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Research Article

Clinico-demographic feature of anemic pregnant women attending for antenatal checkup at a tertiary care hospital

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ABSTRACT

Background & Objectives: Anemia during pregnancy is a common and significant public health issue, leading to maternal and fetal complications, particularly in low- and middle-income countries. Understanding the clinico-demographic characteristics of anemic pregnant women can provide insights for targeted interventions and improve maternal health outcomes. The study was aimed to assess the clinico-demographic features of anemic pregnant women attending antenatal checkups at a tertiary care hospital in Madhesh Province, Nepal.

Materials and Methods: A hospital based an analytical observational study with a prospective a cross-sectional study was conducted among pregnant women attending the antenatal clinic of a tertiary care hospital in Madhesh Province from July 2023 to June 2024. A total of 87 anemic pregnant women were included in the study. Data were collected through structured interviews, medical records, and laboratory results. Clinico-demographic variables such as age, education level, occupation, socioeconomic status, gestational age, parity, history of anemia, nutritional status, and laboratory results for hemoglobin levels were analyzed. The data were analyzed using SPSS version 20. Chi-square test was performed to find out the factors associated with anemia at 95% confidence interval.

Results: Among 87 anemic pregnant women, 52 (59.77%) were mildly anemic, whereas 31

(35.6%) were moderately anemic and 4(4.59%) were severely anemic. Regarding, analysis of clinical symptoms 26 (29.88%) complained of dizziness and 11(12.64%) had palpitation. Clinical sign showed 37 (42.5%) had pallor. Analysis of anemic women in relation to age group was statistically significant and P value 0.02. Among illiterate women 25 (71.4%) had moderate to severe anemia, whereas among literate women had 10 (19.2%) moderates to severe anemia. Birth spacing helps to decrease severity of anemia. Among total 22 multi gravida females with moderate to severe anemia < 2 years of birth spacing were 20 (80.0%) and birth spacing > 2 years were 2 (11.8%).

Conclusion: Clinico-demographic factors such as age, education, parity, and nutritional status were strongly associated with anemia in pregnancy. There is a need for enhanced public health strategies to address the causes of anemia, including better antenatal care, nutritional supplementation, and health education, to reduce the adverse outcomes for both mothers and infants.

Keywords: Anemia, Antenatal care, Clinico-demographic, Pregnancy, Maternal health.

INTRODUCTION

Anemia in pregnancy is major problem worldwide, although it is much high in developing countries. In Nepal, 41% of reproductive age women are anemic, with highest prevalence in Province-2, which is 58%. In terms of severity of anemia in Province-2, mild anemia was 64.8%, moderate anemia was 1.7% and severe anemia was found in 0.3% and in same study it shows that prevalence of anemia higher in multigravida which is 59.4% [1]. Anemia prevalence might differ between communities and even within a single location [2]. Globally, 41.8% pregnant women and close to one third of non-pregnant women (30.2%) are anemic [3, 4]. According to the National Family Health Survey (NFHS-4) data, the prevalence of anemia in India is 50.3% [5]. A study done in Meghalaya India shows that pregnant women in their first trimester, 37.9% in their second trimester and 39% in their third trimester (39.1%) had anemia [6]**.** Around more than half of pregnant women in developing countries suffer from anemia [7]. Literacy is also an important factor associated with anemia during pregnancy, studies has showed that anemia is more common in illiterate women [1, 3]. In Nepal, maternal, newborn, and child mortality has significantly decreased during the last ten years.Despite these successes, Nepal has continued to have some of the worst rates of malnutrition in the world, particularly chronic under nutrition. Another issue is that 39% of teenage girls and 35% of all women suffer from anemia. [10,11]. Maternity status is linked to anemia which prevalence compared to breastfeeding women (39%) and non-lactating women (33%) and pregnant women are more likely to be anemic (48%). In contrast with urban regions and mountain zones anemia varies 28% and 27%, respectively. Similarly, anemia is more common in rural areas then in Teraias36% and 42%, respectively. Probability of developing anemia for pregnant women is significantly impacted by their level of education [11]. Numerous researches on anemia during pregnancy have been conducted in Nepal. A study carried out in the region of Biratnagar by Sinha et al., [12] revealed that 47.25% of women had maternal anemia. According to Shah and Gupta, 68.8% of teenage girls in Dharan had anemia [13]. According to another study, 20% of relatively healthy non-pregnant women between the ages of 13 and 35 years had iron deficiency anemia [14]. Throughout their reproductive

years, women in underprivileged nations are constantly in a fragile iron balance. In Nepal, hemorrhage, eclampsia, and infections are the three main causes of maternal fatalities. [15]. Although the prevalence of anemia is on the decline, it is still a major health issue in Nepal. Nepal has long prioritized lowering the prevalence of anemia among women and children. In order to increase the coverage of iron and folic acid (IFA) supplements and anthelminthic treatment during pregnancy, The Nepal government started the Iron Intensification Program (IIP) in 2003 [10].

