Prevalence, Magnitude, Contributing Factors of Anemia among Pregnant Women

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ABSTRACT

Introduction
Anemia during pregnancy is a major cause of morbidity and mortality of pregnant women in developing countries and has both maternal and fetal consequences.

Methods
Quantitative approach with descriptive research design was adopted for the present study. Five hundred (500) pregnant women attending antenatal OPD of IMS & SUM Hospital, Bhubaneswar, Odisha were selected purposively. Pregnant women can understand Odia language and available during data collection period were included in the study. Institutional Ethical Committee (IEC) and administrative permission was taken from IMS & SUM Hospital. The tools used to collect the data were as follows: 1. Demographic questionnaire, 2. Questionnaire to assess the contributing factors of anemia and 3. Checklist to assess the symptoms of anemia. Data was collected by interview schedule. The data were analysed by using descriptive and inferential statistics with SPSS 21 version.

Results
The overall prevalence of anemia among pregnant women was 41.2%. Nearly half of them had mild anemia (48.6%), followed by 9.6% had moderate anemia and whereas only 3% had severe anemia. The magnitude of anemia was associated with age in years ($\chi 2=2.450$, p=0.003), duration of menstrual cycle ($\chi 2=2.707$, p=0.004), type of menstrual flow ($\chi 2=3.080$, p=0.005), multiparity ($\chi 2=4.339$, p=0.004).

Conclusion: It is concluded that the prevalence of anemia in pregnancy was low compared to the finding of other studies and magnitude of anemia among pregnant women was found to be anemia is a moderate. Frequent assessment of their physical health and counselling is more important to prevent anemia rather than treatment.

KEYWORDS: *pregnant women, anemia, prevalence, contributing factors, magnitude*

INTRODUCTION

Pregnancy is not just a matter of waiting to give birth but a joyful and a fulfilling period in a woman's life. It can also cause ill health or even death. Anemia is one of the most common nutritional deficiency disorders affecting the pregnant women; the prevalence in developed countries is 14%, in developing countries 51%, and in India, it varies from 65% to 75%.[1] Anemia is the second most common cause of maternal death in India and contributing to about 80% of the maternal deaths caused by anemia in South East Asia.[2]

Anaemia is the term that indicates a low red cell count and a below normal haemoglobin or haematocrit level. A reduction in the concentration of

haemoglobin in the blood stream to a level below 11gm/dl for pregnant women. Among different types of anaemia iron deficiency anaemia is the most common nutritional disorder (66-80%), in the world as per WHO (2002). [3]

Women in developing countries are always in a state of precarious iron balance during their reproductive years. Their iron stores are not well developed because of poor nutritional intake, recurrent infections, menstrual blood loss, and repeated pregnancies. Gender discrimination in a country like India resulting girls lacking access to a balanced diet, adequate health care and proper education. Thus, the average Indian woman enters her reproductive years, and particularly pregnancy, with iron and folate deficiency.[4]

Anemia during pregnancy is a public health problem especially in developing countries and is associated with adverse outcomes in pregnancy.[5] The prevalence of anemia is highest among pregnant women in Sub-Saharan Africa (SSA) (57%), followed by pregnant women in Southeast Asia (48%), and lowest prevalence (24.1%) was found among pregnant women in South America .[3.] Tanzania Demographic and Health Surveys reported a slight decrease in the prevalence of anemia among pregnant women from 58% in 2004/05 to 53% in 2010. [6]

The causes of anemia during pregnancy in developing countries are multifactorial; these include micronutrient deficiencies of iron, folate, and vitamins A and B12 and anemia due to parasitic infections such as malaria and hookworm or chronic infections like TB and HIV. Contributions of each of the factors that cause anemia during pregnancy vary due to geographical location, dietary practice, and season. [7]

Anemia during pregnancy is reported to have negative maternal and child health effect and increase the risk of maternal and perinatal mortality. The negative health effects for the mother include fatigue, poor work capacity, impaired immune function, increased risk of cardiac diseases, and mortality.[8]

Anemia in pregnancy has several maternal health effects such as preterm deliveries, heart failure, postpartum haemorrhage and even death [9] and for the foetuses, the effects include low birth weight, birth asphyxia and perinatal death [10-12].

Anemia during pregnancy time is found to be major health problem. It is associated with adverse health and socio –economic consequence among pregnant women, particularly severe anemia increases risk of maternal and perinatal mortality. Hence this study was planned to assess prevalence, magnitude and contributing factors of anemia among pregnant women.

