The Study on the Body Composition of the Mongolian Nationality in Qinghai Province

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ABSTRACT. *Objective: To study the status and characteristics of human body composition of Mongolian ethnic groups in Qinghai Province. Methods: A total of 361 Mongolian adults (166 males and 195 females) were randomly selected to measure the body composition of all subjects by anthropometric method. The survey data were collected by Excel2010. The difference between male and female body composition of Mongolian ethnic group in Qinghai was statistically significant by u test method. Conclusion:(1) except for the significant difference of BMI, there were significant differences between the sexes of Mongolian nationality in Qinghai, and the differences were statistically significant.(2)with the increase of age, the body fat rate, BMI, visceral fat grade, limb fat rate, trunk fat rate of Mongolian people in Qinghai showed a trend of increasing gradually, regardless of whether they were male or female.(3) with the increase of age, the height, total muscle mass and trunk muscle volume of Qinghai Mongols, whether male or female, are gradually decreasing.(4) with the increase of age, the weight and the presumed bone mass of the Mongolian males and females in Qinghai showed the tendency of rising first and then decreasing.(5) But in the limbs muscle quantity, Qinghai Mongolian nationality male and female presented the big difference. The quantity of limbs muscle of Qinghai Mongolian males increased with the increase of age, but the quantity of limbs muscles of Qinghai Mongolian women increased first and then decreased with the increase of age.*

KEYWORDS: *Qinghai Mongolian; body composition; body fat rate; muscle mass*

1. Introduction

China is a unified multi-ethnic country, and the Mongolian nationality is one of the ethnic minorities with a large population in my country. The Mongolian nationality has a long history, large branches, and many tribes, mostly distributed in the northern region. A small number of Mongolian nationalities live in southern my country. The Mongolian population in China is 5,981,840 (data from the sixth census in 2010), accounting for 0.45% of the country's total population. It is mainly distributed in the Inner Mongolia Autonomous Region, the three northeastern provinces, Hebei, Qinghai, and Xinjiang, and the rest are scattered in Sichuan, Henan, Beijing, Yunnan and Guizhou. Nearly half of the Mongolian people in the

world live in China. At the same time, the ethnic policies of the People's Republic of China have allowed the Mongolians to develop their society, culture, and economy by leaps and bounds. All ethnic groups in the big family of the Chinese nation prosper together, reflecting a rich China Characteristic enlightened ethnic relations.

Qinghai Mongolians are Mongolians who live in Qinghai, and they are also called Qaidam Mongolians. Compared with other Mongolians, the Qinghai Mongolians have accepted more Tibetan culture, and they are also one of the ethnic minorities that have lived in Qinghai. According to the research of historians, it entered Qinghai in about the 1320s. According to the sixth census, there were 99,815 Mongolians in Qinghai in 2010, accounting for 1.77% of the total population of Qinghai Province. They are mainly distributed in Delingha, Golmud and Dulan and Ulan counties in Haixi Prefecture, and Henan in Huangnan Prefecture. Mongolian Autonomous County, Menyuan County, Haiyan County and Qilian County of Haibei Prefecture, as well as Xining City, Hainan Prefecture, Haidong Prefecture, Datong County and some areas; ethnic autonomous areas include Haixi Mongolian-Tibetan Autonomous Prefecture and Henan Mongolian Autonomous county.

In order to further understand the Qinghai Mongolian from the perspective of human physiology, the research team went to Qinghai in August 2016 to measure the body composition of some Qinghai Mongolian adults. Human body composition refers to the total composition of various tissues and organs of the human body. It is a key indicator for evaluating human development, nutritional level and physical condition, and is also an important factor affecting human health [1]. However, the content of each component of the human body varies due to different ages, genders, races and metabolic processes [2]. Due to the influence of living conditions, geographical environment and genetic factors, different nationalities have different characteristics of the proportion of human body composition with gender and age. The living environment and eating habits of the Mongolian ethnic group in Qinghai are quite different from those of other ethnic groups. In recent years, many foreign scholars have conducted research on body composition [3-5], and there are also research reports on the analysis of body composition of some ethnic groups in China [6-8]. However, there has not been a detailed investigation and report on the human body composition of the Mongolian ethnic group in Qinghai. In view of this, this study explores the human body composition of the Mongolian ethnic group in Qinghai.

