

## **Effects of Environmental Factors on Children's Health and Development in the Aral Region**

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### **ABSTRACT**

In a healthy organism, the principle of sequential interaction is traced (the so-called continuum of action of various functional systems). In addition, the law of consistency of the activity of various functional systems also operates, which determines the interaction of various rhythmic processes in a healthy organism. The child's body, developing according to a clear genetic program, subtly reacts to all changes in the environment.

**KEY WORDS:** Physical development of children, assessment of the growth and development of children, the Aral Sea disaster, ecology.

Child health is age-appropriate, sustainable physical and intellectual well-being of a growing person in the process of implementing a genetic development program in specific conditions of the social and ecological environment, nutrition and upbringing [5]. The main indicators of health are the physical development of children. The physical development of a child as a set of various indicators (length, weight, shape, strength, etc.) that characterize his growth and development is determined by a complex of hereditary and social factors. To study the physical development of children and adolescents, a unified technique for measuring the human body and its parts has been developed [3,4]. The simplicity of anthropometric methods, objectivity, the possibility of full automation predetermines their widespread use in pediatrics, physiology and other disciplines. For a correct assessment of the growth and development of children, it is necessary to know the features of the physiology of these parameters, respectively, the age of the child, as well as the factors influencing them [1]. The growth and development of a child's body are complex cyclical processes based on the repetition of phylogenesis and which are irreversible. The human life cycle is conventionally divided into three stages: maturation, mature age and proceed in accordance with objectively existing laws [8]: uneven rate of growth and development; non-simultaneous growth and development of individual organs and systems (heterochronism), (sexual dimorphism); biological reliability of functional systems and the organism as a whole; genetic conditioning of growth and development; conditionality of growth and development by environmental factors; acceleration of growth and development. Each age period is characterized by a certain growth rate due to morphological and functional characteristics. The child maintains a relatively stable state in the environment due to several physiological mechanisms, primarily system genesis and self-regulation of physiological functions. Systemogenesis determines the priority degree of maturity of those physiological systems, the activity of which at this stage of ontogenesis constitutes the basis of the child's vital activity. The normal functioning of the body is subject to the law of self-regulation of

physiological functions, when the deviation of physiological parameters from the level that supports all life processes, especially the normal stable metabolism, itself becomes the reason for the return to the initial level. In a healthy organism, the principle of sequential interaction is traced (the so-called continuum of action of various functional systems). In addition, the law of the coordination of the activity of various functional systems also operates, which determines the interaction of various rhythmic processes in a healthy organism. The child's body, developing according to a clear genetic program, subtly reacts to all changes in the environment [7].

The term "growth" means a quantitative change in the size of the body and its parts. This is a genetically programmed process of increasing body weight, its linear and volumetric dimensions with an optimal intake of ingredients with food and favorable environmental conditions. The growth process has a certain cyclical nature: periods of acceleration are replaced by phases of its deceleration. A healthy child in the first year adds about 25 cm in height, in the second year - 10-12 cm, and then the increase is on average 5-6 cm per year. At the age of 5-6 years, there is a so-called "half-height jump", when a child reaches up to 70% of the genetically determined body length of an adult, mainly due to an increase in the length of the limbs. At the age of 13-14, a pubertal growth spurt occurs. It is distinguished by changes in body length due to the simultaneous lengthening of the trunk and limbs. These quantitative changes are accompanied by qualitative changes in the physiology of the functioning of the most important biological systems of the body, which gradually adjust to the new morphological situation [12].

All body functions are related to body size. Growth processes provide the appearance of quantitative differences in the structures and functions of the developing organism. The relationship between the growth and development of the body is that for the onset of certain stages of the body's development, it is necessary to achieve certain body sizes. The alternation of the processes of growth and differentiation of tissues is a natural biological marker of the development of the organism [15].

Body weight is the most constituent part of the growth and development of a child, slowing down or stopping its increase is the first sign of failure and growth of the child. The birth weight of a healthy full-term baby varies from 2.5 to 4.4 kg. During the first 3-4 days after birth, a 5-6% weight loss occurs, this is called "physiological weight loss". After the first week of life, the weight gain becomes stable and continuous. During the first 6 months, a healthy baby gains weight from 15-250 g every week. Over the next 6 months, weekly body weight gain is 100-150g, between 12 and 24 months-50g. 5 months after the birth of a child, it doubles its body weight relative to that at birth, and by 12 months it triples [10,17].

Problems of growth and development of a child are among the most important in pediatrics, because are considered the main indicators of children's health. The general biological significance of growth is to achieve such a level of development of the organism, which is necessary for the reproductive, intellectual and social perfection of a person [19].

According to the authors' data, conducted studies from 1990-2000, it was found that the physical development of children over 10 years showed the absence of growth and development of the manifestation of acceleration and vice versa, the preservation or deterioration of growth and development, a decrease in the number of children with normal RF and an increase in deviations in RF ( by increasing the number of children with MT deficiency, a significant number of overweight and growth retardation) [14].

