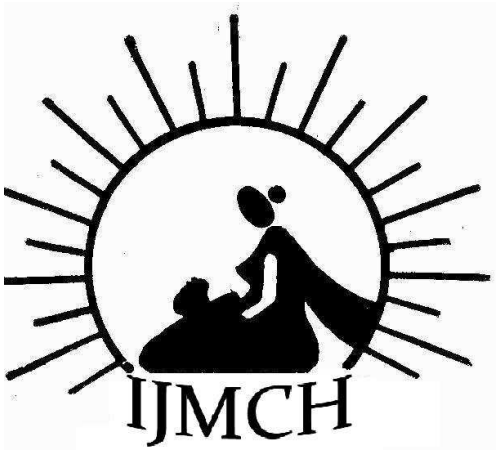
Volume 12 (1), 2010

Prevalence of Anemia among Women in Reproductive age group in Rural area of Wardha district, Maharashtra, India.

Goyal R C
Gaidhane Abhay
Agrekar Shushil
Wagh V V

www.ijmch.org



INDIAN JOURNAL OF MATERNAL AND CHILD HEALTH

What is the prevalence of anemia among women in reproductive age group in rural areas of Wardha district, Maharashtra, India?

Prevalence of Anemia among Women in Reproductive age group in Rural area of Wardha district, Maharashtra, India.

Goyal R C,[*] Gaidhane Abhay, [**] Agrekar Shushil,[***] Wagh V V[****]

***Professor and Head, **Associate professor, ***Assistant Professor, ****Professor**
J N Medical College, DMIMS University, Sawangi (M), Wardha, M.S, 442004
Correspondance: DR. R. C. GOYAL
Email :drgoyal_45@rediffmail.com,
drgoyal45@gmail.com

ABSTRACT

Research question:

What is the prevalence of anemia among women in reproductive age group in rural areas of Wardha district, Maharashtra, India?

Introduction:

Anemia is an indicator of both poor nutrition and poor health. Globally, anemia affects 1.62 billion people and majority of them are in South East Asia Region with 48.2% among pregnant and 45.7% non-pregnant women (WHO 2008). In India, anemia is severe Public Health Problem with 74.3 % of the population having Hb < 11 gm%.

Objective:

To assess the prevalence of anemia among pregnant & non-pregnant women and find out association between maternal characteristics, influencing factors and level of hemoglobin.

Methodology:

Study setting: Rural community under field practice areas of the institute.

Study design: Observational Cross sectional health center based.

Study participants: 800 women in reproductive age group (400 pregnant and 400 non-pregnant women) were selected by random sampling method – 100 each (pregnant & non-pregnant) from 4 blocks of Wardha district.

Methodology- Interview technique method was used to collect the data. Hemoglobin was estimated by Sahli's method. Level of anemia was categorized as per WHO criteria. Appropriate statistical methods were used to analyze the data.

Results:

Two third females belonged to 26-35 years of age group, majority were literate and 56.5% housewives. Mean hemoglobin percentage among non-pregnant women was 9.00 gm% as against pregnant 6.5 gm%. Non-pregnant women were less (54%) anaemic as compared to pregnant women (70%). Among the pregnant women with more than two children with spacing less than three years and who suffered with malaria in recent past were more anemic than non pregnant women. There was an association between maternal characteristics and level of hemoglobin.

Key Words: Anemia, Reproductive age, Pregnant women, Non-pregnant women, Hemoglobin level.

INTRODUCTION

Anemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development.

In 2002, iron deficiency anemia (IDA) was considered to be among the most important contributing factors to the global burden of disease (1). It is generally assumed that 50% of the cases of anemia are due to iron deficiency (2), but the proportion may vary among population groups and in different areas according to the local conditions.

Anemia is an indicator of both poor nutrition and poor health. The most dramatic health effects of anemia, i.e. increased risk of maternal and child mortality due to severe anemia, have been well documented.

Globally, anemia affects 1.62 billion people (95% CI: 1.50–1.74 billion), which corresponds to 24.8% of the population (95% CI: 22.9–26.7%) and majority of them are in South East Asia Region with 48.2% among pregnant and 45.7% non-pregnant women (WHO 2008).

In India, anemia is severe Public Health Problem (any country having >40% anemic population) with 74.3 % of the population having Hb < 11 gm%. In women, anemia may become the underlying cause of maternal mortality and perinatal mortality (3). Anemia also results in an increased risk of premature delivery and low birth weights.

