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Determinants of Factors for Anaemia in Pregnancy in a Rural Medical College

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Introduction - Anaemia is defined as reduction in circulating haemoglobin mass below the critical level. The normal haemoglobin (Hb) concentration in the body is between 12-14 grams percent. WHO has accepted up to 11gm percent as the normal haemoglobin level in pregnancy. However in India and most of the other developing countries the lower limit is often accepted as 10 gms percent.Anaemia ranges from mild, moderate to severe and the WHO pegs the haemoglobin level for each of these types of anaemia in pregnancy at 10.0 – 10.9g/d1 (mild anaemia) 7 – 9.9g/dl (moderate anemia) and < 7g/dl (severe anaemia) (12).

According to WHO,in developing countries the prevalence of anemia in pregnant women averages 56%,ranging between 35-100% in different regions of the world.(1). In India anemia is the second most common cause of maternal deaths for 20% of total maternal deaths (1).

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Determinants of Factors for Anaemia in Pregnancy in a Rural Medical College

Dr. D Shrivastava [α], Dr.Satrupa Mukherjee [σ], Dr. Richa Lohana [ρ] & Dr. Sanjana Khemka [ω]

I. Introduction

Anaemia is defined as reduction in circulating haemoglobin mass below the critical level. The normal haemoglobin (Hb) concentration in the body is between 12-14 grams percent. WHO has accepted up to 11gm percent as the normal haemoglobin level in pregnancy. However in India and most of the other developing countries the lower limit is often accepted as 10 gms percent.Anaemia ranges from mild, moderate to severe and the WHO pegs the haemoglobin level for each of these types of anaemia in pregnancy at 10.0 – 10.9g/d1 (mild anaemia) 7 – 9.9g/dl (moderate anemia) and < 7g/dl (severe anaemia) (12).

According to WHO,in developing countries the prevalence of anemia in pregnant women averages 56%,ranging between 35-100% in different regions of the world.(1). In India anemia is the second most common cause of maternal deaths for 20% of total maternal deaths (1). Association of anemia with adverse maternal outcome suchas, antepartumhaemorrhage, post partumhaemorrhage, maternal mortality and puerperal sepsis. (1) Apart from the risk to mothers it is also responsible for increased incidence of premature births, low birth weight babies and increased perinatal mortality (1) It is estimated that 20 – 50% of the world population is suffering from iron deficiency anaemia. Iron deficiency is believed to be most common cause of anaemia in pregnancy.Iron deficiency anaemia does not only affect the mother but also has impact on cognitive and psychomotor function and anaemia in infant.

Pregnant women are vulnerable to deficiencies in iron, folate, cobalamine and vitamin A. In addition, chronic infections may inhibit cell proliferation and erythropoiesis in the bone marrow which can cause anaemia.(5) The changes in the immune system associated with pregnancy have been suggested as the reason for hookworm and malarial parasite infestation on the other hand, impaired micronutrient absorption thus increasing the susceptibility of pregnant women to anaemia. Recently, infection with HIV has emerged as an additional important risk factor for anaemia in pregnancy (6).

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Nearly half the pregnant women in the world are considered to be anemic that is 52% as compared to 23 % in industrialized countries. Recent World Health Organization (WHO) data shows that approximately 10.8 million in African countries, 9.7 million in western Pacific and 24.8 million pregnant women in South East asia are anemic, the highest number being in South east Asia. (3)

II. Aim

- To assess prevalence and identify predisposing factors for anaemia in pregnant women to highlight the importance of antenatal care regarding maternal health.
- To formulate the recommendations for correction of predisposing factors for furtherreduction of incidence of anaemia.

III. Objectives

- To investigate the importance of nutritional deficiencies and infections in the development of anaemia in pregnant women.
- To establish if 'at risk' group can be identified for targetted intervention.

IV. Methods and Methodology

A retrospective study was donefrom January 2007 to January 2010 on 1000 antenatal patients attending to the O.P.D. of our hospital with haemoglobin less than 10 gm% with gestational age between 8 weeks till delivery and singleton pregnancy were included in the study.

We assessed prevalence of iron deficiency anaemia and associated risk factors in women. Women before 8weeks, multiple pregnancies, Hb% 10 or more were excluded from the study.

Complete blood count was performed to assess the severity and type of anaemia (along with blood indices and peripheral smear) and was repeated after treatment to see the response to treatment.

Hb% levels were measured at first visit. Other investigations to rule out any chronic infection apart from routine urine and stool examinations were done.

Test for sickling with Hb-electrophoresis were done in all patients as this area is endemic for sickling. Serum iron and serum ferritin levels were not done as most of the patients were not affording.

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The information was recordedby taking detailed history to assessrisk factors leading to anaemia such as nutritional status parity, birth spacing, family planning methods,infection, bleeding from any site, use of recreational drugs such as Pan, tobacco, habit of Pica).

For this study, anemia was defined as Hb below 10g/dl. Anemia was further categorized into 3 levels mild (9-10 gm %) moderate (7- 8.9 gm %)) and severe (<7 gm %).

