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A STUDY OF MATERNAL AND FETAL OUTCOME IN MATERNAL ANEMIA.

Obstetrics & Gynaecology

Dr. Y. Kusuma Rani	Postgraduate Department of Obstetrics and Gynaecology, Alluri Sitarama Raju Academy of Medical Sciences Eluru, West Godavari District Andhra Pradesh 534005 India
Dr. K. Vandana	Professor and HOD Department of Obstetrics and Gynaecology, Alluri Sitarama Raju Academy of Medical Sciences Eluru, West Godavari District Andhra Pradesh 534005 India
Dr. V. Arani*	Assistant Professor Department of Obstetrics and Gynaecology, Alluri Sitarama Raju Academy of Medical Sciences Eluru, West Godavari District Andhra Pradesh 534005 India*Corresponding Author

ABSTRACT

BACKGROUND: Anemia is one of the world's leading causes of disability, and thus one of the most serious global public health problem affecting both developing and developed countries particularly in reproductive age groups. Anemia in pregnancy is a common and worldwide problem that deserves more attention.Prevalence of anemia in South Asian countries is highest in the world. WHO estimates that even among the South Asian countries, India has the highest prevalence of anemia. Iron deficiency anemia is today the most common nutritional problems affecting pregnant women. **MATERIAL AND METHODS:** A total 100 pregnant anemic women admitted were categorized according to ICMR guidelines into mild anemia (Hb: 10.9 - 10 g%), moderate (Hb 10- 7 g%), severe (Hb <7g%), very severe anemia (Hb<7 g%) that fulfilled the inclusion criterion. Their maternal complications in terms of infection, postpartum hemorrhage, puerperal sepsis and perinatal outcome included preterm delivery, low birth weight at delivery, fetal growth restriction, perinatal mortality, intrauterine death were observed. **RESULTS:** Number of women with parity >3 were highest in severe anemia. The patients with severe anemia had a 3-6fold higher risk of postpartum hemorrhage compared to mild anemia. The risk ratios for puerperal sepsis showed a 3-6 fold higher risk in patients with severe anemia. The risk of preterm delivery, low birth weight was 3.6 and 5.6 times higher among severely anemic women respectively. **CONCLUSION:** Mild anemia fared best in maternal and perinatal outcome. Severe maternal anemia carries significant risk of hemorrhage and infection in mother. It is also associated with preterm birth, low birth weight babies, intra uterine death and high perinatal mortality.

KEYWORDS

Anemia, Maternal outcome, preterm birth, low birth weight, fetal growth restriction.

INTRODUCTION:
Anemia begins in childhood, worsens during adolescence in girls and gets aggravated during pregnancy. Prevalence of anemia is high in all the States of India[10].

Anemia is defined as decrease in the oxygen carrying capacity of the blood due to decrease in amount of RBCs or hemoglobin or both.

The main causes of anemia in developing countries include: inadequate intake and poor absorption of iron, malaria, hookworm infestation, diarrhea, HIV/AIDS and other infections, genetic disorders (e.g., sickle cell and thalassemia), blood loss during labor and delivery, heavy menstrual blood flow and closely spaced pregnancies. Iron deficiency and anemia during pregnancy are associated with many complications[9].

WHO defines anemia in pregnancy as hemoglobin of pregnant women less than 11 gm% and hematocrit less than 0.33(33%)[5].

Centre of disease control (CDC) has suggested cut-off value of hemoglobin as 11 gm% in 1st and 3rd trimester whereas 10.5 gm% for 2nd trimester of pregnancy.

WHO (2002) Classification of anemia:
Mild Anemia (9.1 to 11 gm/dl), Moderate Anemia (7.1 to 9gm/dl), Severe Anemia ($\leq$ 7 gm/dL)

The Indian Council of Medical Research; Classification of anemia (ICMR):
Mild (10-10.9 gm/dl), Moderate (7-10 gm/dl), Severe (<7 gm/dl), Vere severe (<4 gm/dl)

ETIOLOGY OF ANEMIA IN PREGNANCY:
Physiological (increased plasma volume) & Pathological

1. Nutritional, iron deficiency, folate deficiency, vitamin B12 deficiency, vitamin A deficiency
2. Hemorrhage: Acute early trimester bleeding, APH
Chronic: Hookworm and other parasitic infestations

3. Hemolytic anemia: Congenital: G6 PD deficiency Hereditary spherocytosis
Acquired - Microangiopathic hemolytic anemia Acquired immune-hemolytic anemia
4. Hemoglobinopathies: Sickle cell trait, Sickle cell diseases,Thalassemia
5. Aplastic anemia

ADVERSE EEFECTS OF ANEMIA IN PREGNANCY ON MOTHER[4]:

During pregnancy: Weakness, breathlessness, infection, preterm labor, cardiac failure (at 30-32 weeks)

During Labor: Uterine dysfunction (due to impaired myometrial contractility) Post-Partum hemorrhage (impaired myometrial contractility due to inhibition of cellular enzymes)[2].
Cardiac failure (due to hypovolemia, myocardial depression). Shock (inability to tolerate even normal blood loss)[3].

