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MATURE AGE GIRLS AND WOMEN BODY FAT COMPONENT AMONG KYRGYZ POPULATION

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ABSTRACT

This work aim was to identify quantitative data on the absolute and relative content of body fat component in mature age girls and women with various constitutions. Physical status of 580 girls and women from adulthood 1st and 2nd periods in Kyrgyz ethnic women residing in Osh city and around Osh city, Kyrgyzstan examined by complex anthropometry and somatotyping methods. To assess the body fat component content, they were resorted by bioimpedancemetry method using the ABS-01 Medass device. By means of Microsoft Excel programs, the package STATISTICA version 6.0, all the statistical information obtained in a work were processed. In the sample we studied, women with leptosomal constitutional group accounted for 20%, mesosomal 32%, megalosomic 33%, and 15% were women from indefinite group. Noteworthy are the fat component percentages. In girls with leptosomal group, these values are 1.8 times higher than in girls with a mesosomal constitution ($p < 0.05$), 1.6 times ($p < 0.05$), compared with girls from megalosomal group, but at the same time ($p < 0.05$) 1.7 times lower in contrast to the indefinite group. In 1st period of mature age women with leptosomal constitution, the fat component percentage is 2.1 times ($p < 0.05$) lower than in women with mesosomal constitution, 1.8 times ($p < 0.05$ with megalosomal and 1.9 times ($p < 0.05$) with an indefinite constitution. This indicator is 1.8 times ($p < 0.05$) less in representatives of mesosomal, megalosomal and indefinite groups in women of the 2nd period of the mature age of leptosomal constitution. The personal maximum of absolute and percentage fat component content in 2nd period mature age women is mainly greater than in girls. The presented

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digital materials indicate the presence of significant constitutional and age-related features of body fat component (both absolute and relative values of this indicator), which may be important for practical and theoretical medicine.

Keywords: somatotype, girls and women of mature age, anthropometry, bio-impedancemetry, body composition, fat component.

1. INTRODUCTION

Control over the preservation of health requires new approaches development in assessing the physical and nutritional status of a healthy and ill person, which is necessary to preserve and maintain adaptive potential, and introduce health saving technologies into practice [1-5]. An important aspect to this approach is body composition assessment, including its fat component [6, 7]. In methods and technologies for assessing the body fat component composition, the hardware for this activity constantly being improved. At present, transition realized from determining the component composition using traditional formulas introdusing bioimpedance method. However, assessment of body fat component requires the presence of quantitative standards that have constitutional, ethnic, age and gender specifics [8, 9, 10]. However, the most significant assessment of body component composition can be recognized in the diagnosis and treatment of alimentary obesity and osteoporosis [11, 12]. In this regard, girls and women body fat component features with Kyrgyz nationality have not yet been clarified.

The purpose in this work is to obtain quantitative indicators for absolute and relative content body fat component in mature age girls and women with different constitutions.

2. RESEARCH MATERIAL AND METHODS

The complex anthropometry method was used in this work, including assessment of 21 anthropometric parameters, with the help of which we analyzed physical status of 580 girls and women of the 1st and 2nd periods of adulthood, ethnic Kyrgyz women, Osh residents and its surroundings. The sample excluded cases of diseases presence that can affect formation of physical status (osteoporosis, alimentary obesity, degenerative-dystrophic diseases, etc.). The selection of constitutions types in women was performed according to the scheme by I.B. Galant, B.A. Nikityuk and V.P. Chtetsov. The fat component content was determined by bioimpedancemetry [13, 14]. Digital data morphometric processing includes calculation of arithmetic mean indicators and their errors. The individual minimum value and maximum of each indicator was also evaluated. The significance of differences in digital data was assessed by the Student's method.

3. RESEARCH RESULTS AND DISCUSSION

According to obtained anthropometrical data which made possible to distribute the studied female population in accordance with parameters of individuals to a specific

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constitutional group. In particular, the following was obtained (Table 1):

Table 1: Distribution of juvenile mature age women by constitutional groups (abs. value of indicator and its value in % with the min-max parameter).

Constitutional group	Value indicator	
	Numerical value	In %, c min-max
leptosomic	208	20+ 3.2 14-25
mesosomic	330	32+ 0.1 29-35
megalosomic	346	33+0.1 29-38
indefinite	144	15+0.1 12-18

Note: for the minimum and maximum in relative indicators assessment of the trait occurrence and its juvenile and mature age values (extreme values of the indicators) are considered.

According to the presented data, women with leptosomal constitutional group were identified in 208 cases, the mesosomal group in 330, the megalosomic group in 346 and the indeterminate group in 144 cases. The percentage representation in groups shows that the number (20%) of women in the leptosomal group is 1.6 times lower ($p < 0.05$) than in the mesosomal group and 1.7 times ($p < 0.05$) than in megalosomal group, but 1.4 times higher ($p < 0.05$) than in the indefinite group. At the same time, individual minimum and maximum indicators percentage composition in different constitutional group women are less than in women with meso- and megalosomal constitution, but more than in indefinite constitutional group women.

