

Impact of Environmental Factors on Children's Health in Uzbekistan : Review

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1 Introduction

Research of development of physical and functional appropriateness of young generation and its relationship with various environmental factors is of great social and economic importance as it is necessary for elaboration of preventive measures to protect and strengthen children health.

There are a lot of papers and books published on the impact of environment on children and adolescents health in Central Asia which necessitates to limit the review by the following major subjects:

- The regional characteristics of the environmental factors impact on morbidity of children and adolescents;
- Peculiar features of physical development, functional abilities, psycho-physiologic condition and the level of biological maturation of a child as the most important indicators of environmental impact on the health of growing body.

In the Central –Asian region with its diversity of nature and climate areas and multinational population, a special role urgency and practical importance are assumed by the research of physical development and health children and adolescents from different climatic and geographic areas, different ethnic and national groups. It is important to stress that most of studies were held to investigate the effect of factors of anthropogenic origin on natural environment and the condition of children health. This gave an opportunity to assess the shifts in physical and functional development of the children population under study. The research of children living under different nature conditions, especially under the conditions of hot climate, is of special importance.

Children body is known to be especially sensitive to the influence of a complex of environmental factors and the research of the character of the effect of different factors of anthropogenic and natural origin on children development is one of the most urgent problems of the present time. The main criterion of health of any individuum (a child) is the presence or absence of chronic diseases, the level of achieved physical and psychic development, the degree of functional condition of organs and system and the body resistance [1]. The necessity of consideration of as many factors influencing on the body of children and adolescents as possible is emphasized, changes in the environment and other factors of modern life are likely to be playing a significant role [2], [3].

2 Social and hygienic aspects

Unfavorable ecological and socio-hygienic conditions and related complications of the pregnancies and confinements, high level of women's general and gynecologic diseases, pathologies of newborn children negatively affect the health status of the infants and children of the early age.

The infant mortality rate in agricultural districts of Uzbekistan is shown to be related to high mortality rates in the early neonatal and postnatal periods. Among the causes of death the leading role was played by infectious-parasitic disease (29.8%), respiratory disease (21.3%), and perinatal pathology (17.1%). Risk factors influencing the infant mortality rate have been determined. They include socio-hygienic, medico-organizational, and biological factors. A rating prognosis table for individual estimation of death risks in infants of the first year of life has been compiled, and steps to reduce infant mortality have been planned [6].

Integration evaluation of importance of social, hygienic and biological factors made by Bayesian method allowed determine the following list of risk factors of infant morbidity [7]:

- Mother is younger 20 years (integration risk indicator "X"=3);
- First delivery (X=3.5);
- Extragenital diseases of mother (X=3.57);
- Pathologic course of pregnancy and labour (X=4.2);
- Mother's social status (workers and housewives) (X=9);
- Artificial feeding (X=6.4);
- Unfavourable psychologic climate in family (X=3.1).

The major biologic and socio-hygienic risk factors for infants are respiratory organs diseases and perinatal pathology, mother's social status (workers, students), mother's age (under 20 years).

For the purpose of obtaining a socio-economic characteristic of a rural family a complex survey has been conducted in three regions of Uzbekistan covering all families having children of early age. The findings showed that in rural areas of the republic women marry early and the birth spacing in 74-78 percent of women does not exceed 2 years. Rural women deliver babies during the whole period of reproductive age but when they reach the age of 28-30 the birth spacing increases. All rural families tend to have many children and there is no evidence that they might shift to having less children in the nearest years. About 60 percent of rural families have two babies under 3 years of age. Living and socio-economic conditions of most rural families are estimated as poor. Most of these families have many children, their health culture is poor and medical activity slow. Many of these families preserve old, at times negative traditions. The demographic development of a rural family does not correspond to the level of socio-economic development of the rural area. All this contributes to the formation of a slow dynamic lifestyle concentrated on narrow family interests. As a whole an average rural Uzbek family lags behind other such families from industrial regions of the country as far as their cultural and socio-economic development is concerned, and to overcome this backwardness it is necessary to create real conditions for more active involvement of population in different spheres of social and public activities [8].

