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Original Research Article

Burden of anemia and its associated factors among pregnant women of Vindhya region: prospective observational study

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ABSTRACT

Background: Anemia is major public health problem. It is especially prevalent in women of reproductive age, particularly during pregnancy. It affects both developed and developing countries. According to the National Family Health Survey, anemia is prevalent in approximately 53.1% of non-pregnant and 50.1% of pregnant women. Objective of this study was to study the prevalence of anemia in pregnant women of Vindhya region and also various degree of anemia and factors associated.
Methods: All pregnant women attending the outdoor and indoor of the obstetrics and gynecology department of, GMH. Rewa, taken for calculation of prevalence of anaemia and among them 510 pregnant women were selected who were satisfying inclusion and exclusion criteria for studying association factors. Study period was 1 year. Haemoglobin estimation done by sahlis haemoglobinometer.
Results: Prevalence of anaemia figures 81%, Out of them, 38.05% mild, 33.26% moderate and 7.80% of women were severely anemic. Maximum number of women were housewives 71.1%. Anaemia was found more commonly among those who are either taking iron prophylaxis irregularly or not taking. High prevalence was noted among those pregnant women who had <4 antenatal visits i.e., 54.51%.
Conclusions: Considering the high prevalence of anaemia in Vindhya region, extensive efforts should be made not only to correct anaemia, but to prevent anaemia. Various programmes for anaemia control should be executed more resourcefully to overcome it. Strong reinforcement of government scheme should be done at Anganwadi, CH, PHC to ensure prevention as well as early detection of anaemia.

Keywords: Anaemia, Antenatal care, Pregnancy

INTRODUCTION

Anemia is one of the most frequently observed nutritional diseases in the world and major public health problem. It is especially prevalent in women of reproductive age, particularly during pregnancy. WHO defines anemia as less than 11 gm/dl in the first and third trimester and less than 10.5 gm/dl in second trimester.[1] The main causes of anemia in developing countries include: inadequate intake and poor absorption of iron, early age at marriage, teenage pregnancy, ill spacing between two pregnancies, blood loss during labour and delivery, heavy menstrual blood flow, malaria, hookworm infestation, genetic disorders (e.g., sickle cell and thalassemia).[2-4] According to the NFHS 4, anemia is prevalent in approximately 53.1% of non-pregnant and 50.1% of pregnant women in India, and in Rewa, Madhya Pradesh it is 40.8% in non-pregnant and 44% in pregnant women.[5,6]

Aims and objectives

The objectives of the study were to study the prevalence of anemia in pregnant women of Vindhya region; to find out degree of anemia and to study various factors associated with anemia.

METHODS

Prevalence of anaemia was calculated in 20608 antenatal cases attending the outdoor and indoor of the department of obstetrics and gynecology of GM Hospital Rewa. Sample size for the study was calculated by using single population proportion formula with a 95% confidence interval, 5% margin of error, and 44% prevalence of anaemia among pregnant women of Rewa region (according to NFHS-4).

Sample size (n) = $4pq/d^2$ Where,

p: prevalence (44%),
q-p-q: (56%),
d: 10% of prevalence (4.4)

n=4×44×56/4.4×4.4=510

A total of 510 pregnant women were selected was are satisfying inclusion and exclusion criteria for the study.

Inclusion criteria

All pregnant women attending antenatal OPD and admitted in labour room who had completed 37 weeks of gestation.

Exclusion criteria

Patient's refusal, patient's already on treatment for anemia, women with complaints of acute blood loss, hemorrhagic disorders, chronic renal disease were closed.

Study period was 1 year, from March 2018 to February 2019. All the women attending OPD and IPD were taken to calculate prevalence and are subjected for haemoglobin estimation by sahlis haemoglobinometer.

With the decided sample size, after obtaining consent detailed history taken and association factors were studied in them. All the subjects were analyzed in full details regarding age, literacy, socio economic status, parity, interval between conceptions, significant past history and other complications associated with anemia were noted.

Hemoglobin percentage

Quantitative estimation of hemoglobin was done by Sahlis haemoglobinometer.

All the subjects were classified according to WHO criteria i.e. Mild anemia: 10 to 11 gm/dl; moderate anemia: 7 to 9.9 gm/dl; severe anemia: <7 gm/dl.