During Puerperium: Subinvolution,puerperal sepsis,failing lactation,peripheral venous thrombosis,pulmonary embolism,cardiac failure.

ADVERSE EFFECTS OF ANEMIA IN PREGNANCY ON FOETUS:
Low birth weight, Preterm birth[8],poor APGAR score, Intra uterine death, Still birth,perinatal morbidity and mortality[1].

Long Term Effects: Behavioral abnormalities in children,reduced cognitive skills,impaired schooling later, due to deficiency of chemical mediators in fetal brain as a result of maternal iron deficiency

PREDISPOSING FACTORS DURING PREGNANCY[11]:
Increased demand of iron, deficient iron stores, deficient intake of iron and other hematopoietic factors, chronic and acute blood loss, Infections

DETECTION OF ANEMIA:

Most women with mild-to-moderate anemias during pregnancy are asymptomatic, it is recommended that all patients be assessed for anemia during their initial prenatal visit, late in pregnancy (34–36 weeks), and at the postpartum vist[13].

Clinical feature of anemia:
Symptoms: Patients may complain of weakness, exhaustion and lassitude, indigestion and loss of appetite. Palpitation, giddiness, dyspnea, edema and rarely anasarca and even congestive cardiac failure can occur in severe cases
Signs: Pallor, koilonychia (spoon shaped nails) pathognomonic of iron deficiency anemia, platynychia (thin, lusterless, brittle flattened nails), Edema, Soft systolic murmur, Bilateral basal crepitations i.e., in CCF

Management of IDA:
Objective: 1. Correction of anemia
2. Restitution of iron stores

Mode of treatment depends on: 1. Severity of anemia, 2. Duration of pregnancy, 3.Associated complications.
Available treatments:1.Oral iron, 2.Parental iron,3.Blood transfusion.
The following factors will influence on mode of therapy:
a) Cause of anemia, b) Severity of anemia, c) Duration of pregnancy, d) Time available before delivery, e) Associated complications, f)Tolerance to iron[7].

MATERIAL AND METHODS:
This study titled "A Study of Maternal and Fetal outcome in Maternal anemia" was conducted in Department of Obstetrics and gynecology in Alluri Sitarama Raju Academy of Medical Sciences, Eluru, during July 2019 to July 2020 satisfying the exclusion and inclusion criterion.

Aims and Objective of the study:
To study the effect of anemia in pregnancy affecting its outcome by categorizing anemia according to ICMR guidelines (mild: 10.9-10gm%, moderate: 10-7gm%, severe: <7gm%, very severe: <4gm%)
To study maternal and fetal risk due to anemia.

Inclusion criteria:
All pregnant women with Hb less than 10.9gm%

Exclusion criteria:
Pregnant women with Hemoglobin more than 10.9gm%. Pregnancy with anemia due to APH
Women with obstetric complications or medical illnesses, except anemia, were excluded.

Methods: Of the total patients delivered during the study year, we included all the women who fulfilled the inclusion criterion. The women were interviewed in their language in full details regarding age, literacy, socioeconomic status, diet, parity, etc. Pregnancy details regarding ANC, significant past and family history were noted. The other complications associated with anemia were noted.Subjects was followed further by a thorough general physical, systematic and obstetrics examinations.

The investigation done were:
1. Blood tests: a) Hb, b) Complete blood picture, c) Peripheral smear for type of anemia, d) Hematocrit (PCV), e) Blood grouping and typing 2. Urine routine3.Smear for malarial parasite4.Stool for occult blood, cyst/ova

All the study subjects were subjected to clinical examination to detect the complications of anemia at the earliest. Utmost care was exercised to prevent the complications of blood transfusion. Blood components were used in all the cases. These women, in labour were carefully monitored and progress of labour noted, for any obstetric or medical (CCF) complication was carefully watched for. Finally the mode of delivery, operative intervention, maternal, perinatal morbidity and mortality were studied in all the study subjects. The perinatal outcome(live birth, still birth, intra uterine death, fetal growth restriction). The weight of newborns and their APGAR score at 1 and 5 min were recorded. The neonate was attended by the pediatrician to detect the complication of severe anemia. Outcome was judged by analysis of above data.

