



A Study of Anemic Status of Women of Child Bearing Age from Rajkot Western India

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Abstract

Anemia is the most common disorder of the blood. It is a pathophysiological condition where production, morphology and functionality of red blood cells (RBC) are adversely affected. Up to 10% or more of adolescent and adult women in USA under age 49 years are iron deficient. It is in the range of 50-90% or even more in developing countries like India. In the present study a survey of was carried out of 1,000 women from semi-urban area in child bearing age, i.e. 15-49 years to check hemoglobin level and to correlate it with some of the contributing factors like age, educational qualification and dietary habit. A very high prevalence (80.4%) of anemia along with very poor awareness was observed. Correlation between age of the respondents as well as educational qualification with hemoglobin level was found to be statistically significant at more than 1% level of significance. Respondents with non-vegetarian food habits were found to be having high hemoglobin level compare to their counterparts. Thus, awareness regarding dietary modifications, supplementations etc. is highly recommended to overcome huge burden of anemia in this very important segment of society.

Introduction

Anemia is a worldwide public health issue. It is a condition which reflects outcome of interplay between many factors. Nutritional anemia may

result from the deficiency of one or more nutrients that are required for hemopoiesis. Iron deficiency (IDA) is the most common and primary cause of anemia in the third world countries. IDA

prevalence indicates the nutritional status of a community. Considering the effects of IDA on maternal and fetal mortalities, physical function and child growth and development, it is regarded as one of the main health indicators especially in women of child bearing age. (De Benoist B, McLean E, Egli I, Cogswell M. Worldwide prevalence of anaemia 1993–2005, WHO Global Database on Anemia. Geneva: World Health Organization; 2008. p. 21.)

Iron deficiency in childbearing women increases maternal mortality (World Health Organization, 1992), prenatal and perinatal infant loss, and prematurity. (Macgregor MW. 1963) (Schorr TO, Hediger ML., 1994). Forty percent of all maternal perinatal deaths are linked to anaemia. Favourable pregnancy outcomes occur 30-45% less often in anaemic mothers, and their infants have less than one-half of normal iron reserves. (Bothwell TH, 1981). About half of all pregnant women develop iron-deficiency anemia. The condition can increase a pregnant woman's risk for a premature or low-birth-weight baby. In India 16% of maternal deaths are due to anemia. (AbouZahr C., Roystone E. 1991) More recent studies have shown beneficial effects of iron supplementation during pregnancy especially on the foetus.

(http://www.nhlbi.nih.gov/health/dci/Diseases/ida/ida_whoisatrisk.html).

Materials & Method

Women in the age group of 15-49 were targeted for the study and to generate awareness about anemia.

A total of 1,000 women from schools, college, anganwadi beneficiaries and social groups were

given standard questionnaires to gain insight into women's socio-economic status, dietary habits, history of menstruation, pregnancy and other factors which may be possible causes of anemia.

Blood Sample Collection:

Blood samples were collected mostly by vein-puncture or in some cases by fingertip puncture methods. Blood was collected in EDTA vials and stored at low temperatures till hemoglobin estimation was carried out.

Hemoglobin Estimation:

Modified cyanmethaemoglobin method (Drabkin's method) was used for hemoglobin estimation.

Principle of the test: Hemoglobin and its derivatives(except sulfHb) are oxidized to methamoglobin in presence of K-Ferricyanide at alkaline pH. So formed methamoglobin reacts with potassium cyanide to form cyanmethemoglobin-a colored complex- which can be measured calorimetrically at 546 nm. (Drabkin's, D.L. and Austin, J.H. 1978).

A fixed quantity of blood(0.02 ml) is diluted with a reagent (5.0 ml) (Drabkin's solution) and haemoglobin concentration is determined after a fixed time interval in an accurate, well-calibrated photometer against standard .

