

## Original Article

# PREVALENCE OF ANAEMIA AND ITS SOCIO-DEMOGRAPHIC DETERMINANTS IN PREGNANT WOMEN: A CROSS-SECTIONAL STUDY IN TERTIARY HEALTH CARE SETUP IN CENTRAL INDIA

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## ABSTRACT

**Background:** Anaemia in pregnancy accounts for one fifth of maternal death worldwide. The association between anaemia and adverse pregnancy outcome, higher incidence of preterm & low birth weight deliveries has been demonstrated. However, nutritional anaemia in pregnancy remains one of the India's major public health problems, despite of the fact that this problem is largely preventable.

**Objective:** To determine the prevalence of anaemia in pregnant women and to determine association of anaemia and socio-demographic factors.

**Methodology:** A descriptive cross sectional study was conducted among pregnant women who came to outpatient unit of obstetrics and gynecology department during March- May 2013 by using pre-designed, pre-tested structured schedule. Written consent was taken. Hemoglobin estimation was done by Sahli's method and anaemia was graded according to WHO criteria. Statistical analysis was done using Microsoft Excel 2007 and SPSS Version 20.

**Result:** - Overall prevalence of anaemia among the pregnant women was found to be 63%. It was seen that 23% of women were illiterate and 58.7% of them belong to upper lower class. Factors such as level of education of women, occupation, age at first pregnancy and consumption of Iron Folic Acid were found to be significantly associated with prevalence of anaemia in pregnancy.

**Conclusion:** - A very high prevalence of anaemia in pregnancy needs mandatory regular supply of IFA tablets to adolescent and pregnant women along with correction of other nutritional deficiencies and timely intervention for reducing the burden of related diseases.

**Keywords:** Pregnant women, IFA supplements, anaemia

## INTRODUCTION

Anaemia during pregnancy is a major public health problem throughout the world, particularly the developing countries. Anaemia in pregnancy accounts for one fifth of maternal deaths & is a major factor responsible for low birth weight. It contributes directly to 20% of maternal deaths & indirectly to a further 20% [1, 2]. Despite the fact that most of the anemia's seen in pregnancy are largely preventable & easily treatable if detected in time, anaemia still continues to be a common cause of mortality and morbidity in India. In view of the low dietary intake of iron and folate, high prevalence of anaemia and its adverse health consequences, India has started National Nutritional

Anaemia Prophylaxis Program (NNAPP) to prevent anaemia among pregnant women. A pack of 100 IFA tablets with an instruction to take one tablet a day after food is advised to pregnant women [3]. However, high prevalence of anaemia among pregnant women persists despite the availability of this effective, low-cost intervention for prevention and treatment [3]. According to WHO report, the global prevalence of anaemia among pregnant women is 55.9%. In India, this prevalence has been reported to be in the range of 33% - 89% [4]. The present study is an attempt to determine prevalence and the sociodemographic determinants associated with them so as to formulate a multipronged strategy to control this important public health problem.

**MATERIAL & METHODOLOGY**

The present cross sectional study was conducted among pregnant women who attended outpatient unit of obstetrics & gynecology department of Index Medical College, Hospital & Research Centre, Indore. All the pregnant women from second trimester onwards who attended the centre for ANC checkup for the first time during the study period were included. The study was carried out during March to May 2013. Pregnant women with multiple pregnancies, history of high grade fever in last 3 months, passing worms in stool, bleeding disorders, chronic infection were excluded from study. Informed consent was obtained from them after explaining the purpose of the study. A detailed demographic profile of the women, that is, age, age at first pregnancy, religion, type of family, family size, education level of women & her husband, occupation of a woman & her husband was collected. Their weight (kg) was recorded. After through clinical examination, hemoglobin estimation was done by Sahli's method. Socioeconomic classification suggested by B.G Prasad was adopted & updated [6].

Ethical approval for the study was obtained from the ethical committee at Index Medical College, Indore.