Methods and Materials:

Quantitative approach with descriptive design was adopted to assess the Prevalence, Contributing factors and magnitude of anemia among pregnant women. The study was carried out in the Gynaecology OPD of IMS & SUM Hospital, Bhubaneswar, Odisha. Five hundred (500) pregnant women attending antenatal OPD were selected purposively. Pregnant women can understand Odia language and available during data collection period were included in the study. Institutional Ethical Committee (IEC) and administrative permission was taken from IMS & SUM Hospital. The tools used to collect the data were as follows: 1. Demographic questionnaire, 2. Questionnaire to assess the contributing factors of anemia and 3. Checklist to assess the symptoms of anemia. Data was collected by interview schedule. The data analysed using descriptive and inferential statistics with SPSS 21 version.

Results

Table No1. Frequency and percentage distribution of demographic characteristics of pregnant women

N= 500

Sl. No	Socio-demographic data	Criteria	Frequency	Percentage (%)
1.	Age	18-24	102	20.4
		25-31	324	64.8
		32-38	74	14.8
2	BMI	Below 18.5	14	2.8
		18.5-24.9	304	60.8
		25.0-29.9	132	26.4
		30.0 and above	50	10
3.	Education Standard	No formal	38	7.6
		Primary	143	28.6
		Secondary	193	38.6
		Higher secondary	108	21.6

4.	Occupation	Housewife	324	64.8
		Working	176	35.2
5.	Residence	Urban	318	63.6
		Rural	182	36.4
5.	Type of family	Joint family	248	49.6
		Nuclear family	250	50
		Extended family	2	0.4
6.	Family Income	5,000-20,000	137	27.4
		21,000-50,000	347	69.4
		>50,000	16	3.2

Table No 1 shows that the demographic characteristics of pregnant women indicate that the highest percentage (64.8%) were aged between 25-31 years. Less than one percentage (0.6%) had severe anemia (Hb < 7g/dl), while 41.2% had normal Hb levels. The majority of women (60.8%) had a BMI of 18.5-24.9, and 38.6% had a secondary level of education. Additionally, 63.6% of women were from urban areas, and 64.8% were housewives. The largest religious group was Hindu (89%), and 50% of the women were from nuclear families. In terms of family income, the highest percentage (69.4%) had a family income between 30,000-50,000.

Table No 2: Prevalence of anemia among pregnant women.

N=500

Sl No.	Characteristics	Frequency	Percentage (%)
1	Anemic	206	41.2
2	Normal Hb	294	58.8

Table No 2 shows that among 500 pregnant women, 206 (41.2%) were anemic according on their hemoglobin test result (Hb) test.

Table 3: Magnitude of anemia among pregnant women.

N=500

Sl No.	Magnitude of Anemia	Hemoglobin values	Frequency	Percentage (%)
1	Mild	9 -10.9 g/dl	243	48.6
2	Moderate	7 - 8.9 g/dl	48	9.6
3	Severe	<7g/dl	3	0.6

Table No 3 shows the Magnitude of anemia among pregnant women. Nearly half of the pregnant women (48.6%) had mild anemia (Hb level: 9-10.9 g/dl), 9.6% had moderate anemia (Hb level: 7-8.9 g/dl), and the remaining 0.6% were diagnosed with severe anemia (Hb level: <7 g/dl).

Table No 4. Contributing factors of anemia among women with anemia

N=500

Sl. No	Contributing Factors	Criteria	Frequency	Percentage (%)
A	**Obstetrical factor**			
1.	Gravida	1	2	2
		2	371	74.2
		>2	117	23.4
2.	Parity	Primi	98	19.6
		Multi	402	80.4
2a.	If multi para (Mode of delivery	Normal vaginal delivery	83	84.7
		Ceasrean section	15	15.3
3.	Any complication during previous birth of the child	Yes	41	8.2
		No	459	91.8
B.	**Menstrual factor**			
4.	Interval of menstrual cycle per month	21 days (polymenorrhea)	16	3.2
		22- 35 days (normal)	461	92.2
		More than 35 days (Oligomenorrhea)	23	4.6
5	Type of menstrual flow	Scanty	35	7
		Normal	450	90
		Heavy	15	3

