American Journal of Interdisciplinary Research and Development
ISSN Online: 2771-8948
Website: www.ajird.journalspark.org
Volume 27, April - 2024

ENDOCRINE PATHOLOGY AND ITS CONSEQUENCES IN CHILDREN

Abdurakhmanov Karshi Khalxodjaevich
Head of the Department of "General Medical Sciences" of the Medical Faculty of Gulistan State University. 120100, Republic of Uzbekistan, Syrdarya region, Gulistan, microdistrict 4. tel: +998994942961. qarshixonxolxodjayevich@mail.ru

Fayziev Olim Ayubovich
Teacher of the Department of "General Medical Sciences" of the Faculty of Medicine of Gulistan State University. 120100, Republic of Uzbekistan, Syrdarya Region, Gulistan, Microdistrict 4. tel: +998883706611. olimjonimronbek@gmail.com

Abstract
Data from domestic and foreign literature and statistical observations indicate unfavorable trends in the health of children associated with diseases of the endocrine system, especially diabetes.
In general, diseases of the endocrine system occupy a small proportion among the entire range of diseases that children suffer, which does not correspond to the severe social consequences and deterioration in the quality of life of this pathology.
New approaches to health assessment based on the determination of preventable health losses and reduction in active life years can identify diseases on which national health systems should focus their efforts.

Keywords: diseases of the endocrine system in children, morbidity, disability, mortality, medical and social consequences of endocrine pathology, health assessment, preventable losses, reduction in years of active life.

Introduction

According to WHO estimates, the incidence of diabetes is growing into a global epidemic. There are 177 million people with diabetes mellitus registered in the world, of which 10 million are children and adolescents; the number of newly diagnosed cases doubles every 15 years.
By 2025, according to expert forecasts, due to increased life expectancy, obesity, a sedentary lifestyle, and changes in diet, the number of patients may reach 250 million.
Many researchers believe that these data are underestimated, since approximately 50% of patients with diabetes remain undiagnosed, and, therefore, these people do not receive any glucose-lowering therapy, as a result they develop chronic hyperglycemia and dyslipedemia, which creates favorable conditions for the development of vascular disease. complications of diabetes [6].

More than 90% of children and adolescents with diabetes suffer from type 1 diabetes (T1DM).

A minority develop type 2 diabetes mellitus (T2DM), with an unusual onset in childhood or young adulthood.

Other rare conditions are even less common. The incidence of T1DM varies significantly around the world.

The highest incidence of T1DM in children and adolescents (more than 20 per 100 thousand per year) was found in the Scandinavian countries - Finland, Sweden, Norway (for example, in Finland 40/100 thousand cases per year), in Sardinia (Italy) and in Yemenite Jews in Israel.

The average incidence (7–19 per 100 thousand per year) is observed in the USA, New Zealand, the Netherlands, and Spain. Low (less than 7 per 100 thousand per year) - in countries such as Poland, Italy (except Sardinia), Israel.

Minimal incidence (less than 3 per 100 thousand per year) was noted in China, Korea, as well as in Chile and Mexico [7].

At the same time, in the vast majority of countries, an increase in the incidence of not only T2DM, but also T1DM is recorded.

The wide variability of incidence can be explained by genetic differences, changes in environmental factors due to the rapid development of industry, transport, population migration, and different levels of national well-being [3].

In regions with a high risk of developing diabetes, the incidence of new cases of type 1 diabetes is higher among males.

In addition, seasonal fluctuations in incidence rates have been recorded in these same regions.

The highest frequency of newly diagnosed cases of T1DM occurs in the autumn-winter-spring months, which coincides with the maximum incidence of viral infections.

There are two age-related incidence peaks. One peak occurs at ages 10–12 years, and a smaller age peak occurs at ages 5–7 years.

In regions with high incidence (Finland, Sweden, Denmark), there is a tendency to increase the incidence of the disease in children at an early age (0–5 years) .