Table 1 A : Showing Thedemographic Profile of the Patients(N = 1000)

Parameters	No. of patients	frequency
Age (in years)		
18-25	330	33%
26-35	540	54%
>35	130	13%
Gestational age (in weeks)		
10-28 weeks	150	15%
29-34 weeks	600	60%
>34 weeks	250	25%
Parity:		
a.Primigravida	340	34%
b.Multipara	540	54%
c.Grand Multipara	120	12%
Birth spacing		
a.< 1 year	250	25%
b.1 – 3 years	650	65%
c.> 3 years	150	15%
Family planning method:		
a.Users	340	34%
b.Non-users	660	66%
Types of admission:		
Booked	280	28%
Un-booked	720	72%
Accordance to referrel		
a. Referred	680	68%
b. Non-referred	320	32%

Table1 B : Showing the Socio-Economic Standard of the Patients According to Income and Education

Parameters	No. of patients	frequency
Literacy frequency		
I. Illiterate	240	24%
II. Primary	320	32%
III. Secondary	280	28%
IV. Higher secondary	160	16%
Socio-economic condition		
a. upper middle	100	100
b. middle	440	440
c. lower	460	460

Table 1 C : Showing t he Dietery Habits Features No. of Patients Frequency Dietary Habits

Features	No. Of Patients	Frequency
DIETARY HABITS		
a. Vegeterian	640	64%
b. Non-vegeterian	360	36%
Usage of regular supplements		
a. Iron supplements only	430	43
b. Both iron and folic acid	110	11
c. No suppliments	460	46

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Blood picture	No. of patients	Percentages
Normocytic	440	44
Microcytic hypochromic	480	48
Macrocytic	120	12

Table 2 : Distribution of patients according to severity of anaemia

Parameters	No. of patients	Frequency
Haemoglobin		
Mild (9-10 gm%)	180	18
Moderate (7- 8.9 gm%)	440	44
Severe (<7.0gm %)	380	38
MCV (83 – 97 fl):		
Low (< 83fl))	630	63%
Very low (< 60 fl)	340	34%
High (> 100 fl)	300	3%
MCHC (32 – 36 gm%):		
Low (<32gm%)	920	92
Normal (32 – 36gm%)	80	8

Table 3 : Percentage of participants with positive Risk Factors (n=1000)

Risk factors:	Percentage
Nutritional deficiency:	
Iron	22%
Iron and folic acid	7%
Protein	8%
Combined	63%
Worm infestation	13%
Chronic medical illness:	
Malaria parasite	9%
UTI	37%
TB	3%
Other infections -eg-uri/lri/csom/skin/hiv	21%
	0.5%
Chronic blood loss:	
Menorrhagia	21%
Bleeding piles	12%
Pan, tobacco chewing	33%
Sickle cell trait	7%

(So me participants had multiple positive etiological factors leading to anemia)

Table 4 : Birth weight of child and mother's haemoglobin level at last antenatal visit

Birth weight	Hb< 7	Hb 7-8.9	Hb 9-10
<2 kg	140	100	20
2-3 kg	240	180	80
> 3kg	0	160	80
Total	380	440	180

V. Discussion

Anaemia in pregnancy particularly severe anemia is associated with an increased risk of maternal mortality, which, in most developing countries, continues to be unacceptably high. In 1993, the World Bank rankedanaemia as the eighth leading cause of disease in girls and women in developing countries (1).

Anaemia is more common in women especially if they are young, poor, pregnant or members of an ethnic minority.It is most common medical disorder in pregnancy related to increase maternal and perinatal morbidity, therefore antenatal care should be done for early detection and management.The prevalence, etiology and degree of severity vary in different populations, it is 35% for non pregnant women and 51% for pregnant women globally, and 3 – 4 times higher in developing countries. In south Asia prevalence of anaemia among pregnant women is as high as 65%.

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In developing world, current strategies to prevent and correct anaemia and iron deficiency in pregnant women have met little success.Our study revealed iron deficiency anaemia the most common type of anaemia in pregnant women.Two large studies with industrial world, involving over one million pregnancies clearly indicated that favourable pregnancy outcomes are less frequent among anaemic mothers. Our data showed association of maternal anaemia in pregnancy with nutritional deficiency habit of pan, tobacco, acute and chronic blood loss and chronic medical disorders.

The present study showed that anaemia was common during 29-34 weeks of gestation. Adequate birth spacing were lacking in our study group, 65 % had a spacing of 1-3 years only, and 25% having spacing even less than 1 year.

66% of these rural women had no history of usage of any family planning methods. Lack of ante-natal check up was prevelent among these anaemic patients, as 72% of these patients were unbooked.

Contraception use is unpopular among rural mothers.However, with more of the rural women being educated and being employed, and with theimproved accessibility to health care, contraception use will improve in the future. This process can be accelerated by combining accessibility with effective health education to the rural mothers. However, mothers at high risk should be strongly advised to practice contraception. (3) This advice can be reinforced during both the antenatal and postnatal periods.

