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ASSESSING ANAEMIA SCREENING FOR LOW IRON LEVEL DURING PREGNANCY

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Abstract: Assessing anemia for low iron levels during pregnancy is essential for improving the health of both the mother and the fetus. With an emphasis on Indian nations, this review study investigates the frequency, causes, and effects of anemia in pregnant women. Despite decades of anemia management measures, the literature shows enduring difficulties; the prevalence ranges from 18% to 80%, with severe anemia affecting 2.7% to 20% of expectant mothers. mother anemia, low birth weight, and preterm delivery are linked to variables such as mother age, parity, and late prenatal checkups. There is hope that interventions such as nutritional changes, iron supplementation, and training for community health workers will lower the incidence of anemia. Successful programs in India attest to this. Even though randomized controlled studies show that iron supplementation is useful, additional study is required to evaluate the efficacy of treatments in developing nations as well as compliance. To enhance maternal and fetal health outcomes, this abstract emphasizes the persistent problem of anemia throughout pregnancy as well as the need for efficient screening and management techniques.

IndexTerms - ***Anaemia, Screening, Iron deficiency, Pregnancy, Maternal health, Fetal health.***

INTRODUCTION

The most frequent medical condition that is faced daily is anemia. According to functional definitions, anemia is characterized by a reduction in erythrocyte masses, which makes it unable to transfer enough oxygen to peripheral tissue (Sudoyo AW, 2009). Whether acquired or inherited, anemia is only one of the symptoms of an underlying sickness rather than a distinct medical condition (Alli N, 2017).

Anaemia is a serious health issue, particularly in underdeveloped nations where it is more prevalent. The World Health Organization (WHO) reported in 2008 that anemia affects 24.8% of the global population, with pregnant women accounting for

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42% of cases, non-pregnant women for 30%, and preschoolers for 47%. According to Kassebaum et al.'s research, the prevalence of anemia was estimated to be 32.9% worldwide in 2010, translating to 68.4 million years of life with impairment. Hemoglobinopathy, malaria, and iron deficiency anemia are the three main causes of anemia (Kassebaum NJ, 2014)

IDA is a kind of anemia that results from low iron levels during erythropoiesis, which is caused by empty iron storage and decreased hemoglobin synthesis. Of all the anemic origins, IDA accounts for 50% and is the most often occurring kind. In poor nations, the prevalence of this anemia was found in 2–4% of women aged 20–49 and 11% of males over 50 (Liu K, 2012). IDA may impede an adult's capacity to work as well as a child's ability to grow and develop. There are serious and harmful health repercussions from this anemia.