Equal attention was to the study subject during the post-partum period to detect the complications. Breast feeding was encouraged in

immediate post-partum. Parous women were counselled regarding the need for sterilization and were asked to follow up at a later date for the same. Primiparous were explained the importance of spacing. Advice was given regarding the need for continuous use of hematinics for minimum period of 6 months of post-partum. Cases were followed up till they were discharged from the hospital.

RESULTS:
**Table - 1: Distribution of cases of anemia according to haemoglobin level**

Hb (gm%)	NUMBER OF CASES	PERCENTAGE
10.9 – 10	56	56
9.9 – 9	15	15
8.9 – 8	12	12
7.9 – 7	7	7
6.9 – 6	5	5
5.9 – 5	2	2
4.9 – 4	1	1
<4	2	2
Total	**100**	**-**

It was observed that out of 100 anemic patients taken into study, 56% had mild (10-10.9gm%) anemia, 34% had moderate(9.9-7gm%) anemia, 8% had severe(6.9-4gm%) anemia, 2% had very severe(<4) anemia. Majority of women had mild anemia i.e, 56%.

Distribution of cases of varying degrees of anemia according to age:
Maximum age was 38yrs and minimum age group was 17yrs. About 29%of women belong to age group <20 yrs (teenage pregnancy), and minimum 20.33%were above 30 yrs of age.

Graph - 1: Distribution of cases of varying degrees of anemia according literacy status
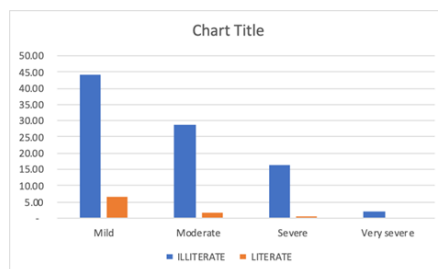

Majority of women 91 (91%) were illiterate and only 9% were literate. About 44 (86.84%) women with mild anemia, 28 (94.5%) of women with moderate anemia, 6.3 (96.07%) of women with severe anemia, 2 (100%) of women with very severe anemia were illiterate.

Distribution of cases of varying degrees of anemia according to geography
In the study, 73.3 (73.33%) women belonged to rural area. About 34.67 (68.42%) of women with mild anemia, 22.33 (73.62%) of women with moderate anemia, 15 (88.23%) of women with severe anemia, 1.33 (66.66%) of women with very severe anemia belonged to rural area.

### Graph - 2: Distribution of cases of varying degrees of anemia according to obstetric index
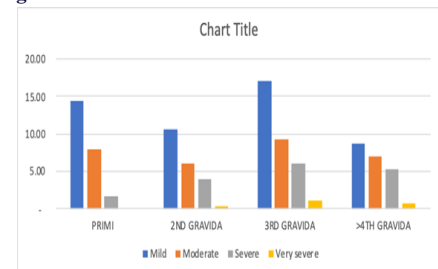
Majority of the anemic women 50 (33.33%) in the study were 3rd gravida. Primi in the study were 24 (24%). Majority of the women, i.e; 17 (33.55%) women with mild anemia, 9.33 (30.76%) women with moderate anemia, 6 (35.29%) women with mild anemia, 1 (50%) women with very severe anemia were 3rd gravida.

**Distribution of cases of varying degrees of anemia on the basis of spacing between two pregnancies:**

In this study, majority of women 61.4 (61.4%) had pregnancy interval <2yrs. Among the anemic women, about 31.61 (62.38%) women with mild anemia, 18.11 (59.7%) women with moderate anemia, 10.35 (60.86%) women with severe anemia, 1.33 (66.66%) women with very severe anemia had pregnancy interval less than 2yrs.

Graph3: Distribution of cases of varying degrees of anemia according to type of anemia
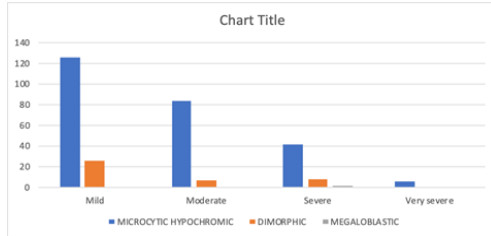
Majority of the women 86(86%) in this study had microcytic hypochromic anemia as compared dimorphic anemia 13.66 (13.66%). Only one case of megaloblastic anemia was detected. Hence iron deficiency anemia is the commonest nutritional anemia.

Graph -4: Distribution of cases of varying degrees of anemia obstetric outcome
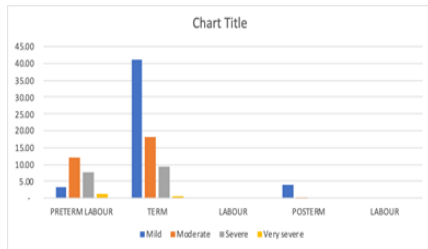
Majority of the women 1.33 (66.66%) in very severe anemia had preterm labour. Around 7.67 (45.09%) women with severe anemia and 11.98 (39.5%) women with moderate anemia had preterm labour. And only 3.29 (6.5%) women with mild anemia had preterm labour.

