Original Article

FREQUENCY OF IRON DEFICIENCY ANAEMIA IN PREGNANCY

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ABSTRACT

Objective: *independent of gestational age, to ascertain the prevalence of iron deficiency anaemia in pregnant women.*

Study design: *a descriptive study*

Duration and place of study: *From January to Dec 2013, descriptive research was carried out at the Mardan Medical Complex's Gynae-B Unit in Mardan.*

Material and methods*: In 2013, descriptive research was carried out at the Mardan Medical Complex's Gynae-B Unit in Mardan. All Gynae B Unit pregnant patients, both indoor and outdoor, met the inclusion criteria. Of these expectant patients, 100 with a haemoglobin percentage of less than 10 gm/dl underwent further testing, including a detailed history assessment and questionnaire completion. All pertinent tests for iron deficiency anaemia were performed, including serum ferritin, Hb electrophoresis, and a complete blood picture. The whole blood picture also determines anaemias other than iron deficiency. The patient's iron status is determined by serum ferritin, but the various forms of haemoglobin in the blood are identified by haemoglobin electrophoresis. Results: Out of 100 patients, 73% had iron deficiency anaemia, 6% had thalassemia, and there were warning signs of hemolytic anaemia and blood loss anaemia from eclampsia, APH, and PET. In one instance, severe iron deficiency anaemia was discovered to be caused by a malarial parasite.*

Conclusion: *The most common type of anaemia during pregnancy is iron deficiency due to the increased demand for iron stores from repeated pregnancies.*

Key Words: *Haemoglobin, pre-eclamptic toxaemia, antepartum haemorrhage, total iron binding capacity.*

INTRODUCTION

Iron is necessary for the human body to produce haemoglobin, which is the material that delivers oxygen throughout the body in red blood cells. Furthermore, myoglobin stores oxygen, a protein found in muscles that transport oxygen and encourage cell growth.1. Iron is abundant in red meats, vegetables, and other foods; a well-balanced diet may often provide an adequate quantity of the mineral. However, when there is insufficient iron in the diet or due to blood loss, the amount of haemoglobin in the circulation is reduced, and oxygen cannot be properly transported to tissues and organs throughout the body. The resulting disease, iron deficiency anaemia, is characterized by fatigue, pale skin, headaches, dizziness, weariness, weakened immunity, and lack of energy [1]. There is a considerable risk of iron deficiency in pregnant women. The increased need for iron during pregnancy may help to explain this. While dietary iron intake is inadequate in wealthier countries to meet a pregnant woman's iron requirement, iron deficiency is mostly a problem in underdeveloped nations. Most expecting moms have low or nonexistent iron levels at the start of their pregnancy [2]. Insensible iron losses during pregnancy are estimated to be 1 mg daily.

In contrast, daily needs are around 4 mg. If the expectant mother's iron levels were low before becoming pregnant, iron deficiency will become apparent.3. As an iron deficiency deepens, ferritin levels

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initially decline and then serum iron levels. Later in life, haemoglobin concentration starts to drop [3, 4], Inadequate iron. One of the main causes of maternal morbidity and death is anaemia. Iron-dependent enzymes found in every cell are impacted when iron deficiency anaemia occurs. This significantly impacts how the body functions, affecting things like infections, altered gastrointestinal function, neurotransmitter activity, exercise tolerance, muscular dysfunction, and epithelial alterations. Problems with tissue enzymes might arise even in the first phases of iron insufficiency [3]. Additionally, preterm delivery and anaemia during pregnancy are linked [3]. Research has also shown a connection between behavioural problems and variations in chemical mediator concentrations in the brain among children suffering from iron shortage [3].

Pregnancy-related anaemia is quite prevalent. However, a difference should be made between anaemia that develops as a direct consequence of pregnancy and anaemia that either develops spontaneously during pregnancy or is already present before becoming worse during pregnancy [6].

Even after gestation, anaemia in women is a common condition worldwide. For several causes, including starvation, multiple pregnancies, worm infestation, and the ubiquity of diseases, including malaria, hepatitis, TB, and amebiasis, this is almost common in underdeveloped nations [6].

