

Constitutional Features of Girth Size of the Body in Women of Different Somatotypes

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Abstract

The purpose of this study is to identify the “somatotypological profile” and girth size of girls and women of mature age in the Kyrgyz population. 1028 healthy young and middle-aged women living on the territory of Osh and its immediate surroundings took part in the study, where their physical development was assessed using the method of complex anthropometry and somatotyping. Statistical processing of the obtained morphometric data was performed using Microsoft Excel programs and the STATISTICA package (V. 6.0). The result revealed that women leptosomic constitution 1.6 times ($p < 0.05$) less than mesosomal of the constitution, and 1.7 times ($p < 0.05$) than megalosomal, however, 1.4 times ($p < 0.05$) greater than represent uncertain group. Age features of different constitutions in women are a consequence of the existence of a tendency to predominate the proportion of megalosomal and mesosomal groups over leptosomal and indefinite constitutional groups. Total breast circumference of women of the first mature age (88.5 ± 0.2 ; 65.1-112.5 cm individually) is 1.1 times more ($p < 0.05$), waist circumference (65.3 ± 0.4 ; 40.1-78.2 cm) - 1.1 times ($p < 0.05$) and buttock girth (98.4 ± 0.3 ; 79.6-113.2 cm) is more than 1.03 times ($p < 0.05$) than in girls. In women of the second Mature age, the presented parameters increase by 1.09, 1.09 and 1.05 times ($p < 0.05$), respectively, in comparison with girls. Thus, the obtained information about the “somatotypological profile” of Kyrgyz women of adolescent and mature ages concludes the relative dependence of the indicators of the measuring parameter on age and morphoconstitutionality.

Keywords: Anthropometry; Somatotyping; Girth Size; Adolescent And Mature Age; Women

Introduction

Physical development of a person is the leading criterion for determining the state of health of the individual's body [1]. In such areas as biomedical and clinical anthropology and anatomy, an important place in the designation of the degree of physical development is given to the anatomical and constitutional approach [2,3].

When organizing activities for the examination of patients, it is necessary to focus on the standards of physical development of the body, since the heterogeneity of the population is constitutional, gender-age and ethno-territorial factors [4,5].

Despite a significant number of studies in this area, the physical status of different population groups is characterized by heterogeneity; most of the data are not representative, studies were performed in people who significantly differ in age and gender; and the results of many anatomical and anthropometric studies have lost their relevance [6,7]. Thus, today there are practically no predisposing data on the “somatotypological profile” of Kyrgyz women, and size indicators are not reflected taking into account their constitutional types [8,9].

In this regard, this study aims to obtain relevant data on the “somatotypological profile”, the girth size of girls and Kyrgyz women with mature age.

Materials and Methods

The object of the study was girls and women of different age periods, residents of Osh, and its environs. Physical status was studied using the method of complex anthropometry in 1028 Kyrgyz women, including 310 girls (youth group from 16 to 20 years), 308 mature women (1st period from 21 to 35 years), and 410 women (2nd period from 36 to 55 years).

The work was carried out according to the “scheme of age periodization of ontogenesis”, which was adopted by the VII All-Union conference on problems of age morphology, physiology, and biochemistry, held in 1965. Women with various pathologies (body mass deficit,

osteoporosis, degenerative-dystrophic diseases, alimentary obesity, etc.) were excluded from the actual sample to exclude their influence on the results of the study of their physical status. For somatotyping of women, the traditional constitutional diagnostic scheme of I.B. Galant, V.P. Chtetsov, B.A. Nikityuk (1983), within three constitutional groups in which seven somatotypes are put forward. But along with them have a place to be such types as asthenic and stenoplastic in liposomal; pyknic and metaplastic in mesosomal; athletic, sub-athletic, and euriplastic in megalosomal constitutions [10].

