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Prevalence of Anemia and Associated Factors in Pregnant Women Admitted in Antenatal Ward at Birat Medical College Teaching Hospital: An Analytical Cross-Sectional Study

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ABSTRACT

Introduction: The World Health Organization (WHO) defines anemia as a condition in which the haemoglobin concentration of a woman during pregnancy is < 11g/dl. Anemia is one of the global public health problems, with a global prevalence of 29.90% in women of reproductive age and 36.50% in pregnant women.

Objectives: The objectives were to find out the prevalence of Anemia and to find out the association between Anemia and selected sociodemographic, obstetric and dietary characteristics of the pregnant women.

Methodology: An analytical prospective cross-sectional study was conducted among pregnant women in antenatal ward of Birat Medical College Teaching Hospital from July 2024 to February 2025. Data was collected using a semi structured self-developed questionnaire, entered MS Excel and converted into SPSS 25 for statistical analysis. For descriptive analysis mean, standard deviation, range, and percentage proportion were calculated. Test of association was done using Chi square.

Results: In this study, overall prevalence of Anemia was 43.6% (23.9 % are mildly anaemic and 19.7% are moderately anaemic). Prevalence of anemia was significantly associated with the number of meals per day ($p=0.039$) and increment of diet in pregnancy than previous ($p=0.011$)

Conclusion: Prevalence of anemia is quite high despite the iron supplementation signifying Anemia as one of the major health problems among the pregnant women. Screening is essential for timely intervention to reduce maternal and fetal risks.

INTRODUCTION

The World Health Organization (WHO) defines anemia as a condition in which the haemoglobin concentration of a woman during pregnancy is < 11g/dl.¹ Anemia is one of the global public health problems, with a global prevalence of 29.90% in women of reproductive age and 36.50% in pregnant women.¹ Anemia remains a major public health challenge with a prevalence rate of 47% among non-pregnant and 52% in pregnant women in South and Southeast Asian (SSEA) countries.² The Nepal Demographic Health Survey reported that 34% of reproductive age women and 33% of pregnant women had anemia, with higher prevalence living in the plains (45%) than those living in the hills (20%) and mountain (23%) regions.³

Anemia can lead to adverse health outcomes for both mothers and baby, including infections, premature rupture of membrane, Intra-Uterine growth restriction, fetal hypoxia, premature birth, low birth weight babies and Intrauterine fetal

death. In low- and middle-income countries, 12% of low birth weight, 19% of preterm births, and 18% of perinatal mortality, are attributable to maternal anemia.⁴ Anemia prevalence rates among expectant moms range from 35% to 72% in Africa, 37% to 75% in Asia, Sub-Saharan Africa has a prevalence of 45.8% and Tanzania has a prevalence of 57%.⁵ as they vary from 1 area to another. This study determined the prevalence of anemia and its associated factors among pregnant women in Ilala, Tanzania. This community-based, analytical cross-sectional study was conducted in April 2022 involving 367 randomly selected pregnant women. An interviewer-administered questionnaire and a HemoCue analyzer were used for data collection. The data was described using descriptive statistics (frequency distributions, percentages, etc

The major reasons of anemia during pregnancy in developing countries includes different nutritional deficiencies like iron, folate, and vitamin B12 and commonly parasitic diseases, such as malaria and hookworm. The relative contribution of each of these factors to anemia varies greatly by geographical location, season, and dietary practices.⁶ Iron deficiency is the most common cause of anemia during pregnancy, which occurs when the body does not have enough iron to produce adequate amounts of haemoglobin. Several studies also depicted pica behaviour during pregnancy as a risk factor for anemia.⁵ A recent meta-analysis showed that the risk of maternal mortality decreases by 20% for every 1 g/dl increase in the haemoglobin concentration. This decline is continuous between Haemoglobin levels between 5 and 12mg/dl but not linear. Thus treating anemia has major health implications in pregnancy and would go a long way in improving maternal and foetal outcome.⁷

The levels of haemoglobin used for the classification of anemia in pregnant women as mild, moderate, and severe anemia were those recommended by the Indian Council of Medical Research (ICMR), which is defined as follows: Mild anemia: Hb 10.0 mg/dl–10.9 mg/dl. Moderate anemia: Hb 7.0 mg/dl–9.9 mg/dl. Severe anemia: Hb less than 7 mg/d.¹

The objectives of this study were to find out the prevalence of Anemia and to find out the association between Anemia and selected sociodemographic, obstetric and dietary characteristics of the pregnant women.

