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PHYSICAL DEVELOPMENT OF SCHOOL-AGE GIRLS OF THE REPUBLIC OF KARAKALPAKSTAN

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ANNOTATION

The level of physical development of children and adolescents determines the reproductive, morphofunctional status of the future generation and reflects the influence of climatic, socio-economic living conditions in the region. The growing part of the population is most sensitive to environmental factors, so it is important to study the features of growth and development of children and adolescents living in environmentally unfavorable conditions. In the spring of 2022, an anthropometric survey of 139 15-year-old girls living in the city of Nukus, Muynak and Ellikkalinsky districts of the Republic of Karakalpakstan was conducted. The results of the study coincided with the literature data and showed that representatives of the Muynak district, which is an ecological disaster zone, have a body mass deficit and the values of the studied morphofunctional indicators (body length, body weight, chest circumference, waist circumference, hip circumference) are lower than those of their peers living in another area.

INTRODUCTION

The physical development of children and adolescents is formed under the influence of heredity and environmental influences. The influence of these factors plays an important role in changing physical development in a positive or negative way. Hypersensitivity of the human body to the environment is especially characteristic of puberty [1, 8, 26]. The main indicators of physical development of children and adolescents are: body weight, body length and chest circumference [1, 9, 26]. Of these, growth is considered a labile indicator of physical development. And body weight is variable in relation to height. Measuring the length of the arms and legs is necessary when determining the structure of the body of the organism.

The most commonly used index to determine body weight gain or weight loss is the Body mass Index (BMI). BMI is recommended by the World Health Organization not only for assessing a

person's physical development. Currently, the index is also used for preliminary diagnosis of obesity and risk assessment of cardiovascular and other diseases [3, 11, 13].

People with a BMI≥25 kg/m2 are associated with an increased risk of developing type 2 diabetes mellitus, dyslipidemia, hypertension and cardiovascular diseases [22, 28]. Waist circumference (OT) is a unique indicator that correlates with the amount of abdominal fat and shows the distribution of adipose tissue. It is also used in the diagnosis of abdominal obesity. The definition of OT is highly effective in clinical practice compared to BMI. For example, it is used to identify patients with cardiometabolic risk [21, 22, 28].

Numerous national and foreign scientists have studied the level of physical development of the population living in the Aral Sea region, the adaptation of the body to external adverse environmental conditions, functional, reserve capabilities of the body and the impact of the Aral catastrophe on them [4, 7, 10, 19, 20, 23-25, 27]. The purpose of this work is a comparative characteristic of the diversity of physical development of girls living in the Republic of Karakalpakstan.

Material and methods. There are 3 zones in the Aral Sea region with different distances from the Aral Sea coast and different ecological conditions. 1st zone – Muynaksky district - settlements near the Aral Sea coast; 2nd zone – relatively prosperous territory (for example, Nukus), located 200 km from Muynaksky district; 3rd zone – ecologically safe settlements 400 km from Muynaksky district (for example, Ellikkalinsky district) [12]. Accordingly, in the spring of 2022, we conducted an anthropometric survey of 47 15-year-old girls studying at secondary school No. 3, located in the Muynak district of the Republic of Karakalpakstan, 53 15-year-old girls studying at secondary school No. 8, located in the city of Nukus, and 39 15-year-old girls studying at secondary school No. 44, located in the Ellikkalinsky district.

The following parameters of the body structure were determined by the generally accepted method: 1. Body weight was measured on electronic medical scales with a measurement accuracy from 50 g to 150 g, depending on body weight. 2. Body length was estimated using a height meter with a measurement accuracy of up to 5 mm. 3. The length of the arms and legs was measured using an anthropometer. 4. Girths, including: OGK, OT and hip girth, were measured using an anthropometric tape. Based on the results of measuring these characteristics, it is possible to monitor the physical development of a person, as well as determine the anthropometric model of the body structure.