The National Causes of Death in T1DM Study, conducted in England, found that patients aged 1–4 years were at greatest risk.

The cause of death in the majority of children (83%) was hyperglycemic keto-acedotic coma, in 8% of cases - hyperglycemic coma.

In 70% of children aged 12 years, death occurred due to cerebral edema (incorrect treatment tactics).

WHO experts provide data that the average life expectancy of patients with T1DM is less than half the average life expectancy of a healthy person.

According to epidemiological studies, if diabetes develops in childhood, life expectancy is on average about 30 years, that is, 50% of the average in the population.

In patients with later onset of diabetes (after 20 years), life expectancy is on average about 70% of that of a healthy person.

According to the literature, thyroid diseases currently lead in frequency among endocrine pathologies in children and adolescents.

Among all diseases of the thyroid gland, a significant place is occupied by pathological conditions associated with disruption of its function due to reduced iodine consumption.

Iodine deficiency conditions are among the most common non-infectious human pathologies.

According to WHO, about 2 billion people on Earth live in conditions of iodine deficiency, which leads to the development of diseases such as endemic diffuse and nodular goiter, hypothyroidism, mental and physical retardation of children, cretinism, and miscarriage.

The most common type in this group of diseases is iodine deficiency, or endemic, goiter, which occurs in the population in more than 5% of children of primary and secondary school age.

Based on literature data, it can be stated that a normal level of iodine consumption has been achieved in many countries of Western and Central Europe: Austria, Bulgaria, Croatia, Czech Republic, Finland, Germany, Iceland, Macedonia, the Netherlands, Slovakia, Sweden, Switzerland, Great Britain.

In three more countries – Greece, Poland and Serbia – the problem of iodine deficiency is close to being resolved.

Iodine deficiency still persists in 13 countries: Belgium, Bosnia, Denmark, France, Hungary, Ireland, Italy, Luxembourg, Portugal, Romania, Slovenia, Spain and Turkey [10,11].

Pregnant women, fetuses, newborns and young children are most sensitive to the effects of iodine deficiency.

According to the literature, in childhood and especially adolescence, common diseases of the thyroid gland, in addition to endemic goiter, include autoimmune thyroiditis and sporadic goiter.

Autoimmune thyroiditis in frequency accounts for 40% of all thyroid pathology in children and adolescents; its prevalence in childhood is in the range of 0.1–1.2%.

The peak incidence occurs in the middle of puberty. Autoimmune thyroiditis is the most common cause of acquired primary hypothyroidism (excluding surgical treatment of the thyroid gland, radioactive iodine therapy) [1,5].

It is observed in areas where there is no endemic goiter.

Nodular goiter in childhood and adolescence is less common than in the adult population; its prevalence among children in conditions of sufficient iodine intake or mild iodine deficiency does not exceed 1%.

Diffuse toxic goiter (Graves' disease) is a rare thyroid disease in pediatric practice and is more often observed in teenage girls; frequency – 1–2 cases per 100 thousand children annually.

The prevalence of congenital hypothyroidism in different countries varies significantly depending on the population: from 1:1650 in Lebanon, 1 case in 3000–4000 to 5000 births in Europe, North America, Australia to 1 case in 6000–7000 births in Japan[3,10].

In regions with severe iodine deficiency, congenital hypothyroidism occurs in 1% or more of newborns.

The disease is rarely registered in people of the Negroid race.

In Moscow, the frequency of congenital hypothyroidism is one case per 3141 newborns, which corresponds to the level of the disease in European countries [4].

In the structure of thyroid diseases, congenital hypothyroidism has one of the leading places.

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The child's central nervous system suffers the most from a lack of thyroid hormones, which subsequently leads to delayed psychomotor development and mental retardation.

The level of intellectual development depends on the timing of the start of replacement therapy and does not depend on the development of the thyroid gland.

Untimely detection, as well as late initiation of replacement therapy in the vast majority of cases causes a significant delay in the psycho-intellectual development of children and a decrease in their quality of life in the future.

