THE IMPORTANCE OF IRON DEFICIENCY ANEMIA PREVENTION FOR PREGNANT WOMEN'S HEALTH

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Abstract: Anemia is a pathological condition characterized by a decrease in hemoglobin concentration and, in the vast majority of cases, the number of red blood cells per unit volume of blood. Iron deficiency anemia (IDA) is a disease of global significance, affecting 2 billion people (30% of the world's population). Iron deficiency affects more people than any other health condition, making it a major public health problem. Iron deficiency anemia (IDA) is the most common deficiency and the most common form of anemia in pregnant women. The problem of iron deficiency disorders (IDD) and iron deficiency anemia (IDA) remains a pressing issue. Its clinical implications are extremely important, as the adverse effects of iron deficiency not only affect the woman's body but can also impact pregnancy outcomes and the health of newborns.

Anemia in pregnant women is a widespread problem that remains relevant today.

Key words: iron deficiency anemia, pregnancy, iron deficiency, hemoglobin, prevalence, prevention.

Relevance: IDA occupies one of the leading places in the structure of extragenital morbidity in pregnant women, since during pregnancy the need for iron increases sharply due to the high demand of the placenta and fetus, and an imbalance in the supply and demand of the essential microelement occurs. According to modern data, iron deficiency at the end of the gestational process develops in all pregnant women without exception. Iron deficiency anemia syndrome is characterized by weakening of erythropoiesis due to iron deficiency as a result of the discrepancy between the intake and expenditure (consumption, loss) of iron, a decrease in the filling of hemoglobin with iron, followed by a decrease in the hemoglobin content in the erythrocyte [1]. The study of anemia during pregnancy has a long history. Despite extensive research, the pathogenesis of anemia in pregnant women remains unresolved. According to various authors, almost 95% of anemias among pregnant women are iron deficiency, but only 50% of all anemias during pregnancy can be adequately corrected with the use of iron supplements [2]. It is believed that anemia as a chronic disease in pregnant women can be caused by chronic infections, autoimmune diseases, and smoking. In addition to iron deficiency, folate and/or vitamin B12 deficiency may play a significant role in the pathogenesis of anemia in pregnant women [3,4]. When considering a woman's macro-

and micronutrient needs during pregnancy and in preparation for it, the crucial role of folic acid cannot be overlooked. A deficiency triggers a cascade of negative consequences in the fetus. A normal amount of absorbable folic acid has a complex positive effect on the body of a woman carrying a fetus and the normal development of the embryo itself. Thus, folic acid plays a key role in the synthesis of nucleotides and DNA replication, which are involved in the processes of physiological division and normal growth of all cells [4,9]. This form of anemia disrupts the normal maturation of red blood cells, resulting from a deficiency of vitamin B12 or folic acid. Currently, according to the WHO, iron deficiency is the most common pathology worldwide after acute respiratory viral infections [3]. Iron deficiency leads to serious consequences, including loss of health and premature death. According to WHO (2015) and the World Bank, severe iron deficiency occurs in every third woman of reproductive age and every second pregnant woman. IDA is the third most common cause of temporary disability in women aged 15–44 years. Therefore, one of the UN goals is to reduce the prevalence of anemia in women of reproductive age by 50% by 2025 [4]. The human body contains approximately 4 g of iron: the majority (75%) of it is found in hemoglobin, a smaller portion is found in myoglobin (3.5%) and tissue enzymes (0.5%), and is also deposited in the liver and spleen as ferritin and hemosiderin. Some ferritin is present in plasma, and its concentration serves as an indicator of iron stores in the body [4]. One of the main criteria of IDA is the hemoglobin level. WHO experts have adopted a classification of anemia in pregnant women based on the concentration of hemoglobin (Hb) in the blood: mild anemia –Hb concentration in the blood from 90 to 110 g/l; moderate anemia – Hb concentration in the blood from 89 to 70 g/l; severe anemia – Hb concentration in the blood < 70 g/l. Also, the diagnostic criteria for IDA include: color index - < 0.85, micro and anisocytosis; average diameter of erythrocytes - < 6.5 μm; total iron-binding capacity of serum - > 64.4 μmol/l; serum iron - < 12.6 μmol/l and serum ferritin level (normally 32–35 μg/l), which serves as an indicator of iron deficiency in the body (≤ 12 μg/l) [1].