This series of studies present data on the circumference of the waist, chest, and buttocks. Using a measuring tape in the horizontal plane was determined as circumference dimensions – (“girths”), (Bunak V.V., 1925, 1941): bust (chest circumference) tape was applied under the scapula, in the dorsal part of the thorax, and then the side of his chest just above this level, the front – top of the nipples; the waist - in the middle of the distance between the X-th rib and the iliac crest of the pelvic (iliac) bone; the circumference of the buttocks at the most protruding posterior to their points.

Approval for the study was received from the local Ethics Committee of the Institute of medical problems of the southern branch of the National Academy of Sciences of the Kyrgyz Republic (12.10.16, prot. 4). The informed consent was signed voluntarily.

Statistical indicators on morphometry were processed by a computer using Microsoft Excel and the STATISTICA package (V. 6.0). The results are presented as arithmetic averages (X) and their errors (Sx), where each parameter is reflected in the minimum (Min) and maximum (Max) individual options. Using the Student’s criterion helped to establish full confidence between statistical data. Differences between comparable indicators were considered significant at $p < 0.05$.

The results of the study and their discussion

Based on the anthropometry of the respective membership of individuals in a particular constitutional group, materials were obtained that provide an opportunity to study the female population. In particular, it was shown that women of leptosomal constitutions were identified in 208 cases, mesosomal group in 330, megalosomal in 346, and indeterminate in 144 cases (Table 1).

| Constitutional group | Indicator value | |
|----------------------|-----------------|--------------------|
| | Absolute number | in %, from min-max |
| Leptosomal | 208 | 20 ± 3.2 14-25 |
| Mesosomal | 330 | 32 ± 0.1 29-35 |
| Megalosomal | 346 | 33 ± 0.1 29-38 |
| Uncertain | 144 | 15 ± 0.1 12-18 |

Table 1: Constitutional groups of young and mature women.

Note: The Minimum And Maximum Values Of The Relative Occurrence Of A Trait Were Taken As Its Values In The Adolescent And Adult Age Periods (Extreme Values Of Indicators).

It turned out that the percentage of women liposomal constitution less than mesosomal 1.6 times ($p < 0.05$), in megalosomal 1.7 times ($p < 0.05$), but more than an undefined group 1.4 times ($p < 0.05$). At the same time, in leptosomal, the individual minimum and maximum percentage of women of different constitutions tend to decrease than for mega - and mesosomal groups, but more than for an indeterminate constitution. Morphometric analysis of the representation of women of different constitutional groups in the youth, 1st, and 2nd periods of adulthood shows the following data (Table 2).

| Age | Constitutional group | | | |
|-----------------------------------|----------------------|-----------|-------------|-----------|
| | Leptosomal | Mesosomal | Megalosomal | Uncertain |
| Young (n = 310) | 76 (24%) | 100 (32%) | 92 (29%) | 42 (15%) |
| 1st period of adulthood (n = 308) | 70 (22%) | 102 (33%) | 98 (31%) | 38 (14%) |
| 2nd period of adulthood (n = 410) | 62 (15%) | 128 (31%) | 156 (38%) | 64 (16%) |

Table 2: Constitutional groups of women by age group (abs., in %).

Among adolescent girls, the absolute values of the listed trait are dominated by the mesosomal constitution (100%), followed by the megalosomal group 92, leptosomal 76, and in the indeterminate group 42. The first mature age women leading positions at mesosomal group (102), followed by megalosomal group 98, leptosomal 70 and undefined group with 38 cases. In women of the second mature age, there is mainly a greater representation in the megalosomal group (156 cases), then in decreasing numbers in the mesosomal group 128 women and approximately equal numbers (62 and 64) in the leptosomal and indeterminate groups.

Here, the age features of women of different constitutions are distinguished by the fact that girls (i.e., in adolescence) tend to prevail in the proportion of mesosomal and megalosomal groups over leptosomal and indeterminate groups (Table 2).

In comparison with the leptosomal and indeterminate groups, the number of women in the mesosomal and megalosomal groups in the first adult age prevails over those listed above. Women who have the same 2-year period revealed the prevalence of women megalosomal group over mesosomal group and largely on leptosomal and uncertain groups.

