Original Research Article

Hemoglobin status in pregnant women for diagnosis of anemia, assessment of severity and its socio-demographic determinants in rural area of Kanpur district, Uttar Pradesh, India

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ABSTRACT

Background: Anaemia is one of the most common nutritional deficiency disorders affecting the pregnant women in the developing countries. In India anaemia in pregnancy is a major health issue with adverse maternal and foetal outcome. Nutritional anaemia in pregnant women continues to be a cause of concern despite the fact that this problem is largely preventable and easily treatable. Objectives was to determine the prevalence and severity of anaemia in the pregnant women.
Methods: Around 350 pregnant women in different trimesters of pregnancy were enrolled coming for the 1st time in outpatient department of Obstetrics and Gynaecology, in Rama Medical College Hospital and Research Centre, Kanpur from Janurary 2016 to December 2016. Information regarding age, age at marriage, age at 1st 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 auto analyser and anaemia was graded according to WHO criterion. Statistical analysis was done by percentages and proportions.
Results: A high prevalence of anaemia, (87.71%) was observed in pregnant women. The current study shows (24.7%) cases of mild anaemia, (54.5%) cases of moderate anaemia, and (7.9%) of severe anaemia.
Conclusions: A very high prevalence of anaemia in pregnancy needs awareness about late marriage, birth spacing, one or two child norm, antenatal care, green leafy vegetable in diet, mandatory regular supply of iron folic acid (IFA) tablets to adolescent and pregnant women along with correction of other nutritional deficiencies.

Keywords: Anaemia in pregnancy, Prevalence and socio-demographic factors

INTRODUCTION

Pregnancy is a unique experience in every mother's life. The thought of a growing foetus in the mother's womb, indeed is nature's way of expressing the attributes of motherhood.[1] Anaemia in pregnancy accounts for one fifth of maternal deaths and is a major factor responsible for low birth weight. In India, 16% maternal deaths are attributed to anaemia.[2] About one-third of the global population is anaemic.[3] WHO estimates that prevalence of anaemia is 14% in developed countries, 51% in developing countries, and 65-75 %in India.[4] 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.[4] The main causes of Anaemia in the developing countries in Antenatal women includes low dietary intake of iron and folic acid, poor bioavailability of iron and fiber rich Indian diet, poor absorption of iron due to hook worms infestation and blood loss during delivery and heavy menstrual blood loss.[5-6] Unfavourable socio demographic factors are the major barriers to the efforts put in place for the prevention of anemia during pregnancy. Knowledge of the socio demographic factors associated with anemia in pregnancy can be used to formulate a multipronged strategy to attack this important public health problem. The present study was undertaken to find out the prevalence and severity of anemia in pregnant women from rural area of Kanpur.

METHODS

The present cross-sectional study was conducted among pregnant women who attended antenatal clinic of obstrics and gynaecology department of Rama Medical College Hospital and Research Centre, Kanpur.

A statistically valid sample size 350 was calculated by applying the formula for sample size estimation as:

Minimum sample size= 4(PQ)/L2

Where, P= Prevalence of -70% (According WHO in India 2010), Q= 100-P and L=7% of P

Inclusion criteria

All pregnant women (350) from second trimester onwards who attended the hospital for ANC check-up for the first time during study period were included pregnant females aged between 18-50 years

Exclusion criteria

Pregnant women less than 18 years and above 50 years. History of chronic illness (respiratory disease, cardiac disease, diabetes mellitus, hypertension, endocrine disorders) and twin pregnancy.

Informed consent was obtained from them after explaining the purpose of the study. A detailed profile of women like age, type of family, education status, socioeconomic and dietary habits was collected. BMI was calculated by the formula weight Kgs/Height in meter square. After through clinical examination, haemoglobin estimation was done by automated analyzer. Socioeconomic classification suggested by modified BG Prasad classification (July 2009) was adopted. Anaemia in pregnancy is defined by WHO as a haemoglobin concentration below 11g/dl. The degrees of anaemia studied were mild anaemia (10-10.9g/dL), moderate anaemia (7.0-9.9g/dL), and severe anaemia (less than 7.0g/dL) (9, 10). Statistical Analysis: The collected data

was compiled and tabulated using Microsoft Excel 2007 and then data analysis was performed using the SPSS windows version 16.0 software. The values included in the results will be tabulated and percentage changes were calculated. Data was analyzed using paired t-test. A p value of <0.05 will be considered to be statistically significant.

RESULTS

Table 1 shows the majority of subjects were between ages 20-29 years. The study subjects who belong to nuclear family were 101 (28.85%) and from joint family were 249 (71.14%). The maximum numbers of women were from social classes III and IV (30.85% and 31.14% respectively).

Table1: Demographic characteristics of pregnant women (n=350).