The Indian Council of Medical Research (ICMR) study in 1989 showed that 87.6 per cent women had Hb <10.9 g/dl (3). During 1986-1991 hemoglobin estimations in rural pregnant women in Varanasi showed 94.5, 95.3 and 95.9 per cent prevalence of anemia in I, II and III trimesters. ICMR district nutrition survey 1999-2000 also reported prevalence of anemia as 84.2 per cent with 13.1 per cent with severe anemia in pregnancy (4). Hemoglobin in all these studies was estimated by Cyanmethaemoglobin method. Contrary to the above studies, the NFHS-2 (National Family Health Survey, 1998-1999) data using Hemocue system reported prevalence of anemia as 49.7 per cent in pregnant women; 56.4 per cent in breastfeeding non pregnant; and 50.4 per cent among non-pregnant non-breastfeeding women (5).

As per WHO (2008) prevalence of anemia among Indian pregnant women were 49.7% and non-Pregnant women 52.0% (7). The NFHS-3 (National Family Health Survey, 2005-06) reported 56% of ever married and 59% of pregnant women are anemic that shows marginal difference between these two groups.

In view of above, this study was planned to find out prevalence of anemia among pregnant & non-pregnant women in reproductive age group and to study factors influencing the hemoglobin level such as age, income, literacy, occupation, no. of children, spacing, dietary intakes, history of malaria etc.

MATERIAL AND METHODS

This observational Cross sectional study was conducted among rural women in four blocks of Wardha district, Maharashtra, India. A total of 400 pregnant and 400 non-pregnant women attending Health Centers run by the institute in four blocks namely Seloo, Wardha, Deoli and Hinganghat of Wardha district were selected. Each study participants was subjected to personal interview for data collection by trained team of Medical Interns under direct supervision of the faculty in Community Medicine. Estimation of hemoglobin was

done by trained personnel who underwent training for seven days at pathology laboratory at tertiary care hospital. The duration of the study was from July to December 2008. Sample size was calculated by using following formula:

Sample size = $n = z^2 [P (1-P)] \div d^2$, where P = 59% (Prevalence of anemia among pregnant women as reported by NFHS-III), Confidence: 95%, so z=1.96 and Absolute Precision: d = 5%. Sample size is = $(1.96)^2 (0.59) (0.41) / (0.05)^2 = 368.84$ so it was rounded off to 400 for both the groups.

The following information was collected on a pretested performa after obtaining informed verbal consent from the study participants: Age, religion, education status, occupation of woman, family income, number of live children, inter-pregnancy interval, Number of iron folic acid (IFA) tablets consumption, amount of calories intake by the woman as per RDA and an additional one serving consumption of Iron rich food items such as green leafy vegetable, fresh fruits, meat & its group, legumes & nuts daily for pregnant women and normal intake for non-pregnant women were also recorded (13). History of malaria in last three months was also obtained.

For this study total family income per annum in rupees (in thousands) was recorded and classified as Low Income group (less than Rs. 150,000/-), Middle Income group (Rs. 151,000-500,000/-), and High income group (more than Rs. 500,000/-) for the Wardha district.

Ethical clearance was obtained from Institutional Ethical Committee.

Hemoglobin (Hb) estimation by Sahli's method: The procedure was explained to each of the participants, and then finger tip was cleaned with spirit, dried and clean puncture made with a sterilized disposable lancet. First drop of the free flowing blood was wiped off and second drop was used for hemoglobin estimation. An accurate volume (20 µl) of blood was drawn into the Hb pipette and immediately delivered to Hb tube containing 0.2 ml of N/10 HCl. After 10 minutes of waiting period , distilled water was added to the Hb pipette till the color matched with standard color coded disc/ rod. The reading was noted to the nearest of 0.2 gm%. The cut off point of Hb was 11 gm% for pregnant women (PW) and 12 gm% for non-pregnant women (NPW) as per WHO criteria. Severity of anemia was graded on the basis of hemoglobin status in gm percent as given below:

Pregnant women	**Non-Pregnant women**
• Severe → <7.0 g/dl	Severe → <7.0 g/dl
• Mod. → 7.0-8.9 g/dl	Mod. → 7.0-8.9 g/dl
• Mild → 9.0-10.9 g/dl	Mild → 9.0-11.9 g/dl
• Normal → >11.0 g/dl	Normal → >12.0 g/dl

Classification of anemia as a problem of public health significance: Hb threshold was used to classify countries by the level of the public health problem (2).

Prevalence of anemia (%)	**Category of public health significance**
< 4.9	No public health problem
5.0–19.9	Mild public health problem
20.0–39.9	Moderate public health problem
> 40.0	Severe public health problem

RESULTS AND DISCUSSION

Table I: Distribution of Women as per their Hemoglobin level (in gm percent).