3 Environmental Pollution

3.1 Air pollution

In connection with the idea that under conditions of contemporary towns, discharge to atmosphere by industry, automobile transport, thermal energy plants is one of the biggest source of air pollution, the research of its qualitative inter-relation with indicators of children morbidity becomes urgent. A number of studies were undertaken which demonstrated the impact of actual contamination of atmospheric air in industrially developed cities on the level of general morbidity of children. The children morbidity rate was shown to depend on the amount of summarized pollution of atmospheric air. It was found that children with different diseases were more often reported in the places with the worst pollution of atmospheric air. The total morbidity of children living in the areas with contaminated atmospheric air was 6,243.3 cases per 1,000 children versus 4,304.5 per 1,000 children from the control area, i.e. in 1.5 times higher [9].

The study of pair – relation between divisibility of exceeding the maximum allowed concentration (MAC) of chemical substances and the level of total morbidity confirmed the significance of chemical substances impact in the following order: hydrogen sulfide, sulphurous anhydride, nitric oxide, carbon oxide, formaldehyde. High α values are caused by the influence of not only chemical substances but other factors alike on the morbidity rate. So, the performed study resulted in determination of a correlation between the level of different ingredients in atmospheric air and some (nosologic forms of) diseases. The correlation allows to suggesting that a complex of chemical substances not being a direct cause of the diseases at the same time may contribute to development of conditions when they appear through reduction of non-specific resistance of the body.

4 Research on state of children's health

The complex evaluation of health status of children living in different ecological areas of Uzbekistan was given by Khalmetov [10]. On the basis of the obtained findings, a methodology of complex evaluation of income and living conditions of a family and regional criteria of assessment of their influence on a child's health, the criteria of evaluation of degree of tension of organs and system of the child depending on the impact of environmental factors were developed. The causes of children morbidity and its levels were studied using automatic systems. A technique of prognostic evaluation of changes in health of children population in association with the expected changes in environment pollution level was developed. Necessity of medical and social research of children's and adolescents' family was specially stressed as it allows to analyses deeply family factors without which it is impossible to study objectively the condition of health of children [9], [10]. The influence of such factors as harmful habits was shown to influence schoolchildren's health. The role of hereditary predisposition and genetic disorders in development of some pathologic conditions in children was emphasized [9].

There are findings on such a negative tendency as increasing number of children with chronic diseases and functional disorders, rise of gastro-enterologic, allergic and neuro-mental pathologies, metabolism disorder (obesity), blood diseases (anemia) vision impairment. Different chronic diseases were diagnosed in 40-45% of examined schoolchildren, 70% have different morphologic and functional disorders. The number of healthy schoolchildren is 20% (junior years) and 14% (senior years). In most of schoolchildren, chronic diseases begin developing at 11-12 years of age [11], [12]. In all the age groups of children and adolescents, the most often are respiratory diseases, then go diseases of the nervous system and sense organs, gastro-intestinal diseases, those of skin and subcutaneous fat [10], [11], [12].

The health status of schoolchildren residing in a rural area of Uzbekistan was studied. It also provides the results of an analysis of the pupils' morbidity rates by age, sex, pattern of chronic diseases and extent of their spread. Taking into consideration the cotton-growing specialization of agriculture in Uzbekistan, it is of great scientific and practical importance to make the comparative evaluation of physical development and morbidity rate of schoolchildren in the areas where pesticides are widely used [13], [14].

The high proportion of nervous and mental diseases concurrent with headache is associated with chronic pesticide intoxication. It is concluded that there is a need of a wide range of health promotion measures, removal of some poor exogenous factors, and improvement of socioeconomic living conditions of the Uzbekistan's rural population [14].

The study of health state of children visiting preschool institutions of the city of Tashkent in Uzbekistan showed that 80% them belonged to 2nd (morpho-functional disorders, high level of respiratory diseases incidence per year etc.) and 3rd health groups (existing of chronic diseases). Breathing exercises, point treating massage, therapeutic electrophoresis, galvanization, d'arsonvalization and others measures reduced disease incidence in children by half [15].