Result

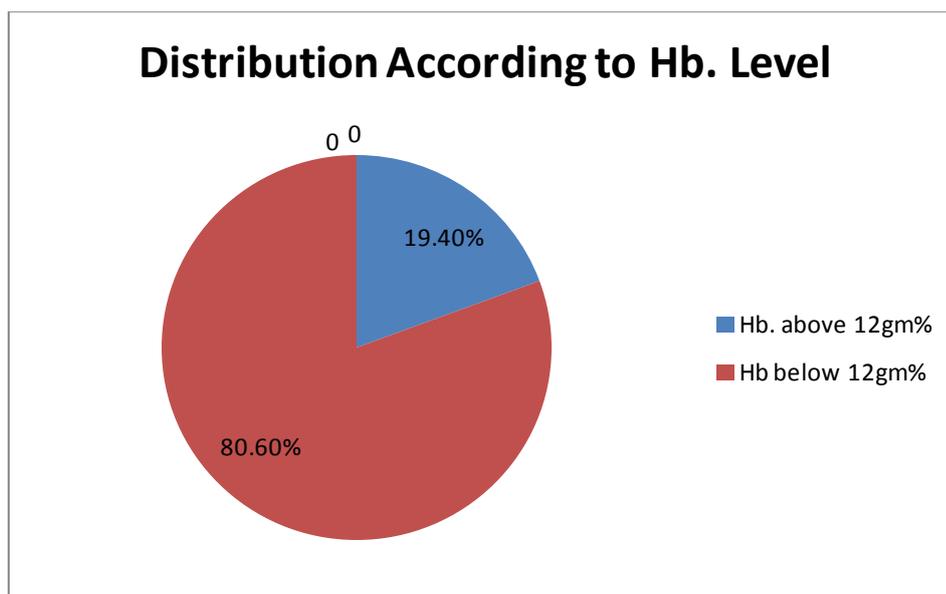
Very high prevalence of anemia was observed in the women in present study. This can be observed from the following result.

1. Hemoglobin Level of Respondents at the beginning of the study:

Table 1

Hemoglobin	No. of Women	%
Hb. Above 12gm%	194	19.4%
Hb. Below 12gm%	806	80.6%
Total	1,000	100%

