BIOEMEPED ANALYSIS OF THE BODY COMPOSITION AND ANTHROPOMETRIC CHARACTERISTICS OF STUDENTS FROM INDIA

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Abstract : Anthropometry for more than 50 parameters and component composition of the body with the help of the bioassayed analyzer ABC-01 "Medass" were studied in 80 first-year students from India (50 young men, 30 girls). The control group consisted of 100 students and 50 female students permanently residing in the city of Osh. Some of the anthropometric figures of visiting students were significantly lower in comparison with the control group, especially among girls. Bioempedance analysis revealed a significant decrease in fat mass parameters, normalized for growth, a proportion of skeletal muscle mass in young men and women of the main groups, and an increase in the specific basal metabolism in young men compared with the control group.

Key words: young men, girls, anthropometry, bio-impedance analysis.

Introdection: One of the most sensitive modern methods of morphological and functional diagnostics in medical anthropology and sports medicine in the last decade has been the bioimpedance analysis of the composition of bodies [3, 4, 6, 9].

Bioimpedance analysis of body composition (BIA) is a diagnostic method that allows to estimate absolute and relative values of parameters of body composition and metabolic correlates on the basis of measured values of electrical resistance of a human body and anthropometric data, correlate them with intervals of normal values of attributes, estimate reserve capacities of an organism and risks Development of a number of diseases. It is important that BIA is a non-invasive and highly informative method, in fifteen minutes in clinical, outpatient and field conditions it is possible to obtain dozens of parameters important both from the positions of sports medicine and modern nutrimetabolomics and pathology.
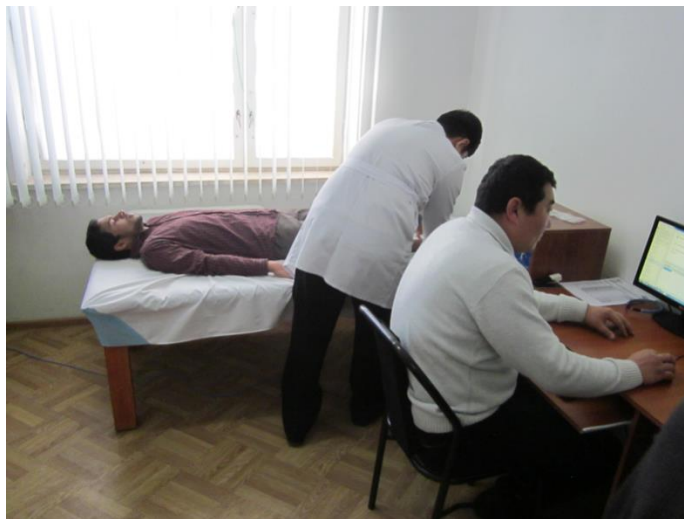
The aim of the work was a comparative description of anthropometric indicators and component composition of the body of young men and women from India and Kyrgyzstan - first-year students of the Osh State University.

Material and Methods: Four statistically comparable groups of healthy students were examined. The first group consists of 50 young Hindus - students of the International Medical Faculty. The second group consists of 30 girls of Indian women, students of the same faculty. The third group includes 100 students and 50 students of the medical faculty. Age from 17 to 25 years, and the average in all groups was approximately the same. By nationality, all students of Groups 1 and 2 were Hindus. In the third group, 78% were Kyrgyz, 11% Uzbeks, 8% Tajiks, 1% Kazakh, Turkish and Azeri. In the fourth group, 83.8% were Kyrgyz, 14.2% Uzbeks, and 2% Tajiks. The study was conducted during the month of November.

50 anthropometric values were determined: 4 weight-height, 7 length parameters, 10 span parameters, 8 diameters, chest circumference was determined in resting state, with the maximum inspiration and maximum expiration, thickness of subcutaneous fat at 7 points, using a digital electronic caliper KETS-100 , An error of 1 mm, in addition spirometry, dynamometry for the right and left hand was performed, blood pressure, pulse, oxygenation of the blood were monitored.

