

# Prevalence and Possible Risk Factors of Anaemia in Different Trimesters of Pregnancy

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## ABSTRACT

**Introduction:** Anaemia in pregnancy is a major health issue with adverse maternal and foetal outcome worldwide, specially in developing countries like India. Nutritional anaemia in pregnant women continues to be a cause of concern despite the fact that this problem is largely preventable and easily treatable. Objective of this cross-sectional descriptive study was to determine the presence of anaemia in pregnant women in different trimesters, and to assess the possible risk factors of anaemia.

**Material and Methods:** 300 pregnant women in different trimesters of pregnancy were enrolled coming for the 1<sup>st</sup> time in outpatient dept of Obstetrics and Gynaecology, in Punjab Institute of Medical Sciences, Jalandhar from July 2015 to December 2015. Information regarding age, age at marriage, age at 1<sup>st</sup> pregnancy, parity, Interval between previous and index pregnancy, no of abortions, educational status, dietary habits, Type of family, Socioeconomic status was collected in pre-designed structured schedule after taking written consent from pregnant women attending out-patient department. Haemoglobin estimation was done by Sahli's method and anaemia was graded according to WHO criterion. Statistical analysis was done by percentages and proportions.

**Results:** A high prevalence of anaemia, 65.6% was observed in pregnant women. The current study shows (60 %) cases of mild anaemia, (30.4 %) of moderate anaemia, and (9.6%) of severe anaemia. The study also observed higher prevalence of anaemia in last trimester of pregnancy (81.4%) as compared to 1<sup>st</sup> and 2<sup>nd</sup> trimester which is statistically significant. 90.8% anaemic women had parity >3 as compared to anaemic women with parity 2(56.2%) and parity 1(29.4%) and 87.5% women with spacing between previous and next pregnancy <1 year suffered more from anaemia as compared to women with parity <2 and >3 years space between pregnancies which is statistically significant. In the current study, it was also observed that socio-demographic factors significantly influencing anaemia are educational status, type of family, infrequent consumption of Iron-folic acid tablets.

**Conclusion:** Anaemia continues to be a serious health problem in India where the life of pregnant women and her child are endangered. It is directly proportional to parity, less spacing between pregnancies and related to lower educational status. It is highly recommended that more effective guidelines regarding educating girl child, spreading effective awareness regarding balanced diet, regular antenatal checkups, regular intake of iron-folic acid tab, should start at grass-root levels to get safe motherhood.

**Keywords:** anaemia, pregnant women, prevalence

## INTRODUCTION

The prevalence of anaemia during pregnancy is widely recognized as a major health problem throughout the world, particularly in the developing countries. WHO estimates that

prevalence of anaemia is 14% in developed countries, 51% in developing countries, and 65-75% in India.<sup>1</sup> India contributes to about 80% maternal deaths in South Asia, as estimated by WHO.<sup>2</sup>

The National Family Health Survey (NFHS) 2(4) and 3(5), Indian council of Medical Research(ICMR) estimates reveal the prevalence of anaemia to be over 70% in preschool children, over 70% in pregnant women and adolescent girls.<sup>3</sup>

Anaemia in pregnancy is not only associated with adverse maternal outcomes like Puerperal Sepsis, Ante partum hemorrhage, post partum hemorrhage, maternal deaths<sup>4</sup> but also adverse fetal outcomes like increased incidents of premature births, low birth weight babies and high perinatal mortality.<sup>4,5</sup> Despite the fact that most of the anaemia seen in pregnancy is largely preventable and easily treatable, but still it continues to be a common cause of mortality and morbidity in India.

During pregnancy, foetal and placental growth and larger amount of circulating blood, leads to an increased demand for nutrients, especially iron and folic acid. In developing countries, majority of women start pregnancy with low reserves of iron and folic acid due to either younger age at marriage, early pregnancy, less spacing between previous and index pregnancy, more no of children, or due to less resources in joint families, low socio-economic strata, lack of education, lesser and infrequent intake of Iron-folic acid tab in pregnancy, While mild and moderate anaemia may not be direct cause of maternal mortality but contribute to morbidity by low resistance to common infections, poor wound healing, foetal morbidity but can also contribute to maternal mortality from post-partum haemorrhage. Anaemic mothers do not tolerate blood loss to the same degree as healthy non- anaemic woman. Anaemia in 3<sup>rd</sup> trimester can be very fatal as small amount of blood loss will be detrimental for the woman.