Table 1 : Prevalence of diseases per 1000 among rural schoolchildren of age 11-17 years

<i>Disease groups according to /CD-9</i>	Prevalence per 1000 of examined children	% to total number of diseases (structure)
3. Diseases of endocrine sy stem and disturbances of nutrition, metabolism and immunity	82.3	6.34
5. Mental Disorders	61.24	4.71
6. Diseases of the nervous system and sense organs	120.57	9.29
7. Diseases of the circulatory system	22.01	1.69
8. Diseases of the respiratory sy stem	107.18	8.25
9. Diseases of the digestive system	863.16	66.47
12. Congenital anomalies (defect of development)	23.92	1.84
Other diseases	18.18	1.4

The research of some scientists dealt with various aspects of development, prevention and treatment of caries in children. The comparative evaluation of the maxillo-facial system in children living in areas with different ecological environment and a positive correlation between the rate of dental diseases and the degree of environment contamination with harmful substances. A combined amount of pesticides and fluoric compounds as well as gases mixture is 2.8-23 times higher than the maximal allowed concentration (MAC) which significantly influence to development of caries and non-caries lesions of teeth, diseases of the paradontium and oral mucosa in children living in ecologically unfavourable cotton-growing and industrial areas of Uzbekistan [16].

5 Anaemia as a leading health problem among children

Anaemia is not itself a disease, but rather a condition, defined as a reduction in hemoglobin below acceptable physiologic lower limits, is considered to be among the leading public health problem in the countries of the Aral Sea Basin. Anemia can be acquired or inherited (thalassemia, hemoglobinopathies).

In Central Asia, clinical research has identified some individual predisposing factors, which increase the likelihood of anemia in children; the risk factors include having a mother who is anemic; premature birth; low birth weight; child was a twin; short birth interval between child and next older sibling; and a history of frequent illness by infectious diseases, and gastrointestinal tract disorders [17]. Anemia, biologic and medical aspects of anemic conditions in young children and endocrine regulation of corpuscular elements of peripheral blood as well as hematologic evaluation of adaptation ability had been studied by G.I. Shaikhova [18].

Statistical data attesting to the fact that during the development of iron deficiency anemia in schoolchildren, the hematological, biochemical indicators characterizing iron metabolism in the body and phagocytic activity of peripheral blood leukocytes, one of the parameters of cellular immunity, undergo noticeable changes had been provided. It has been noted that in the regions where toxic chemicals are intensely used, both children with iron deficiency and normal ones

demonstrate a significant decrease of phagocytic activity of leukocytes in spite of the fact that no quantitative alterations in iron metabolism are detectable in such a case [19].

The Muynak District located close to the Aral Sea has one of the highest estimated prevalence of anemia among young children in the Central Asian region. Laboratory tests confirm that iron-deficiency anemia is the primary form of anemia in this area. The study on prevalence and correlates of anemia in this district of rapidly changing social and economic conditions had been carried out in 1993 [20].

Questionnaire data and blood samples were collected on a random sample of 433 children aged 1 through 4 years. The mean hemoglobin level was 9.78 (SD = 1.80) g/dL. According to WHO criteria, 72.5% of the children had anemia (26.3% mild, 38.8% moderate, and 7.4% severe). Of the 173 children with complete results for ferritin, iron, and red cell distribution width, 95 (55%) had 2 or more abnormal tests results, indicative of iron deficiency. In both simple and stepwise multiple logistic regression models, only age, history of pica, and primary household water source were significantly associated with anemia status ($P < 0.05$). Age-specific anemia rates were 89%, 79%, 66%, and 48% for 1-, 2-, 3-, and 4-years-olds, respectively. The odds of anemia were 2.4 times greater for children with a history of pica than in those with no such history, and 2.4 times greater for children whose primary household water source was a communal tap than for those with a private household tap. No significant associations were detected between anemia and the child's sex, nationality, gestational age, birthweight, health history, or diet ($P > 0.05$ in all cases). Similarly, no significant associations were detected between the child's anemia status and parents' education, employment, socioeconomic status, or income; the mother's history of anemia or toxemia during pregnancy; or the number of or spacing between siblings [20].

A population based cross-sectional point prevalence survey was designed to determine the prevalence, severity, and causes of anemia, and to identify demographic, socioeconomic, sanitation, dietary, and personal risk factors for anemia in different segments of the general population of Muynak District of Karakalpakstan [21]. Of all of the 243 children under five years of age, 70.37% (171) had nutritional anemias and only 2.1% (5) had the anemia indicative of infection and chronic disease. Fifteen (6.2%) of the children under five had iron deficiency without anemia, and 52 (21.4%) had depleted retinol levels without anemia, of which 12 had both iron and retinol deficiency simultaneously. Twelve (4.9%) of the children had no anemia and no retinol or iron deficiency.