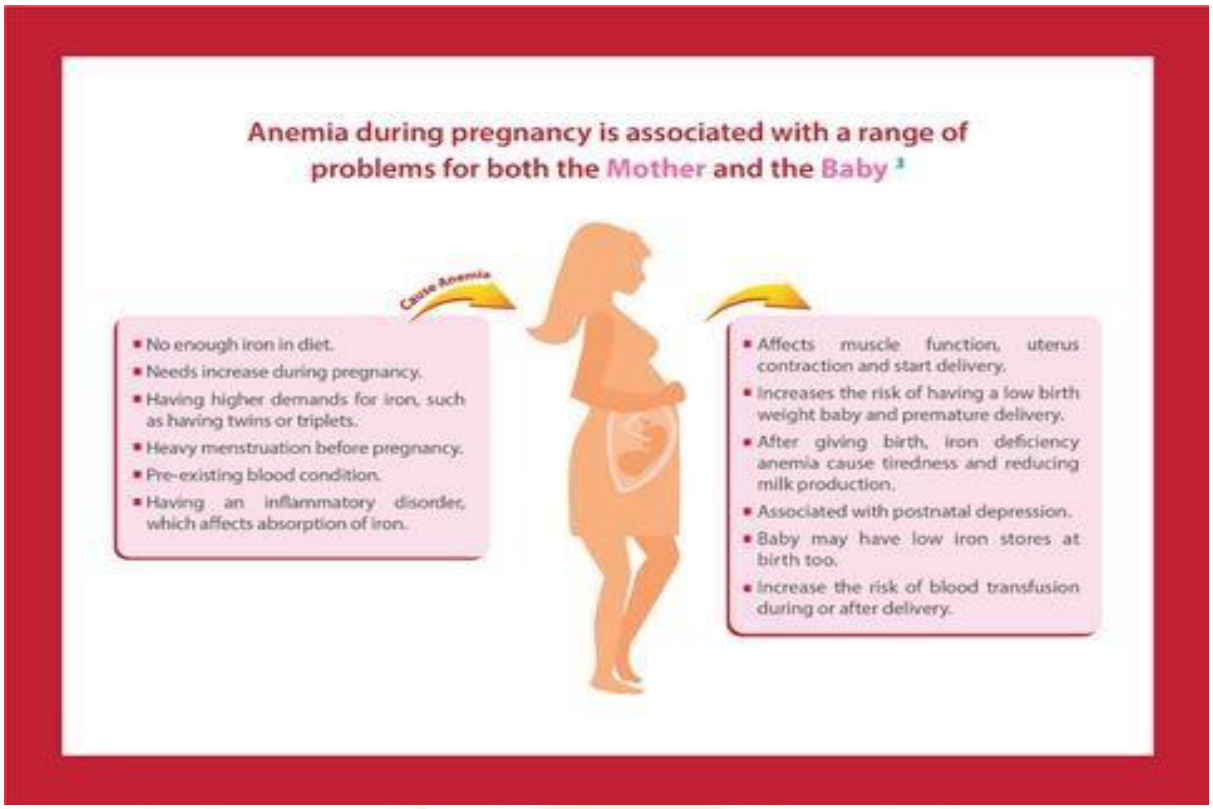

Figure 1: Anaemia During Pregnancy

1. IRON-DEFICIENCY ANAEMIA

A reduction in the body's overall iron content is known as iron deficiency. When an iron shortage is severe enough to obstruct erythropoiesis, anemia symptoms manifest. This condition is known as iron deficiency anemia. This occurs when the body's ability to satisfy the demands of erythrocyte synthesis is outweighed by the balance between iron intake, storage, and loss (Jimenez K, 2015).

2.1. Iron Metabolism

Iron is necessary for erythropoiesis, which is governed by three factors: tissue oxygenation, erythrocyte replenishment, and erythrocyte loss via bleeding. Twenty milliliters of outdated red blood cells are eliminated, and twenty milligrams of iron inside those cells are recycled to create new red blood cells. Iron is needed in huge quantities by erythrocytes and their precursors to make heme and hemoglobin (Dev S, 2017)

The essential component for the construction and operation of hemoglobin is iron. Low transferrin-binding iron saturation is linked to iron deficiency anemia. The liver, macrophages, and intestines are the sources of the iron associated with transferrin. The requirements for erythrocyte synthesis must be satisfied by nutritional intake and iron obtained via erythrocyte recycling. The freshly generated erythrocytes will have less hemoglobin and will be unable to perform their oxygenation-related tasks correctly if this is not balanced and iron loss occurs continually (JL., 2013).

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Hepcidin controls the metabolism of iron. Enterocytes' absorption of iron is decreased when hepcidin binds to the ferroportin receptor. Consequently, there will be a reduction in iron absorption and mobilization to the bone marrow and its storage region (liver, bone marrow, and reticuloendothelial system). When transferrin's iron saturation rises, hepcidin production will follow suit, and when iron saturation falls, the opposite will occur (Goddard AF, 2011).

Iron transport from enterocytes to the plasma is blocked when the liver produces hepcidin, which circulates into the colon and binds to ferroportin as iron saturation rises. Enterocytes harboring iron will ultimately peel off and discharge their contents into the intestinal lumen, trapping the iron within. Low iron saturation will result in less hepcidin being produced, which will force the small intestine to employ ferroportin to transfer iron to the blood plasma. The process of recycling iron in macrophages may be explained by the interaction between ferroportin and hepcidin, which causes a rise in inflammation and disrupts the export of iron from macrophages to the small intestine, trapping iron within the macrophages (JL., 2013) (Goddard AF, 2011)

1.2. Etiology

For this study, secondary data has been collected. From the website of KSE, the monthly stock prices for the sample firms are obtained from Jan 2010 to Dec 2014. From the website of SBP, the data for the macroeconomic variables are collected overa period of five years. The time series monthly data is collected on stock prices for sample firms and relative macroeconomic variables for the period of 5 years. The data collection period is ranging from January 2010 to Dec 2014. Monthly prices of the KSE -100 Index are taken from Yahoo Finance.

Anaemia may stem from a variety of factors, including age, gender, and socioeconomic situation. Reduced iron intake, decreased iron absorption, and iron loss via bleeding are the main causes of iron deficiency anemia (IDA). Among premenopausal women, one of the main causes of IDA is excessive menstruation. Another prevalent cause of IDA is bleeding in the gastrointestinal tract. In individuals with IDA, the percentage of digestive tract pathology ranges from 43 to 86%. Up to 39–57% of all gastrointestinal diseases are discovered to be upper gastrointestinal lesions, with peptic ulcers accounting for the majority of these cases.

1.3. Diagnosis

Variables of the study contain dependent and independent variables. The study used a pre-specified method for the selection of variables. The study used the Stock returns as the dependent variable. From the share price of the firm, the Stock returns are calculated. The rate of a stock salable at the stock market is known as the stock price.