Along with the standard methods of investigation, the component composition of the body was determined using the bioassayed analyzer ABC-01 "Medass" (Fig. 1) with an assessment of the following parameters: basic metabolism (BM), body mass index (BMI), body fat mass (BFM), fat-free Mass (FFM), active cell mass (ACM), percentage of ACM in lean mass (% ACM), skeletal muscle mass (SMM), percentage of skeletal muscle mass in lean mass (% SMM), specific (Normalized to the surface area of the body), the basal metabolism (EO), total body water (TBW), volume of extracellular fluid (ECF), waist-hip index (WHI), and body fat percentage (% BF).

The statistical processing of the results was carried out using the application software "Statistic 6.0". During the statistical analysis, the nature of the distribution of features for normality was evaluated. The reliability of the differences in quantitative traits having a normal distribution was analyzed using Student's t-test in a confidence interval of more than 95%. In the case of an abnormal distribution of the variational series, the reliability of the differences was analyzed using the Mann-Whitney u-criterion. Differences between the compared values were considered statistically significant at a significance level of $p < 0.05$.

Results

The growth of the young men of the first group ranged from 151 to 188 cm and averaged 168.7 ± 1.6 cm (Table 1). The weight in this group varied from 43 to 84 kg, on the average - 64.09 ± 1.8 kg.

In the boys of the 3rd group, the growth was characterized by a more even distribution, ranging from 158 to 190 cm, and averaged 174.17

± 1.5 cm, which is significantly higher than in the group of young men of Indians (p <0.05).

The growth in Indian girls ranged from 149 to 166 cm (Fig. 2) and averaged 155.88 cm. In local girls, the average height was almost 5 cm higher, but the difference in this sample was not statistically reliable. We intend to continue to continue the collection of material and to conduct a statistical analysis of the quartiles.

Figure 2 - First-year group - study participants

Weight in the young men of the first and third group was approximately the same, although as mentioned above, the average height in them differed. Therefore, the body mass index in the first group was higher, but not so much that the difference was reliable.

Also a very less differences in body weight and BMI in girls 2 and 4 groups.

The circumference of Hindu students' breasts was 3 cm less compared to same age group from Kyrgyzstan, the difference is reliable for the indicator at rest and the circumference of the chest with the maximum inspiration ($p < 0.05$). Girls from Kyrgyzstan exceeded these values compared to their same age groups from India was not so significant ($p > 0.05$), again, with a larger sample and application of the analysis on the quartiles, the difference may be reliable. In favour of this testify functional indicators. The vital capacity of the lungs (VCL) among students and students from Kyrgyzstan was significantly higher than that of students from India ($p < 0.05$). Maybe because of the existing adaptation to the mountains Of course? Part of the Hindus, too, live in the mountainous areas, but in this work the height of the surveyed was not subdivided.

Table 1 - Anthropometric indicators in young men and women from India and Kyrgyzstan

Indicators ,units of measurement	Boys		Girls	
	India (n-50)	Kyrgyzstan (n-100)	India (n-30)	Kyrgyzstan (n-50)
Age , years	19 ±0,9	18,5 ±0,8	20,1 ±1,1	19,4 ±0,9
Height,cm	168,7 ±1,6	174,17 * ±1,5	155,88 ±1,6	160,76 ±1,7
Weight ,kg	64,09 ±1,4	63,72 ±1,3	55 ±1,5	55,2 ±1,2
Body mass Index	22,13 ±0,72	20,98 ±0,54	22,56 ±0,74	21,35 ±0,64
Chest circuference, cm	84,4 ±1,5	87,27 * ±1,2	81,3 ±1,6	83,97 ±1,5
Waist circumference, cm	76,96 ±1,4	75,675 ±1,3	72,75 ±1,5	69,38 ±1,2
Circumference of hips, cm	94,05 ±1,1	92,11 ±1,3	93,38 ±1,4	94,22 ±1,1
Waist / hip ratio	0,816 ±0,031	0,84 ±0,033	0,78 ±0,021	0,755 ±0,023
Subcutaneous fat in abdomen (mm)	11,3 ±0,7	10 ±0,6	18,3 ±1,4	16,5 ±1,0
Vital Capacity of Lungs (л)	3,07 ±0,31	4,31 * ±0,32	2,45 ±0,25	3,27 * ±0,28

Note: * - the difference indicator with the comparison group $p < 0.05$

The waist circumference index had sex differences - the girls are thinner, but did not have ethnic differences. Also, the hip circumference was not significantly different. The index of thickness of subcutaneous fat at this age also had no ethnic differences, but it had pronounced sex differences, in girls it was 1.5-2 times more.

