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Analysis of the Centile Distribution of Anthropometric Indicators of Surveyed Adolescents

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Abstract: The article presents the relevance of the study is due to the problem of degradation of the health of the population, especially students. It is generally recognized that one of the most important risk factors for the formation of diseases of the cardiovascular and other functional systems of the body of adolescents, while the level and mode of physical activity appropriate for age and health status is a powerful factor in disease prevention and health promotion.

Keywords: Physical development, centile method

The relevance of the study is due to the problem of degradation of the health of the population, especially students. It is generally recognized that one of the most important risk factors for the formation of diseases of the cardiovascular and other functional systems of the body of adolescents, while the level and mode of physical activity appropriate for age and health status is a powerful factor in disease prevention and health promotion.

Physical development, being a reflection of morphological and functional features that interact with the environment, can most of all characterize the changes taking place at a given time in each child and the population as a whole (Kudrya, 2002). So, disharmonious acceleration can be characterized by a lag in the development of internal organs from physical development. Physical development, being a reflection of morphological and functional features that interact with the environment, can most of all characterize the changes taking place at a given time in each child and the population as a whole. (Uzunova A.N., Lopatina O.V., Zaitseva M.JL, 2002)

Physical development reflects the process of organism formation at separate stages of postnatal ontogenesis (individual development), when the genotypic potential is most intensively transformed into phenotypic manifestations. Deviation from the norm of indicators of physical development is the first important manifestation of both a violation of the functional state of the child's body and an already existing disease.

Approaches to assessing the physical development of children and adolescents are constantly being improved and developed based on the goals and objectives of research, the exchange of experience and the use of recommendations from various international medical organizations. Centile tables are published in textbooks and manuals on pediatrics, pediatrician's reference books and other medical literature. [4, 6, 7, 9].

Physical development is understood as a dynamic process of changes in the morphological and functional characteristics of the body (changes in body size, its proportions, physique, increase in muscle mass, performance), due to hereditary factors and specific environmental conditions. As a result, the intensity of growth of children and adolescents may be subject to significant changes.

In 1993, the World Health Organization (WHO) conducted a comprehensive review of the uses and interpretations of anthropometric indicators. This review concluded that the WHO National Centers for Health Statistics reference development indicators, which have been recommended for international use since the late 1970s, do not adequately reflect early childhood development and therefore new curves are needed. development. In 1994, the World Health Assembly approved this recommendation. In response, between 1997 and 2003, WHO conducted the Multicentre Developmental Measurement Study to develop new curves to measure the growth and development of young children worldwide. For adolescents, such studies have not been conducted, and centile tables have not been updated [3, 4].

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The centile method is based on the percentage distribution of the frequencies of occurrence of the values of a particular trait. When assessing indicators of physical development, 7 centiles are usually used: 3, 10, 25, 50, 75, 90, 97), which reflect the values of the trait. For example, if you take students from one class and measure their height, then the majority of students (50%) will have some average value of this indicator. The smallest and largest children (3rd and 97th centiles) will have the least number of children. At the same time, the results will be more reliable if a large number of schoolchildren of the same age and gender are examined.

The level of physical development, its harmony are an objective reflection of the state of health of the child. A child's height is an important indicator of somatic health, a sign of adequate functioning of the endocrine system, social well-being (balanced nutrition, child care, psycho-emotional environment), pronounced deviations in growth may indicate a genetic disease [2]. Body weight is a more labile indicator and is the first to respond to the influence of external and internal factors. There is evidence that weight loss is associated with the risk of developing infectious diseases, anemia, and psychomotor disorders [6]. Excess body weight of a child can be associated with both poor nutrition of the child and endocrine, genetic pathology [5]. It is very important to identify deviations of physical development indicators from the normative values as early as possible, to determine the level and cause of these deviations, in order, if necessary, to proceed with an in-depth examination of the patient. At the same time, indicators for assessing anthropometric data should correspond to modern realities. From these positions, the analysis of the secular trend of growth processes is necessary for an adequate assessment of the physical development of children. There is evidence that in our country there is a tendency to increase the body length of modern urban newborns compared to children born in the middle of the last century [8,9]. The same trends are observed in European newborns, as evidenced by the data of studies by foreign authors [7–9].

