Is anemia in pregnant women an emerging crisis? A study carried from southern coastal public teaching hospital, india

ABSTRACT

Background: This study underscores the concerning prevalence of anemia among pregnant women in the southern coastal region of India, a significant public health issue that necessitates urgent intervention.

Objectives: This study seeks to conduct a comprehensive evaluation of demographic characteristics, the severity of anemia, obstetric variables, contributing risk factors, and prevalent prescription practices.

Methodology : This six-month study, conducted at the Government Medical College and Hospital in Nagapattinam, Tamil Nadu, from December 2023 to May 2024, offers significant insights into maternal health.

Results: A significant number of women aged 24 to 28 experience anemia, a condition that can lead to symptoms such as fatigue and difficulties in reading. Additionally, these women frequently encounter other health complications, including thyroid disorders and hypertension during pregnancy. The majority have undergone blood tests, with some reporting low levels of amniotic fluid or a history of cesarean deliveries. To maintain their health, they typically supplement their diets with vitamins and minerals, and many are prescribed a medication known as cefotaxime.

Conclusion: The high prevalence of anemia in pregnant women underscores a critical public health issue, highlighting the urgent need for effective health education and nutritional interventions to ensure the well-being of both mothers and their fetuses.

Keywords: anemia, fatigue, thyroid disorders, hypertension, cefotaxime

INTRODUCTION

IRON DEFICIENCY

“Worldwide, the contribution of anemia to maternal and fetal morbidity and mortality is well recognized; in some parts of Africa, more than 75 percent of pregnant women are anemic, and there is a significant cor- relation between maternal mortality and anemia. It has been suggested that iron deficiency may protect against placental malaria, but epidemio- logic studies have not been conducted to verify this supposition. In preg- nant women, anemia is defined as a hemoglobin concentration of less than 11 g/dL in the first and third trimesters, and less than 10.5 g/dL in the sec- ond trimester. In both the industrialized and the developing world, iron-deficiency anemia is the commonest cause of anemia. On average approximately 1 g of iron is required during a normal pregnancy; 300 mg of iron are required by the fetus and the placenta, whereas expansion of the

maternal red cell mass requires 500 mg, and 200 mg are lost via excretion. These requirements exceed the iron stor- age of most young women and in general cannot be met by the diet. Even in cases of maternal iron deficiency, the fetal requirements for iron are always met; thus there is no correlation between the hemoglobin of the fetus and that of the mother" [1,2].

"Iron-deficiency anemia during the first two trimesters of preg- nancy is associated with a twofold increased risk for preterm delivery and a threefold increased risk for delivery of a low-birth-weight infant. However, a large randomized trial comparing routine iron prophy- laxis in pregnancy versus iron supplementation given only as needed demonstrated no significant differences in adverse maternal or fetal outcomes. As in nonpregnant individuals, iron-deficiency anemia can generally be diagnosed using laboratory values such as serum ferritin, and transferrin saturation levels. Pica, the ingestion of non- nutritive substances, is said to be more common among iron-deficient pregnant women than among other populations with iron deficiency. Ice, clay or dirt, and starch are the most frequent substances ingested; to some extent, however, the choice appears to be cultural and much more widespread than most practitioners realize" [3-5].

FOLATE AND VITAMIN B12 DEFICIENCY

"Apart from iron deficiency, folate deficiency is the next most frequent nutritional deficiency leading to anemia in pregnant women. In the United States, where foodstuffs are supplemented with folate and the level of awareness of the association between folate deficiency and neural tube defects in the embryo is high, folate deficiency is relatively unusual. Folate requirements in pregnancy are roughly twice those in the non-pregnant state (800 mcg/day vs. 400 mcg/day), and if diet is insufficient may exceed the body's stores of folate (5–10 mg) relatively quickly. Anemia related to folate deficiency most often presents in the third trimester and responds to folate supplementation with reticulocy-tosis within 24 to 72 hours. Reports of severe pancytopenia and even states resembling the HELLP (Hemolysis, elevated liver enzymes, and low platelet count) syndrome as a result of folate deficiency in preg- nancy have appeared in the literature. Despite these case reports, a review of 21 trials measuring the effect of folate supplementation on biochemical and hematologic parameters and pregnancy outcome" [6,7].

(excluding neural tube defects) revealed improvement in low hemoglo- bin level in late pregnancy, but had no measurable effect on any substan- tive measures of pregnancy outcome.

"Vitamin B12 (cobalamin) deficiency during pregnancy is rare, in part because deficiency of this vitamin leads to infertility. Serum cobal- amin levels are known to fall during pregnancy. A shift from the serum to tissue stores is proposed to account for the drop in serum B12 lev- els. However, values less than 180 pmol/L usually are not observed in healthy women, and these low-normal levels are not accompanied by increased levels of methylmalonic acid, an indicator of cellular defi- ciency of cobalamin" [8].