Anaemia was classified according to WHO criteria [5]. Hemoglobin concentration of less than 11gm/dl is considered as an indicator of anaemia. Hemoglobin concentration of 10.0-10.99g/dl, 7-9.99g/dl and less than 7g/dl were considered to indicate mild, moderate and severe anaemia respectively. Those women who had severe anaemia as well as high risk pregnancy were further investigated & then treated.

Sample Size: Minimum sample required for the study was calculated with the help of Methods in Biostatistics 7<sup>th</sup> Edition by BK Mahajan at 10% relative precision and 95% confidence limit, based on the knowledge that about 57.9% of pregnant women in the country are anaemic [7]. All the pregnant women (300) from second trimester onwards who attended the centre for ANC checkup for the first time during study period were included.

Statistical Analysis: The collected data was compiled & tabulated using Microsoft Excel 2007 and then analyzed using SPSS Version 20. Descriptive statistic, including Mean, Range and Standard deviation were calculated for all variables. Group comparisons were done by Chi-square test. P values less than 0.05 were considered significant.

**RESULT**

The demographic characteristics of the subject are summarized in Table 1. The present study included 300 pregnant women having an average age of 22.73±3.123 yrs ranging from 18 to 36 yrs. More than half (58%) of the study subjects were from joint families. A majority of women were housewives 267 (89%), about 115(38.3%) had studied up to middle school followed by 69(23%) who were illiterate. The age of mar-

riage for most women 164 (54.7%) was below 18 yrs followed by 125 (41.7%) between 19-24 yrs with mean age of marriage of 18.76±2.856years. According to modified B.G. Prasad's Classification [6], majority 176(58.7%) belonged to Upper lower class followed by 95(31.7%) belonged to lower middle.

**Table 1: Demographic Characteristics of Pregnant Women (N=300)**

Parameter	Number (n=300) (%)
<b>Age group(years)</b>	
<20yrs	90(30)
21-24yrs	121(40.3)
25-29yrs	78(26)
>30yrs	11(3.7)
<b>Religion</b>	
Hindu	234(78)
Muslim	66(22)
<b>Type of family</b>	
Nuclear	93(31)
Joint	174(58)
Extended	33(11)
<b>Occupation</b>	
Employed	33(11)
Unemployed	267(89)
<b>Education Status</b>	
Illiterate	69(23)
Primary	64(21.3)
Middle	115(38.3)
High school	26(8.7)
Higher Secondary & above	26(8.7)
<b>Socio-economic class</b>	
Class I	0(0)
Class II	12(4)
Class III	95(31.7)
Class IV	176(58.7)
Class V	17(5.7)

**Table 2: Distribution of Related Characteristics among Study Population**

Variable	Women (n=300) (%)
<b>Age at first pregnancy</b>	
<18 yrs	41(13.7)
19-21yrs	178(59.3)
22-25yrs	67(22.3)
>26yrs	14(4.7)
<b>Anaemia</b>	
Present	188(62.7)
Absent	112(37.3)
<b>Anaemia (n=188)</b>	
Mild	90(47.87)
Moderate	91(48.40)
Severe	07(3.72)
<b>Antenatal Registration</b>	
Registered	215(71.7)
Unregistered	85(28.3)
<b>Parity</b>	
Primigravida	154(51.3)
Multigravida	146(48.7)
<b>Received IFA Tablet</b>	
Yes	227(75.7)
No	73(24.3)

It was seen in table 2 that out of 300 women, majority had their first pregnancy 178(59.3%) between 18-21yrs

followed by 67(22.3%) between 22-25yrs with mean age of first pregnancy being 20.61± 2.571 years. Out of 300 women examined 188(62.7%) were found anaemic. Moderate anaemia was found in 91(48.40%) followed by 90(47.87%) who had mild anaemia. Thus prevalence of mild & moderate anaemia was found to be high in comparison to severe anaemia. Mean hemoglobin was found to be 10.27± 1.65 gm/dl between 4 to 14gm/dl. A total of 215(71.7%) were registered during antenatal period. Majority 51.3 % (154) were primigravida and 146(48.7%) were multigravida. About 227(75.7%) women received IFA tablets while 73(24.3%) didn't received tablets.

