

ORIGINAL RESEARCH

Study of Anemia in Antenatal Care Patients: A Retrospective Study

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ABSTRACT

Aim: To study the prevalence of anemia in antenatal care (ANC) patients and their sociodemographic factors associated with anemia.

Materials and methods: In this retrospective hospital-based study, data were collected from medical record section from 1st January to 31st December 2011. Patients admitted to labour room for delivery were selected as per the WHO classification of anemia. Various sociodemographic factors were also studied. Data were analyzed with the help of frequency and percentage tables. Association between variables were checked by Chi-square test.

Results: Out of 6,356 patients delivered, 6,300 patients were anemic. Maximum percentage of patients (93.8%) were in the category of moderate anemia. A total of 4174 patients were in age group of 21 to 25 years. It was found that 56.4% of patients are primigravida. Seventy-eight percent patients belong to rural population. Baby weight of 3,046 patients were in group of 2.1 to 2.5 kg.

Conclusion: It was found that out of 6356 patients delivered, 6300 were anemic. Maximum patients (93.8%) had moderate anemia, mild and severe anemia was found in 0.8 and 5.4% of patients.

Keywords: Anemia, Pregnancy, Iron deficiency, Hemoglobin.

How to cite this article: Mandve P, Nawale K, Motghare VM, Pajai S. Study of Anemia in Antenatal Care Patients: A Retrospective Study. *J South Asian Feder Obst Gynae* 2014; 6(3):133-138.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Anemia is the most common nutritional deficiency disorder in the world. The WHO Global Database on Anemia from 1993 to 2005, which covered almost half the world's population, estimated the prevalence of anemia to be 25% worldwide.¹ In absolute numbers, anemia affects 1.62 billion people globally with about 293 million children of preschool age, 56 million pregnant women, and 468 million nonpregnant women.¹ Although the prevalence of anemia is estimated to be 9% in developed countries, it is as high as 43% in developing countries.²

Global anemia prevalence estimates of 47% in children younger than 5 years, 42% in pregnant women, and 30% in nonpregnant women aged 15 to 49 years.² Africa and Asia account for more than 85% of the absolute anemia burden in high-risk groups and India has worst 74.3% of population affected by anemia.

Anemia is estimated to contribute to more than 115,000 maternal deaths and 591,000 perinatal deaths globally per year.³ Analysis of data on global prevalence shows that anemia is disproportionately concentrated in low socioeconomic groups, and that maternal anemia is strongly associated with child anemia.

Nutritional anemia is a major public health problem in India and is primarily due to iron deficiency. The National Family Health Survey-3 (NFHS-3) data suggests that anemia is widely prevalent among all age groups, and is particularly high among the most vulnerable — nearly 58% among pregnant women, 50% among nonpregnant nonlactating women, 56% among adolescent girls (15 to 19 years), 30% among adolescent boys and around 80% among children under 3 years of age.⁴

The most common causes of anemia in pregnancy include iron deficiency, folate deficiency, vitamin B12 deficiency, hemolytic diseases, bone marrow suppression, chronic blood loss and underlying malignancies.⁵

Thirty to fifty percent of women become anemic during pregnancy, with iron deficiency being the most common form of anemia in more than 90% of the cases.⁵⁻⁷

Amongst South Asian countries, India has highest percentage (87%) of pregnant women with iron deficiency anemia. India constitutes 22,000 to the total no. of 50,000 worldwide, for the maternal deaths from anemia per year.⁸

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Anemia is second most common cause of maternal deaths in India, estimated to contribute 20% of all maternal deaths and nine times higher risk of perinatal mortality.⁹ India contributes to about 80% of the maternal deaths due to anemia in South Asia.¹⁰

Prevalence of anemia is high in all the states, though there are considerable variations between states in prevalence of moderate and severe anemia.¹¹ The risk of low birth weight is tripled, while that of preterm delivery is more than doubled in association with iron deficiency anemia (IDA).¹²

Anemia and iron deficiency in pregnancy are associated with large placental weight and a high ratio of placental weight to birth weight (placental ratio),¹³ both of which are predictors of adult hypertension.¹⁴ In the newborn, IDA is associated with poor performance in the Bayley Mental Development Index.¹⁵ The risk of anemia occurs during the time of rapid growth and nutritional demand especially at the age of 6 to 24 months, adolescence and during pregnancy.