C.	**Nutritional Factor**			
6.	Type of diet	Non –vegetarian	250	50
		Vegetarian	250	50
7.	Vegetable Intake	Never	35	7
		Weekly	250	50
		Daily	150	30
		Occasionally	65	13
8.	Fruits Intake	Never	20	4
		Weekly	452	90.4
		Daily	14	2.8
		Occasionally	14	2.8
9.	Dry Fruits	Never	5	1
		Weekly	134	26.8
		Daily	33	6.6
		Occasionally	328	65.6
10.	Egg	Never	5	1
		Weekly	134	26.8
		Daily	33	6.6
		Occasionally	328	65.6
11.	Fish	Never	5	1
		Weekly	134	26.8
		Daily	33	6.6
		Occasionally	328	65.6
12.	Red meat	Never	5	1
		Weekly	134	26.8
		Daily	33	6.6
		Occasionally	328	65.6
13.	Milk	Never	5	1
		Weekly	134	26.8
		Daily	33	6.6
		Occasionally	328	65.6
14.	Pulses	Never	5	1
		Weekly	134	26.8
		Daily	33	6.6
		Occasionally	328	65.6
D.	**Medication factor**			
14.	H/O Medical Disease	Bleeding piles	71	14.2
		Gastritis	68	13.6
		Diabetes mellitus	24	4.8
		Hook worm infestation	4	0.8
		Other	333	66.8
15.	H/O Taking Medication	Iron and folic acid	491	98.2
		Calcium	468	93.6
		Deworming medication	7	1.4

Table No 4 shows the contributing factors of anemia among pregnant mothers shows that 74.2% were multigravida, while 80.4% were multipara. Among multiparous mothers, 84.7% had a normal vaginal delivery, and during delivery, 91.8% of women experienced no complications.

Regarding menstrual factors, the duration of the menstrual cycle showed that the majority (92.2%) of women had a normal duration of menstrual flow. In terms of the type of menstrual flow, the majority (90%) had a normal flow, followed by 7% who had light menstrual flow, and 3% who had heavy menstrual flow.

Among the nutritional factors, equal 50% of women were vegetarian & 50% were non-vegetarian. In terms of specific dietary intake, 50% of women consumed vegetables less than once a day. Additionally, 90.4% of women consumed fruits weekly, 65.6% consumed dry fruits daily, 87.2% consumed pulses daily, 35.2%

consumed eggs daily, 9.2% consumed fish daily, 10.6% consumed red meat daily, and 58.2% consumed milk daily.

Among medical factors, 62.6% of women had a medical condition during pregnancy, while 37.4% had no disease condition. Additionally, 85.8% of women had no bleeding piles, 4.8% had diabetes mellitus during pregnancy. Furthermore, 0.85% had hookworm infestation during pregnancy.

In terms of medication history, the majority of women (98.2%) were taking iron and folic acid, while 93.6% were taking calcium tablets. Additionally, 1.4% taking deworming medication.

Table 5–Distribution of sign and symptoms of anemia among pregnant women.

N=500

SL. No	Sign and Symptoms	Frequency	Percentage (%)
1.	Skin pallor	150	30
2.	Dizziness	53	10.6
3.	Shortness of breath	1	0.2
4.	Fatigue	253	50.6
5.	Leg cramp	17	3.4
6.	Irregular heart rate	17	3.4
7.	Insomnia	80	16
8.	Sore mouth	1	0.2

Table 5 outlines the signs and symptoms of anemia among women. The highest percentage (50.6%) reported experiencing fatigue, followed by 30% with skin pallor, 10.6% with dizziness, and 0.2% with shortness of breath. Additionally, 3.4% reported leg cramps, 3.4% had an increased heart rate, 84% experienced sleep disorders, and 0.2% had a sore mouth.

Association between level of hemoglobin with factors contributing to anemia.

Chi-square test was used to analyse the association between demographic characteristics and factors contributing to anemia. Results revels that there was significant association between level of hemoglobin and age in years (χ^2= 2.450, p= 0.003), duration of cycle (χ^2=4.655, p = 0.002), type of flow (χ^2= 2.707, p = 0.004), multiparity (χ^2=4.339, p=0.004).

Discussion:

In present study highest percentage (64.8%) of the study participant were aged between 25-31 age group, highest percentage (63.6%) of women were from urban area, Highest percentage (64.8%) women were house wife.

Suzon Ahmed, et.al (2019) found that Majority 144 (37.5%) of the study participants were found 21 - 25 age group. More than half of the participants 200 (52.1%) lived in urban area and rest 184 (47.9%) pregnant women were in rural area[5]. **Sinha A,,et.al (2021**) The most common age group in our study was 20-30 years (54.5%)[13]**. Abriha A,et.al (2014)** The mean age of the respondents was 25.7 years with 1.05 years , 178(62.21%) of them were urban residents[14].

In present study the prevalence of anemia among pregnant women was (41.2%) and (48.6%) of women were having mild anaemia (Hb level :9-10.9g/dl), 206 (41.2%) had normal hemoglobin levels, 243 (48.6%) had mild anemia (Hb level: 9-10.9 g/dl), 48 (9.6%) had moderate anemia (Hb level: 7-8.9 g/dl), and the

remaining 0.6% were diagnosed with severe anemia (Hb level: <7 g/dl).