Bio-impedance analysis made it possible to reveal differences in the body composition of the body (Table 2).

Gender differences were clearly pronounced, which corresponds to the data of other authors who used bio-impedance analysis for examination of children and young people [3, 4].

Table 2 - the component composition of the body in young men and women from India and Kyrgyzstan

Indicator, unit of measure	Boys		Girls	
	Foreigners (n-50)	Local (n-100)	Foreigners (n-20)	Local (n-50)
Fatty mass (kg), normalized according to the height	16,20 ±1,87	9,51 * ±1,63	20,09 ±1,71	15,10 * ±1,65
Emaciated mass (kg)	47,88 ±2,03	54,73 * ±2,13	34,91 ±2,2	39,97 * ±1,9
Active cellular mass(kg)	27,80 ±1,7	31,72 ±1,76	19,04 ±1,82	21,525 ±1,57
Part of active cellular mass (%)	57,96 ±1,4	57,17 ±1,53	54,49 ±1,42	53,59 ±1,37
Musculoskeletal mass (kg)	25,60 ±1,41	31,2 * ±1,56	15,43 ±1,55	19,7 ±1,44
Part of musculoskeletal mass (%)	53,54 ±1,85	56,6 ±1,56	44,2 ±1,87	49,01 * ±1,43
Total fluid (kg)	35,00 ±1,87	40,35 ±2,32	25,56 ±2,1	29,41 ±2,52
Extracellular fluid (kg)	13,93 ±1,32	16,1 ±1,25	10,89 ±1,34	12,63 ±1,22
Specific main metabolism (kcal/quad.m/day)	845,19 ±14,2	911,29 * ±23,4	810,23 ±24,2	831,49 ±19,6
фазовый угол, град	7,2 ±0,5	6,81 ±0,62	6,45 ±0,52	5,98 ±0,66

Note: * - the difference indicator with the comparison group $p < 0.05$

Despite the characteristics of the national food of : Indians - vegetarians, Kyrgyz - lovers of fatty meat , the fat mass normalized for growth in Hindus was significantly higher than that of Kyrgyz people. On the contrary, the lean mass (without taking into account the fat mass) was significantly lower both in young men and in girls. Active cell mass had reliable gender differences, but not ethnic ones. At the same time, the proportion of active cell mass did not have significant gender differences, although the girls were somewhat lower. The musculoskeletal mass of Indians was significantly lower than that of Kyrgyz, however, their significantly smaller growth should be taken into account. Therefore, the proportion of musculoskeletal mass, although it had a tendency for Indians to lower values, but the difference was unreliable.

Differences in the amount of total fluid and extracellular fluid ($(p> 0.05)$) were also not reliable.

Therefore, the part of musculoskeletal mass, although it had a tendency for Indians to lower values, but the difference was unreliable. Also, there were differences in the amount of total fluid and extracellular fluid ($(p>0,05)$).

An important difference is the increased level of specific basic exchange among Kyrgyz people. In our opinion, Kyrgyz, they are (boys and girls) make up about 80% of the number of investigated local students. So, in the opinion of Ibraimov A.I., (2008), the Kyrgyz people are genetically adapted to the severe conditions of the mountains and spend a lot of energy on heat exchange. The Hindus, on the contrary, are adapted to the hot tropical climate and do not spend energy on heat exchange, only on heat transfer. Thus, various differences were identified in the anthropological characteristics and the component composition of the body in healthy young boys and girls from India and Kyrgyzstan, who have both genetic and ethnic backgrounds. Identified features among students from India should be taken into account when developing programs aimed at improving the processes of their adaptation to study and life in the southern Kyrgyzstan.

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