Of those under five years of age who were anemic, 97.15% had nutritional anemia, with 55% caused by simultaneous iron and vitamin A deficiency, 14% caused by iron deficiency alone, and 27.8% by vitamin A alone. Only 2.8% of the total anemia was caused by non-nutritional factors in this age group. The rate of anemia declined with age. There were no gender disparities of mean hemoglobin or rate of anemia. Of the 151 children five to 15 years of age, 17.9% were normal, 26.5% had nutrient deficiencies of iron, vitamin A or both without anemia, 7.3% had the anemia of infection and chronic disease, while 48.35 had nutritional anemia caused by vitamin A and iron deficiency. Nutritional causes of anemia were far greater than non-nutritional causes. When the subjects were separated into sex- and age-group categories, differences in mean hemoglobin and the rate of anemia emerged as shown in the table 2

Table 2: Mean hemoglobin and prevalence of anemia by sex and age group

Age Group	Sex	N	Mean Hgb g/dL	s.d.	mode	median	% of anemic children
Infants < 12 months	M	22	9.71	0.8	9.7	9.7	90
	F	20	10.53	1.5	10.1	10.5	60
Toddlers 12-36 months	M	113	9.12	1.81	7.4	9.2	88
	F	114	9.29	1.59	9.6	9.5	76
Preschool 36-60 months	M	96	10.51	1.67	10.2	10.7	61
	F	109	10.31	1.71	10.2	10.6	57
Schoolage 5<10 years old	M	66	11.59	1.39	11.8	11.8	63
	F	70	11.59	1.26	12.7	11.7	58
Adolescent 10<15 years old	M	53	12.12	1.22	12.9	12.3	35
	F	49	12.13	1.11	12.2	12.2	38

Note: there is no statistical difference in the mean hemoglobin or rates of anemia between the sexes in the same age group at the 0.05 level of significance [22].

6 Education and health

The conditions of education and bringing up, the body's functional condition were assessed, and some risk factors were revealed. The study focuses on relationships amongst functional abilities and level of psycho-physiologic development of school children living in Tashkent City and their health found that only about 18% of school children in Tashkent had no significant health problems (Health Group I). Health Group II, children with some morpho-functional problems, accounted for 51% of the region's children. The third Health Group, characterized by children having chronic diseases at the stage of compensation, included 26% of school children, while Health Group IV, children with sub-compensated chronic diseases, accounted for 4% of the child-age population. Among chronic diseases, those of digestive, respiratory and nervous systems, as well as the diseases of sense organs and endocrine pathology prevailed. In 30% of all examined children, limited functional abilities impaired learning and social adaptation. In this group of children 43% had chronic diseases, and the remaining 67% had various morpho-functional disorders. Overall correlation analyses were used to develop linkages between a child's health status and exogenous factors, including prevailing climatic, geographic, and ecologic and socioecologic condition's of the child's life. It was revealed that the most powerful links between contamination of the environment and children's health related to endocrine system diseases, nutrition levels, disorders of metabolism and immunity, blood and blood-forming organ diseases, and mental disorders.

The analysis of children with adaptation disorders showed that 43% had some disturbance of intra-uterine development, 17% had some pathology during the labour period, and there is speculation that an unknown percentage had some combination of both. It was found that 45% of children with adaptation disorders were born fifth or later, 50% and 8% of them were living in unsatisfactory and poor living conditions respectively, 16% were being raised in an unfavourable psychological climate, and 7% were from single parent families. Overall, the study showed that school children with health symptoms relating to environmental degradation had impaired nervous system function and processes, as well as more difficulty with memory functions and attention.

An additional concern is that the medical professionals, including specialists, often fail to detect morpho-functional deviations (i.e. Health Group II). Inaccurate and incomplete diagnoses often result in no or inappropriate medical treatments, and over time the health of these children can deteriorate to the status of Health Group III. Hence, it is necessary to improve the mechanisms for diagnosing various morpho-functional and immunologic deviations in children living in environmentally degraded areas [23].