RED CELL APLASIA

"A rare cause of anemia in pregnancy is pure red cell aplasia. In pure red cell aplasia, anemia tends to occur early in pregnancy and often resolves within weeks of delivery. The pathogenic mechanism

leading to red cell aplasia does not appear to be transferred to the fetus, but does tend to recur in subsequent pregnancies.Conservative treatment, if feasible, is probably best until delivery; successful prenatal treatments with glucocorticoids and with intravenous immunoglobulin have been reported" [9].

MATERIAL AND METHODOLOGY:

A Retrospective study was conducted among the patient who were diagnosed for anaemia and admitted in the government medical college and hospital, Nagapattinam for over a period of 6 months, from December 2023 - May 2024

SAMPLE SIZE :

The study population of 110 patient data were collected and analysed for the study

INCLUSION CRITERIA :

The patients who were 18-40 years of age with complete medical history and medication responding

RESULT :

Table-1 incidence of anemic pregnant woman by age group

Age Group	No. Of Patients	Percentage
18	05	4.54
19-23	26	23.63
24-28	47	42.72
29-34	26	23.63
35>ABOVE	06	5.45

In our study, we classified patient demographics according to age, revealing that the 24—to 28-year-old age group constitutes the majority, comprising 47 patients (42.72%). In sharp contrast, only 5 patients (4.54%) are from the 18-year-old age group, which indicates a markedly lower representation within our study population(Table-1)

Table-2 severity of anaemia-1of anemic pregnant woman

Category	No. Of Patients	Percentage
Mild (10.0 – 11.0 g/dL)	32	29.0
Moderate (7.0 – 9.9 g/dL)	71	64.54
Severe (4.0 – 6.9 g/dL)	7	6.36

In our study population, we identified 71 patients with moderate anemia (hemoglobin levels ranging from 7.0 to 9.9 g/dL), which constitutes 64.54% of the total cohort. Furthermore, 32 patients, representing 29.0%, were diagnosed with mild anemia. The remaining 7 patients, or 6.36%, were classified as experiencing severe anemia. These findings clearly illustrate the prevalence of anemia within our population. (Table-2).

Table-3 Obstetricsof anemic pregnant woman

Obstetrics Variables	Variables	No. Of Patients
Gravida	Primi (01)	61(55.45%)
	Multi	49(44.45%)
Abortion	A 0	91(82.72%)
	A 1	19(17.28%)

In our study involving 110 pregnant women, we observed that 82.72% were experiencing their first pregnancy, with 55.45% classified as primi gravida. Notably, 17.28% of the participants reported having experienced an abortion during their initial pregnancy. The cohort exhibited a low literacy rate, with only 31 participants (28.2%) being literate, while 79 participants (71.8%) were illiterate. Common comorbidities identified included hypothyroidism (23.6%), pregnancy-induced hypertension (20.8%), and gestational diabetes mellitus (18%). Additionally, other health concerns such as pulmonary tuberculosis, bronchial asthma, and acute gastritis were reported by one patient each (1.3%). All participants underwent a complete blood count (CBC), and 75.4% also received a peripheral smear test.

Table-4 Risk factorsof anemic pregnant woman

Risk Factors	No. Of Patients	Percentage
Oligohydraminos	18	23.6
Elderly Primigravida	05	6.5
Elderly Pregnancy	04	5.2
Teenage Pregnancy	04	5.2
Thrombotic Micro Angiopathy	03	3.9
Under Weight	03	3.9
Polyhydraminos	02	2.6
Refractory Anemia	01	1.3

In our research, we identified several significant risk factors associated with pregnancy that warrant further investigation. The most commonly observed risk factors included oligohydramnios, which occurred in 23.6% of cases, previous cesarean sections at a rate of 13.1%, and instances of preterm labor and pedal edema, both of which were present in 10.5% of the subjects. Less frequently noted risk factors included underweight conditions at 3.9%, polyhydramnios at 2.6%, and refractory anemia at 1.3%. A comprehensive understanding of these risk factors is essential for enhancing maternal and fetal health outcomes.

Table-5 Prescribing patternof anemic pregnant woman

TREATMENT PLAN	DRUGS	No. Of Patients
PHARMACOLOGICAL APPROACH	Vitamin B Complex, Ferrous Sulphate, Vitamin C & Calcium Carbonate	110(100%)
	PRBC Transfusion	76(69.1%)
	Vitamin B12	53(48.1%)
	Dexamethasone	33(30%)
	Iron Sucrose	28(25.4%)
	L-arginine	15(13.6%)
	Amino Acid	12(11%)
ANTIBIOTIC PRESCRIBED	Cefotaxime	18(16.3%)
	Azithromycin	12(11%)
	Amoxycillin	05(4.5%)
	Ceftriaxone	08(7.2%)
	Cefperoxazone + Sulbactam / Piperacillin +Tazobactum / Ciprofloxacin	03 (2.7%)

Our study engaged 110 patients receiving essential treatments, including vitamin B complex, ferrous sulfate, vitamin C, and calcium carbonate, at various intervals. Notably, 76 patients—69.1%—benefited from packed red blood cell (PRBC) transfusions by the end. This underscores the significance of proactive anemia management, as additional treatments were employed: folic acid for 29 patients, iron sucrose for 28, L-arginine for 15, and amino acids for 12.