It commences in childhood, worsens during adolescence in girls and gets aggravated during pregnancy. It is known fact that babies of iron anemic mothers are born with low iron reserve. A number of observational studies have found that children who experience anemia early in life continued to demonstrate lower academic performances during their school age years, even after anemia has been corrected.¹⁶

In a recent (September 2001-April 2003) study, the Healthcare and Research Association for Adolescents, Noida and the Nutrition Foundation of India, New Delhi, studied women in the same districts and villages studied in NFHS-II and concluded that the prevalence and severity of anemia in rural pregnant women was much higher than that reflected in NFHS-II: 84% prevalence, of which 9.2% fell into the severe anemia category.¹⁷

The Indian Council for Medical Research (ICMR)'s district nutrition survey data also reported similar anemia prevalence of 84.2%, with 13.1% being in the severe anemia category.¹⁸ The most recent survey by the NFHS (NFHS-III, 2005-06) has reported a rise in prevalence from 49.4 to 59.4%.¹⁹ In World Health Organization/World Bank Ranking, iron deficiency anemia is the third leading cause of disability-adjusted life years for females aged 15 to 44 years.²⁰

Available data from India indicate that maternal morbidity rates are higher in women with hemoglobin (Hb) below 8.0 gm/dl. Maternal mortality rates show a steep increase when maternal Hb levels fall below 5.0 g/dl. Anemia directly causes 20% of maternal deaths in India and indirectly accounts for another 20% of maternal deaths.²¹

Anemia gives rise to various problems ranging from lethargy, low birth weight, preterm delivery, postpartum hemorrhage, menorrhagia, decreased quality of life to congestive cardiac failure. One of the goals for the 12th 5-year plan is to reduce anemia in girls and women by 50%.

Hence, present study was carried out to study the prevalence of anemia in ANC patients admitted in labour room and to study sociodemographic factors associated with anemia.

MATERIALS AND METHODS

The present study was carried out at tertiary care teaching hospital in India.

This is retrospective hospital based study. In this study data was collected from medical record section from 1st January 2011 to 31st December 2011. Antenatal women admitted in labour room for delivery with anemia were selected. Data, in the form of hemoglobin percentage, registration status, age and parity of patients, address, baby weight, was collected from case paper of every selected patient. Hemoglobin percentage was done by cell counter.

Anemia in pregnancy was defined and classified as per WHO classification as follows:

- Mild anemia: Hemoglobin = 10 to 10.9 gm%
- Moderate anemia: Hemoglobin = 7 to 9.9 gm%
- Severe anemia: Hemoglobin = <6.9 gm%

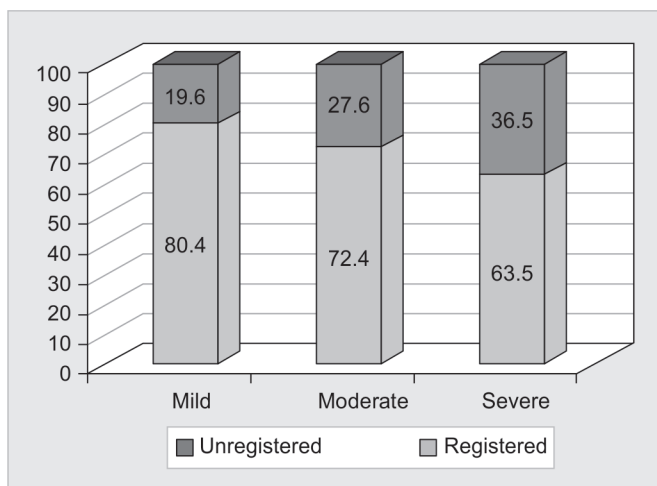
Association of anemia with factors like age of mother, registration status (registered or not), parity, residence, baby weight was studied. Data analysis was done by percentage and frequency distribution tables with the help of software SPSS-22. Association between variables was studied by Chi-square test.