The diagnosis of IDA is established by a series of processes. To identify anemia, a thorough medical history, physical examination, and laboratory testing are the initial steps. Finding out whether IDA is present is the second step. Finding the root cause of IDA by a comprehensive diagnostic assessment is the third stage.

Taking a history and doing a physical examination IDA manifests clinically in a range of ways, from minor to severe. Patients often report experiencing weakness, exhaustion, headaches, irritability, and dyspnea (Liu K, 2012). Patients may also notice a decline in their mental and cognitive abilities. Additionally, IDA is linked to a well-known neurological aftereffect. One of the symptoms of IDA is restless leg syndrome, which is characterized by reluctance to move in the lower extremities, particularly while at rest (JL., 2013).

Bleeding, gastrointestinal symptoms (abdominal pain, altered bowel habits, dysphagia), aspirin or NSAID use, a family history of gastrointestinal cancers, and hematological abnormalities are additional histories that must be monitored. The most important question to ask to detect a drop in iron intake is how the patient's daily diet is going (Goddard AF, 2011). Pallor, or paleness, of the skin and conjunctiva, which is linked to anemia, glossitis, koilonychia, and dysphagia, will be discovered during a physical examination. It is very uncommon to find Plummer-Vinson Syndrome (post-cricoid dysphagia, IDA, oesophageal webs) when IDA is continuous and presents with significant clinical symptoms (Liu K, 2012).

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RESEARCH METHODOLOGY

1.4. Laboratory test

Hematocrit and hemoglobin levels are two factors that must be looked at to diagnose anemia. The levels of hematocrit and hemoglobin will drop in IDA. Age, gender, pregnancy, height of habitation, and history of smoking all affect hemoglobin distribution. A hemoglobin level below 13 g/dl in males over 15, below 12 g/dl in non-pregnant women over 15, and 11 g/dl in pregnant women is considered anemia, according to the World Health Organization (WHO) (Liu K, 2012) (Jimenez K, 2015) (World Health Organization. Iron Deficiency Anemia: Assesment, 2001) The total blood count test revealed a reduction in both mean corpuscular volume (MCV) and mean corpuscular hemoglobin (MCH). Red blood cells in IDA are classified as hypochromic microcytic. As much as ~80 g/dl will be reduced in the MCV (Jimenez K, 2015).

1.5. Diagnostic evaluation

There are clinical and physiological reasons for IDA, and further testing is necessary to identify the cause. The primary cause of IDA in males and menopausal women is gastrointestinal bleeding. In research including over 700 persons with IDA, up to 6% of the participants had gastrointestinal cancers identified. Patients with IDA who are older than 65 had a 9% higher chance of developing cancer. Patients diagnosed with IDA should be assessed for concealed bleeding unless a moderate etiology was identified during physical examination and history collection (Killip S, 2007) (Sivanganam, 2017) (Zahra, 2019) (Wijayanti, 2019) (Sari, 2018) (Tala, 2017) (WHO., 2008) (VE., 2014) (CHH., 2016) (Geisel T, 2014).

Table 1: Anaemia prevalence and how it affects maternal mortality

Country	Prevalence of anemia in pregnant women (%)	Maternal deaths from anaemia
Afghanistan	-	-
Bangladesh	70	2865
Bhutan	70	<105
India	85	22,000
Nepal	60	750
S. Asia region (total)	-	25,560
World Total	-	50,245

Table 2: Specific features of the eleven articles that made up the review

Sr. No.	Author	Method	Findings
1	Patra S, Puri M, Trivedi SS, Pasrija S.	Prospective study	A total of 56.9% of people had anemia,

	2010 (Patra S, 2010)		and 2.7% of those people had severe anemia.
2	Sharma A, Patnaik R, Garg G, Prema R. 2008 (Sharma A, 2008)	Descriptive study	Nine weeks after treatment ended, the Hb level in 754 (20.1%) of the 3,658 anemic women was only 9.6 gm/dl. 3.40 women who finished the therapy had mean birth weights that were 2.8 kg ($p<0.001$) greater than those of women whose HB was less than 8.0 gm/dl at the time of delivery.
3	Rohilla M, Ravenndran A, Dhaliwal LK, Chopra S. 2010 (Rohilla M, 2010)	Retrospective study	Of the 798 women (17.1%) who were determined to be anemic, 96 had severe anemia, while the remaining 702 women (15.75%) had mild to moderate anemia. Six of the 96 very anemic women who were admitted to the hospital died.
4	IjazUl Sohail, Zara, 2011 (Ijaz-UL HT, 2011)	Descriptive study	Out of 552, 138 had anemia. Moderately anemic were 83 (60.145). There was moderate anaemia in 55 (39.56). Of the 250 antenatal women, none developed severe anemia. 108 women refused to take iron supplements.
5	Liabsuetrakul T, Chaikongkeit P, Korviwattanagarn S, et al, 2011 (Liabsuetrakul T, 2011)	Observational study	Anaemia was less common in overweight and obese pregnancies according to Asian criteria-based BMI. Over time, there was no discernible change in the HB levels. Maternal anemia, low birth weight, and premature delivery were independently correlated with both part and late prenatal visits in addition to BMI.