Graph 1

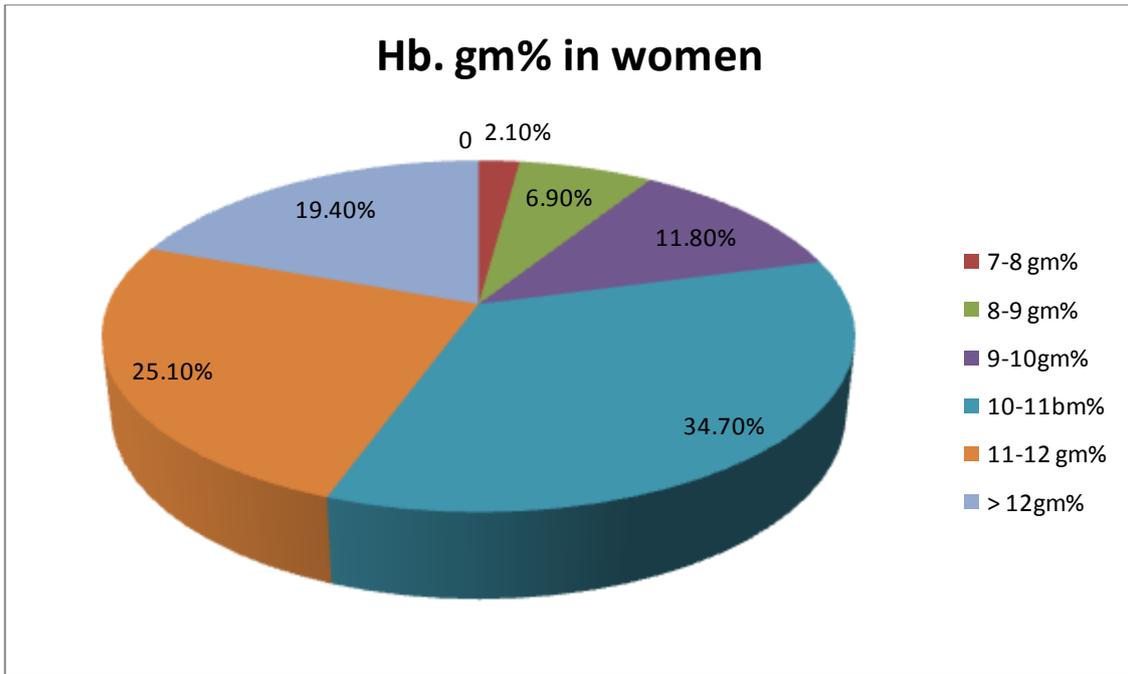


- 2.1% women had Hb. Level between 7-8 gm%, 6.9% women had it between 8-9gm%, 11.8 had it between 9-10 gm%, 34.7% had it between 10-11gm%, 25.1% women had Hb. level between 11-12gm%. Only 19.4% women had Hb. above 12gm%.

Table: 2

Hb. Gm% between	Degree of Anemia	No. of women	%
7-8	Moderate	21	2.1
8-9	Moderate	69	6.9
9-10	Moderate	118	11.8
10-11	Mild	347	34.7
11-12	Mild	251	25.1
>12	Normal	194	19.4
Total		1,000	100

Graph: 2

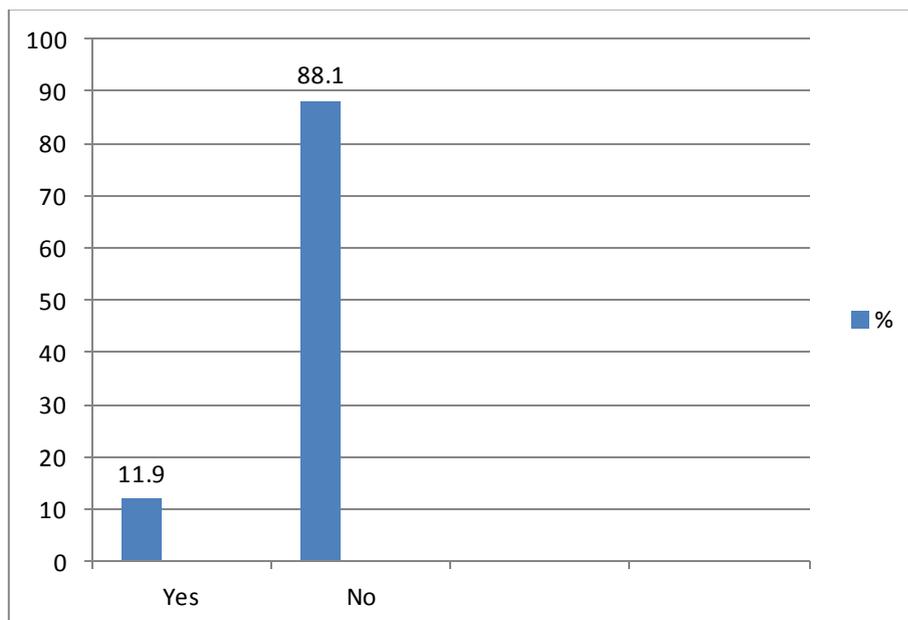


- Anemia awareness in Respondents was studied by standard questionnaire regarding symptoms of anemia.

Table 3

Response	No.	%
Yes	119	11.9
No	881	88.1

Graph 3



- Hemoglobin level of respondents according to age group was also studied.

2. Distribution of Respondents according to age group

Table 4

No.	Age group(Yrs.)	No.	%	Average Hb. Gm.%
1	15-20	158	15.8	10.53
2	21-30	374	37.4	10.49
3	31-40	319	31.9	10.62
4	41-50	149	14.9	11.04
	Total	1000		