Anaemia is classified according to WHO criteria. According to W.H.O, Haemoglobin concentration of <11 gm/dl, is considered as an indication of anaemia.

### Types of Anemia (WHO Classification)<sup>6</sup>

- Mild Anemia: Hb between 10 -10.9 gm/dl
- Moderate Anemia: Hb between 7.0 -10.0 gm/dl
- Severe Anemia: Hb <7.0 gm/dl

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The present cross-sectional descriptive study was done with the aim to determine the prevalence of anaemia in different trimesters of pregnancy and to explore possible risk factors e.g. age at marriage, age at 1<sup>st</sup> pregnancy, interval between subsequent pregnancies, No. of abortions, Parity, socio-demographic features e.g. education, socioeconomic status, dietary habits, type of family and occupation.

**MATERIAL AND METHODS**

The present study was conducted, comprising of 300 pregnant women of ASA 1 and 2 coming into Ante natal clinic, in the department of Obs and Gynae, in Punjab Institute of Medical Sciences Jalandhar, who came in different trimesters of pregnancy, for 1<sup>st</sup> time. There was continuous enrolments of the patients into the study for twelve months, as many as consented were enrolled in the study. The blood sample was collected from pregnant women and haematological investigation was carried out to determine blood group genotype and pack cell volume. The subjects were examined monthly for PCV until delivery. High risk pregnancy like ladies with cardiac, renal or hepatic diseases, diabetes, hypertension were excluded. Written informed consent was obtained from each ante-natal women for their participation, after explaining the nature of study in their own language.

A questionnaire was prepared on the basis of present age, age at first pregnancy, no. of abortions, present gestational age, diet, socioeconomic status, education and whether she is taking iron folic acid supplements or not. Socioeconomic status was calculated by modified B G Parsad Scale (2013).

Socio Economic Status: Class	BG Prasad’s Classification of 1961	Modified BG Prasad’s Classification for 2013
Class – I	Rs 100 and above	Rs 5156 and above
Class – II	Rs 50-99	Rs 2578-5155
Class – III	Rs 30-49	Rs 1547-2577
Class – IV	Rs 15-29	Rs 773-1546
Class – V	Below Rs 15	Below Rs 773

**Sample size**

After clinical examination, venous blood samples were col-

Age	Examined		Anaemic	
	N	%	N	%
<20 years	80	26.6%	52	65%
20-30 years	170	56.6%	100	58.8%
35-49 years	50	16.8%	45	90%
Total	300	100%	197	65.6

**Table-1:** Prevalence of Anaemia among Antenatal mothers according to Age

Age	Examined		Mild		Moderate		Severe	
	N	%	N	%	N	%	N	%
<20 years	80	26.6%	90	76.2%	28	46.6%	7	37%
20-30 years	170	56.6%	15	12.7%	8	13.3%	6	31.5%
35-40 years	50	16.8%	13	11.1%	24	40%	6	31.5%
Total	300	100%	118	60%	60	30.4%	19	9.6%

**Table-2:** Shows that (60%) mothers suffered from mild anaemia, 30.4% suffered from moderate anaemia and only 9.6% suffered from severe anaemia

lected in Ethylene DiamineTriacetic Acid (EDTA) tubes in haematology lab. Haemoglobin estimation was done by Sahli’s Haemoglobinometer method. Anemia was graded as Mild, Moderate and Severe as per WHO guidelines.

All those pregnant women with clinical infection, bleeding disorders, multiple pregnancies, haemoglobinopathies and chronic diseases were excluded from the study.

**STATISTICAL ANALYSIS**

The data was compiled, tabulated, analyzed with percentages and proportions. Data analysis will be done by SPSS version 21 (Statistical package for social sciences). P < 0.05 was considered statistically significant.

**RESULTS**

A total of 300 pregnant women were studied. Most of the pregnant women were between age group 0f 35-49 years (90%) followed by <20years (65%) and between 20-30 years (56.6%). Out of 300 participants who were examined 197 (65.6%) were anaemic (table-1).

The above table shows that mild (60%), moderate (30.4%) and severe anaemia (9.6%) was more prevalent between age group of 35-40 years (table-2).

Table-3 shows that maternal anaemia was significantly (p<0.001) associated with vegetarian dietary pattern as majority of the anaemic women (83.3%) were vegetarian.

The table-4 depicts that education significantly influences maternal anaemia. As the level of education increases, prevalence of maternal anaemia significantly decreases (p<0.001).