Results of women number indicators analysis in groups with different constitutions in accordance with age characteristics (juvenile, adulthood 1st and 2nd periods) presented in the Table 2.

Table 2: Distribution of women by constitutional groups, considering age (abs. %).

Age	Number of observations	Constitutional group			
		leptosomal	mesosomal	megalosomal	indefinite
juvenile	310	76 (24%)	100 (32%)	92 (29%)	42 (15%)
1st period adulthood	308	70 (22%)	102 (33%)	98 (31%)	38 (14%)
2nd period adulthood	410	62 (15%)	128 (31%)	156 (38%)	64 (16%)

According to absolute values, the mesosomal constitutional group dominates in adolescence (100 observations), girls with megalosomic group were 92, leptosomal were 76, in indefinite constitutional group were 42. Among 1st period mature age women the maximum number detected in mesosomal with value 102, in megalosomal group were 98, in leptosomal were 70 and in indefinite group were 38 cases. Among 2nd period mature age women the largest representation was noted for megalosomal

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group (156 observations), 128 women belong to mesosomal group, and approximately the same number of women belong to leptosomal and indefinite groups (62 and 64).

The age-related representation features with different constitutional groups in women are that among girls (i.e., in adolescence) there is a tendency for representatives of mesosomal and megalosomal groups to predominate over women from groups with a leptosomal and indefinite constitutions. The relative numbers of women in mesosomal and megalosomal groups appear to be significant comparing to leptosomal and indefinite groups.

In women of second period mature age a tendency towards a greater representation of carriers of the megalosomal constitutional group was revealed, compared with the mesosomal group, and, especially, with the leptosomal and indeterminate constitutional groups. Percentage of representatives in each constitutional group was compared in terms of age and identified a trend according to which, in comparison with girls, leptosomal group was detected 1.1 times less often in the first period of maturity and 1.6 times less often, in second period of adulthood.

In contrast to girls, representatives of mesosomal group were observed 1.03 times more often in the adulthood first period and 1.04 times less often in old age. Percentage of women in megalosomal group was 1.1 times higher in the first adulthood period and 1.3 times more in the second period of adulthood. In comparison with girls, women relative number in the group with indefinite constitution is 1.1 times less in the first adulthood period and on the contrary, 1.2 times more in the second period mature age.

Thus, in studied group, women with leptosomal constitution were accounted for 20%, mesosomal 32%, megalosomic 33% and indeterminate 15%. It should be noted that in comparison with girls, in the 1st adulthood period and further in its 2nd period, there are no cardinal changes in constitutional affiliations. This fact is in agreement with of B.A. Nikityuk, V.P. Chtetsov (1983) concept noting that there is no abrupt change in the constitution in postnatal ontogenesis, and possible relatively small changes are of a modification nature.
The body fat component content, according to our data, largely depends on the women constitution shown in Table 3.

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Table 3: Absolute and relative fat component content in body of mature age girls, women of the first and second periods with different constitutional groups (X + Sx; min-max).

Age	Constitution			
	leptosomal	mesosomal	megalosomal	indefinite
Fat component (kg)				
I	8.4+0.2	17.8+0.3	26.7+0.3	17.5+0.6
	5.4-11.5	12.0-32.4	15.6-35.4	12.0-29.1
II	8.6+0.2	19.1+0.3	28.0+0.3	20.5+0.3
	5.5-12.9	11.3-33.1	16.1-36.1	17.3-30.4
III	9.6+0.1	21.2+0.4	34.0+0.5	25.5+0.7
	7.6-13.2	13.4-34.1	17.5-49.0	20.1-36.6
Fat component (%)				
I	18.4+0.2	32.9+0.3	29.6+0.4	30.2+0.5
	15.0-22.3	20.0 -45.3	12.4-42.3	22.4-41.0
II	16.4+0.2	33.7+0.3	28.7+0.4	31.6+0.4
	15.2-24.6	20.1-44.0	14.1-40.2	26.1-42.6
III	19.1+0.1	34.9+0.3	34.7+0.4	34.7+0.4
	17.1-22.2	22.0-47.6	15.4-40.0	26.0-42.5

Compared with absolute amount of body fat component in girls with a leptosome constitution, its content in girls with a mesosomal and indeterminate constitution prevails 2.1 times ($p < 0.05$), megalosomic constitution 3.2 times. In 1st period of adulthood women with leptosomy, this indicator is 2.3 times less than in women with mesosomal group ($p < 0.05$), megalosomic 3.3 times ($p < 0.05$) and of an indefinite constitution 2.4 times ($p < 0.05$).