Graph 4

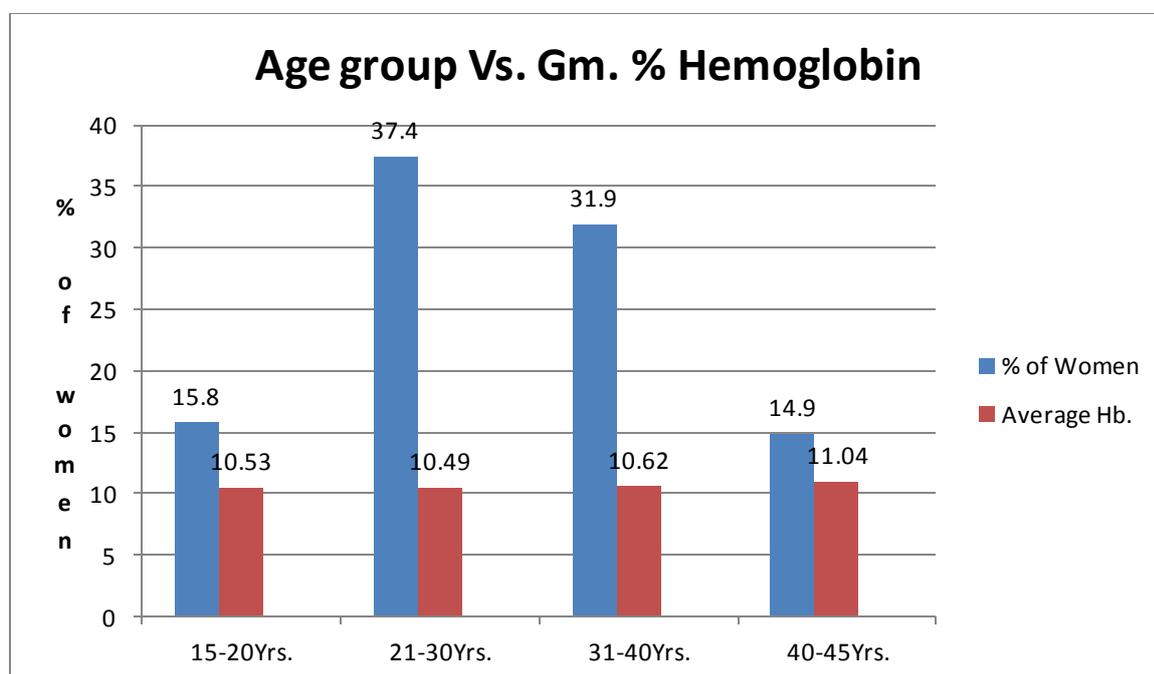


Table no 5: Statistical analysis of Distribution of Respondents.

Anova: Two-Factor Without Replication

SUMMARY	Count	Sum	Average	Variance
Age 15-19.9	4	202.33	50.5825	5138.055
Age 20-29.9	4	446.89	111.7225	30694.04
Age 30-39.9	4	396.52	99.13	21603.12
Age 40-49.9	4	219.94	54.985	4158.83
Age group	4	123	30.75	138.9167
Number	4	1000	250	12934
Percentage	4	100	25	129.34
HbGm %	4	42.68	10.67	0.0638

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Age group	11440.84	3	3813.612	1.218574	0.358056	3.862548
Response	156616	3	52205.34	16.68132**	0.00051	3.862548
Error	28166.12	9	3129.569			
Total	196223	15				

** Significant at more than 1 %

Age factor significantly affects hemoglobin level, as shown in Table 1.

Correlation between hemoglobin level and educational qualification of respondents were studied.

Educational Qualification of Respondents:

Table 6

No.	Education	No.	%	Average Gm % Hb.
1	Illiterate	038	3.8	10.24
2	Primary	145	14.5	10.16
3	Secondary	437	43.7	10.77
4	Graduation	323	32.3	10.86
5	P.G.and above	057	5.7	11.03
	Total	1000		