Argaw D, et.al (2020) the overall prevalence of anemia among pregnant women attending antenatal care was found to be 28.7% (95% CI: 24.1–33.5). Out of which 19.57% had mild anemia, 8.58% had moderate anemia, and 0.55% had severe anemia[1]. **Abdallah F, et.al (2022**) 243 (48.6%) had mild anemia (Hb level: 9-10.9 g/dl), Overall prevalence of anaemia in pregnant women was 25.5%. Out of 107 pregnant women diagnosed with anaemia and, sixty-six had mild anaemia[16].

Abriha A, et.al (2014) The overall prevalence rate of anemia with hemoglobin level < 11 g/dl was 19.3% (CI:19.1, 19.5). In terms of severity, mild anemia was 13.7%, moderate anemia was 4.4% and severe anemia was 1.6% [17]. **Mathewos B, et.al (2014)** The prevalence found in this study is comparable with studies done in Southeast Ethiopia (27.9%) [18]. **Argaw D et.al (2020)**Overall prevalence of anemia was 28.7%, of which (19.6%) had mild anemia[3]. **Neeraj Rai et.al (2016)** they stated that maximum 44.7% were suffering from mild anaemia[19]. **Raga A. Elzahaf et.al (2016)** they stated that maximum 44.5% were suffering from mild anemia[20].

In this study highest percentage of women (80.4%) were multiipara. **Yesuf NN, et.al (2021)** stated that (45.8%) of them were multiparous anemia were 2.43 times higher among multiparous pregnant mothers as compared to primigravida mothers. Multiple factors

including multiparty and living in rural areas were associated with anemia during pregnancy[21].

In this study, in terms of the type of menstrual flow, the majority (90%) had a normal flow, followed by 7% who had light menstrual flow, and 3% who had heavy menstrual flow. **Grum T ,et.al (2018)** found that among 582 pregnant mother (91.8%) had no history of excessive menstrual bleeding[22].

This highest percentage of women taking vegetables less than once per day (50%) of womrn taking lesst. Fruits intake of women shows that (90.4%) of women taking weekily. **Niguse Obse et.al** 2013 they found that intake of vegetables and fruits less than once per day .

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anemia adversely affects the maternal and fetal well-being, and is linked to increased morbidity and fetal death. Affected mothers frequently experience breathing difficulties, fainting, tiredness, palpitations, and sleep difficulties.

Lee KA, Zaffke ME, Baratte-Beebe K. Restless legs syndrome and sleep disturbance during pregnancy: the role of folate and iron. *J Womens Health Gend Based Med.* 2004;10:335–341. [PubMed] [Google Scholar]

Conclusion: The burden of maternal anemia was considerably high in the study population. Although iron folic acid supplementation is available under th national health program to address other risk factors when designing and implementing target intervention for anemia control in selected populations.

References

[1] Liyew AM, Tesema GA, Alamneh TS, Worku MG, Teshale AB, Alem AZ, Tessema ZT, Yeshaw Y. Prevalence and determinants of anemia among pregnant women in East Africa; A multi-level analysis of recent Demographic and Health Surveys. PloS one. 2021 Apr 27;16(4):e0250560.

[2] Tusa BS, Weldesenbet AB, Bahiru N, Enyew DB. Magnitudes of anemia and its determinant factors among lactating mothers in East African countries: using the generalized mixed-effect model. Frontiers in Nutrition. 2021 Jul 28;8:667466.

[3] Argaw D, Hussen Kabthymer R, Birhane M. Magnitude of anemia and its associated factors among pregnant women attending antenatal care in Southern Ethiopia: a cross-sectional study. Journal of blood medicine. 2020 Oct 9:335-44.

[4] Osman MO, Nour TY, Bashir HM, Roble AK, Nur AM, Abdilahi AO. Risk factors for anemia among pregnant women attending the antenatal care unit in selected jigjiga public health facilities, somali region, east ethiopia 2019: Unmatched case–control study. Journal of multidisciplinary healthcare. 2020 Aug 10:769-77.

[5] Ahmed S, Al Mamun MA, Mahmud N, Farzana N, Sathi MS, Biswas BK, Datta A, Ahmad T. Prevalence and associated factors of Anemia among pregnant women receiving antenatal care (ANC) at Fatima Hospital in Jashore, Bangladesh: a cross-sectional study. Food and Nutrition Sciences. 2019 Sep 3;10(9):1056-71.

[6] Wemakor A. Prevalence and determinants of anaemia in pregnant women receiving antenatal care at a tertiary referral hospital in Northern Ghana. BMC pregnancy and childbirth. 2019 Dec;19:1-1.