In 2nd period of mature age women with leptosomal constitution, this parameter is less than in the mesosomal group by 2.2 times ($p < 0.05$), megalosomic by 3.6 times ($p < 0.05$), indefinite constitution 2.7 times ($p < 0.05$). The fat component percentage, according to our data, a sign in girls of a leptosome constitution, is 1.8 times more than in the mesosomal group ($p < 0.05$), megalosomic 1.6 times ($p < 0.05$), and compared with an indefinite constitution, it is 1.7 times less ($p < 0.05$). In first period of mature age women with leptosomal constitution, the fat component percentage is 2.1 times lower ($p < 0.05$) than in women with mesosomal, 1.8 times ($p < 0.05$) of the megalosomic groups and 1. 9 times ($p < 0.05$) groups of indefinite constitution.

This indicator in representatives of mesosomal, megalosomic and indefinite groups is 1.8 times less ($p < 0.05$) in second adulthood period women with leptosomal constitution. Compared to women of other constitutions, the individual minimum and maximum indicators of absolute and percentage of body fat component in women with leptosomal constitution are lower.

We have analyzed absolute and percentage fat component features in age aspect. With

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a leptosomal constitution in women of the first period of mature age, the absolute value of the indicator, compared with girls, does not change, and its percentage decreases by 1.1 times. In the second period of adulthood, compared with girls, the absolute amount of the fat component in leptosomy increases 1.1 times ($p < 0.05$), and percentage of this component remains almost unchanged.

In first period of mature age women with mesosomal constitution, absolute fat component content is 1.1 times higher ($p < 0.05$) relative to the girls' indicators, despite the fact that its percentage remains unchanged. The absolute fat component amount in second period mature age mesosomal group increases by 1.2 times ($p < 0.05$) in relation to girls, and the percentage also increases by 1.1 times ($p > 0.05$). In first period mature age women with megalosomal constitution, the body absolute fat component content is 1.1 times higher ($p> 0.05$) than in girls. The percentage remains virtually unchanged. Compared with girls, the absolute amount of the fat component in second period adulthood megalosomal group increases by 1.3 times ($p < 0.05$) and the percentage of this body component by 1.2 times ($p < 0.05$).

The body absolute fat component content in 1st period mature age women with indefinite constitution is 1.2 times higher ($p < 0.05$) than in girls, while its percentage does not change. In the 2nd period of adulthood, compared with girls, the absolute fat component amount in an indefinite constitution increases 1.5 times ($p < 0.05$), the percentage of this component increases to 1.1 times ($p > 0.05$) The fat component personal minimum and maximum of the absolute and percentage contents in second period mature age women with different constitutions, in general, is greater than that of girls.

In general, our results showed that among women of adolescence and adulthood, mesosomal (31 to 33%) and megalosomal (30 to 38%) constitutions dominate the proportion of leptosomal (15 to 25%) and indefinite (12 to 16%) is significantly lower. In the leptosomal constitution, structure of the stenoplastic (66 to 77%) prevails and asthenic thin-boned (18 to 24%) and broad-boned (5 to 10%) somatotypes are less. In mesosomal constitution, the proportion of mesoplastic (31 to 66%) is more comparing to picnic (34 to 69%) somatotypes. The structure of megalosomal constitutions was dominated by euryplastic tall (22 to 35%) and short (58 to 59%) somatotypes; less typical are subathletic (5 to 16%) and especially athletic (0.8 to 4.4%) somatotypes.

As we found, materials on the body composition component juvenile and mature age women ethnic Kyrgyz are also important. Thus, the body absolute fat component content is associated with somatotype characteristics: for women, this indicator is minimal in asthenic (7.0 to 8.9 kg) and stenoplastic (10.5 to 11.1 kg), and has a maximum value in euryplastic tall somatotype (32.0 to 46.8 kg). During the transition from youth to the 2nd period of mature age, the absolute content of the fat component of the body increases (from 17.6 to 22.5 kg). Similar data during the somatotypological analysis of the Slavic ethnic group mature and elderly age women who are residents of St. Petersburg are given by D.A. Starchik (2017). Based on the materials by I.S.

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Aristova and V.N. Nikolenko (2005), obtained during the Saratov region women somatotyping in a large proportion revealed representatives of subathletic (54.1%) and stenoplastic (14.9%) somatotypes. Women with picnic type were identified in 4.1%, athletic in 3.4% and asthenic extremely rarely (0.7%). Authors did not differentiate mesoplastic and euryplastic constitutional types (although women of these somatotypes could not be missing in population). Probably, some disagreements with our data may be due to the presence of regional specifics on "constitutional diversity" of population (Nikityuk B.A., Chtetsov V.P., 1983), as well as age-related modifications of somatotypological status, since the authors studied mainly the girls physical status.

CONCLUSION

Thus, the paper presents digital materials indicating the presence of significant constitutional and age-related features of body fat component (both absolute and relative values of this indicator), which may be important for use in practical and theoretical medicine.

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