RESULTS

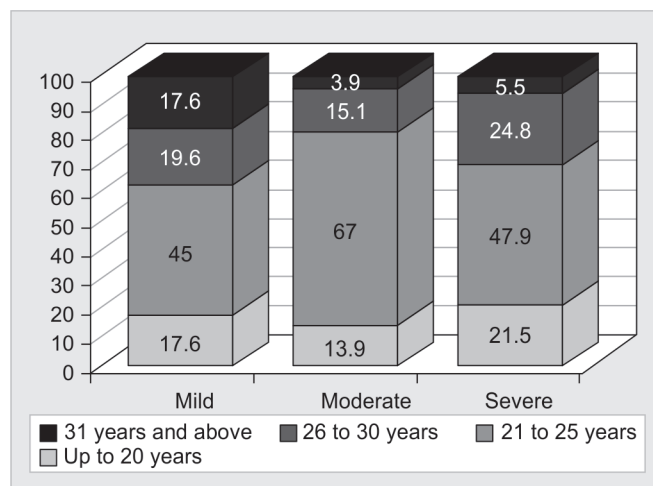
It is seen in the Table 1 and Graph 1 that in all 72% patients were registered. It can be seen in the row of severe anemia that 125 (36.5%) out of 342 severe anemic patients were not registered.

Table 2 and Graph 2 show that maximum patients were in age group of 21 to 26 years which is found to be statistically significant ($p < 0.0001$).

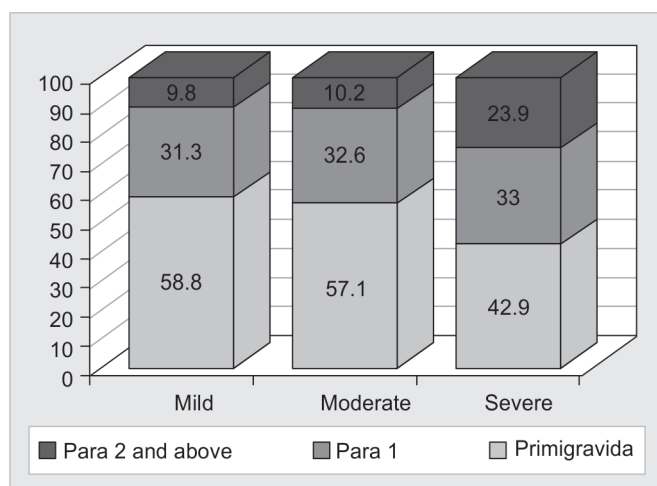
It was found that maximum patients were primigravida (Table 3 and Graph 3), which is statistically significant ($p < 0.0001$). Table 4 and Graph 4 show that 78% patients belonged to rural area. 48.3% patients had baby weight in group of 2.1 to 2.5 kg (Table 5 and Graph 5) which is statistically significant ($p < 0.0001$).



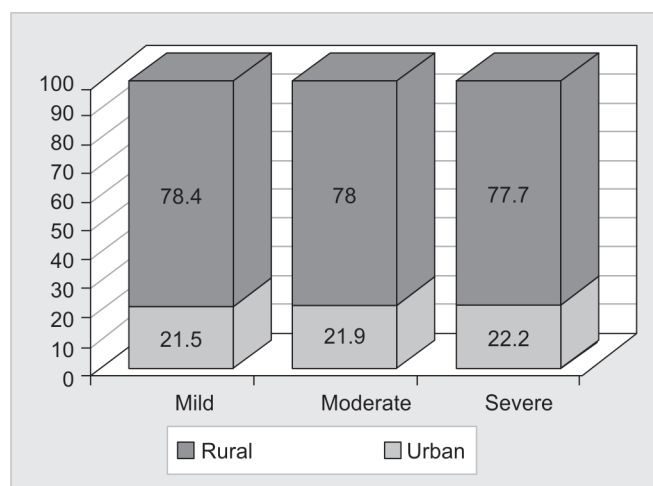
Graph 1: Degree of anemia vs registration status



