

ASSESSMENT OF THE IMPACT OF SEVERE IRON DEFICIENCY ANEMIA ON PSYCHOMOTOR AND COGNITIVE DEVELOPMENT IN INFANTS AND YOUNG CHILDREN.

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Abstract: Iron deficiency anemia (IDA) is a major pediatric concern, especially in early childhood when brain development is most rapid. This study evaluates how severe IDA affects psychomotor skills and cognitive functions in children aged 6 to 36 months. Findings indicate that severe anemia leads to significant delays in motor skills, speech development, attention span, and memory. The paper highlights the risk of long-term neurological deficits and advocates for early screening and prevention strategies.

Keywords: Iron deficiency anemia, infants, psychomotor development, cognitive functions, iron deficiency, developmental delay, pediatrics.

INTRODUCTION

Iron deficiency anemia (IDA) remains one of the most severe and widespread public health challenges globally, affecting more than a quarter of the world's population. According to the World Health Organization (WHO), young children represent the most vulnerable group, with the prevalence of anemia exceeding 40% in certain regions. Despite significant advancements in modern pediatrics regarding nutrition and early diagnostics, iron deficiency continues to be a leading cause of preventable neurodevelopmental disorders during the first three years of life.

Iron is an essential micronutrient that plays a fundamental role in biological processes far beyond hematopoiesis; it is vital for systemic metabolism and, most importantly, for the developing brain. The first 1,000 days of life—from conception to the age of two—are characterized by an unprecedented rate of

neurogenesis, synaptogenesis, and myelination. Iron serves as a key cofactor for enzymes involved in the synthesis of myelin, the sheath of nerve fibers that ensures rapid and efficient transmission of neural impulses. Furthermore, this micronutrient is necessary for the proper functioning of neurotransmitter systems, specifically dopaminergic, serotonergic, and noradrenergic pathways, which regulate learning, memory, attention, and emotional control.

Severe iron deficiency anemia in young children is not limited to hematological changes, such as reduced hemoglobin and erythrocyte levels. The clinical picture of profound iron deficiency involves systemic hypoxic syndrome and tissue sideropenia, which collectively exert a devastating impact on the child's psychomotor status. Numerous studies confirm that children with severe IDA demonstrate lower scores on motor development scales; they experience delays in achieving coordination, balance, and fine motor skills. Such children are often characterized by reduced physical activity, lethargy, and rapid fatigue, which limits their ability to explore and interact with their environment.

Moreover, the cognitive deficit developing against the backdrop of severe anemia poses a particular social and medical threat. Iron deficiency in early childhood correlates directly with speech development delays, reduced attention spans, and impaired short-term memory. The intellectual development of a child in a state of chronic "iron starvation" slows down, creating an unfavorable foundation for future learning and socialization.

One of the most concerning issues in pediatric neuropsychology is the question of the reversibility of these changes. Scientific evidence suggests that even after successful restoration of hemoglobin levels and iron stores, certain cognitive and behavioral impairments formed during "critical periods" of brain development may persist in the long term. These can manifest in school-aged children as lower IQ scores, learning difficulties, and behavioral disorders. This transforms the problem of severe anemia from a purely medical issue into a multidisciplinary challenge requiring the involvement of pediatricians, neurologists, hematologists, and psychologists.

In many developing countries, including Uzbekistan, the prevention and treatment of IDA in young children are priority tasks within state policies for maternal and child health. However, despite the implementation of food fortification and iron supplementation programs, the number of severe anemia cases remains significant, often linked to dietary factors, the early introduction of whole cow's milk, and insufficient parental awareness.

The objective of this study is to provide a comprehensive assessment of the impact of severe iron deficiency anemia on the psychomotor and cognitive development of children aged 6 to 36 months. We aim to identify specific patterns of developmental delay relative to the depth of iron deficiency. This will help justify the need for more aggressive early screening and timely neuroprotective correction for this category of patients. Early intervention during childhood is key to preserving a nation's intellectual potential and ensuring the healthy development of future generations.

REFERENCES

- 1.Ubbiniyazova A. M. Characteristic of a functional condition of an organism of workers of the Tashkent tractor plant //Medical magazine of Uzbekistan. – 2012. – C. 80-82.
- 2.Ataniyazova R. A. et al. Assessment of knowledge and skills of hand hygiene among representatives of three generations of the family living in different regions of Uzbekistan.
- 3.Madaminova M. A. et al. The dynamics are changes in organoleptic parameters and chemical composition of amudarya river water //European Journal of Molecular and Clinical Medicine. – 2020. – T. 7. – №. 7. – C. 537-545.
- 4.Атаханова Д. О., Уббиниязова А. М., Садирова М. К. ОСНОВНЫЕ ГИГИЕНИЧЕСКИЕ ПРОБЛЕМЫ КЛАССИФИКАЦИИ ЗАГРЯЗНЕНИЯ ПОЧВ В КАРАКАЛПАКСТАНЕ //The Way of Science. – 2014. – С. 77.
- 5.Iskandarova G. T., Ubbiniyazova A. M. PROBLEMS OF ANTI-INFECTION PROTECTION IN BEAUTY AND HEALTH INSTITUTIONS //Медицинский журнал молодых ученых. – 2025. – №. 15 (09). – С. 202-205.