7 Physical development and morbidity as the indicators of children's health

Physical development of children is one of objective phenotypic characteristics of the body which is formed under the influence of hereditary nature of a person and environment. It is combined influence of heredity the environment surrounding a person that determines his phenotype. It is known that children are the most susceptible part of the population to external factors, and anthropometric indices reflect the nutritional status and other conditions of children, that for its turn, influences health. According to the report of a WHO Expert Committee [24], "abnormally" short structure may be a result of infection, inadequate food intake, or psychological deprivation, or because of endocrine, metabolic, or other diseases. The proportion of the influence of hereditary factors and environmental conditions on development of some morphologic and functional signs in children (the body's height and weight, the lung's circumference, etc.) is widely discussed. Most research, devoted to the study of children's growth considers the question of child development by examining nutrition; these studies discuss causes of child growth retardation and its relationship to health, relationships between anthropometric indicators, different diseases and mortality, the difference in growth between various ethnic groups and countries. The research in this field which had been made in Central Asia for the last twenty years was undertaken in Kazakhstan [25], [26], Turkmenistan [27], Tadjikistan [28], [29], and Uzbekistan [30], [10], [31], [32].

The above listed scientists had studied the actual condition of physical development of children and adolescents in different climatic and geographic regions of Uzbekistan. The standards and tables to evaluate the level of their physical development were elaborated [31].

The body size of children under 17 years living in different territories of Central Asia was found to be unequal. To some degree these differences were caused by biologic peculiarities associated with the ethnic origin of children. At the same time the body size is associated both with the geographic place of living and ethnic and social conditions of the region. Anthropometric signs were indicated to depend on the geochemical structure of soil. For example, in the areas with a high level of phosphorus, calcium, aluminum, iron, the population is characterized by a large stature but in the areas with excess of cremium the stature is smaller while brachicephaly is more marked. In this connection, evaluation tables of physical

development of children and adolescents which were made on the basis of correlation between the signs may be used in practice only for those areas where the appropriate research had been performed [10], [25].

More than 90,000 Uzbekistan children were examined. The majority of them (83.3%) has normal physical development. In some regions the share of children with normal development was reduced. Method of investigation used in this work helps obtain objective information on the status of childhood populations and compare the results obtained in different regions [30].

The studies on physical development of children adolescents carried out in different ecological areas showed that the northern regions children and teenagers are taller than in the southern. Most of researchers explain this by two major reasons. First possible mixture of population; second geochemical peculiarities of the place which may influence the level of bone-forming elements (calcium, phosphorus, iron) in the soil and food products. It had been also observed that in the rural area, the general level of physical development (as a health indicator) is slightly higher than in towns through the height of village children is usually smaller.

The most intensive rate of boys' growth per year was found to be at the age under 17 years. A lower rate of growth per year in girls is explained by their earlier pubertal development: when this period begins the growth stops [34].

According to the coefficients of paired correlation, indicators of physical development (as indicators of children's health) are connected with various environmental factors in different ways. The factors characterizing the household and production harmful conditions, parents' health, the mothers' course of pregnancy and labour were shown to influence significantly the physical development of schoolchildren. This indicator had been studied in children of preschool age living in the area of the Aral Sea area. Composition of the data for the control area and the findings obtained in the pilot area showed a significant decrease in the indicators of growth and weight of children in the pilot area with unfavourable ecological situation [35].

Growth status of children under 12 years of age was studied in the Muynak District of the Aral Sea Zone [22]. As it was shown in the table, the prevalence of growth faltering in the under five and over 5-years-old groups was estimated based on distribution of anthropometric Z-scores for height-for-age (HAZ), weight-for-age (WAZ) and weight-for-height (WHZ).

Table 3 : Prevalence of growth faltering among children under 12 years of age, N=538

Growth category	Under 5 years old		5-12 year old	
	n	% < -2.00 s.d.	n	% < -2.00 s.d.
HAZ (stunting)	138/532	25.9	30/200	10.0
WAZ (underweight)	66/538	12.3	7/201	4.9
WHZ (wasting)	19/532	3.6	7/163	4.3

One of the vivid manifestations of the effect of environment pollution on physical development of children may be found in the Sariasiya district of the Surkhandariya province of Uzbekistan [75]. Discharge to atmosphere of fluorine hydrogen, sulphur dioxide and nitrogen dioxide by the Tadjik aluminum plant result in ecological disorders in the area. The research showed that pre-school children in the Sariasiya district have significantly low values of the body's length and weight compared to the same indicators in the control Djarkurgan district ($p < 0.001$). The average values of the body's length and weight of children in "contaminated" district were also significantly less than in other districts of the province ($p < 0.001$). Ecologically unfavourable situation in the Sariasiya district exerted a negative impact not only on physical development but also on endocrine status of children and adolescents. Diffuse enlargement of the thyroid gland of grades I-II in the pilot area was diagnosed in 1.6 times more often than in the control one (14.5% versus 9.1%). This difference was more evident in girls (21.7% and 12.2%, respectively). An increased rate of cryptorchidism was reported in boys living in the Sariasiya district (5.4%) in comparison with the control Djarkurgan district (1.6%).