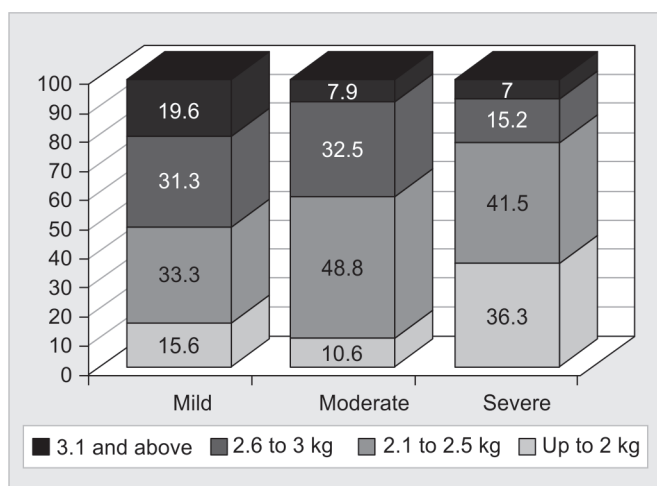
Graph 2: Degree of anemia vs age



Graph 3: Degree of anemia vs parity



Graph 4: Degree of anemia vs residence



Graph 5: Degree of anemia vs baby weight

DISCUSSION

Anemia in pregnancy is one of the dreadful conditions which, if not treated, may culminate into some complications, like preterm delivery, intrauterine growth restriction to life threatening conditions like postpartum hemorrhage. The most common cause of anemia is iron deficiency.

The risk of deficiency occurs during the time of rapid growth and nutritional demand, especially at the age of 6 to 24 months, adolescence and during pregnancy.

World Health Organization estimates global prevalence of anemia as 25%¹ among them more than 90% are iron deficient.

Among South Asian countries, India, has highest percentage (87%) of pregnant women with iron deficiency anemia. India constitutes 22,000 to the total number of 50,000 worldwide for the maternal deaths from anemia per year.⁸

Total 6,356 patients delivered in the period of 1st January to 31st December 2011. Out of them, 6,300 were found to be anemic. As per WHO criteria, 51 (0.8%) patients had mild anemia, 5,907 (93.8%) had moderate anemia and 342 (5.4%) had severe anemia.

Various studies conducted in different parts of India found the prevalence of anemia as, Gautam VP et al (96.5%),²² Priyanka S et al (82.9%),²³ Toteja GS et al (84.9%),²⁴ Viveki RG (82.9%),²⁵ Singh et al 2009 (65.5%),²⁶ Agarwal KN et al (84%),²⁷ Rajaratnam J et al (69.3%),²⁸ Koen MC et al (77%),²⁹ Brabin L et al (79.6%).³⁰ Difference

Table 1: Association between degree of anemia and registration status

Degree of anemia		Registration status		Total
		Registered	Unregistered	
Mild	N	41	10	51
	%	80.4%	19.6%	100%
Moderate	N	4278	1629	5907
	%	72.4%	27.6%	100%
Severe	N	217	125	342
	%	63.5%	36.5%	100%
Total	N	4536	1764	6300
	%	72%	28%	100%

$\chi^2 = 14.7$, CI = 2, DF = 5. The two-tailed p-value is 0.0006. By conventional criteria, this difference is considered to be statistically significant

Table 3: Association among study group between degree of anemia and parity

Degree of anemia		Obstetric history			Total
		Primigravida	Para 1	Para 2 and above	
Mild	N	30	16	5	51
	%	58.8%	31.3%	9.8%	100%
Moderate	N	3378	1925	604	5907
	%	57.1%	32.6%	10.2%	100%
Severe	N	147	113	82	342
	%	42.9%	33%	23.9%	100%
Total	N	3555	2054	691	6300
	%	56.4%	32.6%	10.9%	100%

$\chi^2 = 42.47$, CI = 4, DF = 4. The two-tailed p-value is less than 0.0001. By conventional criteria, this difference is considered to be extremely statistically significant

Table 5: Association between degree of anemia and baby weight

Degree of anemia		Baby weight (kg)				Total
		Up to 2 kg	2.1 to 2.5 kg	2.6 to 3 kg	3.1 kg and above	
Mild	N	8	17	16	10	51
	%	15.6%	33.3%	31.3%	19.6%	100%
Moderate	N	628	2887	1921	471	5907
	%	10.6%	48.8%	32.5%	7.9%	100%
Severe	N	124	142	52	24	342
	%	36.3%	41.5%	15.2%	7%	100%
Total	N	760	3046	1989	505	6300
	%	12%	48.3%	31.5%	8%	100%

$\chi^2 = 140.451$, CI = 6, DF = 6. The two-tailed p-value is less than 0.0001. By conventional criteria, this difference is considered to be extremely statistically significant

in the results may be because of difference in the population studied.