Figure-1 depicts that as parity is increasing, maternal anaemia significantly (p<0.001) increases.

Figure-2 shows that maternal anaemia is significantly (p<0.001) higher in last trimester. Sociodemographic distribution of the anemia patients is shown in table 5.

**DISCUSSION**

Anaemia is the most common nutritional deficiency disorder in the world. Inadequate intake or absorption of iron in conjunction with blood loss may contribute to anemia. Anaemia during pregnancy is a major problem especially in India due to many contributing factors like increased iron demand of body, increased appetite and other social factors like high parity, frequent pregnancies, education and type of family. The current study was conducted to estimate prevalence of anaemia and associated risk factors in different trimesters of pregnancy. The study will be discussed in accordance with objectives outlined earlier.

The study revealed that prevalence of anemia among pregnant women is 65.6 %. These findings are similar to the findings documented by National Family Health Survey – 3(NF-

Diet	Examined		Anaemic	
	N	%	N	%
Veg	180	60%	150	83.3%
Non veg	60	20%	30	50%
Mixed	60	20%	17	28.3%
Total	300	100%	197	65.6%

$\chi^2=16.1, \text{dof}=2, p < 0.001$

**Table-3:** Prevalence of Anaemia among Antenatal mothers as per dietary pattern

Education	Examined		Anaemic	
	N	%	N	%
Illiterate	80	26.6%	71	88.7%
Primary	60	20%	55	91.6%
Secondary	40	13.3%	31	77.5%
Higher Secondary	35	11.6%	24	68.5%
Graduate	50	16.6%	9	18%
Post graduate	35	11.6%	7	20%
Total	300	100%	197	65.6%

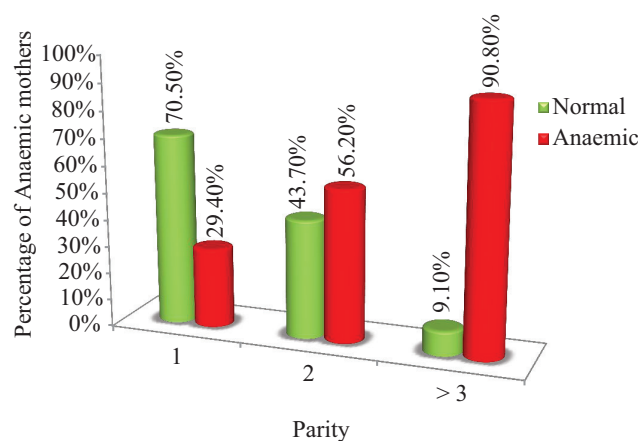
$\chi^2=31.1, \text{dof}=5, p < 0.001$

**Table-4:** Prevalence of Anaemia among Antenatal mothers as per Literacy status

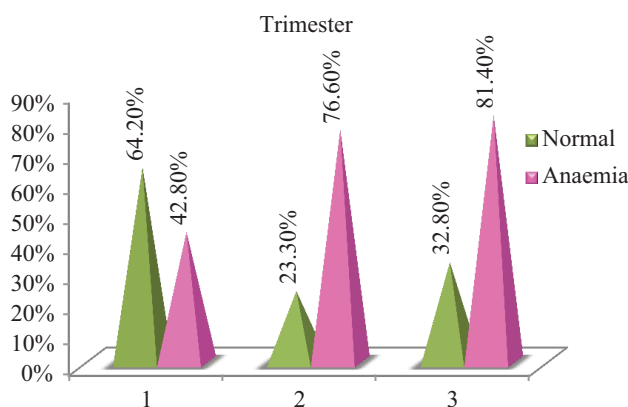
SES (BG Prasad)	Examined		Anaemic		P value
	N	%	N	%	
Class 1	35		20		
Class 2	30		19		
Class 3	40		28		
Class 4	150		115		
Class 5	45		34		
Type of family					<0.001
Nuclear	120		42	35%	
Joint	180		155	86.1%	0.004
IFA consumption					
Nil	60		54	90%	
Full	200		133	66.5%	
Partial	40		10	25%	
Spacing					0.000
< 1yr	128		112	87.5%	
1-2 years	60		50	83.3%	
2-3 years	34		19	55.8%	
3-4 years	30		9	30%	
>4 years	48		7	14.5%	