Table 3 revealed that pregnant women suffering from anaemia was 56(81.16%) in illiterate group as compared to 132(57.15%) in literate women. There is a positive association between anaemia and literacy status of women. This relationship was found to be statistically significant (P<0.001). It was seen in 65.92% of unemployed and 36.37% of employed women had anaemia. The association between occupation of pregnant women and their anaemic status was found to be statistically significant (P=0.001). Table also showed proportion of pregnant women suffering from anaemia in different socioeconomic classes. Class 4 (Upper Lower) had highest percentage of women suffering from anaemia (71.6%). This association between socioeconomic status of family and anaemia in pregnancy was found to be statistically significant (P=0.002).

It was observed that 75.8% of Muslims were suffering from anaemia when compared with 59% of Hindu. The association observed between Hindu and Muslims with prevalence of anaemia during pregnancy was significant (Chi square = 6.19, d (f) 1, P = 0.013).

Table 4 revealed that out of 300 pregnant women 227(75.7%) received IFA tablets. When women were divided into groups based on age at first pregnancy, it was seen that 82.02% (146) women in age group 19-21 years had received IFA tablets. The association between the age at first pregnancy & IFA consumption was found to be statistically significant (P=0.0167). IFA Tablet consumption was found significantly associated with female occupation (P<0.001). Though IFA tablet consumption was slightly more in literate (77.48%) as compared to illiterate women (69.56%). This observed difference was not found significant. 79% (170) of pregnant women with antenatal card and 67% (57) of women without antenatal card received IFA tablet. The association between IFA tablet consumption and ANC registration was found statistical significant (P=0.029).

Table 5 revealed that Anaemia was detected in 72.6% (53) of pregnant women who had not taken IFA tablets as compared to 59.5% (135) who had taken IFA tablets. This difference was found to be significant (P=0.044).

**Table 3: Distribution of Study Subject According To Prevalence of Anaemia**

Socio demographic character	Anaemia Status			Crude OR (95%CI)	P value
	Normal (n=112) (%)	Anaemic (n=188) (%)	Total (n=300)		
<b>Literacy</b>					
Illiterate	13(18.84)	56(81.16)	69	3.230 (1.674-6.233)	P<0.001
Literate	99(42.85)	132(57.15)	231		
<b>Employment</b>					
Employed	21(63.63)	12(36.37)	33	0.295 (0.139-0.627)	P=0.001
Unemployed	91(34.08)	176(65.92)	267		
<b>Socioeconomic status</b>					
Class II	5(41.7)	7(58.3)	12	-	P=0.002
Class III	48(50.5)	47(49.5)	95		
Class IV	50(28.4)	126(71.6)	176		
Class V	9(52.9)	8(47.1)	17		

**Table 4: Distribution of Study Subjects According to Iron Folic Acid Consumption**

Socio demographic Character	Received/Consumed Iron Folic Acid Tablets (n=300)			Crude OR (95%CI)	P value
	Yes (n=227) (%)	No (n=73) (%)	Total (n=300)		
<b>Age at first pregnancy</b>					
<18yrs	25 (60.97)	16 (39.03)	41	1.506 (0.827-2.740)	P =0.0167
19-21yrs	146 (82.02)	32 (17.98)	178		
22-25yrs	46 (68.65)	21 (31.34)	67		
>26yrs	10 (71.42)	4 (28.58)	14		
<b>Literacy</b>					
Literate	179 (77.48)	52 (22.52)	231	1.506 (0.827-2.740)	P = 0.1785
Illiterate	48 (69.56)	21 (30.44)	69		
<b>Employment</b>					
Employed	16 (48.48)	17 (51.52)	33	0.249 (0.118-0.525)	P < 0.001
Unemployed	211 (79.02)	56 (20.93)	267		
<b>ANC Card</b>					
Yes	170 (79)	45 (21)	215	1.855 (1.061-3.246)	P = 0.029
No	57 (67)	28 (33)	85		

