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Age Features of Body Proportions of Yakut women in the Republic Sakha (Yakutia)

The study of anthropometric measures and body proportions of Yakut women from different age groups (I and II periods of middle-aged, elderly and senile age groups). The age variation of the length and proportions of women's bodies has been established (higher parameters of body length, lower index of pelvis width, higher index of trunk length at women of the I and II middle-aged period as compared with the women of older age groups). The assessment of body proportionality of the Yakut females of the RS(Y) has identified some not age-related features: rectangle body shape and relative leg shortness. Such anthropological characteristics show that there is age and regional variability of the physical status of the population of Yakutia promoting active life in the contemporary conditions of Yakutia.

Keywords: body proportions, indices, Sakha Republic (Yakutia)

INTRODUCTION

Long habitation of human populations under certain conditions of the environment determines the presence of specific morphofunctional characteristics of the population, peculiarities of vital activity of organism, allowing living and developing under these conditions. Accordingly, the characteristics of both external features and internal organization of humans of the population of different regions and ethnic groups are variable too. The singularity of the natural and climatic conditions of Yakutia (prolonged exposure to low temperatures, photoperiodism, geochemical situation), definite type of nutrition and other factors affected the structural and physiological set-up of people whose ancestors for generations lived in relatively slightly varied environmental conditions [10]. The history of anthropological studies of the peoples of Yakutia covers a period of over a hundred years [1,3,8,11,14]. Researchers were able to identify somatoscopic and somatometric features of the population of Yakutia. Aggregate natural and climatic factors of the Sakha Republic (Yakutia) along with current socio-economic and environmental conditions, and changes in dietary pattern of the population of Yakutia affect the morphofunctional status of the contemporary population, allow adapting to changing environmental conditions. In this regard, since 1997 in the Sakha Republic (Yakutia), the staff of Ammosov North-Eastern Federal University together with the staff of Voyno-Yasenetsky Krasnoyarsk State Medical University has been conducting comprehensive anthropometric study of the adult population of Yakutia [9], including the characteristics of overall dimensions, component body composition, and constitutional characteristics. However, up to the present the



assessment of the proportionality of the body build of the Yakutian adult population and the study of the variability of body proportions have not been carried out. The aim of this study was to establish the body proportions of women of Yakut ethnicity of different age groups, born and resident in Yakutia.

MATERIALS AND METHODS

We have analyzed anthropometric measures of 1227 women of Yakut ethnicity, born and resident in the Sakha Republic (Yakutia). Ethnic affiliation was determined on the basis of personal data (a survey of ancestors' ethnicity for three generations). This limitation to three generations is due to the difficulties in the responses of the surveyed. In accordance with the age periodization of human ontogenesis, adopted at the 7th All-Union Conference on Age Morphology, Physiology and Biochemistry of the USSR Academy of Sciences (1965), examined women fell into four age groups: adult age period I (21-35 years), adult age period II (36-55 years), elderly (56-74) and senile age periods (75-90 years). By social status, the examined women were full-time and part-time students of various faculties of higher and secondary specialized educational institutions of Yakutsk, manual workers, office workers, pensioners of various districts of the Sakha Republic (Yakutia). The study has been pursued after receiving a favorable decision of the local ethics committee subject to clear exclusion criteria, namely the presence at the time of the examination of acute diseases or acute exacerbation of chronic diseases, pregnancy, and refusal of examination survey. Anthropometric measurements were performed using the method of V.V. Bunak (1941) [2] adopted at the Research Institute of Anthropology, Moscow State University (1981). To characterize body proportions, the proportionality indices were calculated: the relative length of trunk, leg, arm, the relative width of pelvis, pelvic-brachial index. The analysis of proportions was made by comparison with average data [12]. Obtained material was processed using the methods of mathematical statistics and SPSS Statistics 17 software. We determined the pattern of each feature distribution with subsequent calculation of value M and its error m , the root-mean-square deviation δ , the coefficient of feature variation V . The Kolmogorov-Smirnov test was used to assess the normality of data distribution. We used methods of parametric and nonparametric statistics. Evaluation of group differences was made using the Student's t -test and the Mann-Whitney U -test [4].



RESULTS AND DISCUSSION

The results of the study have revealed that the average body length measures of women in the examined groups had age differences. Women of adult age periods I and II have higher measures of body length, senile women have lower ones. Higher values of height of women of adult ages I and II are caused by adequately higher rates of absolute measures of trunk length ($p < 0,001$) and leg length ($p < 0,05$) (Table 1). The pattern of age variability of women's body length is accounted for by the phenomena of secular trend found in various regions of the world [5], as well as age-related changes of the human musculoskeletal system.