The problem of iron deficiency anemia (IDA) in the pre-pregnancy stage, during pregnancy and in the postpartum period does not lose its relevance due to the high incidence of this pathology, the frequency of which varies from 5.4% in developed countries to more than 80% in developing countries. According to the WHO, iron deficiency of varying degrees affects 20% of the world's population. According to the latest WHO data, the prevalence of anemia among the general population worldwide is 24.8%, with IDA most often found in preschool children (47.4%) and pregnant women (41.8%), while 30% of non-pregnant women also suffer from this pathology. Despite the achievements of modern medicine, IDA occupies a leading position among the most common diseases of humanity [5,6,8]. The development of IDA is caused by chronic blood loss, impaired iron absorption, increased need for iron during growth,

pregnancy and lactation, and insufficient iron intake from alimentary sources [9]. Among the risk factors that play a key role in shaping public health, a balanced diet plays a significant role. From a modern perspective, the key areas for preventing nutrition-related anemia include:

1) informing the population about the principles of rational nutrition;

2) targeted correction of deficiency states in individuals at risk, especially in established risk areas;

3) increasing the proportion of foods in the diet that provide vitamins and minerals;

4) developing specialized functional foods for the prevention and correction of anemia;

5) the use of biologically active additives - nutraceuticals containing nutrients with a proven etiopathogenetic role in the formation of anemia. The purpose of micronutrients is to enrich essential food products with them. When choosing the type of product for enrichment, taking into account the established violations of the nutritional status of the population and obtaining the greatest preventive effect, a group of dairy products related to socially significant mass-consumption goods, which are a natural source of many essential nutrients, was considered first. In addition, milk is a good substrate for the introduction of fat-soluble substances, lacto and bifidoflora [10,11]. ron requirements during pregnancy increase from 0.8 mg/day in the first trimester to 7.5 mg/day in the third trimester (an average of 4.4 mg/day). On average, a normal pregnancy requires an additional 1,240 mg of iron. Studies have shown that many non-pregnant women have reduced iron stores: 42% have serum ferritin less than 30 μg/L, and only 14–20% of them have ferritin levels greater than 70 μg/L, [12], i.e., iron stores balance the needs of a normal pregnancy [7,12].

Objective: To study the course and prevalence of iron deficiency anemia in pregnant women. To determine the importance of prevention and its impact on health.

Iron deficiency is known to be the most common nutritional deficiency worldwide and the most common cause of anemia in pregnant women (up to 75%). According to the World Health Organization, anemia during pregnancy is defined as a decrease in blood hemoglobin to less than 110 g/L, and in the second trimester, less than 105 g/l. It is known that during pregnancy, a woman's body undergoes a number of physiological changes, including changes in blood flow. Total plasma volume increases by up to 50% of its initial value, while globular volume increases by only 25%. As a result, the need for microelements and vitamins necessary for the synthesis of hemoglobin and ensuring the normal development of the fetus and placenta increases [6,12]. Iron deficiency anemia is the most common extragenital pathology in pregnant women. Its importance is determined by its impact on obstetric and perinatal outcomes, as iron deficiency negatively impacts pregnancy and fetal development. Timely

detection, treatment, and prevention of iron deficiency conditions during pregnancy are necessary to reduce the risk of complications [5,6,13]. Iron deficiency anemia (IDA) occurs in 6–30% of the population. More than 90% of cases of anemia in pregnant women are due to iron deficiency, with the incidence of IDA varying depending on the region's level of socioeconomic development. Risk factors for the development of IDA during pregnancy include: increased iron requirements, insufficient iron in the diet, blood loss from previous pregnancies and/or menstruation, and a short interval between births; conditions that prevent adequate iron intake or impair its absorption (nausea and vomiting during pregnancy, inflammatory bowel disease, etc. [6,13]. In Uzbekistan, iron deficiency anemia (IDA) is found in 80% of pregnant women, 60% of women of childbearing age, and 57% of school-age children. UNICEF data assessing the prevalence of IDA in Central Asian countries indicates a high and progressive level of anemia, especially among women and children. Epidemiological studies conducted in various regions of Uzbekistan have shown that the incidence of manifest iron deficiency in the form of IDA among the most vulnerable risk groups is impressive. Moreover, IDA is significantly widespread in risk groups in the regions of the Southern Aral Sea region, which is an area of environmental distress. Considering that all epidemiological studies use the analysis of hemoglobin (Hb) content in the blood as a screening method for detecting iron deficiency, which allows identifying only manifest (obvious) ID, then it can be assumed that a large mass of the population suffering from latent (hidden) forms of ID remains outside the field of view of researchers [14]. Iron deficiency, which leads to hemodynamic, metabolic, immune, and hormonal disorders, contributes to complications during pregnancy and childbirth, disrupts placental formation, increases the risk of perinatal pathology, and can be one of the causes of prematurity and disruptions in early neonatal adaptation. Maternal anemia affects placental vascularization, disrupting angiogenesis in early pregnancy and can cause premature placental abruption and bleeding in the placental and early postpartum periods. The fetus receives iron from the mother through active transport across the placenta, primarily in the third trimester of pregnancy [7,15,22]. The development of anemia is preceded by sublatent and latent forms of iron deficiency, associated with increased iron requirements during gestation. Particularly relevant remain the issues of early diagnosis of preclinical forms of iron deficiency with subsequent correction of the deficiency of this element, which allows avoiding undesirable phenomena associated with the development of anemia [7,11,16,22].