The special attention of pediatricians is attracted by the FR and the health of

preschool children in the Aral Sea region, which is largely influenced by environmental problems, since the relationship between soil, water and air plays a major role in the life of the younger generation.

The main factors affecting the formation of children's health and reflecting the physical development of children are antenatal (complications of pregnancy, childbirth, mother's illness, the formation of congenital malformations, metabolic defects) and postnatal. Among the postnatal factors, the priority place is occupied by ecopathological (industrial pollution of the environment, geochemical endemics, ecological disasters), malnutrition [11].

One of the global catastrophes of the 20th century was the drying up of the Aral Sea, in connection with this there is a desertification and salinization of the soil, the disappearance of flora and fauna, climate change, which affected a sharp rise in the incidence of the population, especially children. Studies have shown that the degree of water pollution in the Amu Darya river is constantly growing, a deterioration in the quality of water in the river within the Aral Sea region has been revealed in terms of such indicators as water salinity, its total hardness, the content of chlorides and sulfates, phenols and oil products, the Amu Darya is one and the main source of water supply. regions of the Aral Sea region [9].

The negative impact of unfavorable environmental factors on the health of the population has acquired particular significance for Uzbekistan.

The impact of the environmental crisis in the Aral Sea region has a large impact on the health and physical development of children of all ages. The impact of environmental factors in the Aral Sea region on the physical and mental development of children, the impact of chemical and radiation factors of this region on the genome of a growing organism is very important. Analysis of the state of health and options for the course of various forms of pathology in modern conditions showed that in chronic pathology, the demographic situation is manifested by a slow generation change, lack of population growth, short average life expectancy and altered pathomorphosis [15,16].

According to hygienists [8], in the Aral Sea region, the content of xenobiotics in soil, water and in the atmosphere is higher than the maximum permissible standards that are dangerous to human life and health (lead, mercury, cadmium, chromium, their compounds, dioxins, ozone, etc.). The general rule is that the younger the child is, the more sensitive his body is to pathogenic factors of the external environment [8,9,10]. The features of the reactions of the child's body to the action of pathogenic factors are as follows: when the sensitivity to the action of xenobiotics in the child's body increases, this leads to disruption of the functioning of organs and systems in general - the development of secondary immunological insufficiency, the accumulation of salts of heavy metals, toxic radicals, neurotropic pesticides in the body of children conducts to delayed neuropsychic development and encephalopathy, as well as late development of reproductive disorders, which will manifest itself as androgenic syndromes in girls, late puberty in boys [18, 20].

The state of health of the child population, especially preschool children in the Aral Sea regions, causes justified concern. It is in the preschool period that the foundations of health are laid, the child must be prepared for the upcoming physical and neuropsychic stress [18]. However, as the data of modern studies show, every third child of 6 years old in the Aral Sea region is not ready for systematic schooling. Half of the children have deviations in the development of the musculoskeletal system, 30% suffer from disorders of

the cardiovascular and respiratory systems, almost 70% suffer from physical inactivity. In general, 90% of children entering school have disabilities in physical and mental development, 30-35% suffer from chronic diseases [7].

Such tendencies in the state of children's health are observed in all regions of the Aral Sea region of the Khorezm and the Republic of Karakalpakstan. Preschool age is characterized by large structural transformations of organs and systems of the body, as well as the development of processes of intrasystem and intersystem interactions [11,12,13]. This is a period of rapid growth, development and improvement of all body systems, which plays an important role in shaping the health of an adult. According to numerous data, a number of chronic diseases are formed already in preschool age [14, 20].

Changes in ecology in the Aral Sea region are reflected in the health of the younger generation in many respects, this is an increased incidence of respiratory organs, in the structure of morbidity in the first place - pneumonia, acute respiratory infections, bronchial asthma, bronchitis, a large tendency for the growth of gastrointestinal tract pathology in preschool children in combination with pathology of the urinary system, pathology of the endocrine system. Associations with unfavorable conditions of pregnancy, maternal toxicosis, anemias, intrauterine infection, ante-natal injuries, including perinatal damage to the central nervous system, have sharply increased. In the future, it requires a deeper study of the impact of environmental factors on the health and RF of children in the Aral Sea regions, in the development of methods for the prevention and reduction of morbidity and health promotion of children in the Aral Sea regions [20].

An increasing number of different specialists at all levels are involved in solving these problems, especially in the framework of scientific and technical cooperation as presented by UNESCO. It can be assumed that in the near future it will be recognized by everyone that only through joint efforts will scientists be able to achieve a qualitatively new level of knowledge and technologies for effectively protecting the environment and the health of the child population in ecologically unfavorable regions.

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## **CONFLICT OF INTEREST**

The authors declare that they have no competing interests.

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