Overweight children have become a matter of concern for doctors around the world. There is a worldwide increase in the incidence of obesity in children and adolescents [6,11].

The International Obesity Working Group estimates that around 45 million primary school-aged children and nearly 3% of children under 5 years of age are obese worldwide.

As reported at a conference on obesity (Milan, September 2003), one in three Italian children is obese.

Among European countries, Spain ranks second after Italy, where the prevalence of childhood obesity is 27%.

The prevalence of obesity in the United States has become an epidemic. Data from the National Health and Nutrition Examination Survey (NHANES) show that in the late 1990s, compared with the 1960s, the number of obese children aged 6 to 11 years more than tripled, from 4 to 15.3% [11].

This trend continued among adolescents aged 12 to 19 years, with prevalence increasing from 5 to 15.5% during this time period.

The increase in prevalence is most pronounced among Mexican Americans and African American adolescents. The prevalence of obesity and overweight in children of different ages varies widely, reaching 20–25% among schoolchildren and 2–6% among preschoolers.

At an early age, obesity occurs equally often in both boys and girls; among schoolchildren and adolescents, it predominates in girls (2:1).

Obesity more often dominates in the urban population, which probably reflects the less active lifestyle of urban children and their freer access to high-calorie refined foods. The most common form is constitutional exogenous obesity, the proportion of which is 75–97%.

Pubertal obesity, or hypothalamic pubertal syndrome, occurs in 3.7–4% of children and adolescents aged 11–17 years.

This is not only the most common form of obesity in adolescence, but also the most common endocrine-metabolic pathology of adolescents in general.

The cause of disability in children is impairments in vital activity that arise as a result of late complications of endocrine diseases. Disability level associated with diseases of the endocrine system, nutritional disorders and metabolic disorders for the period 2003–2008. statistically significantly increased due to children over 5 years of age, and has maximum values in the age group of 15–17 years.

This process occurs against the backdrop of a progressive decline in the overall incidence of disability among children.

The increase in the disability rate was due to T1DM, with the most significant factors in the development of disabling conditions being T1DM (64.5%) and thyroid diseases (10.3%) [5].

Conclusion

Thus, data from domestic and foreign literature and statistical observations indicate unfavorable trends in the health of children associated with diseases of the endocrine system, and especially with T1DM.

This situation can be improved by developing endocrinological care for children and increasing its accessibility, increasing “endocrinological literacy” of the general pediatric network, and increasing attention to the early detection of diabetes mellitus and predicting its complications.

In world practice, new approaches to health assessment are being formed, which make it possible to identify diseases and health conditions that have the most severe consequences for people, on which the efforts of national health care systems should be focused.

This idea is reflected in the concept of reducing “preventable health losses,” which are determined by the amount of reduction in years of active life due to the formation of chronic forms of disease, disability and premature mortality.

Calculations of lost years of active life due to various diseases make it possible to determine the reserves for their reduction, the rating of a particular pathology in the system of measures that should be given priority attention.

In our country, works have begun to appear on assessing the health of the population through the prism of determining health losses, but they are devoted to the study of reserves for reducing morbidity, disability and premature mortality from certain diseases among the adult population.

In general, diseases of the endocrine system and the disabilities caused by them occupy an insignificant proportion among the entire range of pathological conditions that children suffer.

However, when considering this pathology in the context of severe social consequences and deterioration in the quality of life, it becomes obvious that this picture does not correspond to the low rates of general morbidity and disability, on the basis of which decisions are made in the field of protecting children’s health and developing endocrinological care for children.

Assessing the reserves for preventing losses in the health of the child population due to diseases of the endocrine system will help measure the effectiveness of socio-economic and political measures aimed at protecting children's health.

The relevance of this approach in the current conditions is due not only to the high rates of morbidity and disability among the child population, but also to the unfinished reorganization of the healthcare system and the fragile economy of the country.

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