Graph 5

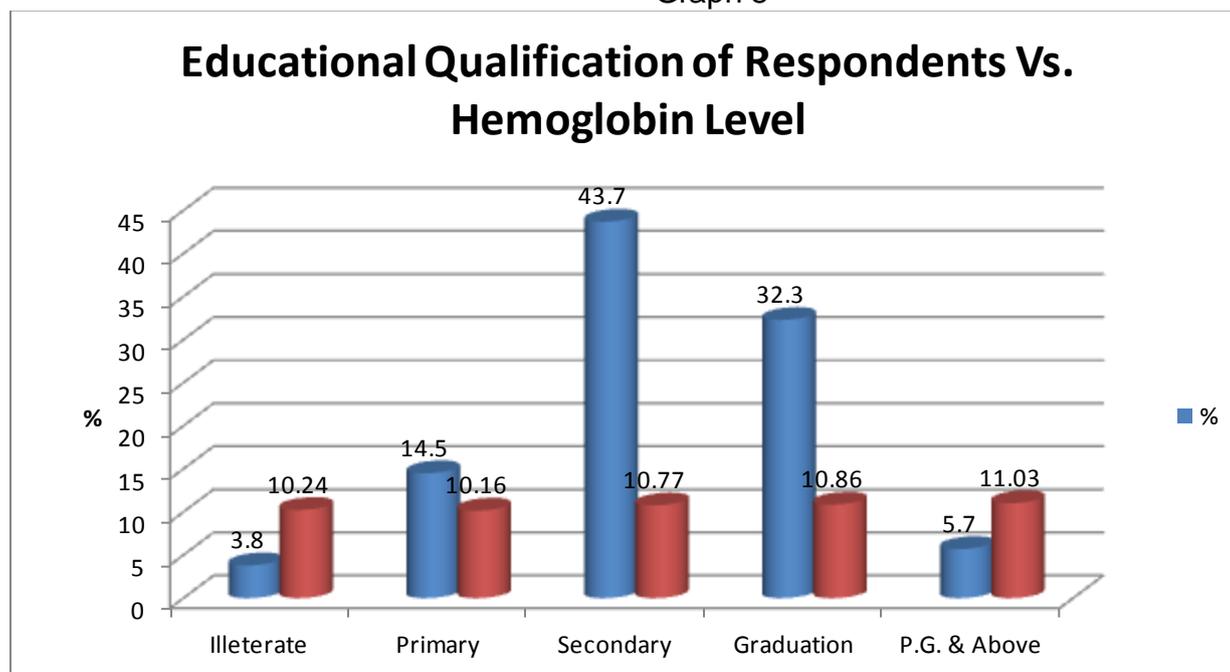


Table 7

Anova: Two-Factor Without Replication

<i>SUMMARY</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Illiterate	3	52.04	17.34667	330.2885
Primary	3	169.66	56.55333	5871.819
Secondary	3	491.47	163.8233	56240.21
Graduation	3	366.16	122.0533	30399.59
P.G.and above	3	73.73	24.57667	795.5566
Number	5	1000	200	30254
Percentage	5	100	20	302.54
Gm % Hb	5	53.06	10.612	0.15097

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Education level	48878.41	4	12219.6	1.332774	0.337134	3.837853
HbGm %	113926.6	2	56963.29	6.212904	0.023531**	4.45897
Error	73348.36	8	9168.544			
Total	236153.3	14				

** Significant at more than 1%

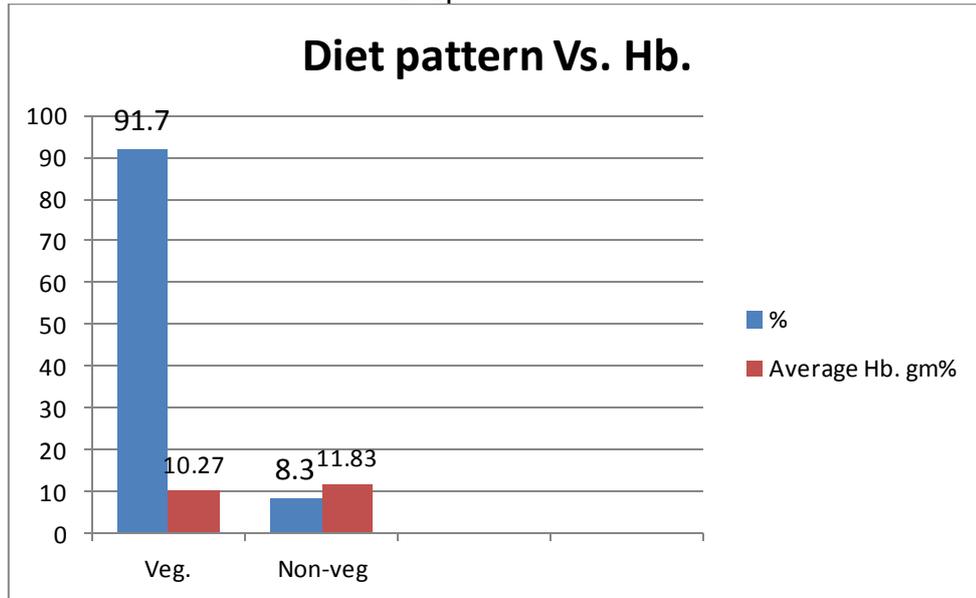
As can be seen from statistical analysis educational qualification has significant effect on hemoglobin level of women.