As per the results of the study done by Viveki RG²⁵, prevalence of anemia was 82.9%. Among them, 58 were mildly anemic, 115 moderately and 16 were severely anaemic.

Rajaratnam J et al²⁸ came to result that 30.2% patients had mild anemia, moderate and severe anemia was found in 35.8% and 3.3% patients respectively. Priyanka S et al²³

Table 2: Association between degree of anemia and age

Degree of anemia		Age (years)				Total
		Up to 20 years	21 to 25 years	26 to 30 years	31 and above	
Mild	N	9	23	10	9	51
	%	17.6%	45%	19.6%	17.6%	100%
Moderate	N	822	3960	894	231	5907
	%	13.9%	67%	15.1%	3.9%	100%
Severe	N	74	164	85	19	342
	%	21.5%	47.9%	24.8%	5.5%	100%
Total	N	905	4174	989	259	6300
	%	14.3%	65.8%	15.6%	4.1%	100%

$\chi^2 = 51.63$, CI = 6, DF = 6. The two-tailed p-value is less than 0.0001. By conventional criteria, this difference is considered to be extremely statistically significant

Table 4: Association among study group between degree of anemia and residence

Degree of anemia		Residence		Total
		Urban	Rural	
Mild	N	11	40	51
	%	21.5%	78.4%	100%
Moderate	N	1299	4608	5907
	%	21.9%	78%	100%
Severe	N	76	266	342
	%	22.2%	77.7%	100%
Total	N	1386	4914	6300
	%	22%	78%	100%

$\chi^2 = 0.015$, CI = 2, DF = 3. The two-tailed p-value equals 0.9995. By conventional criteria, this difference is considered to be not statistically significant

found 27 patients had mild, 33 had moderate and three had severe anemia. Significantly, lower prevalence of anemia among pregnant women has been reported in South-east China (39.6%),³¹ Venezuela (34.4%).³²

The District Level Household Survey (DLHS)³³ (1998-99) showed that pregnant women were not being screened for anemia and given appropriate therapy. Most women in poorly performing states did not come for antenatal check up. Many of those who came for antenatal checkup did not get iron-folic acid tablets (IFA) throughout pregnancy nor did they get 100 tablets. Majority of those who got the tablets did not consume all the tablets.^{11,33} National Nutrition Monitoring Bureau Survey (NNMBS)⁵ showed that the proportion of pregnant women who receive IFA tablets is not high even among well-performing states like Tamil Nadu, Kerala and Maharashtra.

Even with strong antenatal programmes and iron and folic acid supplementation for nearly 20 years, there is no appreciable decline in anemia in India.

Seventy-two percent patients were not registered at any healthcare centre (neither private nor government). They were directly admitted in labor. Despite mass awareness programmes implemented by the government, population of rural India, especially females are negli-

gent about these facilities. Even after providing incentives, registration and institutional delivery rate has not improved significantly. These females are not screened for any diseases hence risk of transmission of infections, like HIV and hepatitis B, are increased.

In the present study, 14.3% of the anemic women were in age group of up to 20 years, whereas 65.8% were in age group of 21 to 25 years. 15.6 and 4.1% patients were in age group of 26 to 30 years and 31 years and above respectively.

Gautam VP²² found that 22 anemic were <20 years, 61 were in age group of 20 to 24 years, 23 and 4 were in age group of 25 to 29 years and >30 years respectively.

Rajaratnam J et al²⁸ found that 63.3% anemic are <19 years, 71.9 and 70.7% were in age group of 20 to 24 years and >25 years respectively. In the study conducted by Priyanka S et al,²³ 6 women were <20 years of age, 38 were in age group of 20 to 25 years and 19 were >25 years. Viveki RG²⁵ found 65 patients in age group of 18 to 21 years, 82 in age group of 22 to 25 and 42 in age group of >26 years.

