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IRON DEFICIENCY ANEMIA AND PREGNANCY

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Iron deficiency anemia (IDA) is a condition in which there is low hemoglobin level due to insufficient iron. And it is the most common cause of anemia in overall world. A detailed health data could be acquired such as parity, menstrual characteristics, infections, previous iron or blood transfusions, etc. The Government needs to take solid steps to improve the quality of education and socioeconomic status of females, increase the number of health care providers and intensify public education. Health behavior's need to be changed and adherence to the prescribed programs by the government is needed. Providing long term iron supplementation and dietary modification starting from adolescence may improve the hemoglobin levels and later on prevent anemia in pregnancy.

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INTRODUCTION:

Iron deficiency anemia (IDA) is a condition in which there is low hemoglobin level due to insufficient iron. And it is the most common cause of anemia in overall world [1]. Globally it has affected 3 billion people in which pre-school child has reached at the top (47.4%) and the pregnant women (41.8%) whereas men with the lowest prevalence (12.7%) [2].

Anemia is the one of the major risk factor in pregnancy for both mother and the fetus. Anemia is associated with different conditions like pre-term labor, pre-eclampsia, and maternal sepsis [3]. The WHO defines anemia during pregnancy as a hemoglobin level of less than 11 g/dl or hematocrit level less than 33%, at any point during pregnancy.

Anemia has divided into three categories on the basis of its severity: HB concentration less than 7.0 g/dl fall into severe anemia, in moderate anemia there is HB level between 7.0-9.9 g/dl whereas in mild anemia HB level range from 10.0-11.0 g/dl. It has multiple factors including nutritional, genetic, frequent labour, multiparity, abortions and infectious disease, however, iron deficiency is the cause of 75% of anemia cases [4]. Iron deficiency anemia could be due to physiological or pathological causes. In physiologic cause there must increase demand during growth and development however pathological causes link to loss of iron in any chronic condition [5]. Iron deficiency anemia has also directly linked with parity and gravidity. Literature shows that socioeconomic status, BMI, education, maternal Hb, maternal serum ferritin, and low birth weight has no significant association.

A full blood count is taken routinely in pregnancy and may show low hemoglobin, mean cell volume (MCV), mean cell hemoglobin (MCH), and mean cell hemoglobin concentration (MCHC); a blood film may confirm presence of microcytic hypochromic red cells and characteristic 'pencil cells' [6].

Iron deficiency anemia arising in pregnancy depends on two reasons: the amount of iron stored at the time of conception and the amount of iron absorbed during gestation. Due to increased demand of iron during pregnancy, most of the women are suffering from IDA. WHO has given the difference of iron deficiency between pregnant and non-pregnant woman which is 32.4% and 44.2% respectively. During pregnancy iron demand increase up to 10-folds, form 6mg/day to 22mg/day in first and third trimester respectively. This increased demand during pregnancy cope up with stored maternal iron that further leads to iron deficiency anemia.

The fact that anemia frequently does arise indicates both that pre-existing stores are often inadequate and that physiological adaptations are insufficient to meet the increased requirements [7]. Both developed and under developed countries are suffering from anemia. The pathophysiology of iron deficiency anemia is when iron demand gets higher or the intake decreases, the small intestine will increase the absorption of iron to meet the needs of body. If iron stores become deficient, many hematologic parameters get affected. When tissue iron store decreases, serum ferritin level decreases, when iron stores are virtually depleted, transferrin saturation also decrease which leads to diminished supply of iron to the erythroid precursor. This impaired erythropoiesis results in reduced erythrocyte indices. Therefore, a normal cell replaced by impaired cell. Low MCH and Low MCH concentration show drop in hb level. Because of the normal physiologic changes in pregnancy that affect the hematocrit and certain other parameters, such as hemoglobin, reticulocytes, plasma ferritin, and unsaturated iron-binding capacity, diagnosing true anemia, as well as determining the etiology of anemia, is challenging [8]. iron-deficiency anemia and folate deficiency megaloblastic anemia are the most common anemia's. in women who have inadequate diets and who are not receiving prenatal iron and folate supplements these anemias are more common among them.. In addition, anemias such as thalassemia and sickle cell disease can have an impact on the health of the mother and fetus. The most frequent causes of true or absolute anemia are nutritional deficiencies. Oftenly, these deficiencies are multiple, and the clinical presentation may be complicated by attendant infections, generally poor nutrition, or hereditary disorders such as hemoglobinopathies [9,10]. However, the fundamental sources of nutritional anemia embody insufficient intake, inadequate absorption, increased losses, expanded requirements, and insufficient utilization of hemopoietic nutrients. Almost 75% of all anemias diagnosed during pregnancy are due to iron deficiency. Significant deficiency of iron leads to characteristic hypochromic, microcytic erythrocytes on the peripheral blood smear. Other causes of hypochromic anemias, even rare, must be considered, including hemoglobinopathies, inflammatory processes, chemical toxicity, malignancy, and pyridoxine-responsive anemia. Whereas the greater percentage of the remaining cases of anemia in pregnancy other than the iron-deficiency type consists of the megaloblastic anemia of pregnancy due to folic acid

deficiency and, to a lesser extent, to vitamin B12 deficiency [11]. Anemia caused by deficiencies of other vitamins or elements does not commonly occur in humans.

Obviously, severe anemia has adverse effects on the mother and the fetus. Evidence states that less severe anemia is associated with poor pregnancy outcome. However, Hb levels even lower may lead to significant morbidity in pregnant women, such as infections, increased hospital stays, and other general health problems [12]. A lot of symptoms and signs may accompany this clinical state, to a variable degree. The commonest of these are headache, fatigue, lethargy, paresthesia, and the clinical signs of tachycardia, tachypnea, pallor, glossitis, and cheilitis. In more severe cases, especially in pregnant women with hemoglobin levels less than 6 gr/dl, significant life-threatening problems secondary to high-output congestive heart failure and decreased oxygenation of tissues, including heart muscle may be encountered. [13]. These conditions if untreated by iron supplementation or blood transfusion may lead to severe complications.

