

Various Predisposing Factors for Anaemia in Pregnancy at Rural College

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Abstract

Anaemia is one of the major nutritional deficiency disorder affecting a large proportion of population, not only in developing but also in industrialized countries. The high prevalence of iron and other micronutrient deficiency among women before or during pregnancy in developing countries concerned.

Efforts must be made to address the problem through strategies such as fortification, periodic supplementation and counseling of the women which are at risk of anaemia in pregnancy. This may help to reduce the manifestation of iron deficiency, improve public health and thus reduce material and neonatal morbidity and mortality. The study was programmed on patients coming to department of Obstetrics and Gynecology of our institution.

Each patient was subjected to a preplanned Performa bearing personal details like history, examination and investigation of the patient. Detailed history, examination and investigation pertaining to diagnoses and typing of anaemia were done as discussed under material and methods are used.

Keywords: Anemia; Pregnancy; Predisposing Factors; Nutritional Anemia; Supplementation; Counseling.

Introduction

In developing country like India, where there is inequity in distribution of urban and rural culture, it is important to reduce mortality and morbidity of the expecting mothers specially due to anaemia and its consequences [1]. The relationship of anaemia to age of mother, parity, gestational age of pregnancy at the first antenatal visit and contraceptive use by the mother are significant in rural parts of India [2].

Two thirds of body iron is present in circulating red blood cells as hemoglobin. Each gram of hemoglobin contains 3.47 mg of iron; thus, each mL of blood lost from the body (hemoglobin 15 g/dL) results in a loss of 0.5 mg of iron contributing to anaemia [4].

Irrespective of the presence of sickle cell prone belt of vidarbh (maharashtra), detected cases of plasmodium vivax malaria were seen as a contributory factor for anaemia in the pregnant women. In various reported studies presence of hepcidin in the circulation also contributed as a factor for anaemia [5].

It is defined as Hb < 11 gm % in women by WHO [3]. Mother can develop following complications because of anaemia:

- Toxemia
- Premature labour
- Premature rupture of membranes
- Intrauterine growth retardation
- oligohydramnios
- Infection
- Lactational failure
- Puerperal venous thrombosis
- Pulmonary embolism

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- Shock during labour
- Cardiac failure

Hence this study was undertaken to assess the most common predisposing factor for anaemia in pregnancy to avoid the complications.

Normal Blood Indices for Pregnant Female are as Follows [4]:

Blood Values	Non Pregnant Female	Second Trimester Of Pregnancy
Haemoglobin(Hb)	14.8gm/100 ml	11-14gm/100 ml
Red blood cells (RBC)	5 million/cu mm	4.4-5 million/cumm
Packed cel volume(PCV) or haematocrit	39-42 per cent	32-36 per cent
Mean corpuscular haemoglobin(MCH)	27-32 pg	26-31 pg
Mean corpuscular volume(MCV)	75-100 cubic micron	75-95 cubic micron
Mean corpuscular haemoglobin concentration (MCHC)	32-36 per cent	30-35 per cent
Total iron binding capacity (TIBC)	300-350µg/100 ml	Increased(300-400µg/100 ml)

Material and Methodology

positive, renal failure.

Study Population

The population of study is the patients coming to the wards of the Department of Obstetrics and Gynecology in AVBRH.

Informed Consent

- Consent from individual patients were taken before carrying out any investigation or examination and their involvement for study
- Maintenance of confidentiality of the records had been assured.

Study Setting

This is a cross sectional study ,conducted in wards of the department of Obstetrics and Gynecology in A.V.B.R.H, a tertiary teaching hospital of Datta Meghe Institute of Medical Sciences University and its peripheral subcenters affiliated to Jawaharlal Nehru Medical College.

Study Procedure:

- All the pregnant women coming to the obstetrics ward of Acharya Vinobha Bhave Rural Hospital (AVBRH) and its peripheral sub centers, in the duration of 2 months. Due consent of the patient was taken before doing any examination and investigations
- Out patients are categorized according to their haemoglobin level.
- In case she was admitted, the patient was approached to categorize the patient as our test sample that is:
"Patient having Hb < 11g/dl were labeled as anaemic as per WHO classification [1]."
- A detailed history of the patient of the was taken according to the performa. All questionnaire was completed that included age, parity, marital status, rural/urban, literacy, income ,dietary history, number of antenatal visit, previous obstetrics history in detail with interval between conception, menstrual history(menorrhagia), history of worm infestation and parasitic infections was taken.
- History of associated illness such as fever, jaundice, malaria, tuberculosis, severe infection, bleeding gums, piles, peptic ulcer and drugs (aspirin, antiepileptic etc) was also taken .