In terms of antibiotic therapy, cefotaxime stood out as the leading choice, prescribed to 18 patients (16.3%). Azithromycin followed closely, administered to 12 patients, while amoxicillin reached 5. Additionally, combination antibiotics—cefoperazone + sulbactam, piperacillin + tazobactam, and ciprofloxacin—were strategically used for 3 patients each, reflecting a comprehensive approach to infection control. This evidence highlights the importance of tailored treatments in improving patient outcomes.

DISCUSSION

Anemia has become a significant concern during pregnancy, particularly among women aged 24 to 28 years. In our study, 97 out of 110 patients (82.72%) reported experiencing their first pregnancy. The results indicate that moderate anemia is the most prevalent form, affecting 71 women (64.54%), while mild anemia is observed in 32 women (29%). Although severe anemia is less common, it still affects 7 women (6.36%), highlighting the urgent need for targeted interventions.

Co-morbidities considerably complicate the management of anemia during pregnancy. In our study, the most prevalent co-morbidities identified were hypothyroidism (23.6%), pregnancy-induced hypertension (20.8%), and gestational diabetes mellitus (18.0%). Conversely, asthma, extra preterm birth (PTB), and acute gastritis were the least prevalent, each occurring at a rate of 1.3%. These findings highlight the necessity for comprehensive screening of pregnant women to effectively identify and manage these concurrent conditions.

The Complete Blood Count (CBC) is a fundamental diagnostic tool for identifying anemia and was administered to all participants in the study. A peripheral blood smear, performed on 83 women, indicated that 40.9% exhibited microcytic hypochromic anemia, while 34.5% presented with dimorphic anemia. These diagnostic findings are critical for the development of targeted treatment strategies.

Risk factors associated with adverse maternal and fetal outcomes are notably prevalent, with oligohydramnios occurring in 23.6% of cases, previous lower segment cesarean section (LSCS) in 13.1%, preterm labor in 10.5%, and pedal edema also in 10.5%. In contrast, less common factors such as oliguria, placenta previa, fetal bradycardia, and psychiatric disorders were observed in only 1.3% of cases each. A comprehensive understanding of these risk factors is essential for healthcare providers, as it enables them to implement preemptive strategies aimed at safeguarding both maternal and fetal health.

The study population received a comprehensive regimen of treatments, which included vitamin B complex, ferrous sulfate, vitamin C (ascorbic acid), and calcium supplements. Notably, 76 patients (69.1%) benefited from packed red blood cell (PRBC) transfusions, while 53 patients (48.1%) were administered vitamin B12 (cyanocobalamin) and 33 patients (30%) were prescribed dexamethasone. Additional treatments comprised folic acid (29 cases, or 26.3%), iron sucrose (28 cases, or 25.4%), L-arginine (15 cases, or 13.6%), and amino acids (12 cases, or 10.9%).

The prescription of dexamethasone during pregnancy, particularly in the first trimester or for prolonged durations, requires meticulous evaluation of the associated risks. Potential complications

include orofacial clefts, low birth weight, premature birth, fetal adrenal suppression, and gestational diabetes mellitus. These considerations must not be disregarded.

Furthermore, while antibiotics play a crucial role in the management of co-morbidities, they also present considerable risks. Azithromycin has been associated with spontaneous abortion, and amoxicillin may demonstrate teratogenic effects. Although ceftriaxone is occasionally required for treatment, it can induce hemolytic anemia and is also linked to the risk of spontaneous abortion. Therefore, the implications of antibiotic use during pregnancy necessitate careful and informed decision-making.

In conclusion, the management of anemia in pregnant women necessitates a proactive and comprehensive strategy that encompasses thorough diagnosis, meticulous risk assessment, and informed treatment options. By prioritizing the health of both the mother and the fetus, it is possible to reduce the adverse effects of anemia and its related complications within this at-risk population.

CONCLUSION

Anemia during pregnancy presents a significant public health challenge, particularly in rural areas where socio-economic and healthcare barriers exacerbate the issue. This study underscores the urgent need for targeted interventions, which should include enhanced antenatal care, nutritional education, and community health programs. Addressing anemia in pregnant women is crucial not only for improving maternal health but also for ensuring better health outcomes for future generations. The high prevalence rate of anemia in this rural area indicates a major health crisis among pregnant women, good health education and promote a nutritious diet to reduce the prevalence of anemia within this population. While preventing anemia during pregnancy poses considerable challenges, concerted efforts must be made to mitigate maternal and fetal risks. Additionally, public health programs should be established in rural regions to educate the community on this critical issue.

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1.

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Ethical Approval:

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

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