2. Research objects and methods

2.1 Research object

From August 11th to 29th, 2016, the team members went to Qinghai to take a random sampling method to measure the body composition of 361 Mongolian adults (166 males and 195 females) in Qinghai. The measurement followed the principle of informed consent. The subjects were all Qinghai Mongolians living in the local area

for more than 3 generations, with good physical development, no disability, no endocrine and metabolic diseases, and long-term medication history. The average age is 47.7±15.4 years for men and 47.0±15.6 years for women. The measurement data is divided into three groups: 20-44 years old, 45-59 years old, and 60-years old and above.

2.2 Measurement methods

According to the method stipulated in "Human Body Measurement Method" [9], use Martin ruler to measure height (Height), use body fat measuring instrument (BC-601) to measure weight (Weight), height (Height), body fat rate (Percent body fat) , PBF), Total body muscle mass (TBMM), Estimated bone mass (EBM), Body Mass Index (BMI), Biological age (Biological age), Percent body water, PBW), Visceral fat level (VFL), Percent right upper limb fat (PRULF), Right upper limb muscle mass (RULMM), Left upper limb fat rate (Percent left upper limb fat (PLULF), left upper limb muscle mass (LULMM), right lower limb fat (PRLLF), right lower limb muscle mass (RLLMM), Percent left lower limb fat (PLLLF), Left lower limb muscle mass (LULMM), Percent trunk fat (PTF) and trunk muscle mass (TMM) 19 Item index value.

2.3 Data processing

Microsoft Excel 2010 was used to enter the survey data, and SPSS 18.0 was used to count the collected data. Finally, the u test was used to determine whether the difference in the body composition between men and women of the Mongolian ethnic group in Qinghai is statistically significant.

3. Result

3.1 Comparative analysis of the measured values of Qinghai Mongolian men and women

The fat distribution characteristics of Mongolian men in Qinghai are that the trunk fat rate is higher than the lower limb fat rate and the upper limb fat rate, the left lower limb and right lower limb fat rate are similar, the left upper limb fat rate is higher than the right upper limb; the whole body muscle distribution characteristics are consistent with the fat distribution characteristics. The muscle mass of the trunk is higher than the muscle mass of the lower limbs, the muscle mass of the right lower limb is higher than that of the left lower limb, and the muscle mass of the right upper limb is also higher than that of the left upper limb. The characteristics of female fat distribution are that the trunk fat rate is similar to the lower limb fat rate and both are higher than the upper limb fat rate, the left lower limb and right lower limb fat rate are similar, and the left upper limb fat rate is higher than that of the right upper limb.

Through the analysis of variance, the 19 human body composition index values of Mongolian men and women in Qinghai are significantly different (P<0.05) except for BMI (P<0.05), and the difference is statistically significant. Qinghai Mongolian men have more muscle mass in all parts of their bodies than women, and their fat percentages are lower than women; meanwhile, men weigh more than women, and the ratio of skeletal muscle to body weight exceeds that of women. These two reasons lead to men's total muscle mass being greater than women. Therefore, in terms of labor intensity and exercise ability, the strength and endurance of Qinghai Mongolian men are better than Qinghai Mongolian women. However, in terms of body fat rate, due to the difference in the functions of the endocrine system between men and women, the body fat rate of adult Qinghai Mongolian men is lower than that of women, and their distribution locations are quite different. Women's fat is mostly distributed in the chest, waist, buttocks and legs, while men are more in the abdomen. The accumulation of fat in the abdomen can lead to abdominal obesity and increase the risk of men with high blood pressure and cardiovascular diseases. It can also be seen from Table 1 that although the body fat rate and trunk fat rate of Mongolian men in Qinghai are lower than those of women, their visceral fat levels are higher than those of women. Visceral fat is necessary for the human body. It plays a role in supporting, protecting and stabilizing the internal organs. However, too much visceral fat is more harmful than too much subcutaneous fat. Too much visceral fat can cause hormone imbalance and increase inflammatory substances, which in turn leads to an increased risk of chronic diseases. This shows that Qinghai Mongolian men are at higher risk of various diseases due to central obesity than Qinghai Mongolian women.