Distribution of cases of varying degrees of anemia according to baby birth weight
In this study, majority of women had baby birth weight 2.1-2.5kgs, Majority of women with very severe anemia, severe anemia, had baby birth weight around 1.6- 2 kg, 1-1.5 kg. And majority of women with mild anemia had baby birth weight 2.6– 3 kg.

DISCUSSIONS:
In this study we observed that out of 100 anemic patients taken into study,56% had mild anemia, 34% had moderateanemia, 8% had severe anemia, 2% had very severe anemia. Majority of women had mild anemia i.e, 56%.

In a study by Anu bala chandal12, out of 299 OPD pregnant women, 160 had Hb%above 11 gm/dl. So, the prevalence of anemia was42.48% of which 37.79% were mildly anemic,8.36% were moderately anemic and 0.72% wereseverely anemic. In the study by Kiran Rawat and Narendra Rawat6in the year 2016, grading of anemia for 8497 no. of patients, percentages.

In this study, around 71% of women belonged to low socioeconomic status which is comparable to study of DLHS -2 of Karnataka and Rangnekar et al 14 in which 43% and 67% of women with anemia belonged to low socioeconomic status which is a risk factor in anemia in pregnancy.

Present study shows that 91% of women with anemia are illiterate which is consistent with study observed by Thangaleela et al which is around 80% as illiteracy is one of the contributing factor of anemia in pregnancy, and severity of anemia is inversely related to the educational status and income.

In this study around 73% of women belonged to rural background

which is consistent with the study of Sohail et al 15 in which 53% of anemic women belonged to rural background.

Observations of birth interval in this study is comparable to study conducted by Virendra.P.Gautham and Thangaleela. Inadequate birth interval has got a high impact on anemia in pregnancy. Severe anemia was more often seen when first pregnancy occurred before 20yrs of age or gravidity more than two.

Majority of women in this study had microcytic hypochromic type of blood picture as in many other studies in which few studies are the study conducted by Lone FW, Virendra.P.Gautham16, Qiaoyi Zhang. It indicates deficient iron intake / absorption irrespective of age, type of family, caste, religion or number of children as the prevalence was equally high in all these groups in this population.

In this study 24%women had preterm labour, in which majority of women belonged to group of severe and very severe anemia which is comparable to study conducted by Lone FW 11, Riffat Jaleel 17, Umbar Jalil 21, Levy A [22].

In this study, 51% of women had low birth weight babies, majority of them belonged to severe and very severe anemia which is consistent with the study conducted by Riffat et al which is 29%, Lone FW 11 which is 13.4% and Umber et al 21 with 10% of Low birth weight babies.The risk of IUD and Neonatal death was 4.1 and 4 times higher in severely anemic women when compared to mild anemia respectively. In present study there were 1.33% IUD and 0.6% neonatal deaths which can be compared with other studies.

The direct effect of anemia predisposing to preterm labour is related to increased synthesis of corticotrophin-releasing hormone as a result of tissue hypoxia 18. These raised levels can induce maternal and fetal stress 19, and thus produce a risk factor for preterm labour and premature rupture of the membranes. CRH also increases fetal cortisol production, which may inhibit longitudinal growth of the fetus 20. In present study, maternal complications observed are infections (26%), PPH (20.33%), puerperal sepsis (12.33%), CCF(2%), post partum morbidity was 4.33%, wound gaping as 19% and failing lactation 16.66% which is consistent with the study conducted by Riffat et al in which PPH was 9.8% and wound infection around 7.8%. Therefore, to reduce the burden of this problem and related morbidity, measures to be implemented at community level, which can prevent and treat anemia in adolescent girls and women.

CONCLUSION:
Anemia is one of the main nutritional deficiency disorders affecting a large proportion of the population, not only in developing but also in industrialized countries. In the developing countries, poverty, gender bias and lack of education about the importance of a balanced and iron-rich diet contribute to anemia. The high prevalence of iron and other micronutrient deficiencies among women before and during pregnancy in developing countries is of concern and maternal anemia is a cause of considerable perinatal mortality andmorbidity.

Although bringing about a change and introducing interventions at an early age in women remain a challenge in developing countries, efforts must be made to address the problem through strategies such as fortification and periodic supplementation and counselling of women of the risks of anemia in pregnancy. This may help to reduce the manifestation of iron deficiency, improve public health and thus reduce maternal and neonatal morbidity andmortality.

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