The analysis of absolute measures of women's shoulders diameter, pelvis diameter has revealed age differences. The diameter of the shoulders of women of adult age periods I and II was not significantly different and was higher than similar measures of women of elderly and senile ages ($p < 0,001$). The diameter of the pelvis of Yakut women had higher values in representatives of elderly and senile ages ($p < 0,001$). Increase in shoulders diameter along with a decrease in pelvis size in girls and young women is observed in other regions too [6].

The analysis of the values of proportionality indices has found that the average value of pelvic-brachial index in all examined age groups accounted for more than 74.9, which indicates the rectangle shape of the trunk of examined women. The index of pelvis width has shown that women of adult age periods I and II have average (16.0–17.9) sizes of the pelvis and elderly women have a wide pelvis (index > 17.9). The analysis of the index of trunk length has found that women of adult age periods I and II had a long trunk (index > 52.9), and women of older age groups had an average trunk. The analysis of the index of leg length has shown that the index of less than 54.9 was found in all age groups, which indicates the relative shortness of leg. Relatively short legs of indigenous inhabitants of the continental zone of Siberia were also determined in other studies and explained by the adaptation of organism to low temperature conditions [1]. The index of arm length has shown that Yakut women of adult ages I and II are characterized by relative shortness of arm (index < 45.0), and longness of arm is typical of senile women (index > 46.9).

The study of age variability of anthropometric measures of the physical status of the population is given much attention in medicine, anthropology [7, 9, 13]. The analysis of proportionality indices in relation to the age has revealed significant differences. Thus, Yakutian women of Yakut ethnicity of adult age periods I and II, as opposed to women of elderly age, have lower index of pelvis width and higher index of trunk length.



CONCLUSIONS:

Thus, as a result of the study of anthropometric measures and body proportions of Yakut women of the Sakha Republic (Yakutia), age features have been revealed. The age variability of the length and proportions of women's bodies has been established (higher measures of body length, lower index of pelvis width, higher index of trunk length in women of adult age periods I and II as compared with those in women of older age groups). The assessment of proportionality of the Yakut women's body build has identified the features of proportions that are independent of age. Rectangle body shape and relative shortness of leg are typical of Yakut women of all examined age groups. Revealed anthropological characteristics show that there is age and regional variability of the physical status of the population of Yakutia promoting active life in the current context of Yakutia.

The impact of climatic and geographical, environmental and social factors determined a number of body build proportions peculiar to the female population of Yakut ethnicity of the Sakha Republic (Yakutia). Knowledge of the laws of morphofunctional status formation is the basis for assessing the health of the population. Identification of the regularities of the variability of the population's physical status at the level of individual groups (regional, ethnic and age, profile and others) is important to address the issues of human biology, clinical and preventive medicine, profiling and to achieve good results in sports.

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Table 1

Anthropometric measures of women of Yakut ethnicity of the Sakha Republic (Yakutia)

parameters	Women of adult age I (n=288)	Women of adult age II (n=475)	Women of elderly age (n=284)	Women of senile age (n=180)
Average age, years	28,80±0,23	41,75±0,17	66,58±0,28	80,70±0,26
Body length, cm	159,31±0,35	157,83±0,25	153,86±0,37	149,15±0,34
Body weight, kg	59,05±0,60	63,07±0,51	62,28±0,67	54,20±0,91
Trunk length, cm	87,68±0,26	87,18±0,22	77,97±0,40	78,60±0,25
Arm length, cm	70,15±0,22	69,98±0,22	70,92±0,36	71,12±0,43
Leg length, cm	82,11±0,35	80,52±0,29	80,02±0,41	79,53±0,38
Shoulders diameter, cm	34,89±0,08	34,82±0,06	33,23±0,12	32,14±0,14
Pelvis diameter, cm	27,43±0,08	27,94±0,08	29,14±0,13	28,25±0,13
Trunk length, %	54,88±0,14	55,32±0,06	51,00±0,24	52,66±0,13
Leg length, %	51,35±0,18	51,19±0,10	52,40±0,27	53,26±0,22
Arm length, %	43,90±0,11	44,41±0,05	46,42±0,22	47,61±0,23
Index of relative shoulder width, %	21,92±0,06	22,08±0,04	21,61±0,08	21,54±0,06
Index of relative pelvis width, %	17,23±0,05	17,71±0,05	18,96±0,09	18,95±0,09
Pelvic-brachial index	78,68±0,25	80,33±0,23	88,06±0,54	88,15±0,55

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