In Study Approvals

This study has been approved by the Institutional Ethics Committee (IEC) of Datta Meghe Institute of Medical Sciences University.

Study Type

Cross sectional study.

Sample Size

A sample size of 200 patients was taken.

Duration of the Study:

Duration of research is 2 months

Inclusion Criteria

- Age 18years and above
- Hemoglobin less than 11 gm%

Exclusion Criteria

- Women with diagnosed medical illness like- HIV

- A detailed dietary history including the intake of antacid, calcium supplements, high protein rich diet, excess of caffeine in the form of tea and coffee or any dairy products like cheese, yogurt or milk which lead to decrease in the absorption of iron in the body or history of vitamin C intake was taken as it enhances the iron absorption.
- Patient's socio economic status was categorized according to Prasad's Classifications on the basis of the per capita income of the family and also the number of family members living together.
- Family history of anaemia to exclude sickle cell anaemia and thalassemia minor was also taken.
- General Examination of mother was done.
- The routine examination of the pregnant women was carried out and required laboratory investigations were carried on to come to the diagnosis.
- Special investigations were done, like serum ferritin, Serum bilirubin for haemolytic anaemia Haemoglobin electrophoresis for Thalassemia and sickle Cell Anaemia according to the affordability of the patient.

Collection, Presentation and Interpretation of Data:

The collection of data has been depicted in tabular form and with the use of graphs interpreted statistically and analyzed.

Statistical Analysis

Independent chi square test is used where comparison in literacy, occupation, diet, caloric recommendation, nutrition status (weight of the patient in Kg) and parity is done.

Observation and Results

All signs of anaemia as well as respective investigations were considered before deciding the grade of anaemia in the patient attended during the research. According to WHO criteria, haemoglobin level below 11gm% is labeled as anaemia [3], and according to ICMR classification for anaemia [6]

In our study, microcytic hypochromic anaemia (nutritional deficiency-78.5%) is the commonest predisposing factor for anaemia followed

Table 1: Distribution of pregnant women according to their class of anaemia*

Grade of Anaemia	Number of Cases	Percentage
MILD (10-10.9 gm%)	90	45%
MODERATE (7-9.9 gm%)	100	50%
SEVERE (<7 gm%)	8	4%
VERY SEVERE (<4gm%)	2	1%
TOTAL	200	100%

*Using icmr classification for anaemia.

Fig. 1: Graphical representation of distribution of pregnant women according to their class of anaemia

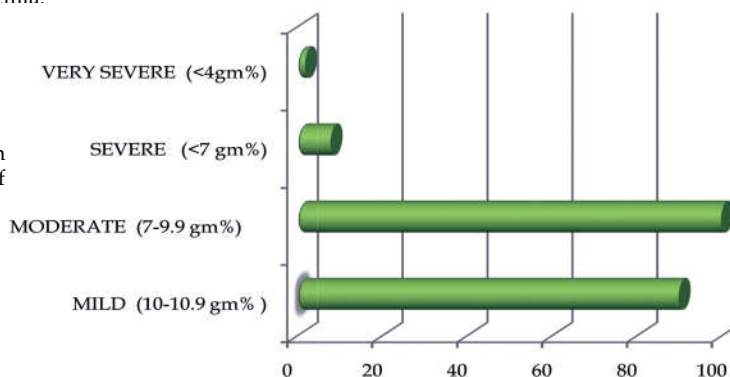


Table 2: Predisposing factors for anaemia

S. No	Type of anaemia	No of cases	Percentage (%)
1.	Microcytic hypochromic Anaemia	157	78.5
2.	Dimorphic Anaemia	10	5.0
3.	Plasmodium vivax malaria	10	5.0
4.	Worm infestation	6	3.0
5.	Sickle cell anaemia	6	3.0
6.	megaloblastic Anaemia	4	2.0
7.	History of menorrhagia	3	1.5
8.	Unknown cause	3	1.5
9.	Thalassemia minor	1	0.5

