (BMI), Gender Dimorphism Index (GDI) with the allocation of sexual somatotypes according to J. Tanner classification, a number of morphofunctional index values such as Relative Shoulder Width Index (RSWI), or Morph Index, Trochanter Index (TrI) were determined. In

order to investigate the features of the constitutional type of the age 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. Stefko [1, c. 117-121; 8; 13, c. 138-140]. The results obtained are as follows: Dysevolutive type was detected in 5 female students, which amounted to 10.42% of all students studied; hypoevolutive type - in 3 (6.25%); Normoevolutive type - also in 3 (6.25%), and hyperevolutive type - in 2 (4.17%) female students; pathological type - in 35 (73, 92%) female students studied.

According to the data obtained, only 3 (6.25%) had a normoevolutionary constitutional type of their age evolution, and 45 (93.75%) female students have different variants of disorders of individual evolution, with the formation of somatotypes that do not always correspond to their biological sex [1, p. 117-121; 8; 13, p. 138-140]. Body length in the group of young female athletes corresponded to the average height and was  $165.56 \pm 0.30$  cm [1, p. 117-121; 8; 9, p. 47-54]. The average value of body weight was  $57.45 \pm 1.18$  kg, and BMI was  $20.94 \pm 0.42$  kg/cm<sup>2</sup>, which corresponds to the normal values of this parameter [1, c. 117-121; 8; 9, c. 47-54]. In the course of the study in both groups there was conducted a definition of the morphic index, or somatotyping according to the method of B.A. Nikityuk-A.I. Kozlov, with the definition of two values, compared and interconnected in somatotypes between themselves - the index of relative shoulder width (IORSW), or morphic index for women [1, p. 117-121; 3, p. 77-82; 7, p. 504-508; 8]. IORW (Morphic Index) was defined as the ratio of shoulder width to body length multiplied by 100 [1, pp. 117-121; 8; 13, pp. 138-140]. The obtained values of IORSW in the group are as follows: brachymorphic physique in 4 (8,33) female students; mesomorphic physique in 12 (25,00%); dolichomorphic physique in 32 (66,67%) female students.

Its average value in the group was  $20,27 \pm 1,00$  cm, which corresponds to the values of dolichomorphic physique. The average value of the width of the shoulders (WS), the bicromial size of the female students was  $31.48 \pm 0.62$  cm, and the width of the pelvis (WP), the intercrestal size (distancia cristarum), was  $26.67 \pm 0.30$  cm. It is noteworthy that in the group, the average size of the pelvic floor was significantly higher than the value of the pelvic floor. The girls of the adolescent fitness group have wide shoulders and narrow pelvis, which is the type of figure characteristic of the male type of build [1, c. 117-121; 7, c. 504-508; 8]. The number of female

students whose shoulder width exceeded the width of the pelvis in the whole study group was 42 (87.5%), and only 6 (12.5%) female students with a pelvic width greater than the width of the shoulders.

At young female athletes, at definition of values of an index of sexual dimorphism by J. Tanner, the following parameters have been received: average value of width of shoulders (or biakromial size (cm) has made in all group  $31,48 \pm 0,62$  cm ( $p < 0,05$ ), and average value of parameters of width of a pelvis - biakromial size (dis. cristarum) (cm) was  $26.67 \pm 0.30$  cm ( $p < 0.05$ ), which was less than the average physiological norm for girls of this age group, which corresponded to 28-29 cm and was an indirect criterion of anatomically narrow pelvis [1, pp. 117-121; 3, pp. 77-82; 7, pp. 504-508; 8]. This ratio of the size of the width of the shoulders to the width of the pelvis, in which the shoulders are wider than the pelvis, does not correspond (for a large number of female students studied) to the criteria of feminine constitution [1, p. 117-121; 3, p. 77-82; 7, p. 504-508; 8]. Taking into account the measurements of shoulder and pelvic width, the average value of the gender dimorphism index in the group was  $68.00 \pm 1.83$  ( $p < 0.05$ ).