Methodology

It was an analytical prospective cross-sectional study conducted in the antenatal ward of Birat Medical College Teaching Hospital from July 2024 to February 2025. The study was reviewed, and approval was made by the Institutional Review Committee of Birat Medical College Teaching Hospital. The study was conducted among 117 pregnant women. Based on a previous study, with prevalence of anemia 7.9%, the sample size was calculated using the formula for cross-sectional studies $N = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$ Where $Z_{1-\alpha/2}$ = standard normal variate (at 5% type 1 error [P < 0.05] is 1.96). P = expected proportion in population based on previous study or pilot study = 7.9%. d = absolute error or precision = 5%.⁶

Data was obtained from the pregnant women after written and informed consent. The study included all the pregnant women irrespective of weeks of gestation. Those who are not willing to participate and from whom consent couldn't be obtained were not included in the study. Nonprobability Convenience sampling technique was for sample selection.

Pregnant women had been operationalized as those who have confirmed through medical testing or self-report that they are currently carrying a fetus in their uterus, regardless of the gestational age and parity. Prevalence refers to the percentage of antenatal mothers affected with anemia admitted in antenatal ward at BMCTH. Anemia refers to haemoglobin level less than 11gm/dl.⁶

Semi structured, self-developed interview schedule was developed by the researcher herself to collect the data. The tool consist of two parts: Part I – consists of socio demographic data of the participants including age, ethnicity, occupation, husband's occupation, monthly income, type of family, living area, the second part – consists of Obstetric history, third part consists of Dietary habits, and the fourth part consists of Haemoglobin level.

Permission for data collection was obtained from the hospital administration of BMCTH. Data was collected by interviewing the participants. Collected data was entered in MS Excel and converted into SPSS 25 for statistical analysis. For descriptive analysis mean, standard deviation, range, and percentage proportion was calculated. Analyzed data was presented in tabular form. Test of association was done using Chi square, with the level of significance set at P < 0.05.

Findings Of The Study

Table 1: Sociodemographic characteristics of the Respondents N=117

Characteristics	Category	Frequency	Percentage
Age in years	<20	4	3.4
	20-29	90	76.9
	>30	23	19.7
Mean±S.D (Range) = 26.06±5.57 (18-44)			
Ethnicity	Dalit	7	6.0
	Janajati	48	41.0
	Madhesi	26	22.2
	Muslim	13	11.1
	Brahmin/Chhetri	23	19.7
Occupation of pregnant women	Unemployed	86	73.5
	Semiskilled worker	5	4.3
	Skilled worker	10	8.5
	Clerical/Shop/farm	4	3.4
	Semi Profession	12	10.3
Husband's occupation	Semiskilled worker	7	6.0
	Skilled worker	53	45.3
	Clerical/Shop/farm	30	25.6
	Semi Profession	27	23.1
Monthly Income in Rs	<10,000	6	5.1
	10,000-20,000	25	21.4
	21,000-30,000	32	27.4
	>30,000	54	46.2
Type of family	Nuclear	30	25.6
	Joint	87	74.4
Level of Haemoglobin	Non-anemia	66	56.4
	Mild anemia	28	23.9
	Moderate anemia	23	19.7

Table 1 depicts that majority (76.9%) of the respondents were of age 20-29 years followed by >30 years (19.7%). The mean age was 26.06 years with the range of 18-44 years. Forty-eight (41.0%) of them were Janajatis followed by Madhesi (22.2%). Majority (73.5%) of them were unemployed. Nearly half(45.3%) of the respondent's husband were skilled worker. More than half (46.2 %) of the women had family income per month above 30000 and 27.4% of them had family income per month between 21000- 30000. Majority (87%) were living in joint family. Less than half of the respondents (43.6%) were Anemic.