Taking into account the data presented above, we analyzed the features of the chest, waist, and buttock girths, which, according to our data, differ significantly in women of different ages and constitutions (Table 3).

| Age | Constitution | | | | |
|-------------|-----------------------------------|--------------|--------------|--------------|--------------|
| | Leptosomal | Mesosomal | Megalosomal | Uncertain | |
| I | <i>Chest circumference</i> | | | | |
| | 75,3 ± 0,3 | 86,7 ± 0,4 | 87,5 ± 0,4 | 85,3 ± 0,5 | |
| | 70,1 - 84,4 | 73,6 - 94,1 | 76,2 - 94,5 | 80,2 - 92,0 | |
| | II | 76,2 ± 0,5 | 92,1 ± 0,3 | 95,2 ± 0,8 | 90,5 ± 0,4 |
| | | 65,2 - 84,5 | 81,5 - 106,4 | 72,1 - 112,5 | 83,5 - 92,7 |
| | III | 76,2 ± 0,4 | 93,0 ± 0,3 | 96,0 ± 0,9 | 98,0 ± 1,2 |
| 72,3 - 85,2 | | 82,3 - 107,6 | 82,0 - 117,7 | 84,7 - 112,6 | |
| I | <i>Waist circumference</i> | | | | |
| | 54.8 ± 0.5 | 58.4 ± 0.4 | 72.0 ± 0.4 | 59.2 ± 0.9 | |
| | 40.2 - 61.4 | 47.4 - 64.6 | 60.1 - 78.2 | 54.8 - 73.6 | |
| | II | 55.7 ± 0.6 | 70.0 ± 0.3 | 75.0 ± 0.6 | 60.5 ± 1.4 |
| | | 40.4 - 62.5 | 59.8 - 76.7 | 60.1 - 88.3 | 54.8 - 80.1 |
| | III | 58.8 ± 0.4 | 72.2 ± 0.3 | 75.6 ± 0.6 | 60.6 ± 1.4 |
| 50.6 - 64.6 | | 60.9 - 77.6 | 62.4 - 99.8 | 54.8 - 80.1 | |
| I | <i>The buttocks circumference</i> | | | | |
| | 84.8 ± 0.3 | 98.7 ± 0.5 | 100.3 ± 0.6 | 97.4 ± 0.7 | |
| | 79.7 - 92.4 | 87.6 - 110.4 | 85.8 - 113.2 | 91.6 - 109.5 | |
| | II | 85.9 ± 0.6 | 102.0 ± 0.4 | 105.0 ± 0.6 | 100.7 ± 0.7 |
| | | 66.2 - 92.4 | 90.6 - 110.4 | 82.7 - 112.4 | 96.1 - 112.5 |
| | III | 86.8 ± 0.7 | 102.4 ± 0.36 | 107.2 ± 0.5 | 103.6 ± 0.6 |
| 68.0 - 94.5 | | 92.2 - 113.2 | 82.8 - 114.7 | 96.4 - 110.0 | |

Table 3: Girth sizes of women of different constitutions (girls (I), women of the 1st period (II) and 2nd period of Mature (III) age ($X \pm Sx$; min - max; cm).

Thus, the breast circumference in girls of leptosomal constitution is 1.2 times less ($p < 0.05$) than in girls of mesosomal, megalosomal and indeterminate constitutions. Breast circumference in representatives of the leptosomal constitution of the 1st period of adulthood is 1.2 times less ($p < 0.05$) than in women of the mesosomal, megalosomal, and indeterminate groups. Bust women of the 2nd period of Mature age leptosomal constitution in comparison with women mesosomal groups are less than 1.1 times ($p < 0.05$) in comparison with representatives megalosomal and undefined groups of less than 1.3 times ($p < 0.05$). Girls of the leptosomal constitution have a waist circumference less than 1.4 times ($p < 0.05$) than girls of the mesosomal group and also less than 1.6 times ($p < 0.05$) than representatives of the megalosomal and indeterminate constitutions. Women of 1st period of Mature age leptosomal the Constitution have a waist circumference of 1.3 times lower ($p < 0.05$) than women mesosomal group, 1.4 times less ($p < 0.05$) than women megalosomal group and 1.1 times less ($p < 0.05$) than women of uncertain constitution. Waist circumference in women of the 2nd period of mature age of the leptosomal constitution is 1.2 times less ($p < 0.05$) than in women of the mesosomal Constitution, 1.3 times less ($p < 0.05$) than in women of the megalosomal group and does not change in women of the indefinite constitutional group.