Materials and methods of the study: The study group consisted of 62 pregnant women (during pregnancy) residents of the city of Tashkent, aged 20 to 35 years (the average age was 29.7±0.25 years). The study was conducted through family clinics. To obtain a general picture of health, clinical blood tests were performed on all pregnant women, even if they had no complaints (this helps detect changes as early as possible

and initiate treatment immediately to avoid complications). Among pregnant women: 32 with IDA and 30 in the apparently healthy group. Women in both groups, starting in the first trimester of pregnancy, showed a significant decrease in hemoglobin levels, red blood cell count, color index, and hematocrit.

Results: During the observation period, the amount of hemoglobin in the first trimester of gestation in healthy pregnant women was 101±1.2 g/l, in pregnant women with IDA - 77.2±3.7 g/l. (P<0.05), in the second trimester - 97±0.82 and 71.4±0.53 g/l, respectively, in the third trimester - 103±1.2 and 61.5±3.5 g/l (P<0.05). The hematocrit level in the first trimester of gestation was 32.1±2.0 in healthy pregnant women, 30.2±2.5 (P<0.05) in pregnant women with IDA, in the second trimester – 32.0±1.78 and 30±2.3 (P<0.05), respectively, in the third trimester – 30.1±2.6 and 29.1±2.0 (P<0.05). Red blood cell counts experienced a compensatory decline during physiological gestation. This was especially characteristic of the second trimester of gestation. By the end of the third trimester, a trend toward normalization of hemoglobin levels, red blood cell counts, and hematocrit was observed. This is associated with increased consumption of important micronutrients for the successful development of the fetus. Women with IDA experienced a 10-fold higher risk of miscarriage than healthy women, directly proportional to the severity of IDA. The prevalence of anemia gradually increased from early pregnancy (2.7%) to the second trimester (14.7%), reaching a peak at the end of pregnancy (16.6%). The overall prevalence of anemia was 23.5%. The most common adverse effects of iron deficiency anemia during pregnancy include growth retardation, fetal hypoxia, and an increased risk of intrauterine infection. Newborns often develop anemia, malnutrition, and hypoxemia of varying severity [1,5]. Therefore, reducing the prevalence of anemia by 50% in women of reproductive age, along with combating malnutrition and overweight, is one of the WHO global goals by 2025 [17,20,21].

Conclusions: Currently, the problem of IDA remains relevant and is widely discussed in the scientific community. Guidelines from professional medical organizations offer varying views on the classification and diagnosis of IDA, but most emphasize the need to diagnose IDA. The most reliable criteria for verifying ID and predicting IDA are determining the level of hemoglobin and serum ferritin. Drug prevention of IDA during pregnancy, according to WHO recommendations, consists of prescribing 60 mg of elemental iron per day no later than the beginning of the second trimester of pregnancy [9,20]. High-risk groups for the development of IDA include patients with a history of anemia; a history of menorrhagia; multiparous women; women with extragenital pathology, chronic infectious diseases; pregnant women with a hemoglobin level in the first trimester <120 g/l; pregnant women with multiple pregnancies; pregnant women with early toxicosis, preeclampsia. In developing countries, where the incidence of IDA can reach 80%, routine prophylaxis is common

because the traditional diet does not provide women with sufficient iron, and some infectious diseases increase the risk of iron deficiency. In developed countries, preference is given to selective prevention: an individual approach based on the rational prescription of iron replacement therapy based on laboratory test data indicating the presence of iron deficiency (based on serum ferritin levels). However, even in developed countries, routine iron supplementation may be recommended: for example, in the United States, the American Association of Obstetricians and Gynecologists recommends 30 mg of elemental iron per day for all pregnant women during the second and third trimesters. The Centers for Disease Control and Prevention and the American Dietetic Association recommend 30–60 mg of elemental iron per day for all pregnant women from the time of first presentation about pregnancy [14,20]. Prevention of iron deficiency anemia should be comprehensive and individualized, and the choice of drug to replenish iron deficiency should be based on high bioavailability of the drug while minimizing side effects. According to available data, oral administration of divalent or trivalent iron preparations is insufficient for the treatment of moderate to severe anemia. In this case, it is necessary to combine the administration of iron sulfate preparations with the prescription of prolonged or recombinant erythropoietin with a transition to intravenous administration of iron preparations. [16,21]. Complications of IDA in the third trimester for newborns include the development of anemia, impaired development of the nervous system and cognitive disorders, which requires active prevention in the second trimester, including the use of parenteral iron preparations [18,19].

Prevention of iron deficiency anemia in pregnant women is the study of iron reserves and hemoglobin levels at the stage of pregnancy planning, and if deviations from the norm are detected, their timely correction, consumption of foods with a high iron content, taking vitamin and mineral supplements, eating foods rich in iron, folate, vitamin B12, vitamin A and other nutrients, and eating a healthy diet with a variety of foods. The body requires iron to synthesize hemoglobin. The need for this compound increases significantly during pregnancy. If iron stores are insufficient and the body doesn't get it from food, iron deficiency anemia develops. This is the most common type of anemia in pregnant women. Up to 52% of expectant mothers experience it. Therefore, it's important to maintain a balanced diet even before pregnancy to replenish your iron stores. And if you've already been diagnosed with an iron deficiency, don't delay treatment. It's important to prepare for pregnancy well in advance.

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