In a North American study—the model for an affluent society—almost 40% of pregnant women were anaemic, and nearly 60% of them had no detectable iron reserves in their bodies. As the pregnancy progresses, these women will most likely acquire iron deficiency anaemia if they are not appropriately and consistently supplemented [6].

Pre-pregnancy anaemia should be grouped with pregnant anaemia to fully understand the severity of anaemia and its thorough therapy of it. Six The fall in haemoglobin levels below normal for an individual's age and sex is known as anaemia [6].

The World Health Organization defines anaemia in pregnancy as having a haemoglobin level below 10.5 gm/dl at any point throughout the gestational period. This is because the typical physiological events of pregnancy lead the mother's internal environment to alter in ways that would be deemed abnormal in non-pregnant women. Therefore, it's important to comprehend the physiological changes during pregnancy and avoid giving them unnecessary importance. High ESR, elevated plasma fibrinogen, elevated FDP, and elevated TIBC should be understood clearly. Pregnant women should not be checked needlessly since this causes them to suffer psychologically and emotionally [6].

The aetiology and management of iron deficiency anaemia in pregnancy have been extensively studied. It has been shown that dietary imbalance is the primary culprit, and intravenous iron sucrose is the most effective and secure way to replenish lost iron levels [7].

MATERIALS AND METHODS

Regardless of gestational age, the incidence of iron deficiency anaemia in pregnant women was the subject of this descriptive research. This research was carried out at the Mardan Medical Complex's Gynae "B" section of the Postgraduate Medical Institute in Mardan. This tertiary-level hospital has units "A" and "B" dedicated to obstetrics and gynaecology. My research was done on Gynae B unit ward and outpatient patients. Regardless of their gestational age, 100 prenatal patients with Hb levels less than 10 mg/dl made up the whole sample size in this investigation.

All prenatal patients (from the OPD and ward), regardless of gestational age, were included in this research. This research used the Hb estimate screening test to determine anaemia using Sahli's technique. Of these prenatal patients, one hundred were chosen for further assessment if their haemoglobin level was less than 10 gm/dl. These patients underwent further investigation, including a complete examination, a detailed history, and completion of a questionnaire created especially for the research.

After completing the Hb estimate procedure, which included a history, examination, and questionnaire completion, the 100 patients with Hb less than 10 gm/dl, who were chosen irrespective of their gestational age, had the following blood investigation. A haematology auto-analyzer was used to get absolute values and the whole image of the blood. The results of this test provide information on the patient's microcytic hypochromic status and iron deficiency anaemia. It provides us with lower MCV, MCH, and MCHC levels in anaemia caused by iron deficiency.

Estimates of serum ferritin were performed using the ELISA method. The ferritin test quantifies

the amount of blood protein the body uses to store iron for later use. Thanks to these two tests, I could determine the patient's iron status and identify those who were indeed iron deficient. However, one must be extra certain and rule out other anaemias, such as sickle cell anaemia and thalassemia.

We do haemoglobin electrophoresis to identify the various forms of haemoglobin in the blood. The procedure is known as electrophoresis, and it moves particles in an electric field to produce "Bands" that split apart in the field toward either half.

This test is conducted when a condition like sickle cell anaemia or thalassemia, which are linked to aberrant haemoglobin, is suspected. I attempted to ascertain the prevalence of iron deficiency anaemia during pregnancy using this number of tests.

Pregnant patients in the Gynae B ward and OPD provided data. Using the Sahlis technique, these patients' Hb was estimated to test for anaemia, independent of their gestational age. Following anaemia screening, 100 patients with haemoglobin levels less than 10 g/dl were included in the study's follow-up group.

Regardless of gestational age, these 100 individuals with Hb less than 10 gm/dl were chosen. They were further examined by thoroughly examining, getting a history, and answering a questionnaire created especially for this research. The following blood test was required of these 100 patients to continue their inquiry. Full blood profile and absolute values were obtained using an auto-analyzer for haematology. ELISA approach for estimating serum ferritin levels.