Based on the measurements carried out , the following were calculated:

A person 's BMI was calculated using the formula: BMI= MT/DT2, where BMI is body mass index, MT is body weight (kg), DT is body length (m). If the amount obtained is less than 18.5 – body weight deficiency; 18.5-24.9 – normal; 25.0-29.9 – overweight; 30.0-34.9 – I degree of obesity; 35.0-39.9 – II degree of obesity; more than 40.0 – III degree of obesity.

All calculations are performed by the built-in Excel functions from the Microsoft Office 2010 application; MicroCAL Origin v.6.10 statistical data processing was carried out using programs.

Results and their discussion. Physical development is the result of the interaction of the genotype and the environment, reflects the ecological level of the environment and is an important indicator of health. Dynamic monitoring of the health of schoolchildren shows significant changes in recent years in terms of the physical development of children and the functional capabilities of their body [26].

The results showed that, as we expected, including girls living in the Ellikkalinsky district, the values of body length, body weight, OGK, OT and hip circumference are significantly higher than those of their peers living in the city of Nukus and Muynak district (Table 1).

However, in terms of the length of the legs and especially the arms, the opposite situation was observed (higher values for representatives living in the Muynak district). It was found that the arm length of girls living in Muynak district is 19.12 cm longer than that of their peers in Nukus and 16.67 cm longer than that of their peers in Ellikkalinsky district. For all other indicators, except for the length of the arm, almost identical values were obtained in girls of the Muynak district and the city of Nukus (Table 1).

The average value and standard deviation of indicators of physical development of girls living in different areas of the Aral Sea region

Districts / Indicators	**Muynak district**	**Nukus**	**Ellikqal'a district**
Hollow bodies,CM	158,22±1,18	157,87±0,77	160,07±1,49
Massage bodies, kg	50,44±1,23	52,32±0,93	55,33±1,16
OGC, SM	78,0±0,72	79,11±1,06	82,45±1,75
Obhwat talii, SM	65,29±1,15	66,30±0,70	72,24±1,10
Dlina Nogi, SM	94,79±0,93	93,24±0,81	92,81±1,22
Deep rookie, SM	75,29±0,65	56,17±0,46	58,62±1,07
Obhwat Beder,SM	85,17±1,24	87,06±0,79	88,85±1,38