When examined village schoolchildren from many regions, more significant deviations both in physical development and condition of their health compared to urban children. The research showed that physical development of children living in the control gardening areas better than in children from cotton-growing areas where pesticides were widely used. When studied physical development of children in differing by the extent of contamination districts of a large city, an evident correlation between the level of schoolchildren's physical development and the degree of environment pollution by discharge of various industrial and service enterprises as by automobiles. Especially interesting are the studies where the mechanisms of interaction and integration of exogenous (environmental) and endogenous (genetic) factors are investigated in their combined influence on the growth and development of the body of children and adolescents. All these factors, depending on the degree of their heterozygosity, determine different sensitivity and reactivity of children's body to external

stimuli. At the same time, even similar conditions of the environment may have different irritating power for the child's body depending on its sensitivity, liability and plasticity. That is why under the same conditions children of the same age may grow and develop at different rates and achieve different levels of their psychophysiological development [31].

6.1 Physical development and endocrine status of children and adolescents in the Aral Sea crisis area.

An emergency medical and sanitary situation developed in the Republic of Karakalpakstan and significant increase of somatic diseases has been found in medical examinations of big samples of Karakalpakstan population carried out in 1989. At the same time physical development (PD) of children as the basic population health criteria and endocrine status that plays crucial role in our adaptation to different internal and external environmental changes remained unstudied [36].

For the first time this indices has been investigated by us in 1989 on the basis of expeditionary study of the representative groups comprised by the 8,036 school and preschool boys and girls from 6 districts and 3 cities of Karakalpakstan.

In total 81.1% of children over Karakalpakstan displayed normal physical development. The most prevailing types of the PD deviation were weight deficiency (7.5%) and overweight (2.3%). A lag in growth by subnanism level was detected in 1.9% of tested children and acute lag in the PD (nanism) was found in 0.2% of examined children. Rural habitants more frequently displayed the PD deviations. The older were school children the more pronounced deviations they had. Thus the weight deficiency increased up to 10.5% in case of girls and up to 11.2% in case of boys, and subnanism increased up to 3.4% and up to 1,6% correspondingly.

Obtained results showed that most frequently children suffer of the first and second degree thyroid glands hyperplasia, which are registered as early as in preschool age. The rate of this hyperplasia is 8.5% for girls and 6.2% for boys. This index increases with time: in girls case – from 16.4% in the pubertal period to 31% in teen-age period and in case of boys' regression of the hyperplasiated thyroid gland -from 3.7% to 1%. Only 0.44% of girls and 0.1% of rural pubertal period boys were diagnosed for «the true» goiter. And 1.8% of investigated children had cryptorchidism. Another endocrine diseases were detected only in isolated instances and amounted only to 0.3% for boys and to 0.1% for girls.

Taking into account the continuous environmental deterioration in the Aral Sea Area we carried out in 1993- 1994 repeated study of 9,484 children and adolescents of the region including 4,834 girls and 4,650 boys.

The results of this study testify that for last 5 years physical development and endocrine status of the growing up generation have notably deteriorated.

The quantity of children with normal physical development reduced from 88.1% to 80.7% and number of weight deficiency cases increased from 7.5% to 11.4%. Moderate and pronounced growth cases lag amounted to as many as 2.8% of all studied people (girls - 2.8% and boys – 3.0%).

For the last 5 years the pathology of thyroid gland has also increased significantly. In total over Karakalpakstan the thyroid glands hyperplasia is registered in 2.4 times more frequently in comparison with 1989, when it used to come to 9.6% whereas by 1994 it has grown up to 23.3% (36.6% of girls and 9.6% of boys). The pronounced goitre morbidity increased in 9.4 times: from 0.17% to 1.6% (2.5% of girls and 0.5% of boys). The study of the hormonal profile displayed that 30% of people with swollen thyroid gland suffer of hidden hypothyreosis, which statistically more frequently influences the physical development.

Cryptorchidism has increased from 1.9% to 5.3%. Other endocrine violations increased up to 6.6%. Thus perspective researches confirm further deterioration of the young generation health and require urgent complex measures for its improvement [37].