As can be seen from the study data reflected in the above diagram, the number of non-physiological for female students sexual somatotypes - mesomorphic (transitional) - 8 (16.67%) and andromorphic - 6 (12.50%), together were determined in 14 (29.17%) female students. In a group of young women of first adulthood ( $n=39$ ), engaged in recreational fitness and classified as first adulthood, we also conducted similar studies. In determining the values of the gender dimorphism index according to J. Tanner, we obtained indicators: the average value of shoulder width or bicromial size (cm) was  $30.09 \pm 0.85$  cm in the whole group ( $p < 0.05$ ), and the average value of pelvic width indicators - bicromial size (dis. cristarum) (cm) was  $24.95 \pm 0.39$  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 of anatomically narrow pelvis [1, c. 117-121; 3, c. 77-82; 7, c. 504-508; 8]. This ratio of the size of the width of the shoulders to the width of the pelvis, in which the shoulders are wider than the pelvis - does not correspond (for a large number of female students studied) to the criteria of feminine constitution [1, p. 117-121; 3, pp. 77-82; 7, pp. 504-508; 8]. However, taking into account measurements of shoulder and pelvic width, the average value of the gender dimorphism index in the group was  $65.32 \pm 2.61$  ( $p < 0.05$ ). This corresponds to the values of

gynecomorphic somatotype [1, pp. 117-121; 3, pp. 77-82; 7, pp. 504-508; 8]. The obtained values of the Trochanter index in the whole study group were  $1.84 \pm 0.02$  ( $p < 0.05$ ), which corresponds to the pathological type of age evolution in young women of first reproductive age [1, pp. 117-121; 8; 13, pp. 138-140]. The obtained values of the trochanter index, in this group, are as follows: normoevolutionary type - 2 (5.13%; hyperevolutionary type - was not detected; hypoevolutionary type - 5 (12.82%; dysevolutionary type - 9 (23.08%) examined; pathological type - in 23 people, or 58.97% of all examined young women.

It was reliably established ( $p < 0,05$ ) that negatively altered types of trochanter index values (hypoevolutionary, disevolutionary and pathological types) in the studied group dominated and were identified in the overwhelming majority of young women of the first adulthood 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 the individuals of this age. When determining the values of the morphic index, it was established that brachymorphs dominated in the group of young women of the first adulthood - 16 (41,03%), mesomorphs - 12 (30,77%), almost as many women-dolichomorphs - 11 (28,21%).

We also studied the motivation of young women of both groups to their health fitness activities by means of questionnaires [12, p. 11-113]. The following answers were obtained, distributed in decreasing order of their importance, in each of the studied groups. In the group of young female students ( $n=48$ ), the motivation was as follows: 1. "To have a beautiful figure" - 29 (60,42%); 2. "To lose excess weight" - 25 (52,08%); 3. "To strengthen 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. "To lose excess weight" - 32 (82,05%); 2. "To recover after childbirth" - 23 (58,97%); 3. "To strengthen and maintain health" - 22 (56,41%); 4. "New dating, communication" - 19 (48,72%). The remaining young women in both groups could not clearly state their motivation for health fitness, answering most often with general phrases such as "It is good for health" or "It is active recreation," «For a change of activity».

### Conclusions

1. When determining the values of the morphic index in young female students engaged in recreational fitness, dolichomorphic type prevails in 32 (66,67%) girls, while in the group of young women of first adulthood brachymorphs dominate - 16 (41,03%), mesomorphs - 12 (30,77%),

almost as many women-dolichomorphs - 11 (28,21%).

2. The number of non-physiological for female students sexual somatotypes - mesomorphic (transitional) - 8 (16,67%) and andromorphic - 6 (12,50%), together were determined in 14 (29,17%) female students. In the group of women of first adulthood andromorphic sexual somatotype was determined in 5 (12,82%), mesomorphic - in 7 (17,95%), gynecomorphic - in the overwhelming majority of women - in 27 (69,23%) people.
3. In the group of women of the first mature age the negatively changed types of trochanter index values dominate (hypoevolutionary, disevolutionary and pathological types) - in the overwhelming majority of young women of the first mature age 37 (94,87%), and in the group of female students only 3 (6,25%) were defined as normoevolutionary constitutional type of their age evolution, and 45 (93,75%) students have different variants of individual evolution disorders, with formation of somatotypes not corresponding with their biological sex.
4. Motivation to engage in recreational fitness differs in young women of adolescent and first reproductive age, in the relationship with life priorities and value orientations in the representatives of both groups under study.

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