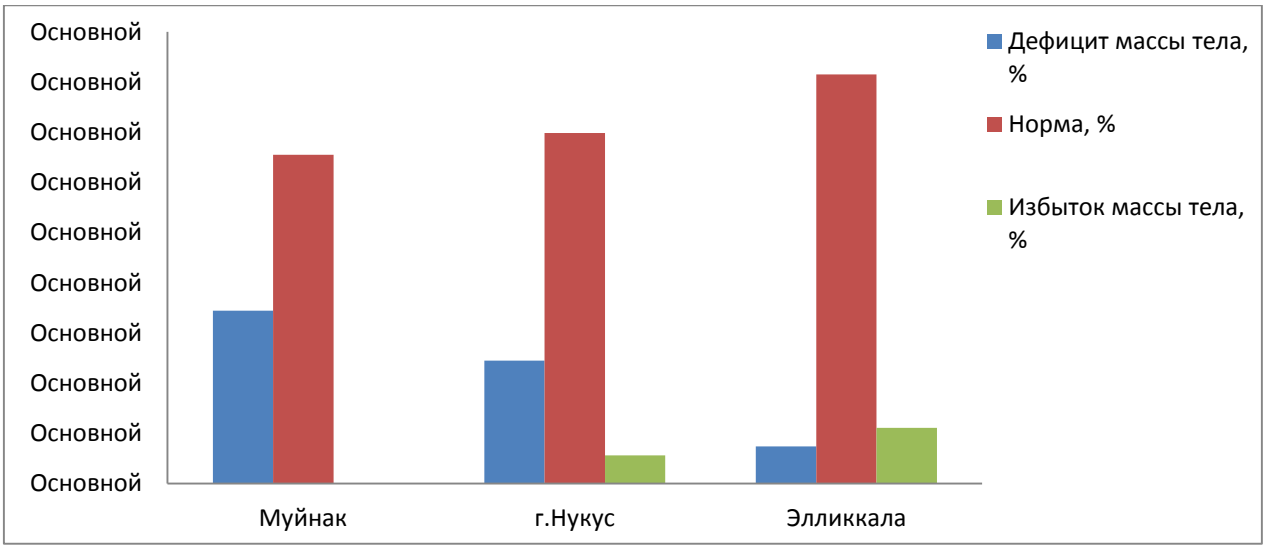

Figure 1. Distribution of body mass deviation fractions determined by body mass index in girls living in different regions of the Aral Sea region

As for BMI, 34.48% of girls living in Muynak district have a body weight deficit, and 65.52% have a normal body weight (Fig.1); 24.53% of girls living in Nukus city have a body weight deficit, 69.81% have a normal body weight and 5.66% of representatives are overweight body weight. Body weight deficiency was detected in 7.41% of girls living in the Ellikkalinsky district, 81.48% had a normal body weight and 11.11% were overweight in representatives (Fig. 1.)

These changes in the health of children and adolescents, the population as a whole, may be caused by the Aral Sea disaster. Because as a result of the drying of the Aral Sea, dust and salt

storms occurred in the region, contamination of food and water with pesticide residues and heavy metals [4, 20]. This negatively affects the health of the population living in this region. In particular, studies have shown that children aged 6 to 10 years living in the Elikkalinsky and Takhtakupir districts have deficiencies in body weight, and children under the age of 14 years living in the Elikkalinsky, Nukus and Takhtakupir districts have body weight below the normative indicators [10]. In previous other studies, it was found that Karakalpaks aged 7-17 years living in Nukus have morphological indicators such as body weight, height and OGK lower than their peers of the same age living in Tashkent and Urgench [7]. According to recent studies, young men living in "zone No. 3" (i.e. in Ellikkala and other southern regions) have higher body weight, height, OGK, knee joint girth and skin-fat folds on the back of the shoulder than their peers living in "zone No. 1" (that is, in Muynak and some other northern regions) [4]. According to the literature [6], in anthropometric studies in children living in an unfavorable environmental environment, cases of low growth and body weight, overweight, ossification disorders, decreased adaptive abilities and accumulation of adipose tissue in the body were also observed. According to studies [2], it was found that, compared with children living in ecologically clean areas, the growth of the bone component of body weight in children living in polluted areas was lower than in children in clean areas. Some authors [14, 15, 17] claim that in large industrial plants there are metal impurities in the atmosphere (Pb, Mn, Ni, etc.), who found that air pollution affects the ossification period of the skeleton.

In children aged 7-14 years living near gas processing plants, there was a lag in physical development, retardation and disharmonic development [5, 14]. Cases of body weight deficiency among the youth of the rural population of the Altai Territory have been identified [18]. In addition, there is evidence that against the background of body weight deficiency in girls in the Penza region, there is a tendency to the effect of androgenization (an increase in shoulder width and a decrease in pelvic size) [6], and in modern youth aged 15-17 in the Magadan region, there is a decrease in body weight, underdevelopment of the OGC and asthenization of the physique [16].

CONCLUSION

Thus, the results obtained in our study are in good agreement with the literature data. In particular, it was found that girls living in the Ellikkalinsky district, which is considered ecologically safe, compared with their peers in the Muynak district, have a height of 1.85 cm, body weight of 4.89 kg, OGK by 4.45 cm, FROM 6.95 cm and hip circumference by 3.68 cm higher. It was found that the arm length of girls living in Muynak district is 19.12 cm longer than that of their peers in Nukus and 16.67 cm longer than that of their peers in Ellikkalinsky district. 34.48% of the girls who took part in the study living in Muynak district had a body weight deficit, and 81.48% of the girls living in Ellikkalinsky district had a normal body weight, and 11.11% of the representatives were overweight.

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