Parameters (n=350)		
Age group (yrs)	Number of subjects	Percentage
<20	16	4.25
21-24	84	24
25-29	86	24.57
>30	164	46.85
Type of family		
Nuclear	101	28.85
Joint	249	71.14
Socioeconomic class		
Class I	21	6
Class II	63	18
Class III	108	30.85
Class IV	109	30.85
Class V	51	31.85
Total	350	100
P valve 0.001		
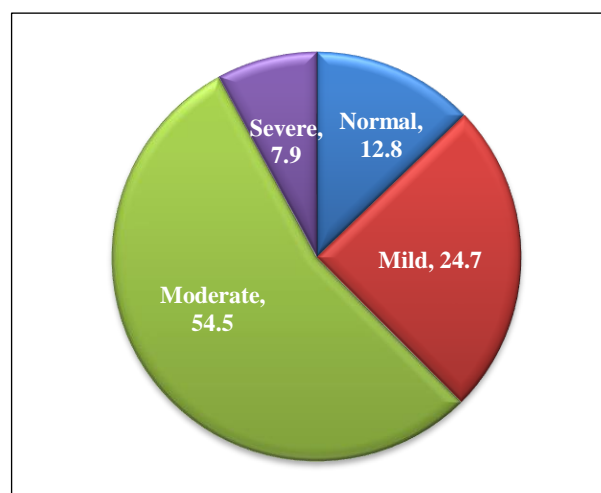
Figure 1: Prevalence of anemia.

Figure 1 shows the overall prevalence of anemia among pregnant women was found to be 87.71%. The

prevalence of mid, moderate and severe anemia were observed as 24.7%, 54.5% and 7.95 respectively. Thus, the prevalence of moderate anemia was high in comparison to the other degrees of anemia.

Table 2: Distribution of anemia in pregnant women according to age (n=350).

Age year	Anemia n (%)				Normal n (%)	Total
	Mild	**Moderate**	**Severe**	**Total**		
<20	5 (33.3%)	7 (43.35)	3 (18.8%)	15(93.8)	1(0.62%)	16(94.28%)
20-24	21 (25%)	43(51.2%)	8(9.5%)	72(85.7)	12(14.3%)	84(24%)
25-29	23 (26.7%)	46(53.5%)	7(8.1%)	76(88.4)	10(11.6%)	86(24.57%)
≥30	38 (22.9%)	94(66.1%)	10(6%)	142(88.37)	22(6.2%)	164(46.85%)
Total	87 (24.7%)	190(54.55)	28(7.9%)	305(87.2)	45(12.8%)	350(100%)

Table 3: Distribution of anemia in pregnant women according to socioeconomic class (n=350).

Socioeconomic status	Anemia n (%)				Normal n (%)	Total
	Mild	**Moderate**	**Severe**	**Total**		
Class-I	7 (33.3%)	2(9.52%)	1(4.76%)	10(47.61%)	11(52.38%)	21
Class-II	14(22.22%)	25(39.68%)	6(9.52%)	45(71.42%)	18(28.57%)	63
Class-III	18(10.66%)	72(66.51%)	9(8.33%)	101(93.51%)	07(6.48%)	108
Class-IV	23(21.1%)	71(64.13%)	9(25%)	103(94.49%)	06(5.50%)	109
Class-V	25(49.01%)	20(39.21%)	3(5.88%)	46(92.11%)	03(5.88%)	49
Total	87(24.71%)	190(54.54%)	28(7.95%)	305(87.21%)	45(12.78%)	350
Socioeconomic status (modified e.g. Prasad classification), p=0.001 significant						

Table 4: Distribution of anemia according to dietary habitats (n=350).

Types of diet	Anemia n (%)				Normal N (%)	Total
	Mild	**Moderate**	**Severe**	**Total (n)**		
Vegetarian	67(30.04%)	136(60.98%)	20(8.96%)	223(63.71%)	19(5.42%)	242
Mixed diet	20(24.39%)	54(15.42%)	08(2.28%)	82(23.42%)	26(7.42%)	108
Total	87(24.86%)	190(54.28%)	28(8%)	305(87.14%)	45(12.85%)	350
P=0.001 significant						

Table 5: Distribution of anemia according to BMI of pregnant women (n=350).

BMI kg/m^2	Anemia n (%)				Normal N (%)	Total
	Mild	**Moderate**	**Severe**	**Total (n)**		
<18.5	53(21.03%)	159(63.09%)	20(7.93%)	232(92%)	20(7.93%)	252
18.5-24.9	22(36.06%)	22(36.06%)	05(8.19%)	49(80.3%)	12(19.67%)	61
25.29.9	8(33.3%)	6(25%)	02(8.33%)	16(66.6%)	08(33.33%)	24
>30	4(30.76%)	3(23.07%)	01(7.69%)	08(61.5%)	05(38.46%)	13
Total	87(24.85%)	190(54.28%)	28(8%)	305(87.14%)	45(71.42%)	350
P=0.001 significant						

Table 2 shows that the proportion of pregnant women suffering from anemia was maximum (93.8%) in the age group <20 and minimum (85.7%) in the age group 20 -24 years. The observed difference was not statistically significant (p>0.05).