6.1 Physical development and morbidity of children living in Tashkent (Uzbekistan)

The problem of relation between physical development and morbidity is of social and hygienic importance as it allows to make targeted correction of the system of health protection of children and adolescents. The objective of the study is to analyse the incidence of some diseases of schoolchildren with different level of physical development.

We have examined 3,200 children (1,612 boys and 1,608 girls) aged from 7 to 14 years and living in Tashkent. Height and weight of their body were determined according to “Unified method of examination and evaluation of physical development of children and adolescents” [38]. The evaluation of anthropometric indices was carried out by comparison with the local

standards [31]. The morbidity analysis was made according to “International Statistical Classification of Diseases and Related Health Problems”.

The schoolchildren were divided into three groups depending on the development rate, 66.7% of Uzbek children having medium level of physical development, 16.6% being in the group with accelerated development and 16.7% having retarded physical development.

The findings show the significant individual inequality of the children’s height and weight. The results of the study demonstrated that greater number of “healthy” children (about 85.5%) was found among those who had the “medium” level of somatic development. Among schoolchildren with the “accelerated” level of physical development 72.5% were healthy and only 65% of children with the retarded level of development.

According to our findings, the level of acute morbidity is decreasing reliably in children with the medium level of physical development as they grow up. During the years of observation (1998-1999) the highest incidence of acute respiratory diseases and angina was in children with accelerated physical development. When comparing this index in the groups of schoolchildren with the medium, corresponding to age, level and the retarded physical development, acute morbidity was found to be lower in the group of schoolchildren with the medium rate of physical development.

High rate of acute respiratory infections promoted greater allergization of schoolchildren with relatively accelerated physical development, more children suffering from various allergic diseases (the asthmatic component in different respiratory diseases, eczema, drug and food allergy).

The obtained results show that there is an inter-relationship between the level of physical development and the condition of the stomatognathic system in the children. Higher incidence of caries (0,82 cases per 1 child) was observed in children with accelerated physical development than in children with normal rate of physical development (0,76 cases per 1 child).

Table Morbidity rate in schoolchildren of different age-groups by the level of physical development

Level of physical development	Morbidity rate							
	by presentation records		by thorough medical examination results					
	ARI, angina		chronic tonsillitis		caries		attitude disorder	
	abs.	per 100 children in a year	abs.	per 100 children in a year	abs.	per 100 children in a year	abs.	per 100 children in a year
accelerated	182	125	333	71	385	82	174	37
medium	149	25	396	21	1322	69	435	23
retarded	109	74	171	36	360	76	123	26

The analysis of the obtained data revealed the influence of physical development level on the incidence of attitude disorders and scoliosis in children outstripping others in physical development. The former have this pathology 1.5 times as high as children with normal, corresponding to the age and gender, level of somatic development.

Tall children were determined to have overweight 1,2 times as often as children of medium height, in schoolchildren with early puberty the body weight increasing quicker than in other children. The girls having menstruation from 10-11 years of age developed overweight 2 times as often as the girls who had their first menstruation at 12-13 years. Therefore, early puberty increased the risk of obesity development in schoolgirls.

The tendency for higher rate of gastric ulcers, chronic gastritis and rheumatism was observed in schoolchildren with relatively slow physical development. Congenital heart defect, chronic TB intoxication, helminths invasion with intoxication were diagnosed in rate cases, but there was tendency to increase their incidence in the group of children with retarded physical development.

Thus, we had confirmed the existence of close relationship between physical development of schoolchildren and their health status. In children with relatively accelerated or retarded physical development, the level of general morbidity appeared to be higher than in children with medium level of physical development. Therefore, children with both accelerated and

retarded development can not be considered to be quite “safe” by their health condition, they are a peculiar “risk group” demanding thorough and constant checking up.

Conclusion

Analysis of existing literature data confirms that the problem of relation of indicators of physical development, puberty development and health of children and adolescents living in different climatic and geographic areas, socio-hygienic conditions of Uzbekistan has been studied. By the present time the role of a number of factors influencing the indicators of physical development and health of children and teenagers has been still unclear and requires further investigation.

On discussion of the problem of “environment and children health”, its socio-economic significance is emphasized first and explains necessity of preventive measures at the government level. In addition, the problem has some very important medical aspects associated with the ways of protection against harmful factors of environment and development of methods of diseases correction.

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