There are a lot of indications that severe maternal anemia in pregnancy is associated with poor pregnancy outcome and that the cause of this association has yet to be elucidated [14]. Some authors believe that even a mild reduction in Hb level (8–11 gr/dl) may produce a predisposition to these conditions; in contrast, other authors support a direct relationship between anemia and fetal distress only when the maternal Hb levels re less than 6 gr/dl.13 It is important to know what effect the iron status of the mother has on the iron status of the fetus for definitive and correct conclusions about management. There are controversial opinions about this: some investigators found that levels of maternal iron exert little effect on that of the neonate at birth. On the other hand, studies of cord blood serum iron levels have shown a direct relationship between maternal and fetal iron levels [15]. It was found that babies born to mothers who did not take iron supplements during pregnancy had reduced iron stores at birth when serum ferritin is used as an indicator of iron status. Most authors agree that only severe anemia may have direct adverse effects on the fetus and neonate and that a mild to moderate maternal iron deficiency does not appear to cause a significant effect on fetal hemoglobin concentration. There are several reports that correlate the anemia during pregnancy with prematurity and low-birthweight infants, indicating a direct relationship between low birth weight and low maternal Hb level. In a large epidemiologic study, it was shown that the risk of a preterm delivery was increased by 20% in pregnancies with Hb levels between 10 and 11 gr/dl. Below 9 gr/dl, the risk was more than doubled, tripled, and so on for each fall of 1 gr/dl.21 In the same study, no correlation was found between maternal Hb levels and growth retardation. Literature study reports that perinatal mortality was found to be tripled when the maternal Hb levels fell below 8 gr/dl in comparison with Hb levels above 11 gr/dl. [16] In addition, Garn et al. demonstrated an association between low maternal Hb levels and poor pregnancy outcomes such as prematurity, low birth weight, fetal death, and other medical abnormalities with increasing complication rates when there were lower maternal Hb concentrations [17]. All these reports are strong indications of an adverse effect of maternal anemia on fetal growth and pregnancy outcome. Nevertheless, it would be better, at least in cases of mild to moderate maternal anemia, to characterize these simply as possible risk factors rather than as an adequate evaluation indicating an obvious adverse impact on the fetus. Moreover, it is important to stress that low maternal Hb levels are often associated with other pathologic conditions, so it is difficult to be sure whether maternal anemia per se causes or even contributes directly to the increased mortality and morbidity rates. In other words, low Hb levels are often a secondary phenomenon caused by antecedent infections or chronic illnesses that in turn may lead to severe complications during pregnancy that do not fundamentally depend on the hematologic profile of the pregnant woman.

DISCUSSION:

The most prevalent micro nutrient is iron deficiency combined with anemia in pregnant women with serious health issues is often associated with other nutritional disorders (particularly folic acid, zinc, vitamin A), and frequently has a secondary cause or association [18]. The prevalence is greater in parous women and in multiple pregnancies. The causes of ID and IDA in the developing world are often different from those in developed countries. Appraisal of iron stores in pregnancy is problematic because of complex physiological changes· Iron deficiency anemia during pregnancy is linked with intrauterine growth retardation, premature birth, low birth weight, increased labor time, higher risk of infection, elevated maternal and prenatal mortality, muscle dysfunction, and low physical capacity. The anthropometry of the mother and her nutritional intake are thought to be among the most important. The most reliable available current diagnostic test for ID is a low serum ferritin. Concentrations <20 µg/L are a very good index of ID. Dietary intake alone to maintain iron stores in pregnancy is unlikely to

succeed because of the increased requirements for iron during pregnancy. Oral supplements at a low dose (40 mg elemental iron per day), starting from at least mid-gestation, can ameliorate ID and IDA and improve neonatal outcome and maternal wellbeing, Intermittent oral treatment regimens (weekly or twice weekly) are an alternative therapeutic option, particularly in areas of limited supply or access [19] [20] Over-treatment with iron in pregnancy may be associated with an increased risk of prematurity and infant mortality.

Intravenous iron has a role in the treatment and avoidance of ID and IDA, particularly in women who present late, and/or display severe deficiency or anemia, or who are intolerant of oral iron. It was observed that the etiology of iron deficiency remains the same over the decades. Multiparity, short birth spacing, poor socio economic statuses, lack of education were responsible for high prevalence of IDA. Besides this, it was observed that majority of women attended clinic during the 2nd trimester of pregnancy. So they had lack of iron intake at the time of conception [21] [22] Non-compliance of iron supplementation was also observed to be an important contributory factor.

Almost all the South Asian countries including Pakistan have national level anemia control programs but this problem still persists. This study will provide a base upon which strategies against the eradication of IDA will be made. Intervention only with iron and folic acid supplements is not adequate to combat this problem but this issue requires a multi-faceted approach. Besides regular screening of hematological parameters during pregnancy, nutritional education and counseling should as a part of anemia eradication plan. Researchers should concentrate on preventive supplements and food fortification approaches.

A detailed health data could be acquired such as parity, menstrual characteristics, infections, previous iron or blood transfusions, etc. The Government needs to take solid steps to improve the quality of education and socioeconomic status of females, increase the number of health care providers and intensify public education. Health behavior's need to be changed and adherence to the prescribed programs by the government is needed. Providing long term iron supplementation and dietary modification starting from adolescence may improve the hemoglobin levels and later on prevent anemia in pregnancy.

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