Table 2: Association between the prevalence of Anemia and selected Sociodemographic Variables. N=117

Variables	Categories	Prevalence of anemia		Test of Significance X2 (P-Value)
		Non-anemic (>=11mg/dl)	Anemic (<11mg/dl)	
Age in years	18-29.9	51	43	0.903(0.342)
	≥30	15	8	
Ethnicity	Janajati	26	22	0.167(0.683)
	Else	40	29	
Monthly Income	<=30000	40	23	2.784(0.095)
	>30000	26	28	
Woman's occupation	Unemployed	50	36	0.395(0.530)
	Else	16	15	
Husband's Occupation	Skilled	29	24	0.113(0.737)
	Else	37	27	
Type of family	Nuclear	16	14	0.155(0.693)
	Joint	40	37	
Living area	Town	35	23	0.724(0.395)
	Village	31	28	

Table 2 depicts that there was no association between prevalence of Anemia and any of the socio-demographic characteristics of the respondents.

Table 3: Association between the prevalence of Anemia and selected Obstetric Characteristics of the respondents.
N=117

Variables	Categories	Prevalence of anemia		Test of Significance X2 (P-Value)
		Non-anemic ($\geq 11\text{mg/dl}$)	Anemic ($< 11\text{mg/dl}$)	
Gravida	≤ 2	59	42	1.208(0.272)
	> 2	7	9	
Weeks of Gestation	> 37	19	22	2.602(0.107)
	≤ 37	47	29	
Type of Pregnancy	Single	61	47	0.003(0.957)
	Else	5	4	
Planned pregnancy	Yes	50	43	1.292(0.256)
	No	16	8	
Blood loss in current pregnancy	Yes	9	6	0.090(0.764)
	No	57	45	

Table 3 shows no association between prevalence of Anemia and any of the obstetric characteristics of the respondents.

Table 4: Association between the prevalence of Anemia and selected Dietary Characteristics of the respondents.
N=117

Variables	Categories	Prevalence of anemia		Test of Significance X2 (P-Value)
		Non-anemic ($\geq 11\text{mg/dl}$)	Anemic ($< 11\text{mg/dl}$)	
Number of meals per day	≤ 3	37	38	4.255(0.039) *
	> 3	29	13	
Consumption of green leafy vegetables	Daily	61	41	3.726(0.054)
	Else	5	10	
Iron supplementation	Yes	63	51	2.379(0.123)
	No	3	0	
Deworming	Yes	39	33	0.383(0.536)
	No	27	18	
Increment of diet during pregnancy	Yes	56	33	6.412(0.011)*
	No	10	18	
Vegetarian/Non-vegetarian	Vegetarian	9	5	0.401(0.527)
	Non-vegetarian	57	46	

Table 4 depicts that there was significant association of prevalence of Anemia with number of meals per day ($p=0.039$) and increment of diet during pregnancy ($p=0.011$).

Table 5: Association between the prevalence of Anemia and Birth interval.
N=69

Variables	Categories	Prevalence of anemia		Test of Significance X2 (P-Value)
		Non-anemic ($\geq 11\text{mg/dl}$)	Anemic ($< 11\text{mg/dl}$)	
Interval between past and present pregnancy	< 2 years	4	4	0.094(0.759)
	≥ 2 years	34	27	

Table 5 depicts that there is no any association between the Prevalence of Anemia and birth interval.

Discussion

In this study majority (76.9%) of the respondents were of age 20-29 years followed by >30 years (19.7%). The mean age was 26.06 years with the range of 18-44 years. Forty-eight (41.0%) of them were Janajatis followed by Madhesi (22.2%). Majority (73.5%) of them were unemployed. Nearly half (45.3%) of the respondent's husband were skilled worker. More than half (46.2 %) of the women had family income per month above 30000 and 27.4% of them had family income per month between 21000- 30000. Majority (87%) of the respondents had joint family.