P W HB gm% & Grade	Number (percentage)	N P W HB gm% & Grade	Number (percentage)
< 7 (Severe)	125 (31.25)	< 7 (Severe)	32 (8.0)
7 – 8.9 (Moderate)	90 (22.50)	7 – 8.9 (Moderate)	81 (20.25)
9.0 – 10.9 (Mild)	65 (16.25)	9.0 – 11.9 (Mild)	103 (25.75)
> 11.0 (Normal)	120 (30.0)	> 12.0 (Normal)	184 (46.0)
Total	400 (100.0)	Total	400
Total anemic women	280 (70.0)	Total anemic women	216 (54.0)
P W Mean = 6.5±2.95 gm%		N P W Mean = 9±3.15 gm%	
*t test , P < 0.0001 , Pooled SD = 2.86 , Overall prevalence of Anemia = 62 %			

*P value calculated by using independent two tailed't' test

Overall prevalence of anemia among women was 62.0%, slightly higher than NFHS-III (56.0%). However, anemia was more (70.0%) among pregnant women as compared to non-pregnant women (54.0%). Severe anemia was higher (31.25%) among pregnant than non-pregnant women (8.0%). As per NFHS-III, severe anemia (2.0%), Moderate (16.0%) and Mild (39.0%) (5).

K N Agarwal et al in 2004 (84.00%) (6), World Bank report of 1998 (50-90%), Tushima et al in 2005 (80.60%) and Sharma et al in 2005 (80.00%) reported higher prevalence for pregnant women but lower by NFHS-III (59.00%), Goyal R C et al (54.44%) (8), and WHO study -1993-2005 (49.70%) (7).

Prevalence of anemia among non-pregnant women was lower (54.0%) as compared to ACC/SCN reports estimate prevalence among non-pregnant adult women between 15 and 49 years of age to be 57%, 67%, 72%, and 75% for 1972, 1981-1984, 1985, and 2000 respectively (11) and higher than John G. Buchanan in 1979 among Indian women in Fiji reported anemia among non-pregnant women as 39% in Hindu & 32% in Muslim (10).

ME Bentley and PL Griffiths reported that prevalence of anemia was high among all women. In all 32.4% of women had mild (100 – 109.99 g/l for pregnant women, 100 – 119.99 for non-pregnant women), 14.19% had moderate (70 – 99.99 g/l), and 2.2% had severe anemia (<70 g/l). (14)

Present study showed significant difference for education up to 10^{th} & 12^{th} standard PW & NPW, Housewives PW & NPW, labourer PW & NPW , low and middle income group PW & NPW (Table-II). R C Goyal et al and Mehta et al also reported similar findings in their studies for pregnant women (8, 9). The study also revealed that Hb level was less among women having more than two living children and spacing less than three years, more so in PW. Similar finding were observed in WHO & K N Agarwal et al for some regions and states. (6,7)

Table II: Socio-demographic characteristics of Study Participants.

Socio-demographic Characteristics		P W – No. (Hb gm% Mean± SD)	N PW – No. (Hb gm% Mean± SD)	P value
Age group (yrs)	15 -20	46 (7.10±1.50)	81 (8.12±1.67)	0.0006 HS
	26 -35	254(8.28±1.54)	197 (8.95±1.06)	0.0001 HS
	36 -45	100(9.24±1.70)	122 (9.76±2.42)	0.0621 NS
Education	Illiterate	6(7.00±1.45)	3(8.76±2.34)	0.3683 NS
	Upto 10th std	232(7.21±1.89)	197(8.98±2.25)	0.0001 HS
	Upto 12 std	123(8.12±2.0)	115(9.15±1.78)	0.0001 HS
	Graduate & above	39(9.78±2.22)	85(9.12±1.98)	0.1168 NS
Occupation	Housewives	224(8.58±1.92)	203(10.17±1.83)	0.0001 HS
	Labourer	170(8.01±2.01)	64(9.18±1.12)	0.0001 HS
	Service	6(8.98±2.19)	87(9.93±2.27)	0.2273 NS
	Students	----------	46(9.12±2.12)	---------
Family income	Low	102(7.32±1.72)	113(8.50 ±1.82)	0.0001 HS
	Middle	224(8.69±2.20)	218(09.26±1.59)	0.0012 HS
	High	74 (9.36±2.12)	69(09.60±1.74)	0.4065 NS
No. of children	None	18(9.12±2.12)	13(9.37 ± 1.66)	0.7263 NS
Living children	1	20(9.02±2.22)	47(9.01 ±1.95)	0.9862 NS
	2	193(8.64±2.66)	215(10.26±1.71)	<0.0001 HS
	3	151(8.00±1.66)	97(9.12 ±1.54)	<0.0001 HS
	4 & above	18(7.99±1.97)	28(7.96 ±3.18)	0,9687 NS
No. of years of spacing**	< 2 years	28(7.78±2.88)	15(9.58 ±1.78)	<0.0336 HS
	2 – 3 years	228(8.23±2.00)	259(10.32±1.57)	<0.0001 HS
	> 3 years	126(9.77±2.88)	113(10.11±1.58)	0.2834 NS

*P value calculated by using independent two tailed t test. HS = Highly significant, NS = Not significant

** Currently Pregnant and unmarried are excluded

Table III: Dietary intake and Level of Hemoglobin among the study participants.