[7] Kenea A, Negash E, Bacha L, Wakgari N. Magnitude of anemia and associated factors among pregnant women attending antenatal care in public hospitals of ilu Abba Bora zone, south west Ethiopia: a cross-sectional study. Anemia. 2018 Nov 12;2018.

[8] Gebreweld A, Tsegaye A. Prevalence and factors associated with anemia among pregnant women attending antenatal clinic at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. Advances in hematology. 2018 Aug 29;2018.

[9] Stephen G, Mgongo M, Hussein Hashim T, Katanga J, Stray-Pedersen B, Msuya SE. Anaemia in pregnancy: prevalence, risk factors, and adverse perinatal outcomes in Northern Tanzania. Anemia. 2018 May 2;2018.

[10] Chowdhury S, Rahman M, Moniruddin AB. Anemia in pregnancy. Medicine Today. 2014 Dec 25;26(1):49-52.

[11] Noronha JA, Al Khasawneh E, Seshan V, Ramasubramaniam S, Raman S. Anemia in pregnancy-consequences and challenges: a review of literature. Journal of South Asian Federation of Obstetrics and Gynecology. 2012 Jan;4(1):64-70

[12] Allen LH. Anemia and iron deficiency: effects on pregnancy outcome. The American journal of clinical nutrition. 2000 May 1;71(5):1280S-4S

[13] Sinha A, Adhikary M, Phukan JP, Kedia S, Sinha T. A study on anemia and its risk factors among pregnant women attending antenatal clinic of a rural medical college of West Bengal. Journal of Family Medicine and Primary Care. 2021 Mar;10(3):1327.

[14] Abriha A, Yesuf ME, Wassie MM. Prevalence and associated factors of anemia among pregnant women of Mekelle town: a cross-sectional study. BMC research notes. 2014 Dec;7(1):1-6.

[15] Argaw D, Hussen Kabthymer R, Birhane M. Magnitude of anemia and its associated factors among pregnant women attending antenatal care in Southern Ethiopia: a cross-sectional study. Journal of blood medicine. 2020 Oct 9:335-44.

[16] Abdallah F, John SE, Hancy A, Paulo HA, Sanga A, Noor R, Lankoande F, Chimanya K, Masumo RM, Leyna GH. Prevalence and factors associated with anaemia among pregnant women attending reproductive and child health clinics in Mbeya region, Tanzania. PLOS Global Public Health. 2022 Oct 5;2(10): e0000280

[17] Abriha A, Yesuf ME, Wassie MM. Prevalence and associated factors of anemia among pregnant women of Mekelle town: a cross-sectional study. BMC research notes. 2014 Dec;7(1):1-6.

[18] Mathewos B, Alemu A, Woldeyohannes D, Alemu A, Addis Z, Tiruneh M, Aimero M, Kassu A. Current status of soil transmitted helminths and Schistosoma mansoni infection among children in two primary schools in North Gondar, Northwest Ethiopia: a cross sectional study. BMC Research Notes. 2014 Dec;7(1):1-7.

[19] Neeraj Rai, Sunil Nandeshwar, and Pushpa Rai. Magnitude of anaemia and its socio-demographic correlates among pregnant women in Sagar city of Bundelkhand Region, Madhya Pradesh, India 2016 Research Article Open Access Volume 2018 |Article ID 3942301 | https://doi.org/10.1155/2018/3942301.

[20] *Raga A. Elzahaf, and Mariam Omar,* Prevalence of anaemia among pregnant women in Dernacity 2016 https://www.ijcmph.com/index.php/ijcmph/article/view/338DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20162065

[21] Yesuf NN, Agegniche Z. Prevalence and associated factors of anemia among pregnant women attending antenatal care at Felegehiwot Referral Hospital, Bahirdar City: Institutional based cross-sectional study. International Journal of Africa Nursing Sciences. 2021 Jan 1; 15:100345.

[22] Grum T, Brhane E, Hintsa S, Kahsay G. Magnitude and factors associated with anemia among pregnant women attending antenatal care in public health centers in central zone of Tigray region, northern Ethiopia: a cross-sectional study. BMC pregnancy and childbirth. 2018 Dec; 18:1-7.

[23] Niguse Obse, Andualem Mossie, Teshome Gobena magnitude of Anemia and Associated Risk Factors among Pregnant Women Attending Antenatal Care in Shalla Woreda, West Arsi Zone, Oromia Region, Ethiopia. Ethiopion Jiournal of Health Sciences,2013 https://www.ncbi.nlm.nlh.gov>pmc