Overall prevalence of Anemia in this study was 43.6% among which 23.9 % are mildly Anemic and 19.7% are moderately Anemic. Higher prevalence in this study indicates Anemia is still a major problem among the pregnant women in the nearby setting. More or less similar results were found in the studies conducted in Ethiopia, by Abdilahi MM and Girma S, prevalence of Anemia among the pregnant women was 50.6% and 46.2% respectively.^{8,9}

Similarly in a study conducted by Lemma EJ in Tanzania, more than half (57.2%) of the respondents were anaemic.⁵ as they vary from 1 area to another. This study determined the prevalence of anemia and its associated factors among pregnant women in Ilala, Tanzania. This community-based, analytical cross-sectional study was conducted in April 2022 involving 367 randomly selected pregnant women. An interviewer-administered questionnaire and a HemoCue analyzer were used for data collection. The data was described using descriptive statistics (frequency distributions, percentages, etc). In contrary, a study conducted by Berhe B in Ethiopia, showed only 7.9 % of the respondents were Anemic but majority of the Anemic cases in this study were mild.⁶ which causes maternal and fetal severe consequences. In Tigray, there are limited literatures on prevalence of anemia and associated factors among pregnant women. Thus, a hospital based cross-sectional study was conducted to determine the prevalence and associated factors of anemia in Adigrat General Hospital. Data was analyzed and computed using SPSS version 22. p value = 0.05 at 95% confidence interval was considered statistically significant. Results: Overall prevalence of Anemia among the pregnant women attending Adigrat General Hospital was 7.9%. About 62.5% and 37.5% of the anemic women were with mild (Hgb: 10.0-10.9 g/d¹). Studies conducted by Nasir M and Tola E depicted the prevalence of Anemia in pregnant women to be 30.9% and 32.9% respectively.^{10,11} Likewise in a study conducted in Tanzania, overall prevalence of Anemia in pregnant women was 25.5%.¹² Possible reasons for this inconsistency might be disparities in socioeconomic position, geographical and cultural differences, and dietary habits of pregnant women.

In the present study, prevalence of Anemia was significantly associated only with the number of meals per day (p value=0.039) and increment of diet in pregnancy than previous (p value=0.011).

In a study conducted in Somaliland by Abdilahi MM, gestational age in the third trimester, lack of Antenatal visits, and absence of iron supplementation in pregnancy were the factors statistically

associated with Anemia. Higher consumption of meat per week was associated with a reduced risk of Anemia.⁸

Likewise in a study conducted by Girma S, prevalence of Anemia were significantly associated with positive stool test for parasites, less consumption of fruits and vegetables, no iron supplementation, large family size, and absence of abortion history.⁹ In the study conducted by Tegegne KT Illiterate pregnant women (p = 0.037), with no iron-containing food intake per day (p = 0.01), and infected with malaria (p = 0.03) had higher odds of being anemic. Gestational age of the first (p = 0.01), and second (p = 0.013) trimester has lower odds of being anemic compared.¹³

In the study conducted by Nasir M, reduced risk of anemia included high dietary diversity, no history of excessive menstrual bleeding, age 25–34 years, and age ≥ 35 years. Conversely, a mid-upper arm circumference (MUAC) of <23 cm, no use of contraceptive devices, and no iron supplementation were significantly associated with an increased risk of anemia.¹⁰

In another study conducted in Tanzania, Anemia was less associated with pregnant women who were living in Mbeya district council, consume at least once a day dark green leafy vegetables, and vegetable liquid cooking oil.¹²

Likewise in a study conducted by Tola E, Age, rural residency, low family income, irregular menstruation, antepartum hemorrhage, multi-parity, short birth interval, not taking iron and folate, 3rd trimester, coffee consumption, poor minimum dietary diversity score, undernourished, and poor knowledge of anemia were significantly associated with anemia in pregnant women.¹¹

Conclusions

In this study, the prevalence of Anemia among pregnant women was high despite Iron supplementation and consumption of green leafy vegetables which are the rich source of Iron. Factors which were significantly associated was number of meal intake per day and dietary increment in pregnancy than previous. Interventions like screening of Anemia among the reproductive age group women, awareness campaign, fortification of food with iron and folic acid, deworming etc would go a long way in improving maternal and foetal outcome.

Limitations of the Study

The study could not include the factors like inherited or acquired disorders that can affect the haemoglobin and Red Blood Cells synthesis. The study also could not reveal the casual links between anemia and risk factors since it uses the cross-sectional design.

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Conflict of Interest: None

Financial Disclosure: None

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