Statistical analysis

Data were entered into a computer using the statistical package for science services (SPSS version 23). Statistical methods employed were the mean, standard deviation (SD), chi-square test.

RESULTS

Prevalence of anaemia figures 81% rest were normal i.e., 19% out of total population. Among them 38.42% mild, 33.89% moderate and 7.82% of women were severely anemic (Table 1).

Out of 510 patients majority of them belonged to the age group of 20-29 years (81.56%) (Table 2).

A total 48.6% of women were studied up to primary followed by illiterate (21.1%) (Table 3).

Anemia was more common among housewives, it is 71.18% (Table 4).

Most of the anemic women belonged to the lower middle class (37.25%) and upper lower class of socioeconomic group 24.71%, respectively (Table 5).

Table 1: Prevalence.

Degree of anaemia	Number	Prevalence
Mild	7842	38.42
Moderate	6856	33.89
Severe	1608	7.82
Normal	4302	19.87
Total	20608	100

Table 2: Relationship of age with various degree of anaemia in study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Age in years	<20	15	6.12	31	14.16	3	6.52	49	9.61	χ^2=41.99 df=6 p<0.05
	20-24 year	153	62.45	122	55.71	15	32.61	290	56.86	
	25-29 year	61	24.90	51	23.29	14	30.43	126	24.71	
	>30 year	16	6.53	15	6.85	14	30.43	45	8.82	
	Total	245	100	219	100	46	100	510	100	

Table 3: Relationship of education with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Education	Illiterate	40	16.33	61	27.85	7	15.22	108	21.18	χ^2=40.69 df=6 p<0.05
	Primary	133	54.29	92	42.01	23	50.00	248	48.63	
	Matriculation	41	16.73	46	21.00	0	0.00	87	17.06	
	Secondary	31	12.65	20	9.13	16	34.78	67	13.14	
	Total	245	100	219	100	46	100	510	100	

Table 4: Relationship of occupation with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Occupation	House wife	163	66.53	163	74.43	37	80.43	363	71.18	χ^2=5.63 df=2 p=0.06
	Service	82	33.47	56	25.57	9	19.57	147	28.82	
	Total	245	100	219	100	46	100	510	100	

Table 5: Relationship of socio-economic status with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
SES	Upper class	36	14.69	27	12.33	0	0.00	63	12.35	χ^2=26.19 df=8 p<0.05
	Upper middle class	26	10.61	35	15.98	1	2.17	62	12.16	
	Lower middle class	87	35.51	86	39.27	17	36.96	190	37.25	
	Upper lower class	60	24.49	51	23.29	15	32.61	126	24.71	
	Lower class	36	14.69	20	9.13	13	28.26	69	13.53	
	Total	245	100	219	100	46	100	510	100	

Table 6: Relationship of type of family with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Type of family	Joint	132	53.88	122	55.71	22	47.83	276	54.12	χ^2=10.24 df=4 p=0.04
	Nuclear	52	21.22	62	28.31	9	19.57	123	24.12	
	Three generation	61	24.90	35	15.98	15	32.61	111	21.76	
	Total	245	100	219	100	46	100	510	100	

Table 7: Relationship of religion with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Religion	Hindu	230	93.88	183	83.56	42	91.30	455	89.22	χ^2=17.27 df=4 p<0.05
	Muslim	15	6.12	26	11.87	3	6.52	44	8.63	
	Christian	0	0.00	10	4.57	1	2.17	11	2.16	
	Total	245	100	219	100	46	100	510	100	

Table 8: Relationship of pre pregnancy BMI with various degree of anaemia in the study subjects.

	Variable	Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Pre pregnancy BMI	<18.5	117	47.76	86	39.26	31	67.39	234	45.88	χ^2=35.12 df=4 p<0.05
	18.5-24.9	77	31.43	87	39.72	12	26.09	176	34.5	
	>24.9	51	20.82	46	21.00	3	6.52	100	19.61	
	Total	245	100	219	100	46	100	510	100	

Table 9: Relationship of weight gain during pregnancy with various degree of anaemia in the study subjects.

	Variable	Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Weight gain during pregnancy in kg	3 to 5 kg	41	16.73	82	37.44	14	30.43	137	26.86	χ^2=35.89 df=6 p<0.05
	5.1 to 9 kg	76	31.02	61	27.85	27	58.70	164	32.16	
	9.1 to 13 kg	77	31.43	46	21.00	1	2.17	124	24.31	
	>13 kg	51	20.82	30	13.70	4	8.70	85	16.67	
	Total	245	100	219	100	46	100	510	100	

Table 10: Relationship of parity with various degree of anaemia in the study subjects.