We obtained Hb Electrophoresis test results from each of the 100 patients, and we used this information to determine the prevalence of iron deficiency anaemia during pregnancy.

RESULTS

More than half of the patients in this study belonged to the age group 31–40. Only 5% of the patients were below 20 years of age.

About 90% of the patients were multigravida. Of this, 48 % were grand multigravida. In more than 2/3rd of the patients, the average duration between successive pregnancies was 1–2 years, and about 70% were in the 3rd trimester of pregnancies.

In this study, only 3 patients had a history of major surgery, and 5 had a history of obstetrical surgery. However, 92 of these patients had no history of any surgery.

Out of these 100 patients, 50% had no symptoms, 27% had palpitations, 35% had weakness, 6% had pain in the body, 5% had drowsiness, 4% had a backache, 5% had swelling of feet, 4% had breathless and only 2% had to present symptom of the sinking of the heart. Of these patients, 62% had a good appetite, but 38% had a bad appetite, 89% had no associated disease, but 11% had different associated diseases, which are 3% had a gastric ulcer, one hypertension, one chest infection, one typhoid, one jaundice and one was diabetic. 90% of these patients were not using any co-medication. 3% were using medicines for gastric ulcers. One was on antihypertensive, and one was on antiepileptic drugs. Two of them were using antibiotics, and only one had PET, for which she was using tab Aldomet and Adalat retard.

Regarding the use of iron preparations, 33% were not using any iron preparations. 64% were on oral preparations, and 3% were using parenteral iron preparations. Out of these 100 patients, 88% had not used oral contraceptives, and 12% had used them.

Maternal complications developed during this pregnancy in these patients were P&T 3%, APH 14%, eclampsia 2%, PROM 1%, and pregnancy-induced diabetes 1%; however, 79% had no complications.

Foetal complications among these patients were decreased foetal movements by 3%, unexplained IUD 2%, and no complications in 95% of the patients. The level of Hb in different patients was 37 patients with 9 gm/dl Hb, 21 with 8 gm/dl, 13 with 7 gm/dl and 20 with 6 gm/dl and below.

Absolute values were reduced by 81% and were normal at 19%. Serum ferritin level was reduced by 73% and was normal by 27%. Hb electrophoresis diagnosed thalassemia minor and trait in 6 patients.

DISCUSSION

This study was conducted to determine the frequency of iron deficiency anaemia in pregnancy. This was done on 100 antenatal patients selected from the OPD and Gynae B wards regardless of their gestational age. This study found that the maximum number of patients was among the age groups 30–40

and were grand multigravida. These results agree with the study of EA3, according to which the pregnancy increases the demand for iron from 2–6 mg/day. Due to successive pregnancies in these patients, their iron stores were used up, so they developed iron deficiency anaemia.[3]

Because most patients belong to a low socio-economic group, their daily iron intake needs to be increased to meet their daily iron requirement.[23] The study also shows the lowest number of primigravida having iron deficiency anaemia; this is proof that grand multigravida have this iron deficiency due to repeated pregnancies.[3]

Out of these 100 patients, about 79 had about 1–2 years between their successive pregnancies. Fifteen patients had 2–3 years, and only 6 had more than 3 years between successive pregnancies.

This indicates that their iron reserves were depleted due to the increasing demand for iron throughout each pregnancy. Additionally, they did not have enough time between pregnancies to replenish their iron reserves, so when they became pregnant again, all of them had been used up [4]. They had iron deficiency anemia.

In this research, over 70% of the women were in their third trimester, 24% in their second, and just 6% in their first. It is known that the need for iron increases from 2.5 mg/day in the first trimester to 6.5 mg/day in the final trimester. Because of this, iron deficiency anaemia will develop if these needs are not met by consuming enough iron each day [3]. This is the cause of iron deficiency anaemia, which strikes 70% of pregnant women in the third trimester.

Only eight individuals in my research had a history of surgery. There was a history of surgical procedures in three of them. There was a history of cesarean sections performed during pregnancy in five of them.