Table 3 shows that the proportion of pregnant women suffering from anemia in class I and II were less (47.6% and 71.4% respectively) as compared with the lower socioeconomic status (93.5%, 94.5% and 92.11% in class III-V respectively). It was noticed that as the socioeconomic status decreased the prevalence of anemia increased. Thus, lower socioeconomic status is associated with increase in the risk of development of anemia in pregnancy. This relation between socioeconomic status of the family and anemia in pregnancy was found to be statistically significant (p<0.001).

Table 4 shows 69.14% women were vegetarian and 3% were on mixed diet. The percentage of mild anemia (30.04%), moderate anemia (60.98%) and (63.71%) were higher among vegetarian as compared to those on mixed diet where mild, moderate and severe anemia was detected as 24.39%, 15.42% and 2.28% respectively.

Table 5 shows majority of pregnant women (92.06%) belonged to category of BMI <18.5kg/m^2 viz: mild anemia 21.03%, moderate anemia 63.09% and severe anemia 7.93% respectively. 36.06% of moderate anemia was seen in the subjects of BMI category 18.5-24.9kg/m^2 and 33.33% mild anemia was seen in BMI category 25-29.9kg/m^2. The difference between BMI underweight and BMI overweight statistically significant (p=0.001).

DISCUSSION

The present cross-sectional study is of 350 pregnant women from the rural area of Mandhana, Kanpur. These pregnant females are those patients, visiting outpatient clinics of Rama Medical College Hospital. Blood sample is collected in the lab under quality control and safety procedure.

Anemia 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. Anemia 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 anemia and associated risk factors in different trimesters of pregnancy. The study will be discussed in accordance with objectives outlined earlier. The current study revealed that prevalence of anemia among pregnant women is 87.17%. Study Shows (24.7%) cases of mild anemia, (54.5 %) of moderate anemia, and (7.9%) of severe anemia (Figure 1). Present study is similar to the study carried out among 7 states by Nutrition Foundation of India had observed the overall prevalence of anemia as 84% among Pregnant women similar to the present study.[7] "Indian Council of Medical Research (ICMR) task force multicenter study" revealed that the overall prevalence of anemia among pregnant women from 16 districts was 84.9% (range 61.0% in current study where more number of antenatal mothers (71.14%) who belonged to joint family suffered-96.8%).[8] The prevalence observed is similar to that reported for pregnant women (60%-77%) in Dares Salaam-Tanzania, Sudan, and Nigeria.[9-13]

In current study women aged between <20 and 25-30 years were more anemic compared to women 20-24 Years. As shown in (Table 2), it was observed that proportion of pregnant Women suffering from anemia was maximum (93.8%) in the age group <20years and above followed by the age group below 25-30years (88.4%). These was not statistically significant (P>0.05). The current study is similar with the study done by Lokar et al.[14]

Present study witnessed socio-demographic parameters statistically significantly influenced anemia status. Socioeconomic status, dietary habits, type of family, significantly determined maternal anemia. In present study it was observed that pregnant women (94.49%) who were low socioeconomic status were associated with a higher prevalence of anemia in pregnancy. This finding are statistically significant (p=<0.00001) (Table 3). Present study are similar to, a cross sectional study in New Delhi had revealed that there was a trend of decreasing severity of anemia with higher per capita income as found in the present study.[15]

In India, pregnant Hindu women are advised to avoid non vegetarian diet during pregnancy as it generates heat. Dietary pattern significantly influences anemia status. The current study revealed that (63.71 %) anemic women were following vegetarian pattern of diet whereas (23.48%) anemic 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 (23.48%) following non vegetarian or mixed pattern of diet were less anemic as compared to women who were exclusively on vegetarian diet (63.71%) and this difference was statistically significant (p<0.001) (Table 4).

Present study findings are supported by studies conducted by Singh R et al, in which it was found that diet contributed to anemia and vegetarians were more anemic as compared to non-vegetarians.[3] Unequal distribution of food in joint family and eating last or after serving the husband contributes significantly to maternal anemia. This trend was reflected from more anemia as compared to those living in nuclear families (28.85%), showing a statistically significant difference (p<0.001) (Table 1). Present study and similar trend was documented by Bisoi S et al, in a study among pregnant women in West Bengal.[16]

Underweight, pregnant women in North India had a higher occurrence of anemia. Underweight women had a significant higher rate of newborns with foetal anemia, LBW, and preterm delivery.[17] Low maternal BMI results in an increased incidence of newborns with low birth weight (LBW), and perinatal mortality. Low maternal BMI has a strong relationship with maternal anemia.[18]

In present study, it was found that prevalence of anemia was high (92.06%) in underweight, pregnant women (Table 5). These results coincide with the earlier studies of Bentley/Griffith.[19]

CONCLUSION

As anemia continues to be a serious health problem in India where the life risk of mother and child, life is endangered. Variation in socioeconomic factors is the major causes of prevention of anemia during pregnancy. There was significant correlation of anemia in pregnant women with their socio-economic status .majority of pregnant women belong to low socio-economic status. There was significant correlation anemia in pregnant women with dietary habits. There is a need for dietary counseling and nutritional education in antenatal clinics to tackle the issue of anemia in pregnancy. During Supplementation of iron and folic acid should be advised to all the pregnant women.

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