**Table 5: Distribution of Study Subject According to Iron Folic Acid Consumption and Prevalence of Anaemia**

Iron Folic Acid Supplement	Anaemia Status (n=300)		Total
	Normal	Anaemic	
Yes	92(40.5)	135(59.5)	227
No	20(27.4)	53(72.6)	73
Total	112	188	300

P = 0.044, OR = 0.553, 95% CI = 0.310-0.987

## DISCUSSION

Antenatal Care is one of the key strategies in maintaining safe motherhood. Although much efforts has been taken to prevent anaemia in Indian women, still the prevalence of anaemia during pregnancy is found to be 62.7% from this study which was similar to the study done by Singh et al 2009(65.5%)[8]. "Indian Council of Medical Research (ICMR) Task Force Multicenter Study" revealed that the overall prevalence of anaemia among pregnant women from 16 districts was 84.9% (range 61%-96.8%).

In developed countries, the prevalence of anaemia was only 18% among pregnant women as reported by WHO (1998) [9]. The socioeconomic developments, higher standard of living, better utilization of health care facilities along with increasing literacy rate are associated with the low prevalence of anaemia in developed countries. A high prevalence of anaemia among pregnant Muslim women as compared with Hindu women was observed in the present study. The religion itself may not be the cause for this finding, but probably it works through different dietary patterns, food taboos, and customs and so on. The overall prevalence of severe anaemia (hemoglobin<7gm/dl) among the study subjects was (3.72%). In other similar studies in India severe anaemia was found in 13.1% by G.S.Toteja et al [4], 8.3% by Raman L et al [10], 3.2% by Langare SD et al [11] and only 1.6% by Umesh Kapil et al [12].

Severity of anaemia was inversely related to educational status and socioeconomic class which is similar to study conducted by Singh et al 2009[8]. In the present study significant association was found between income and anaemia. A cross sectional study conducted in Western Maharashtra had shown that severity of anaemia decreases with higher per capita income as found in present study [11]. In present study it was also found that anaemia is significantly associated with level of educational attainment which was similar to study of Desalegn S 1993[13] where anaemia was more common in illiterate women (53.7%) as compared to literate women 37.1%. Bilenko et al (2004) [14] also worked on women education and their diet status. He estimated that women education and socioeconomic status were significantly related to the prevalence of nutritional deficiency and sickness. The women who were under peak child bearing age as well as low income group have more chances to experience anaemia.

In the present study, only 71.7% had registered for antenatal care and 28.3% were not registered. Similarly Couillet et al (2007) [15] found that 23% had not undertaken any ANC consultation during last pregnancy. As per IFA tablet supply and received, 75.7% had received IFA tablets. Shidhaye PR et al (2012) [16] found that 57.6% had received IFA tablets. Lower anaemia prevalence was observed among women taking IFA supplements than those not consuming the same as seen in Mengi Vijay et al [17]. Thus, anaemia continues to be endemic among pregnant women in India, despite the intervention measures like distribution of IFA tablets. Some of the reasons that Iron supplementation programmes are ineffective may be because of failure of effective distribution of IFA tablets and non compliance by pregnant women.

## CONCLUSION

Anaemia in pregnancy is associated with adverse consequences both for the mother and the fetus. Studies have shown that the adverse consequences of maternal anaemia may affect not only the neonate and infant but also increase the risk of non communicable diseases, when the child grows into an adult and the risk of low birth weight in the next generation. Technology for detection of anaemia and its effective treatment are available and affordable and it is possible to effectively implement these even in primary health care settings and these are very cost effective interventions.

Socioeconomic status, literacy of women and employment status of women are the major determinants that contribute to the problem of anaemia. Educating the women only will not produce any desirable change but increasing the degree of literacy of family will definitely help to solve this problem. Government should design strategies and policies to enhance women education to make them independent in socioeconomic and cultural decision, which directly and indirectly affects women health status. Health education should be provided both to pregnant women as well as adolescent girls about proper nutrition and importance of anaemia free pregnancy. Health care workers should also be motivated for effective distribution of IFA Supplements and to ensure proper compliance by the beneficiaries so as to reduce anaemia in reproductive age in the long term.

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