Since anaemia may result from either acute or chronic blood loss, this might have had a role in the development of iron deficiency anaemia in these individuals[3]. However, there was no history of surgical or obstetrical procedures in the remaining 82 individuals. Their iron deficiency anaemia thus has a cause other than the operation[8].

The outcome indicates the proportion of patients out of 100 with iron deficiency anaemia who also had symptoms.

Weakness was the most prevalent sign of iron deficiency anaemia in these individuals [8]. 35 patients out of 100 had this symptom.

Palpitations were the second prevalent symptom in these individuals[8]. A total of twenty-seven patients reported experiencing palpitations.

Additional symptoms included body aches, fatigue, swollen feet, back discomfort, dyspnea, headaches, and heart palpitations.8 In that order, These were given out in [6, 5, 5, 4, 3, 2].

Iron deficiency anaemia symptoms were absent in 50 individuals. They may be utilizing iron preparations, which might cause this. Additionally, as the research of Last EA3 noted, when patients begin taking iron preparations, their symptoms of iron insufficiency, such as folic acid and vitamin B12 deficiency, improve [3]. And this improvement happens far in advance of the increase in haemoglobin.

This is due to the non-hematological consequences of the depletion of these minerals on different tissues [3]. Of the 100 patients in this research, 38 reported having a poor appetite. In contrast, the remaining 62 had a healthy appetite.

According to studies, iron deficiency anaemia is caused by low iron consumption that falls short of the daily need. Thirteen

Iron deficiency anaemia during pregnancy may arise from a poor appetite, leading to daily food consumption of less iron than a pregnant woman's needed daily. However, this only applied to 38 patients; the other 62 patients showed a healthy appetite, suggesting that dietary imbalance and malabsorption may contribute to anaemia development in addition to other causes [8].

We discovered that 11 participants in this research had related illnesses. Additionally, these data demonstrate that ten individuals were using co-medications. There were three stomach ulcers, two asthma cases, one chest infection, one case of typhoid, one case of jaundice, one case of hypertension, and one case of diabetes among these individuals.

People who suffer from acute or chronic illnesses such as kidney infection, alcoholism, liver disease, rheumatoid arthritis, asthma, heart disease, colitis, and stomach ulcers may have anemia [1].

We discovered related disorders of the same kind. Thus, this might be the cause of their iron-deficient anaemia. It's possible that they were already anaemic when they were identified at their antenatal visit or that they became anaemic throughout pregnancy due to the stress of pregnancy and the increased need for iron.

It was observed that pregnant patients with related disorders used the following medications. Three people utilized these drugs to treat their stomach ulcers. Two patients used antibiotics, two used antihypertensives, and one used antiepileptic drugs.

Iron supplements may interact with antacids, acetohydroxamic (Lithostat), dimercaprol, etidronate, and fluoroquinolones, according to the research by Martin PF [1].

Furthermore, they may lessen the potency of some tetracycline (antibiotic) medications. Before beginning iron supplementation, those using these or other drugs should speak with their doctor [1].

Only 12 of the study's subjects utilized oral contraceptives. This data makes it quite evident that our patients do not understand the idea of contraception, which is why they are becoming pregnant again and again. Thus, our prenatal ladies developed iron deficiency anaemia as a consequence of the ongoing stress of pregnancy and the increased need for iron throughout pregnancy [3,8].

Despite having so many pregnancies, none of the participants in this research used iron supplements. Of these patients, 64 took iron orally, and 3 had taken iron intravenously. But rather than I/V, they utilized I/M. Thirty-three (33) patients reported never using iron of any type.

Malabsorption, increased loss, or increased demand may cause iron deficiency anaemia despite taking iron preparations [8].

There's a chance that these folks needed to take it more consistently. Another option is that they were taking iron supplements with certain meals that hindered their absorption [1]. For example, certain meals made with soy, foods high in calcium, and drinks with vitamin (a chemical included in black tea) and caffeine. Avoid taking these two hours after taking an iron supplement [1].

In addition, several plants contain tannic acid, which should be avoided using iron supplements. These include bayberry (Myricacerifera, commonly known as max myrtle) and allspice (Pimentadioica). In the research, 79 people had no issues, whereas 21 patients had difficulties.

