Procedia of Engineering and Medical Sciences
Volume: 01 Issue: 01 | 2022

Prevention of Hypovitaminosis in School-Age Children

Damirova Sarvinoz [1]
Abdullayeva Muqaddas [2]
Toshkanboyeva Durdona [3]

[1, 2, 3] *3rd year student of the 1st pediatric Faculty of the Tashkent Pediatric Medical Institute*

Abstract. With the arrival of the school year and throughout the entire process of intensive education and school attendance, the child's body experiences stress and a lack of vitamins, which is aggravated by the autumn-winter and spring seasons? At this time, children especially need a balanced intake of vital trace elements and vitamins necessary for the development of a growing organism and the normalization of brain function. Hypovitaminosis contributes to a weakening of attention and a decrease in physical activity, which leads to poor academic results and discipline violations.

Keywords: hypovitaminosis, a balanced diet, components of nutrition, vitamins.

Rational nutrition plays an important role for a healthy lifestyle and for the prevention of hypovitaminosis of a child. A balanced diet, as a rule, is able to meet the needs of all components of nutrition, including minerals and vitamins, which are involved in almost all metabolic processes of an intensively growing child's body. However, despite the fact that we have the opportunity to provide the growing body with the necessary vitamins and trace elements at the expense of food, in real life there are a number of significant problems. Most vitamins and mineral complexes are found in foods, but it should be remembered that no product includes them in a volume sufficient to meet physiological needs. At the same time, the content of vitamins in natural products of plant origin in winter and spring is significantly reduced. The lack of the possibility of providing gentle culinary processing of products (prolonged soaking, thermal exposure, etc.) is also the reason for the loss of useful properties. Therefore, not only in the winter-spring period of the year, the probability of developing vitamin-deficient conditions and hypovitaminosis (seasonal) increases, but also throughout the year. In addition, it is necessary to take into account the fact that the nutrition of a child in a preschool or school institution is very difficult to control, because most children have special gastronomic preferences and refuse to eat, which further aggravates the risk of hypovitaminosis. The global trend shows the practice of taking multivitamins (multivitamin complexes) for an average of six months or more. It should be noted that an additional factor that increases the risk of hypovitaminosis in children is the intensive growth of the body, which additionally causes a deficiency of vitamins and minerals.

The preventive and curative use of vitamin and mineral complexes in children should be based on clear ideas about the physiological functions and mechanisms of action of their components. It should be noted that vitamin and mineral complexes are not medicines, but are essential food substances that are necessary for the body to maintain vital functions. At the same time, the body does not synthesize or synthesizes them in insufficient quantities and therefore has to receive them ready-made: with food or in the form of special additives. Vitamins are usually divided into fat-soluble and water-soluble. Fat-soluble are vitamins A, E, D and K, water-soluble are vitamin C and B vitamins. In accordance with the classification according to their functional affiliation, vitamins are divided into the following three groups:

- Vitamins are precursors of coenzymes and prosthetic groups of enzymes. These are vitamins that the body is still completing. These include B vitamins -- B1, B2, B6, B12, folic acid, pantothenic acid and vitamin K, which works as a coenzyme in the processes associated with the blood clotting system.
- Vitamins-antioxidants. These are ascorbic acid, vitamin E, carotenoids, and bioflavonoids. The functional affiliation of vitamins of this group is that they protect the body from the destructive oxidative effects of oxygen. Oxygen, as a necessary vital element for the vital activity of the body, is at the same time dangerous for its destructive effect, therefore every cell and organ must be protected from its destructive action.
- Prohormones. This group consists of two vitamins - A and D, which actually turned out to be not vitamins, but prohormones, i.e. substances from which hormones are formed in the body. Vitamin D has a hormonal form - deoxycalciferol, vitamin A has a hormonal form - retinolic acid.

Vitamins A, B1, B2, B3, B5, B6, B12, C, D, K, biotin, folic acid are the most important components that ensure the adequate functioning of the body's immune system. Sufficient intake of vitamins in accordance with the changing needs of a growing child is a prerequisite for the normal maturation and functioning of the immune system, which makes it possible to maintain the body's resistance to infectious agents and eliminate the causally significant pathogen effectively enough. Vitamin A (retinol) is one of the key factors in the development of the immune response. Vitamin A deficiency is a global problem. Against the background of vitamin A deficiency in the body, the processes of repair of the epithelium of the mucous membranes slow down, the activity of the cilia of the ciliated epithelium decreases, the ability of neutrophils to phagocytosis decreases, the synthesis of specific antibodies, especially immunoglobulins of classes A and G, to a causally significant infectious agent decreases, the process of proliferation of T lymphocytes is inhibited, the cooperation of CD4 and B cells is suppressed, the gene expression of Th2-associated cytokines is limited, which leads to an increased risk of developing various infectious diseases.