Coming up next are extra factors that can add to iron deficiency: eating toa couple of foods high in iron and "iron enhancers" (foods high in L-ascorbic acid, similar to citrus natural products); low bioavailability of dietary iron; too much "iron inhibitors" during dinners (tea, espresso, and calcium-rich foods, for instance); iron misfortune during the feminine cycle; low iron stores from youth and youth inadequacies; iron misfortune from post pregnancy drain; expanded iron necessity because of tissue, blood, and energy prerequisites during pregnancy and, in certain areas, due to weighty responsibilities; young pregnancy; rehashed pregnancies inside a two-year time frame; low environmental sterilization; perilous drinking water; and deficient individual cleanliness

Low birth weight, which increases baby mortality, and maternal mortality and morbidity are the principal impacts of anemia during pregnancy (LH., 2000) (PJ., 2000). The facts confirm that there is proof connecting it to various fetal and maternal issues. Unfortunate weight development, preterm works, PIH, placenta previa, inadvertent dying, eclampsia, and untimely crack of the film (PROM) are among the maternal worries that exist all through the prenatal period. During the intrapartum and post- pregnancy stages, maternal risks incorporate embolism, subinvolution, and post-pregnancy sepsis. Rashness, low birth weight, low Apgar scores, fetal uneasiness, infant trouble requiring expanded revival, and neonatal anemia inferable from insufficient savings are among the worries related to fetal and neonatal health. Contrasted with babies without anemia, sickly newborn children are bound to have an inability to flourish, accomplish lower scholarly developmental achievements, and experience more prominent paces of morbidities and neonatal passings. Moreover, contrasted with infants whose mothers didn't have AIP during the principal trimester of pregnancy, grown-up overcomers of these children had more noteworthy paces of cardiovascular morbidities and passing (Patra S, 2010).

2. DISCUSSION

Coming up next are extra factors that can add to iron deficiency: eating toa couple of foods high in iron and "iron enhancers" (foods high in L-ascorbic acid, similar to citrus natural products); low bioavailability of dietary iron; too much "iron inhibitors" during dinners (tea, espresso, and calcium-rich foods, for instance); iron misfortune during the feminine cycle; low iron stores from youth and youth inadequacies; iron misfortune from post pregnancy drain; expanded iron necessity because of tissue, blood, and energy prerequisites during pregnancy and, in certain areas, due to weighty responsibilities; young pregnancy; rehashed pregnancies inside a two-year time frame; low environmental sterilization; perilous drinking water; and deficient individual cleanliness

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3. CONCLUSION

The current data emphasizes the ongoing importance of iron deficiency anemia (IDA) for women's health, especially in the context of pregnancy. Eleven research carried out in Indian nations between 2007 and 2012 have shown that severe anemia continues to be a significant factor in maternal mortality and morbidity (Sudoyo AW S. B., 2009). For the sake of the health of the mother and fetus, anemia screening for low iron levels during pregnancy is essential. Pregnant women in these locations continue to have alarmingly high rates of anemia despite attempts to establish anemia management programs, with severe cases presenting serious hazards (Barcklay EG, 2002). It is essential to discover the condition early using thorough screening procedures that include variables including the mother's age, parity, and attendance during prenatal care. Numerous nations have shown the potential of interventions like iron supplementation and dietary adjustments in lowering the incidence of anemia. Nonetheless, issues including supplementing regimen compliance and the need for customized treatments in various socioeconomic circumstances continue to exist (Suherlim D, 2018).

Going ahead, reducing the prevalence of anemia during pregnancy and enhancing maternal and fetal health outcomes in Indian areas and beyond will need a multifaceted strategy that integrates efficient screening techniques, focused treatments,

and community participation (Sivanganam, 2017). IDA continues to be one of the most common health issues in developing nations, having a major negative influence on everyday activities and cognitive abilities (Zhang Q, 2009).

To diagnose and identify the causes of IDA, comprehensive diagnostic examinations including a full history taking, physical

examination, and laboratory testing are necessary (Mah-e-Munir Awan, 2004). Patients with anemia, both male and female, should have diagnostic tests such as endoscopies to find gastrointestinal system issues (Ezzati M, 2002). Increasing hemoglobin, red blood cell counts, iron storage, and treating comorbid diseases are the goals of IDA management techniques (Sukrat B, 2010). Currently used treatments include intravenous iron therapy, blood transfusions when needed, and oral iron therapy as the first line of treatment.

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