Three PET patients, fourteen APH patients, two eclampsia patients, one PROM patient, and one pregnancy-induced hypertension patient were among the study's maternal problems. There were only three occurrences of reduced fetal movements and two cases of inexplicable intrauterine deaths or fetal complications.

An individual with anaemia may be more vulnerable to several consequences [3]. The propensity of the participants in this research to get infections or develop anaemia may be the cause of this.3. However, given that these individuals are more likely to acquire anaemia as a result of hemolysis and frequent blood loss, eclampsia and APH may have a causal relationship with PET [10].

Maternal anaemia and foetal problems are closely associated with one another. According to research by Sifakis S., Xinong X., and his colleagues [11,15], anaemia defined as having a haemoglobin level below 6 gm/dl, is linked to preterm delivery, low birth weight, spontaneous abortions, and fetal mortality [11, 15].

When we looked into these individuals, I discovered that 21 patients had Hb in the 8 gm/dl range, and 37 patients had Hb in the 9 gm/dl range. Thirteen had Hb ranging from 7 gm/dl. Of the 100 patients, 29 had severe anaemia with a haemoglobin level of 6 gm/dl or below. In 73% of these individuals, there was true iron deficiency anaemia. In that instance, 73% of patients had hypochromic microcytic RBCs and serum ferritin levels below normal.

Absolute values confirmed this. Absolute readings fell outside of normal limits in 81% of cases. Using Hb electrophoresis, six of these individuals, 81%, were found to have mild thalassemia.

With reduced absolute levels and serum ferritin, the diagnosis of iron deficiency anaemia is amply supported by this total blood picture in 73% of the patients. However, our diagnosis is questionable in individuals with normal serum ferritin levels. This is because drugs containing iron preparation alter the serum ferritin levels. Iron supplements raise serum ferritin levels, and some illnesses that do not directly impact the body's iron storage capacity may also cause

unnaturally elevated ferritin levels [4].

These conditions include infections, lymphomas, late-stage malignancies, and severe inflammations; ferritin levels are often elevated in alcoholics [4]. Nonetheless, diseases of the kidneys, liver, bone marrow, severe bleeding, or hemolysis of the red blood cells may all result in a normochromic normocytic appearance [10].

Our 81 patients had hypochromic microcytic blood ferritin, and 19 had normochromic normocytic. This point can be correlated with the fact that our 14 patients had blood loss, which is a factor for their development of normochromic normocytic anaemia. However, PET in 3 patients and jaundice in one patient can cause haemolysis of red blood cells in these patients. With this, we conclude that 73% of patients in our study had iron deficiency anaemia, and 6% had thalassemia minor.

The diagnosis can be blood loss anaemia and haemolytic one in the remainder of these patients. The risk factors for the development of those types of anaemia in these patients can be APH, PET and malaria, which were present in these patients.[10]

CONCLUSIONS

The most common type of anaemia during pregnancy is iron deficiency anaemia. A small duration between successive pregnancies can be one of the factors for developing iron deficiency anaemia. Most of our patients do not use contraception, and so they have repeated pregnancies and its associated side effects on their health. Weakness and palpitations are the most typical signs and symptoms of iron deficiency anaemia in pregnancy. Pregnancy problems include PROM, and intrauterine death may result from anaemia. Asking patients about their medication and surgery histories is important since these factors may contribute to their iron deficiency anaemia. Antibiotics and antacids are two examples of medications that may interfere with the absorption of iron supplements. The usage of iron preparations may have an impact on our serum ferritin findings. Necrolysis, severe blood loss, and renal disorders are a few conditions that provide a normo-chromic and normo-cytic appearance. Serum ferritin levels in the high range are often not indicative of conditions such as late-stage malignancies, lymphomas, infections, and severe inflammation, nor of medications such as iron supplements. Despite the possibility that the patients lack iron. Such discrepancies cannot be faced if we use transferrin receptors to diagnose iron deficiency anaemia. This is because TFR is unaffected by the factors affecting serum ferritin levels.

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