	Variable	Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Parity	1	51	20.82	36	16.44	8	17.39	95	18.63	χ^2=27.49 df=6 p<0.05
	2	122	49.80	112	51.14	22	47.83	256	50.20	
	3	61	24.90	51	23.29	4	8.70	116	22.75	
	>3	11	4.49	20	9.13	12	26.09	43	8.43	
	Total	245	100	219	100	46	100	510	100	

Table 11: Relationship of pregnancy characteristics with various degree of anaemia in the study subjects.

	Variable	Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Pregnancy cha-racteristics	Singleton	219	89.39	209	95.43	46	100.00	474	92.94	χ^2=10.28 df=2 p=0.005
	Multiple	26	10.61	10	4.57	0	0.00	36	7.06	
	Total	245	100	219	100	46	100	510	100	

Maximum number of cases i.e., 276 (54.1%) from joint family (Table 6).

Majority of cases were from Hindu religion 455 (89.2%) followed by Muslim i.e., 44 (8.6%) (Table 7).

Most of the cases were from under nutrition group i.e., 45.88% followed by normal BMI i.e., 34.5%, in all the 3 group (Table 8).

Maximum number of study population has weight gain between 5.1 to 9 kg during pregnancy i.e., 164 (32.16%) followed by 3 to 5 kg i.e., 26.86% (Table 9).

Most of them were 2nd para i.e., 256 (50.2%) (Table 10).

Prevalence of anaemia was more among women having spacing between pregnancy <2 years i.e., 61.2% (Table 11).

Table 12: Relationship of dietary habit with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Dietary habit	Vegetarian	178	72.65	122	55.71	26	56.52	326	63.92	χ^2=21.32 df=4 p<0.05
	Non-vegetarian	51	20.82	62	28.31	17	36.96	130	25.49	
	Mixed	16	6.53	35	15.98	3	6.52	54	10.59	
	Total	245	100	219	100	46	100	510	100	

Table 13: Relationship of iron folic acid prophylaxis in present pregnancy with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
Iron folic acid prophylaxis in present pregnancy	Regular	61	24.90	26	11.87	0	0.00	87	17.06	χ^2=37.598 df=4 p=1.356
	Yes but not regular	100	40.82	116	52.97	15	32.61	231	45.29	
	No	84	34.29	77	35.16	31	67.39	192	37.65	
	Total	245	100	219	100	46	100	510	100	

Table 14: Relationship of number of antenatal visits with various degree of anaemia in the study subjects.

Variable		Degree of anaemia								Significance
		Mild (n=245)		Moderate (n=219)		Severe (n=46)		Total (510)		
		No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%	
ANC visits	<4	130	53.06	123	56.16	25	54.35	278	54.51	χ^2=5.664 df=413 p=0.226
	4-8	63	25.71	66	30.14	15	32.61	144	28.24	
	>10	52	21.22	30	13.70	6	13.04	88	17.25	
	Total	245	100	219	100	46	100	510	100	

Maximum number of study group women were vegetarian 326 (63.92%) (Table 12).

Most of them were taking IFA prophylaxis irregularly i.e., 231 (45.29%) (Table 13).

Maximum number of pregnant anaemic women had <4 antenatal visits i.e., 278 (54.51%) followed by 4-8 number of visits 144 (28.24%) (Table 14).

DISCUSSION

Study done by Mangla et al at in rural area of Haryana found a unusually high prevalence anemia (98%) in rural Haryana.[7] And a study conducted by Agarwal et al found a very high prevalence of 91%, and Baig Ansari et al.[8] found high prevalence 90.5% similar to this study.[9] Study by Mangla et al studied maximum number of anaemic pregnant women in the age group of 20-29 years i.e., 70.82% Prashant et al also had similar results.[7,10]

Study done by Dey et al shows prevalence of anaemia was more among primary educated women (58.5%).[11] Similarly, Ghazi et al studied degree of mild and moderately anaemic women among primarily educated women.