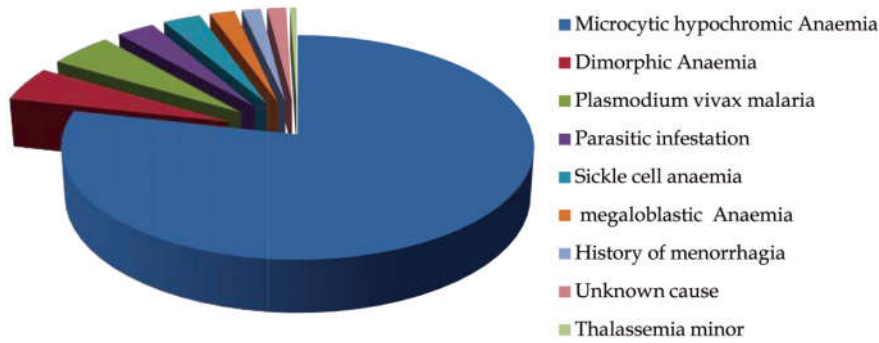


Fig. 2: Various Predisposing Factors for Anaemia in Pregnancy

Dimorphic anaemia (5%), plasmodium vivax malaria(5%) Sickle cell anaemia(3%), Parasitic infestation(3%), B12 deficiency (2%), Thalassemia minor(0.5%), history of menorrhagia(1.5%), Unknown cause (1.5%).

Various Predisposing Factors for Anaemia in Pregnancy

Poor economic status leads to nutrition deprived food intake leads to some form of nutritional deficiency anaemia.

Table 3: Classification of the subjects according to their socioeconomic status*

Social Class	Suggested By Prasad(1961)	Updated As Per Index(June 2010)	No. Of Cases (Total No 200)
I	100 and above	4000 and above	5
II	50-99	2000-3960	10
III	30-49	1200-1960	100
IV	15-29	600-1160	70
V	Below 15	Below 600	15

(multiplication factor = consumer price index of India*4.93/100=40)
 (Consumer price index for June 2010 is 806)
 *using modified prasad's classification

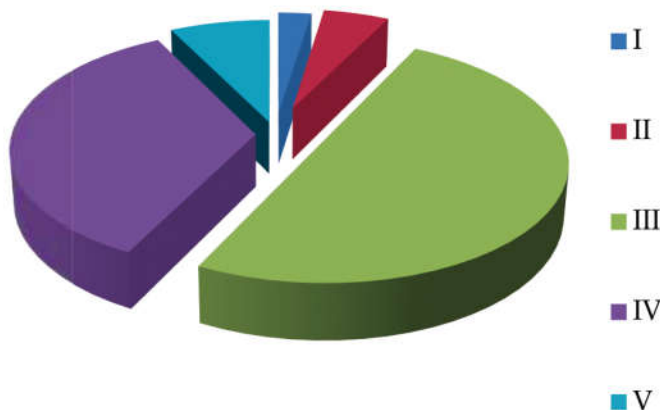


Fig. 3: Pictorial representation of prasad's classification for socio economic status of the patients

Table 4: Categorization according to the literacy of the patient Grades of Anemia

Literacy	Grades of Anemia				Total
	Mild	Moderate	Severe	Very Severe	
Illiterate	22	12	0	2	36
Primary education	50	71	3	0	124
Secondary education	10	15	5	0	30
Higher secondary	8	2	0	0	10
Total	90	100	8	2	200

Using independent chi square test: X^2 cal=34.5
 X^2 tab at 5% degree of significance of 9 df=16.92
 Hence X^2 cal > X^2 tab hence H_0 is accepted.

Hence lack of education and employment, awareness of supplementation for iron and folic acid intake is insufficient, contributing to a cause for anaemia.

Table 5: Type of diet

Type of diet	Grades of anemia				Total
	Mild	moderate	severe	Very severe	
Vegetarian	66	70	4	0	140
Non vegetarian	24	30	4	2	60
Total	90	100	8	2	200

Table 6: Type of diet

Type of diet	Grades of anemia				Total
	Mild	moderate	severe	Very severe	
Vegetarian	66	70	4	0	140
Non vegetarian	24	30	4	2	60
Total	90	100	8	2	200

Table 7: Birth spacing

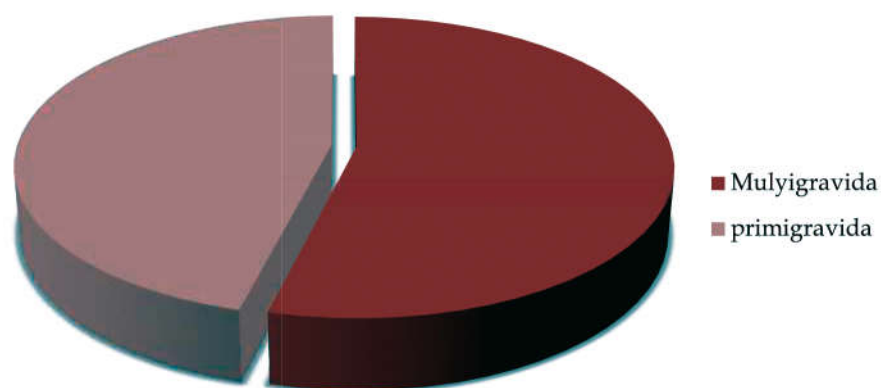
Spacing between two births (years)	Number of patients	Percentage
<3 years	150	75%
3-5 years	40	20%
>5 years	10	5%
Total	200	100%