3.2 Age changes of the human body composition of the Mongolian ethnic group in Qinghai

From Table 1, with age, the height, total muscle mass, and trunk muscle mass of Mongolian men in Qinghai showed a gradual decrease, while body fat percentage, visceral fat grade, limb fat percentage, and trunk fat percentage showed a gradual upward trend. The increase in the body fat rate of men is mainly caused by the increase in body fat mass and extremity fat mass. However, with age, the decrease in trunk muscle mass of Mongolian men in Qinghai leads to a gradual decrease in lean body mass. The height and trunk muscle mass of Mongolian women in Qinghai showed a downward trend, while the body fat percentage, visceral fat grade, and trunk fat percentage showed a gradual upward trend.

This is because with age, the body's basal metabolic rate decreases, the intake and absorption capacity of nutrients decreases, and the body's own ability to synthesize essential amino acids decreases, which will change the distribution of human muscle and fat decline in content.

4. Discuss

Human body composition can provide a lot of important information. It can not

only indirectly show the health status and nutritional needs of the human body, but also provide help for the diagnosis and treatment of various diseases, and compare the distribution of body composition related indicators at various ages. And the content can be used to evaluate the current health of the body [10-11]. Changes in the distribution of relevant indicators of human body composition, increase or decrease in quality, and imbalance of proportions may cause the body to develop disease [7]. From the perspective of BMI alone, according to the "Guidelines for the Prevention and Control of Overweight and Obesity in Chinese Adults (Trial)" published in 2003, the Chinese body mass scale is formulated into four levels of underweight, normal, overweight and obesity. Clinical symptoms such as shortness of breath, joint pain, muscle aches, and reduced physical activity caused by obesity, as well as the subsequent increase in the risk of chronic non-communicable diseases such as hypertension, diabetes, cardiovascular and cerebrovascular diseases, and tumors, have made people aware of Maintaining the dynamic balance of human body composition is a necessary condition for maintaining the body in a healthy state. At the same time, the difference in body composition is the result of a combination of genetic factors, age, gender, growth and development status, late nutrition, environment [12-14], geographic location, local economic development level, customs and habits.

Wells [15] believes that every time the temperature increases by 10°C the body's muscle mass, bone mass, and water content will decrease in fat mass and fat mass. The annual average temperature of the Mongolian ethnic group in Qinghai is -1~15°C, and the climate is cold. Therefore, the Mongolian residents in Qinghai like to eat beef and mutton, dairy products and other high-fat and high-protein foods. One of the reasons for the higher body fat rate of residents. As the age increases, the level of visceral fat increases, which increases the risk of diabetes, arteriosclerosis, heart disease and other diseases, and the incidence of cardiovascular and cerebrovascular events such as stroke and myocardial infarction also increases [18-20]. Therefore, Mongolian people in Qinghai should pay attention to a reasonable diet, exercise moderately, and control their weight within an appropriate range. This will be of great significance to improve the body composition of the Mongolian adults in Qinghai and reduce the occurrence of lipid metabolism disorders and related diseases.

5. Conclusion

(1) The human body composition indicators of Mongolian people in Qinghai have extremely significant differences between genders except for the significant difference in BMI, and these differences are all statistically significant.

(2) With age, the body fat percentage, BMI, visceral fat grade, limb fat percentage, and trunk fat percentage of both men and women of Qinghai Mongolians are gradually increasing.

(3) With age, the height, total muscle mass, and trunk muscle mass of Qinghai Mongolians, whether male or female, show a gradual decline.

(4) With the increase of age, the weight and presumed bone mass of Qinghai Mongolian men and women showed a trend of increasing first and then decreasing.