- Diet Pattern of respondents:

Table 8

	No.	%	Average Hb. Gm.%
Vegetarian	917	91.7	10.27
Non-vegetarian	83	8.3	11.83

Graph 7



DISCUSSION

Though the overall prevalence of anemia has decreased from 40.2% in 1990 to 32.9% in 2010, data gathered also indicate a widening gender gap in anemia burden over time. While prevalence decreased in both genders between 1990 and 2010, the changes were more pronounced for males, while female prevalence remained higher in most regions and age groups. Women of childbearing age are at higher risk for iron-deficiency anemia because of blood loss during their monthly periods. About 1 in 5 women of childbearing age has iron-deficiency anemia. (N. Kassebaum, 2014).A crude estimate is that 500 million women between 15 and 49 years of age

worldwide are anemic. (UN standing committee on Nutrition 5th annual report, March 2004.)

In the present study, prevalence of anemia in the study group- women of child bearing age- was found to be alarmingly high due to combination of many factors. The area from where data is collected is a semi-urban area where awareness about hygiene is relatively good but dietary habits of young girls in particular and women in general are not so healthy.

An alarmingly high percentage of women were found to be anemic in the present study. 80.6% women under study had hemoglobin level above 12 gm/dl while only 19.4% women were having healthy hemoglobin values.

Severe anemia was not observed in any woman. 20.8% anemic women were suffering from moderate anemia while 59.8% had mild anemia. Lowest levels of hemoglobin(10.49 gm%) were found in the age group of 21-30 years of women followed by 10.53 gm% average hemoglobin level in adolescent girls in the age group of 15-20 years. This finding can be attributed mainly to unhealthy eating habits of this age group. They have the tendency to skip meals, eat junk food instead of healthy nutritious food and dislike for green vegetables. Lower hemoglobin level in this age group also proved to be statistically significant at more than 1% level.

Educational qualification is considered to be reflection of socio-economic status of women. In this study, 62% respondents were either illiterate, primary school educated or had education till secondary school level. This data may suggest that according to Socio Economic Classification of India, they belonged to lower or middle strata of the society. (http://en.wikipedia.org/wiki/SEC_Classification).

It was also statistically significant at more than 1% level.

However, two facts are to be borne in mind. 1. Most women were not sole bread earner of the family and 2. Age group 15-30 comprised mostly of students many of whom were perusing their graduation.

Diet pattern does seem to influence hemoglobin level of women. Women having non-vegetarian diet were found to be having higher hemoglobin level than their counterpart having vegetarian diet.

This is due to inclusion of food items rich in heme

iron in non-vegetarian diet such as red meat, eggs etc.

CONCLUSION

In India, prevalence of anemia among women of reproductive age group that is 15 to 49.99 years is alarmingly high. Nutritional deficiencies, mainly iron deficiency are established as major cause of anemia.

Following conclusions can be drawn from the present study:

- Very high prevalence of anemia is observed in all segments of women in child bearing age.
- Women need to be educated and made aware about symptoms of anemia so that they can be treated well in time before they suffer from severe anemia.
- Adolescent girls and women embracing motherhood should be particularly targeted for awareness and treatment since they make a very vulnerable group and their anemic status can percolate into future generation.
- Women in the age group of 21-30 years should be specifically targeted since they had lowest levels of hemoglobin and it was statistically significant at more than 1% significance.
- Nutritional awareness is very essential as food supplementation and fortification programmes can be successful only if women are educated about the right combination of foods to eat and to avoid

foods which interfere absorption of dietary iron.

- Educational qualification of women reflects socio-economic status but from the present study, it can be concluded that there is no significant awareness about anemia even among educated women.

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