Table 8: Nutritional status

Reported studies	Mild	Moderate	Severe
study	45%	50%	4%
ICMR(India)	13%	57%	12%
Thangaleela.T and Vijaylakshmi	23%	38.2%	9.2%

Table 9: Classification of the subjects according to their parity

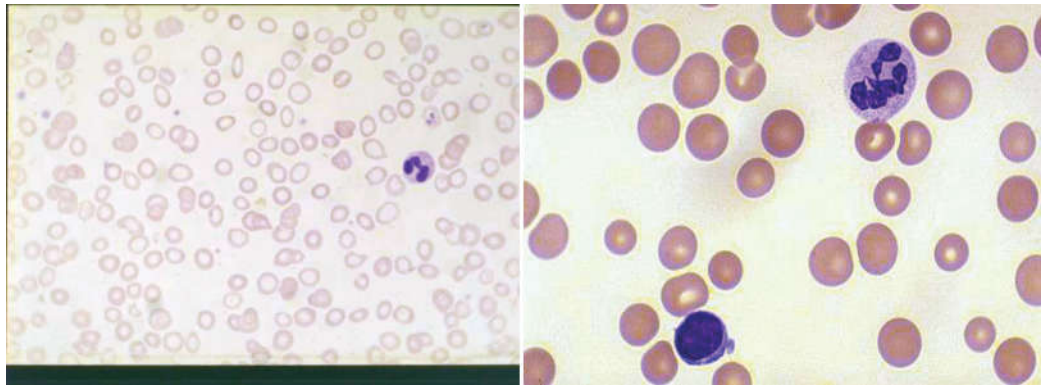
Parity	Grades of anemia				Total
	Mild	Moderate	Severe	Very severe	
Multigravida	54	46	6	2	108
Primigravida	46	54	2	0	92
Total	90	100	8	2	200

**Fig. 4:** Pictorial presentation of parity**Table 10:** Birth Spacing

Spacing between two births (years)	Number of patients	Percentage
<3 years	150	75%
3-5 years	40	20%
>5 years	10	5%
Total	200	100%

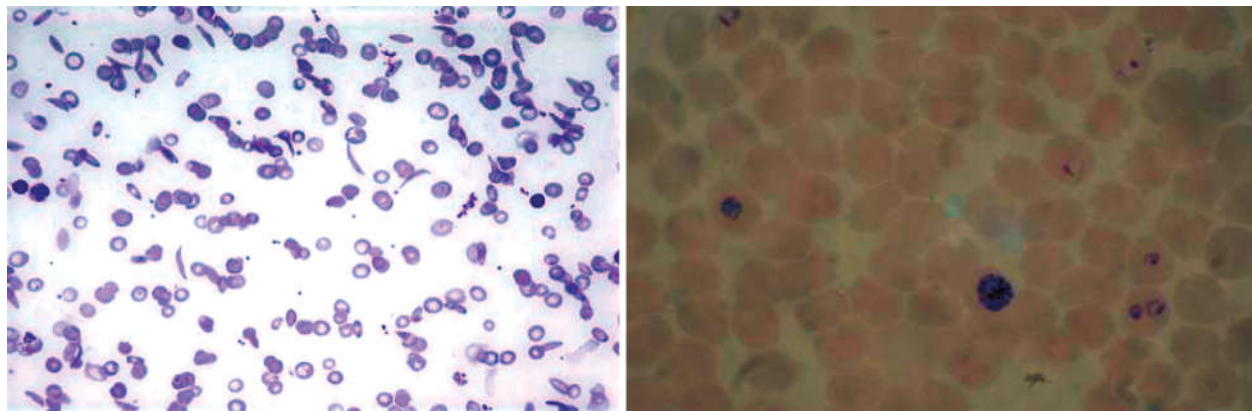
Table 11: Contraceptive use

Barrier contraceptives		Copper T		Oral		Not using contraceptives	
Number	%	Number	%	number	%	Number	%
15	7.5	20	10	10	5	155	77.5



Iron Deficiency Anaemia (Hypochromic Microcytic)

Megaloblastic Anaemia (Normochromic Macrocytic)



Sickle cell anaemia (spindle shaped cells)

plasmodium malarial parasite infection

Fig. 5: Microscopic picture of various type of anaemia ⁷

Table 12:

Reported Studies	Mild	Moderate	Severe
study	45%	50%	4%
ICMR(India)	13%	57%	12%
Thangaleela.T and Vijaylakshmi	23%	38.2%	9.2%

Table 13: Demographic profile of the patient

Parameters	Razia Mustafa Abbassi et al	Zulkifli Ahmed,Rogaya Zaafar et al	Result of study
Parity			
• Primigravida	24.0%	37.5%	46%
• Multigravida	53.0%	47.1%	54.0%
Contraceptives used			
• Users	21.29%	46.7%	22.5%
• Non users	78.70%	48.2%	77.5%

Table 14: Risk factors

Parameter	Razia Mustafa Abbassi et al	Result of study
Nutritional deficiency	76.4%	78.5%
Warm infestation	14.4%	3.0%
Menorrhagia (chronic blood loss)	2.3%	1.5%

- Out of 200 patients, the number of vegetarian patients was found to be 140 while that of non vegetarian patients were found to be 60 in number. Also the diet was rich in protein as the major content of intake is in the form of jowar, yellow gram (tuar), soya bean (cereal rich in protein).

According to the study, there are 108 multigravida females and 92 primigravida.

Discussion

The degree of anaemia as per ICMR classification given by John Studd and et al is as follows:

Mild anaemia - haemoglobin level 10.0-10.9 gm%

Moderate anaemia- haemoglobin level 7-9.9 gm %

Severe anaemia- haemoglobin level <7 gm%

Very severe anaemia- haemoglobin level <4gm%

In our study, there were 45% (no. of cases=90) had mild degree of anaemia, 50% (100) had moderate anaemia, 4% (8) showed severe anaemia and the remaining 1% had very severe anaemia

A comparison was done with studies given by ICMR and Thangaleela.T and Vijaylakshmi et al. Number of anaemia is high, almost 70% in a study in Patna by Kamal Acharai and Usha Rani (1970) and in study of Thangaleela T.and Vijaylakshmi P.(1994).

A comparison was done between these two studies with that of our study ,the results were are as follows:

The variation in the results is due to the sample size of each study. In all the studies on iron deficiency anaemia, MCH and MCHC were found to be reduced and no cases of hyperchromsia were noticed .

A correlation in the demographic profile of the patient was seen in the studies given by Razia Mustafa Abbassi, Shohaib Ansari and Bikha Ram Devrajani; Zulkifli Ahmed and Rogaya Zaafar to our study :

In the above discussion, the sample size various in all the three studies.

In the study given by the Razia Mustafa Abbassi,Shohaib Ansari and Bikha Ram Devrajani, the sample size of the study was 263 pregnant women, in that given by Zulkifli Ahmed and Rogaya Zaafar, the sample size is large that is 9860 pregnant women in Kelantan.

Further correlation was seen between the study given by Razia Mustafa Abbassi, Shohaib Ansari and Bikha Ram Devrajani and our study.

Conclusion

It can be concluded by present study that poor dietary intake, low socioeconomic status of the patient, Illiteracy, multiparity, spacing less than 2 years, caloric intake <80% of expected, vegetarian diet and unemployment, poor use of contraceptives, parasitic infestations, plasmodium vivax malaria were some of the common predisposing factors for anaemia in the pregnancy. So, it is important to diagnose and treat the underlying cause of anaemia in pregnancy to ensure optimal health of mother and newborn. Efforts must be made to address the problem through strategies such as fortification and periodic supplementation and counseling of women of the risk of anaemia in pregnancy. Combined social and medical efforts are required for overall improvement of living status of women. Their awareness is to be increased about dieting habits, small family norms, birth interval and regular antenatal visits.

The plasmodium vivax malaria is one of the important cause of anaemia (microcytic hypochromic anaemia). In our study we came across 5% cases of the same. Chloroquine is given to such women.

Ova and cysts of ancylostoma were seen during the stool examination on the admitted pregnant women. Anthelmintics like Abendazole, 400 mg oral single dose or mebendazole 100 mg twice daily for 3 days is given in every anaemic case showing such worm infestations.

There are various risk factors contributing to causes of anaemia. Iron deficiency is the most common type, followed by the folic acid deficiency, therefore iron and folic acid prophylaxis is given to all the antenatal women coming to A.V.B.R.H. There are other factors like, thalassemia, sickle cell disease, worm infestation, parasitic infection, excessive blood loss (during menstruation), piles, hemorrhoids and also bleeding due to pregnancy related causes contributes to anaemia in pregnancy. Additional studies on pregnant women are needed in which appropriate measures of immune function are evaluated in response to iron supplementation.

Finally, other nutritional deficiencies have also been proposed to have an impact on maternal outcome example, niacin and zinc deficiency.

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