Characteristics / Factors		**P W – No. (Hb gm % Mean± SD)**	**N P W –No. (Hb gm % Mean± SD)**	**P value ***
Consumption of IFA tablets	Not taken	86 (7.09±2.79)	268 (8.56 ±1.89)	<0.0001 HS
	Less than 100	208(7.79±2.01)	90 (9.54 ±1.70)	< 0.0001 HS
	More than 100	106(8.33±3.22)	42 (10.43 ±1.77)	< 0.0001 HS
Calorie intake	Adequate	156(9.04±1.78)	207(11.48±1.15)	<0.0001 HS
	Inadequate	244(8.89±2.41)	193(9.16 ±1.55)	0.1774 NS
Rich Iron diet intake	Adequate	118(9.12±1.86)	199(11.64±1.24)	<0.0001 HS
	inadequate	282(7.65±2.86)	201(9.98± 1.10)	<0.0001 HS
H/O Malaria	Present	75(6.89±2.12)	158(8.99 ±1.43)	<0.0001 HS
	Absent	325(9.88±2.78)	242(10.78±1.84)	<0.0001 HS

*P value calculated by using independent two tailed t test

Table III revealed that mean Hemoglobin level was more (9.16±1.55) among NPW than PW (8.89±2.41) for inadequate calories intake as per RDA. Similar finding were also observed for iron rich dietary intake. These findings were statistically significant. Hemoglobin level was low among those who had malaria in last three months. K N Agarwal et al reported that for the current pregnancy, energy and protein intakes were lower than the recommended dietary allowances (RDA) in all the States. This was true for the pregnant as well as lactating women (6).

CONCLUSION:

Initiatives like 12 x 12 in adolescence (15), nutrition education regarding balanced diet, additional servings of iron rich diet during pregnancy & post partum period, early diagnosis of anemia & ensuring consumption of IFA tablets and overall social developmental activities like women empowerment, literacy etc. will help to reduce anemia in all ages.

LIMITATIONS:

Sahli's method for estimating the hemoglobin may not be 100 percent accurate as compared to other methods due to subjective bias. Only limited variables could be studied.

ACKNOWLEDGMENT:

Authors are thankful to Medical Interns, Medical Officer of health Centers for helping us in data collection.

REFERENCES

1. Barbara Campanini, Angela Haden. The World Health Report - 2002 , Reducing risks, promoting healthy life. Geneva: World Health Organization, 2002.
2. Ross Hempstead. Iron deficiency anemia: assessment, prevention, and control. A guide for programme managers, WHO/NHD/01.3. Geneva: World Health Organization, 2001.
3. ICMR. Evaluation of the national nutritional anemia prophylaxis programme, ICMR Task Force Study. New Delhi: Indian Council of Medical Research, 1989.
4. Toteja G, Singh P. Micronutrient deficiency disorders in 16 districts of India. Report of an ICMR Task Force Study –District Nutrition Project. Part 1. New Delhi: Indian Council of Medical Research, 2001.
5. IIPS. National Family Health Survey-2 - Anemia among women and children. Mumbai: International Institute for Population Sciences, 2000.
6. Agarwal KN, Agarwal DK, Sharma A, Sharma K, Prasad K, Kalita MC et al. Prevalence of anemia in pregnant & lactating women in India. Indian J Med Res 2006; 124:173-84.
7. Bruno de Benoist, Erin McLean, Ines Egli, Mary Cogswell. Worldwide prevalence of anemia 1993–2005, WHO global database on anemia. Geneva: World Health Organization, 2008.
8. Goyal RC, Sachdeva NL, Jejurikar ND, Chavan UA. Anemia in Pregnant women. AAMRHI journal1991; 1:2-4.
9. Mehtal BC Jaranki ,Patel JC. Anemia in pregnancy. Indian Journal of Preventive & Social Medicine 1992; 24:3-4.
10. John G. Buchanan, A. D. Nixon,J. E. Pettit,M. Meerkin,R. Patel, M. V. Pillal,et al. Pathology1982;14:269 -75
11. ACC/SCN, Second Report on the World Nutrition Situation. Vol I. Global and Regional Results. Washington DC: 1992.
12. ACC/SCN, Fourth Report on the World Nutrition Situation. Washington DC: 2000.
13. Old and New Food Pyramid (internet) from http://www.disabled-world.com/artman/publish/food_pyramid.shtml.
14. Bentley ME, Griffiths PL. The burden of anemia among women in India. European Journal of Clinical Nutrition 2003; 57: 52–60.
15. WHO. Addressing Iron Deficiency Anemia: 12 x 12 Initiative http://www.whoindia.org/en/Section6/Section324_1467.htm.

Financial support: None **Conflicts of interest**: None