The common cause noted in our study was nutritional deficiency, (46% of these patients did not receive any nutritional supplements) as evidenced by the prevalence of mainly normocytic, normochromic or microcytic, hypochromic blood picture, followed by hook worm infestations and sickle cell trait was seen in a number of patients. Iron deficiencies may develop during pregnancy because of the increased iron requirements on the mother's body to supply the expanding blood volume and the rapidly growing fetus and placenta. Literatures suggest that iron deficiency is responsible for about 50% of the cases of anaemia in pregnant women in developing countries (4).

It has been suggested that the prevalence of anaemia may depend on the season, increasing in relation to malaria in the wet season, or in relation to food shortage at the end of the dry season (1), though we could not get much correletion between seasonal change and anaemia. Malaria was seen in 9 % of these anaemic patients.

The majority of these mothers were multiparous and would have been prescribed haematinics during previous pregnancies. Yet, many of them (15%) were already anaemic (Hb<10.0 g/dl) at the first antenatal visit. Past iron supplementation may not have prevented anaemia in the current pregnancy. Iron supplementation should be continued even after pregnancy, as there is usually inadequate iron absorption from diet to meet demands of pregnancy without supplementation in this rural population. The net additional iron requirements during pregnancy are estimated to be 1 000 mg per day. (4)

In our institute, iron and folic acid supplementation is routinely prescribed in pregnancy. It is anticipated that good compliance to the prescribed iron supplements prevent anaemia during pregnancy. However, the compliance rate among rural mothers in our region is low.The diet is traditionally vegetarian, and is likely to have a poor bioavailability of iron.

Since cobalamine is exclusively found in animal products, the traditional diet might cause nutritional cobalamin deficiency, as observed in other communities with a predominantly vegetarian lifestyle Cobal-aminemalabsorption may be another explanation for the apparently high prevalence of deficiency in our study.

Assessment of folate status is difficult, especially during pregnancy. Based on the results of the present study, it is uncertain whether the prevalence of folate deficiency really is low. The current practice of routine folate supplementation should therefore con-tinue, especially as the importance of a sufficient folate supply for normal pregnancy outcome has been recognized during recent years.

Intestinal helminthiasis is strongly associated with overall anaemia and severe anaemia in pregnant women in this population. Investigations carried out in villages near Hyderabad indicated that the prevalence of morbidity due to infections was doubled in women with haemoglobin levels below 8.0 g/dl (8).

The drugs used for treating schistosomiasis are not considered totally safe to use in pregnancy. The use of Praziquantel (PZQ) is found to be the safest of all. A review of the current known toxicology of PZQ over two decades of clinical experience suggests a very low potential for adverse effects on either the mother or her unborn child. The review concluded that pregnant women should be treated with PZQ that women of childbearing age should be included in all mass treatment programmes and that lactating women should not be systematically excluded from treatment.

The HIV infection rate among pregnant women is 0.5% other studies have also found that HIV infection is a risk factor for anaemia in pregnancy. This could be due to the enhancement of nutritional deficiencies, opportunistic infections and the use of antiretroviral drugs in patients with AIDS.

It should also be noted that there were no antiretroviral treatment facilities for HIV-positive patients at the time of the study. A single dose of nevirapine was used only at the occurrence of labour pain, and therefore had no impact on anaemia in our study subjects.

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VI. Conclusion

In developing world, current strategies to prevent and correct anaemia and irondeficiency in pregnant women have met littlesuccess. (2) Anaemia still constitutes a public health problem in the world, especially in the developing countries. Nutritional anaemia is found more among rural mothers, where poor dietary intake and parasitic infections are more common. Many women start their lives with insufficient iron stores, but also, because of inadequate child spacing, they have little time to build up their iron levels between pregnancies (3).

However, risk factors such as anaemia in pregnancy can be controlled and monitored by good antenatal care and appropriate action, including referral, in accordance to the level of severity of the anaemia. (3) The problem of anaemia in pregnancy can also be prevented by increasing spacing between births through the promotion of contraception. This will help build up any depletion in iron stores.

A key component of safe motherhood is the eradication of anaemia during pregnancy. The most effective interventions against these infections are preventive and promotive in nature. The prevention should include provision of safe drinking water, clean food, Control of flies, safe sex and ensuring universal precautions in human contact.

This study has noted the high prevalence of anaemia in pregnancy among rural mothers. Although haematinics were routinely given, it has not improved the status of anaemia in mothers, probably because of poor compliance. Compliance should be improved by health education, especially in high risk mothers.Previous global estimates made by DeMaeyer in 1985 indicated that approximately 30% of the world's populationwas anaemic (13).These estimates seem to be based on an

extrapolation of the prevalence in preschool-age children, school-age children, women, and men.Global population resides, indicated that 43% of preschool-age children, 35% of all women, and 51% of pregnant women were anaemic . In 1992, WHO estimates for the year 1988 indicated that 37%, 51%, and 35% of all women and pregnant and non-pregnant women were anaemic (14).GOVERNMENT OF INDIA INITIATIVE AIMING to have hb of 12g/dl by 12 years of age using prophylactic iron therapy&iron rich food. WHO recommendation is 60 mg elemental iron &250ug of folic acid once daily for 6 months. Ministry of india, government of india recommends 100mg of elemental iron &0.5mg folic acid in second half of pregnancy for 100 days.

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