(5) In terms of limb muscle mass, Qinghai Mongolian men and women show great differences. The muscle mass of the limbs of Mongolian men in Qinghai increased with age, but the muscle mass of the limbs of Mongolian women in Qinghai increased first and then decreased with age.

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Table1 Analysis of the Composition of the Body Composition of the Mongolian Ethnic Group in Qinghai

Parameter	Male				Female			
	20-	45-	60-	Total	20-	45-	60-	Total
Weight (kg)	71.0±11.8	72.5±13.4	72.4±9.1	71.9±11.9	62.2±13.0	68.8±13.8	64.4±12.0	65.0±13.5**
Height(cm)	170.0±5.5	166.3±5.7	166.2±5.1	167.7±5.8	158.1±5.3	157.1±5.6	151.1±5.4	156.3.±6.1**
PBF(%)	21.8±6.8	24.0±5.8	25.6±5.5	23.6±6.2	34.7±7.7	40.1±7.4	40.6±8.1	37.8±8.1**
TBMM(kg)	51.7±5.8	51.6±6.2	50.8±4.8	51.4±5.7	37.4±3.4	38.3±3.1	35.0±2.9	37.2±3.4**
EBM (kg)	2.9±0.3	2.9±0.4	2.8±0.3	2.8±0.3	2.3±0.3	2.4±0.3	2.1±0.3	2.3±0.3**
BMI (kg/ m^2)	24.7±3.9	26.1±4.0	26.2±3.0	25.6±3.8	24.9±4.8	27.8±5.3	27.9±5.5	26.5±5.3*
Biological age	34.0±14.2	46.8±14.9	57.1±14.4	44.3±17.1	42.4±15.5	61.1±14.3	67.9±15.4	54.2±18.4**
PBW (%)	52.8±5.1	52.9±4.7	52.7±5.7	52.8±5.1	46.4±4.8	44.5±5.0	45.1±5.3	45.5±5.0**
VFL	8.8±4.3	13.2±3.6	16.2±2.8	12.2±4.8	5.8±2.9	8.8±2.7	9.9±2.9	7.7±3.3**
PRULF (%)	16.9±5.6	17.5±4.5	18.2±3.7	17.4±4.8	32.0±8.3	36.6±8.2	37.1±9.0	34.7±8.7**
RULMM (kg)	2.7±0.4	2.8±0.4	2.8±0.5	2.8±0.4	1.8±0.3	2.0±0.3	1.8±0.3	1.8±0.3**
PLULF（%）	17.8±5.4	18.2±4.1	19.0±3.2	18.2±4.5	33.2±8.0	38.2±8.0	38.5±8.4	36.1±8.5**
LULMM (kg)	2.6±0.4	2.6±0.5	2.6±0.4	2.6±0.4	1.7±0.3	1.9±0.3	1.7±0.3	1.7±0.3**
PRLLF (%)	22.6±5.2	22.9±4.6	23.4±3.4	22.9±4.6	36.5±5.1	39.6±5.4	39.7±5.7	38.3±5.5**
RLLMM (kg)	9.1±1.4	9.4±2.0	9.8±2.2	9.4±1.8	6.1±0.8	6.8±1.4	6.1±1.3	6.4±1.2**
PLLLF (%)	22.6±5.0	23.0±4.5	23.3±3.3	22.9±4.5	36.3±5.0	39.6±5.1	39.6±5.4	38.2±5.4**
LULMM (kg)	9.0±1.4	9.3±1.5	9.4±1.3	9.2±1.4	6.2±0.7	6.6±1.1	6.1±1.0	6.3±1.0**
PTF(%)	21.8±8.1	25.9±7.0	28.3±7.1	24.9±7.9	34.3±9.4	40.8±9.0	42.0±9.0	38.2±9.8**
TMM (kg)	28.6±2.4	27.3±2.6	26.4±2.1	27.6±2.5	21.5±2.1	20.9±2.1	19.1±2.1	20.8±2.2**

Note: *P＜0.05 or **P＜0.01 means the comparison of the difference between the sexes of the body composition, the difference is statistically significant.