Cholecalciferol (vitamin D3) is the most active metabolite of vitamin D, manifesting most of its actions through 1α,25(OH)2D receptors (VDR) and playing an important role not only in the metabolism of calcium, phosphorus, but also in the differentiation and growth of various cells of the body. Vitamin D3 actively affects the state of the immune system, increasing resistance to infectious agents, preventing the development of autoimmune diseases and neoplastic processes. Vitamin D3, inducing p21 and C/EBPß, enhances the differentiation of monocytes, antigen-presenting cells, and dendritic cells. Vitamin E (tocopherol), a fat-soluble vitamin, is one of the main antioxidants of the human body, an oxidant scavenger that protects cell membranes from the destructive action of oxygen-containing metabolites, and an essential component involved in the development of the immune response. Vitamin E deficiency is accompanied by an increase in the rate of lipid peroxidation of cell membranes, including immunocompetent cells, a decrease in the rate of proliferation of T-lymphocytes, IL-2 production, synthesis of specific antibodies and an increase in the synthesis of eicosanoid PGE2. Ascorbic acid (vitamin C) is an essential component of the vital activity of any cell in the human body, but its intracellular concentrations in leukocytes are especially high, the activity of which directly depends on its content. Vitamin C is an active participant in pathophysiological and physiological reactions of the body, including adequate immune response, stress, antioxidant protection, tissue regeneration. Vitamin deficiency C occurs as a severe general disease of the body, known as scurvy, or scorbuta. Subclinical vitamin C deficiency is one of the most widespread pathological conditions and is detected in most (up to 80%) of the population. Vitamin C increases the systemic resistance of the human body to infectious, viral and bacterial agents. One of the mechanisms of antiviral activity of vitamin C is its ability to activate the activity of serine/threonine protein kinases C, which leads to the activation of natural killers that ensure the elimination of viral agents. Vitamin C directly or indirectly prevents the destructive effect of oxygen-containing active metabolites on leukocytes. Vitamin C contributes to the suppression of inflammatory processes by inhibiting the transcription factor NF-kB, increasing the intracellular concentration of ATP.

B vitamins take part in almost all metabolic processes in the body: niacin (vitamin PP), thiamine (vitamin B1), riboflavin (vitamin B2) - in energy metabolism; pyridoxine (vitamin B6) and cyanocobalamin (B12) - in protein metabolism; folate - in the exchange of nucleic acids; pantothenic acid -- in fat metabolism, in the formation of coenzymes and prosthetic groups. Vitamins B1, B2, B6 are directly involved in the processes of metabolism and stimulate tissue regeneration. Vitamins B12, B6, B9 (folic acid) are essential

components of DNA synthesis, participate in the metabolism of phospholipids, myelin, homocysteine, and therefore determine the level of activity of the immune system. Replenishing the body's needs with vitamins is one of the main conditions for maintaining sufficient rates of physical development and an optimal level of resistance of the body to infectious diseases.

Children's meals should be alternated at least twice a week. Products with a minimum degree of technological processing should be included in the diet: unpolished rice, unrefined vegetable oils, meat, cottage cheese. Do not use prolonged heat treatment, which reduces the nutritional value of products. In such cases, it is recommended to cook steamed food, it is also worth not overheating vegetable oil. Include raw vegetables and fruits, nuts and dried fruits in the menu as often as possible. Lovers of homemade preparations need to make a choice in favor of pickled vegetables, not pickled ones, since vinegar marinade almost completely neutralizes the vitamins contained in vegetables. For children of the first year of life, prevention consists in breastfeeding (nutrition of a pregnant woman is the key to the child's health), timely introduction of complementary foods and supplementary feeding. It should be borne in mind that uncontrolled use of vitamins can lead to the development of hypervitaminosis. In addition, intoxication of the body may occur in the form of allergic reactions up to the development of anaphylactic shock. The use of vitamin preparations for children must be coordinated with the attending physician.

Modern multivitamins have specially selected complexes for preschool, primary school, and adolescent children. As a result of their reception, cognitive functions, attention and memory are improved, so that the child gets the ability to better assimilate and memorize more educational material. Oxidative processes and metabolism in the body are accelerated, the work of the brain and cardiovascular system improves, the liver and kidneys of the child receive additional protection from harmful effects, the overall resistance of the body to harmful environmental influences increases, the risk of respiratory diseases decreases, vision improves. The intake of vitamins and minerals is necessary for the balanced physical, mental and mental development of children.

References:

1. Gorbachev V.V., Gorbacheva V.N. Vitamins. Micro- and macroelements. Guide. Minsk: Book House, 2002.
2. Spirichev V.B. What vitamins can and cannot do. 3rd ed., additional M.: Miklos, 2003.
3. Griffith V. Vitamins, herbs, minerals and food additives: Handbook. Translated from English by K. Tkachenko. M.: FAIR PRESS, 2000.
4. Baranov A.A., Shcheplyagina L.A., Maslova O.I., etc. Vitamins and minerals for children's health: Textbook. M., 2003.
5. Low K. All about vitamins [trans. with engl. E.I. Nezlobina]. M.: KRON-PRESS, 1995.
6. Shcheplyagina L.A., Nesterenko O.S., Kurmacheva N.A., Marchenko T.K. Prevention and correction of vitamin and mineral deficiency in children and mothers. Informational letter. M., 2000.
7. Portillo-Castillo ZC, Solano L, Fajardo Z. Risk of macro and micronutrients deficiency in low income preschool children. Valencia, Venezuela. Invest. Clin., 2004.
8. Field CJ, Johnson IR, Schley PD. Nutrients and their role in host resistance to infection. J. Leukoc. Biol., 2002.