Study done by Rajamouli et al on pregnant women, attending the maternity clinic of rural health training centre and teaching hospital of Chalmeda Anand Rao Institute of Medical Sciences Karimnagar, Telangana, India shows high prevalence of anaemia among housewife and agricultural labours i.e., 152 (96.8%).[14] similar study done by Prashant et al prevalence was 63.5% among housewives.[10]

Study done by Gerald et al at Gulu and Hoima regional hospitals located in Northern and Western Uganda, taking 743 pregnant women, mostly studied population were from lowest wealth index i.e., 462 (21.7%).[15]

It was observed by Ghazi et al in their study that most of the anaemic women were from low socio-economic status 136 (22.66%).[13]

Prashant et al performed their study among 400 pregnant women residing in PHC Handignur found more prevalence of anaemia in Hindu family i.e., 86.5%.[10] Similarly study done by Madhavi et al where Hindus were 88.8%, while Priyanka et al found Hindus were 62%.[19,20]

Ravishankaran et al found more prevalence among those women living in joint family i.e., 56%.[16] Bisoi et al and Gautam et al studied similar result among joint family women.[17,18]

Study done by Dey et al shows prevalence of anaemia was 65.6% among undernutrition group.[11] Lin et al study shows mostly women had low BMI i.e., 21.40% similarly Awoke et al studied, 22.89% were under nutritioned.[21,22]

A study done by Taner et al shows 52.20% of pregnant women gains weight <10 kg.[12]

Anaemia was found more among pregnant women having high parity in the study done by Shwetha et al and Anlaakuu et al.[4,23]

Bisoi et al found more prevalence of anaemia i.e., 88.9% among pregnant women having <2 year spacing since last delivery.[17] Huma et al in their study reported similar result.[24]

Study done by Rajamouli et al attending the maternity clinic of rural health training centre and teaching hospital of Chalmeda Anand Rao institute of medical sciences Karimnagar, Telangana, India in 2015, they found high prevalence of anaemia among vegetarian i.e., 108 (40.14%).[14]

Study by Mangla et al at found maximum number of anaemic pregnant women was taking IFA irregularly i.e.42.03%.[7]

Even if the woman had a normal amount of iron before pregnancy, more is needed during pregnancy. This is due to the growth of the foetus, the uterus, the placenta, increased RBC mass and many other changes taking place in a pregnant mother that require many nutrients, especially iron and folic acid. This requirement is not met by food alone in developing countries, and therefore oral iron supplementation is justified. Therefore, to reduce the risk of maternal anaemia, iron deficiency and poor pregnancy outcomes, the WHO guidelines recommend a standard daily oral dose of 60 mg iron and 400 µg folic acid supplements throughout pregnancy, to begin as early as possible as a part of antenatal care (ANC) programs.

WHO recommends that a minimum 4 ANC visits and ideally 13 ANC visits should be done by pregnant women during pregnancy. Proper antenatal checkup leads to early diagnosis and management of anemia and other related infection and factors which can aggravate the condition on time.

Taner et al found anaemia more common among women having ANC visits 5-10 is 45.66%.[12]

CONCLUSION

Anemia is the commonest medical disorder in pregnancy which exists world-wide and is a very common problem in most of the developing countries. It is not only a medical problem, but is a major public health problem. In country like India, it is frequently severe and contributes significantly to maternal mortality and reproductive health morbidity. It causes direct as well indirect deaths in form of cardiac failure, hemorrhage, infection and preeclampsia. Anemia is also responsible for adverse fetal outcome in the form of spontaneous abortions, preterm deliveries, low birth weight babies and intra uterine growth restriction.

Considering the high prevalence of anaemia in Vindhya region, extensive efforts should be made not only to correct anaemia but to prevent anaemia. Iron supplementation during pregnancy in mothers improves iron status during pregnancy and postpartum period, thus providing some protection against iron deficiency in the subsequent pregnancy. Ensuring maternal iron sufficiency during gestation is the most cost-effective method of preventing perinatal iron deficiency and related morbidities.

Various programme for anaemia control should be executed more resourcefully to overcome it. Awareness is to be increased about dietary habits, small family norms, birth intervals and regular antenatal visits. Proper antenatal care is the basic requirement for prevention, early detection and treatment of anemia.

Strong reinforcement of government scheme should be done at Anganwadi, CHC, PHC to ensure prevention as well as early detection of anaemia. One should make sure that the services should reach the beneficiaries especially in peripheral areas where prevalence of these problems are maximum.

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