Various studies have proved that maximum prevalence of anemia is in the reproductive age group, especially 21 to 30 years. In case of moderate and severe anemia working capacity of the female is adversely affected, this decreases their income capacity. In this young population quality of life is badly affected, increasing the disability adjusted life years (DALY).

In this study, 56.4% were primigravida, 32.6% had parity one and 10.9% had parity two and above. Rajaratnam J²⁸ found that 64% of the primigravida were anemic, whereas percentage of anemia in parity one, parity two, parity three and above was 74.4, 68 and 74.4% respectively.

Increasing parity and short interconceptional period maximises the chance of anemia in subsequent pregnancies. As babies of anemic mothers have low iron reserve, iron deficiency aggravates in adolescent and precipitates as anemia during pregnancy. This leads to intergenerational transfer of iron deficiency and anemia.

Unwanted pregnancies, abortions, recurrent deliveries deplete already jeopardized iron stores, further complicating the condition. All temporary and permanent methods of contraception should be readily available. Social campaign to heighten the awareness of contraception and their proper practice should be promoted. It was found that 78% patients belonged to rural population.

Gautam VP et al²² found the high prevalence of anemia (96.5%) in pregnant women of rural area of Delhi. Rajaratnam J²⁸ found 69.3% prevalence of anemia in rural Tamil Nadu. Koen MC²⁹ found the prevalence of anemia in rural South Indian population to be 77%.

Rural population is in general found to be ignorant toward the health and nutrition. Pregnant women,

adolescent girls and children are the most common victims. Lack of education, lack of knowledge of health facilities and government health schemes prevent them from availing the health facilities. Overall negligence to the health of females is another curse to Indian society, especially rural India. The population studied in this study belongs to tribal region where taking medicine during pregnancy is supposed to be failure of mother to grow her child on her own and considered as failure of their motherhood. Also there is a stigma that after taking the pills provided at hospitals baby will be big and woman may have to undergo cesarean section which is again considered as failure of her womanhood.

In the present study, out of 6300, babies of 3046 patients were in group of 2.1 to 2.5 kg. Anemia is known risk factor for the complications like low birth weight, pre-term delivery and intrauterine growth retardation. IDA is a systemic condition, which has many nonhematological consequences in addition to hematological ones. It impairs physical endurance, work capacity, infant growth and development and depresses immune function. Hutardo et al (1999) examined the records of children who enrolled in Special Supplemental Nutrition Programme for Women, Infant and Children before age of 5 years.³⁴ Those, who were anemic, were more likely to experience academic problems at 10 years of age, compared to the children who were nonanemic at enrollment.

CONCLUSION

In the present study, out of 6356 patients delivered, 6300 (99.11%) were anemic. Maximum patients (5907) had moderate anemia, mild and severe anemia was found in 51 and 342 patients.

65.8% patients were in age group of 21 to 25 years. It was found that 56.4% of patients were primigravida. 4914 anemic patients belonged to rural population. Out of 6300 patients, newborns of 3046 patients weighed between 2.1 to 2.5 kg.

As per National Iron-plus Initiative (Guidelines for Control of Iron Deficiency Anemia, 2013) various methods like dietary diversification (to promote intake of iron rich diet), food fortification, supplementation, intervention at vulnerable phases of life are implemented to improve the outcome.

Social campaign to heighten the awareness of anemia, its dreadful complications should be given special consideration to tackle this grave scenario of anemia.

Help of nongovernment organisations to reach the socially and economically deprived population may help to achieve the active involvement of people from different socioeconomic strata. Government should take active legislative measures for compulsory fortification

of every possible food stuff. Use of media for promoting and emphasizing the need of taking IFA can be an effective measure for mass education. Emotional and psychological motivation of females to lead healthy life-style and to strengthen their will to build the healthier next generation will also help to alleviate the social stigma of Indian society.

ACKNOWLEDGMENT

I would like to express my deep sense of gratitude to my friends Dr Prutha Vinchurkar, Dr Ameera Ansari, Dr Rutuja Raut and all staff of SVNGMC, Yavatmal, for their constant support.

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