Buttock girth in girls of leptosomal constitution is 1.2 times less ($p < 0.05$) than in girls of mesosomal and megalosomal constitutions, 1.2 times less ($p < 0.05$) than in women of megalosomal group and 1.1 times less ($p < 0.05$) than in women of indeterminate constitution. Women of the 1st period of mature age of the leptosomal constitution have a buttock girth 1.2 times less ($p < 0.05$) than women of the mesosomal and megalosomal and indeterminate constitutions. Compared with women of mesosomal, megalosomal, and indeterminate constitutions, women of the 2nd period of mature age of the leptosomal Constitution have a buttock girth 1.2 times less ($p < 0.05$).

Individual minimum and maximum values of the girth size of the chest, waist and buttocks in women also differ. Thus, their values in the leptosomal and mesosomal constitutional groups are lower than in women of the megalosomal and indeterminate constitutional groups.

We also analyzed the features of chest, waist, and buttock girths in women of different constitutions at different age periods. So, in a group of women of leptosomal constitution of the 1st mature age, in comparison with girls, the chest girth does not change. In representatives of the groups of mesosomal, megalosomal and indeterminate constitutions of the 1st mature age, these indicators in comparison with girls increase by 1.1 times ($p < 0.05$), and in the megalosomal group do not change. Chest girth in women liposomal constitution of the 2nd period of mature age in comparison with girls, does not change. In comparison with girls, representatives of the mesosomal and megalosomal constitution of the second period of adulthood, this indicator increases by 1.1 times ($p < 0.05$), and representatives of the indeterminate constitution of the second period of adulthood, these data increase by 1.2 times ($p < 0.05$).

In comparison with girls women leptosomal constitutions of the 1st period of mature age, waist circumference does not change, women mesosomal more than 1.0 times ($p < 0.05$), in women megalomaniacal constitution - 1.1 times ($p < 0.05$), in women of uncertain constitution, this indicator does not change. Waist circumference in women of the 2nd period of mature age of leptosomal constitutions, compared with girls, increases by 1.1 times ($p < 0.05$), in women of mesosomal Constitution - by 1.2 times ($p < 0.05$), in women of megalosomal constitution - by 1.1 times ($p < 0.05$), in women of the indeterminate constitution this indicator does not change.

In representatives of the leptosomal, mesosomal and indeterminate groups of the 2nd mature age, the buttock girth almost does not increase (by 1.1 cm, $p > 0.05$), and vice versa, it increases by 1.1 times ($p > 0.05$) in women of the megalosomal constitution. The buttock girth of women of leptosomal and mesosomal Constitution of the 2nd period of adulthood in comparison with girls practically does not increase. At the same time, these indicators increased by 1.1 times ($p < 0.05$) in a representative of the megalosomal and indeterminate constitutions. Individual minimum and maximum girth sizes of the chest, waist, and buttocks in representatives of all the studied groups in the 2nd mature age increased in comparison with girls and women of the 1st mature age ($p < 0.05$).

Conclusion

Thus, for the first time in the Kyrgyz population, the “somatotypological profile” of young and mature women was revealed. It was found that the parameters of girth sizes depend on age and somatotype. When working on appropriate preventive and therapeutic diagnostic programs and developments, it is possible to use the constitutional and typological characteristics of women studied within the relative norm.

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