**Table-5:** Socio-Demographic Distribution of anaemia

HS-III).<sup>7</sup> Singh AB et al (2009) in a study on anemia among pregnant women in Dehradun also reported that prevalence of anemia among pregnant women was 65.5%.<sup>8</sup> In the current study women aged between 35-49 years were more anaemic compared to women <20 years and 20 to 30 years. However this difference was not statistically significant ( $p > 0.05$ ). Dietary pattern significantly influences anemia status. The current study revealed that 83.3% anaemic women were following vegetarian pattern of diet where as 50% and 28.3% anaemic pregnant women were following non vegetarian (diet based on daily or several times weekly consumption of meat/eggs/fish/chicken) and mixed pattern dietary pattern respectively. Women following non vegetarian (50%) or mixed pattern (28.3%) of diet were less anaemic as compared to wom-



**Figure-1:** Status of Anaemia as per parity



**Figure-2:** Percentage of Anaemia in Different trimesters

en who were exclusively on vegetarian diet (83.3%) and this difference was statistically significant ( $p < 0.001$ ). These findings are supported by studies conducted by Rammohan A et al (2011)<sup>9</sup> and Singh R et al (2015)<sup>10</sup> in which it was found that diet contributed to anemia and vegetarians were more anaemic as compared to non vegetarians showing a statistically significant difference ( $p < 0.05$ ).

The current study witnessed socio-demographic parameters significantly influenced anaemia status. Education, type of family, parity, spacing and different trimesters significantly determined maternal anaemia.

In the current study it was observed that pregnant women who were graduates (9%) and post graduates (7%) were significantly ( $p < 0.001$ ) less anaemic compared to those who were illiterate (88.7%) or had received primary (91.6%), secondary (77.5%) and higher secondary (68.5%). Lokare PO et al (2012) conducted a study among 352 antenatal mothers and found that anaemia increased steadily with decrease in the level of education.<sup>11</sup> This is further supported by study conducted by Dutta et al (1992) in which an inverse relation was found between literacy status and maternal anaemia.<sup>12</sup> Unequal distribution of food in joint family and eating last or after serving the husband contributes significantly to maternal anaemia. This trend was reflected in current study where more number of antenatal mothers (86.1%) who belonged to joint family suffered more from anaemia as compared to those living in nuclear families showing a statistically significant difference ( $p < 0.001$ ). Similar trend was documented by Bisoi S et al (2011) in a study among pregnant women in

West Bengal.<sup>13</sup>

Demand of micronutrients is increased in last trimester which aggravates anaemic status. The current study observed a higher prevalence of anaemia in 3<sup>rd</sup> trimester (81.4%) as compared to 1<sup>st</sup> and 2<sup>nd</sup> trimester and this difference was statistically significant. This was because maximum number of pregnant women booked themselves for antenatal check up in last trimester. This finding corroborate with study conducted among antenatal mothers in Uttar Pradesh by Singh R et al (2015).<sup>10</sup>

Other socio-demographic factors impacting maternal anaemia are parity, spacing between two pregnancies and consumption of iron folic acid tablets. 90.8% anaemic women had parity >3 and 87.5 % women with spacing between current pregnancy and outcome of last delivery <1 year suffered more from maternal anaemia as compared to women with birth interval more than 3 years and parity <2 and this difference was statistically significant (p<0.001) These findings are in consonance with study conducted by Bios S et al (2011) in a study among pregnant women in West Bengal in which anaemia was significantly (p<0.05) higher among participants having a gap of less than two years between two pregnancies. Singh R et al (2015) in a study among 352 antenatal mothers observed significant association between anaemia and parity.

Anaemia in pregnancy needs mandatory Iron Folic Acid supplementation from 4<sup>th</sup> month onwards. In the current study it was observed that participants having nil(90%) or partial (25%) IFA supplementation were significantly (p<0.05) more anaemic as compared to those with full (66.5%) IFA supplementation. These findings are in accordance with observations of Viveki R.G et al (2012) in a study among antenatal mothers in Karnataka which revealed anaemia prevalence to be significantly (p<0.05) higher among those having partial consumption of IFA tablets.<sup>14</sup>

## CONCLUSION

Anaemia continues to be a serious health problem in India where the life of pregnant women and her child are endangered. It is directly proportional to parity, less spacing between pregnancies and related to lower educational status. It is highly recommended that more effective guidelines regarding educating girl child, spreading effective awareness regarding balanced diet, regular antenatal checkups, regular intake of iron-folic acid tab, should start at grass-root levels to get safe motherhood.

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