Knowledge of the initial data on the growth and development of the child, the rate of their changes (dynamics of the process) is necessary for a qualitative assessment of the health status of each individual child. The individual diversity of the pace of physical development is quite large, but if it falls within the limits of the norm, then the conditions of life and activity of the child correspond to the capabilities and needs of his body [1, 2]. In young children, especially the first year of life, the rate of physical development is a very accurate indicator of the child's health. Many chronic diseases may not have clear clinical symptoms. And it is precisely the violation of the rate of weight gain and growth that is, perhaps, the first prenosological manifestation of the disease.

The method of assessing physical development using centile tables is easy to use, since it eliminates calculations. Centile scales are a description of the frequency shares of the distribution of the range of feature variation, absolutely independent of the mathematical distribution. Accordingly, these scales are more universal. They are convenient for mass preventive examinations of children, for identifying groups with "borderline" values and possible pathological deviations of signs [10].

Indicators of the physical development of children and adolescents may be a reflection of the climatic, socio-economic, ethnic and other characteristics of a particular region. It is believed that regional standards for the physical development of children and adolescents should be reviewed every 5–10 years. In connection with the processes of socioeconomic transformations taking place in recent decades and the increasing trends in social stratification, the population monitoring of growth and development indicators seems to be a priority, an urgent task [2].

The features noted above in anthropometric indicators in adolescents living in various regions of the South Aral Sea region allowed us to assume that a possible factor in stunting or finding this indicator at a level below the standard value is the state of nutrition. In this regard, an assessment was made of the correspondence of body weight to height. It is carried out using centile values. They allow you to understand a few enough people to eat enough to increase body weight. Centile values do not take into account age, they make it possible to assess the correspondence of body weight to its height. The assessment is given in table. one.

A comparative analysis showed that the distribution of muscle mass in adolescents is within the 25-75th centiles for boys and 75-90th centiles for girls. This indicates that the level of nutrition for the surveyed adolescents is sufficient, since 50 centiles means the average level of nutrition, 75 centiles - above average and 90 - excess nutrition.

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Table 1.
Centile distribution of body weight in relation to body length for adolescents living in different regions of the South Aral Sea

	Karauzyak district			**Nukus**			**Muynaq region**		
BOYS									
Age, years	Body height, cm	Body weight, kg	centiles	Body height, cm	Body weight, kg	centiles	Body height, cm	Body weight, kg	centiles
11-12	134,1±0,05	30,8±0,9	50	137,0±0,09	31,9±1,4	50	138,0±1,3	32,1±2,3	50
13-14	147,0±1,2	39,8±2,9	50	148,0±2,6	40,3±3,7	75	150,2±3,03	42,3±4,3	75
GIRLS									
11-12	127,4±0,04	24,5±0,8	75	131,0±1,5	25,2±1,5	50	132,6±0,06	27,9±2,2	75
13-14	140,2±0,07	35,8±1,2	90	144,5±2,8	36,3±2,8	75	145,8±0,09	37,9±3,4	75-90

Note: 50 ts = between medium and above average supply
        75 c = above average power
        90 Hz = redundant supply

We also note that in adolescence, the magnitude of the distribution of body weight to its length also indicates sufficient nutrition. In boys, they are within the 50th centile, i.e. nutrition is average / above average, and in girls it is in the range of 75-97 centiles, i.e. redundant.

Thus, the analysis carried out allows us to draw some conclusions regarding the state of anthropometric indicators of adolescents living in various regions of the Aral Sea region. Centile values indicate that adolescents do not experience a lack of nutrition, and it provides sufficient for the existing values of growth and development of body weight of adolescents. The somewhat slow development of the skeleton is probably due to the presence of some other factors no less significant than nutrition.

The processes of growth and development are determined by environmental factors. In the life of a child, the role of environmental factors is extremely large and diverse: from purely private moments (the socio-economic situation of the family, the quality of housing, living in a city or rural conditions) to national problems (an unfavorable environmental situation in the area of residence, the influence of other extremely powerful factors, such as wars, local armed conflicts, etc.). Nevertheless, in all the variety of possible influences of environmental factors, special attention is given to the nutrition factor, which determines both the growth rate, growth potential, and its final results. Various degrees of nutritional deficiency, especially prolonged in time, in young children can lead to malnutrition, growth retardation, creating prerequisites for the appearance of functional and organic changes.

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