Pregnancy is a dynamic state consequent of the fact that normal fetal development needs the availability of essential nutrients to be continuously supplied to the growing fetus in spite of intermittent maternal food intake. An adult woman has about 2000 mg iron in the body, 60-70% of which is present in erythrocytes, with the rest stored in the liver, spleen, and bone marrow. During pregnancy, about 1000 mg more is required, comprising 300 mg for the fetus and placenta, 500 mg for increased maternal hemoglobin, and 200 mg that compensates for excretion [15]. Although the requirements of iron are reduced in the first trimester because of the absence of menstruation, they rise steadily thereafter from approximately 0.8 mg per day in the first month to approximately 10 mg per day during the last 6 weeks of pregnancy. Therefore, a high proportion of pregnant women become anemic [16]. When pregnant women's anemia is not properly monitored and treated, it can lead to serious morbidity and mortality as well as a decrease in their resistance to blood loss. Anemic mothers have high anesthetic and operative procedure because of low resistance to common infections and poor wound healing [17]. Anemia is a major public health issue in Nepal. Pregnancy-related anemia raises the risk of fetal, neonatal, and infant mortality and accounts for 20% of all maternal deaths. It is estimated that 48% of pregnant women globally suffer from anemia, affecting almost 25% of the world's population [18]. Milder forms of anemia have "silent" consequences that don't show any signs. In its more severe form, symptoms like weakness, exhaustion, loss of normal skin and lip color, lightheadedness, and drowsiness may manifest [19].

Anemia during pregnancy in impoverished nations is caused by a variety of factors, including parasite illnesses like hookworm and malaria as well as nutritional deficits such as iron, folate, and vitamin B12deficiency [20]. Thus, this study was aimed to assess the clinico-demographic features of anemic pregnant women attending antenatal checkups at a tertiary care hospital in Madhesh Province, Nepal.

MATERIALS AND METHODS

This study was prospective observational study conducted at Janaki Medical College Teaching Hospital (JMCTH) from July 2023 to June 2024. All cases of anemia with pregnancy patients presented at Janaki Medical College & Teaching Hospital from ANC Clinic, Gynae/Obs OPD, and Emergency Department. All patients presenting to JMCTH with Anemia with Pregnancy (as per case definition) from the ANC Clinic, Emergency and Obs/ Gynae OPD were enrolled for the study until the required sample size was achieved. The Sample size calculation was done using prevalence rate of anemia in pregnant women reported in literature done by Umesh et.al. 2021[1]. The inclusion criteria were all cases of pregnant women with diagnosis of anemia presented

at ANC Clinic, Obs/Gynae OPD and GP and Emergency Department at JMCTH. The exclusion criteria were patients with known chronic disease, patient undergoing chemotherapy/radiotherapy, known case of blood dyscrasias, autoimmune disorder (SLE, ITP) and trauma cases.

Diagnosis of Anemia is made on the basis of clinical judgment by the researcher or designated by college on the basis of history (generalized body weakness, easy fatigability, dizziness fainting attacks palpitation), clinical examination (pallor, edema, oral ulcers, and koilonychias), and laboratory findings (decreased hemoglobin level) WHO classify anemia [5] as

Mild Anemia refers to Hb level 9 to 10.9 g/dl
Moderate Anemia refers to 7 to 8.9 g/dl
Severe Anemia refers to <7 g/dl

Procedure:

All the cases of pregnant women with diagnosis of anemia presenting to the Obstetrics and Gynecology Department and General Practice OPD and Emergency Department was included Patient was evaluated by the investigator himself and in his absence cases will be evaluated by fellow residents and Interns. Only first visit of patient was included in this study

Diagnosis of Anemia is made on the basis of clinical judgment by the Physician on the basis of history (generalized body weakness, easy fatigability Dizziness fainting attacks palpitation), clinical examination (pallor, edema, oral ulcers, and koilonychias). Measurement of Hb was done by Cyanmethemoglobin method. Measurement was done in all the three trimesters when they arrived for antenatal checkup.

All data will be analyzed using SPSS Version 20. Descriptive statistics such as percentage will be calculated and analysis will be done by Chi-square test. Categorical variables will be expressed as number and percentage.

Ethical Considerations:

Approval from the institute review committee of JMC was taken with reference number 009/IRC-JMC/2023/009 before patient enrollment/data collection.

RESULTS

Table 1 indicates total of 87 anemic patients among them 27 patient (31.0%) were between age 16 to 20 years, 30 patients (34.5%) were between age 21 to 25 years, 22(25.3%) patients were between age 25 to 30 years, 7(8.0%) patients were between age 30 to 35years and 1 patient (1.1%) was above 35 years. Also, of 87 anemic patients among them 35 (40.2%) were illiterate, 23(26.4%) patients had studied up to primary level, 27(31.0%) had gone school till secondary level and only 2(2.3%) patients had studied above secondary level. Total of 87 anemic patients among them 28 patients (32.2%) were of first trimester pregnancy and 16(18.4%) were of second trimester and 43(49.4%) were of third trimester pregnancy. In table 1: Out of 87 total patients, 52(59.77%) patients were found to be mild anemic, 31(35.6%) patients were found to have moderate anemia and 4(4.59%) were found have severe anemia as shown in table 1.

Out of 87 total anemic patients,39(44.82%) complained of generalized body weakness, 26(29.88%) complained of dizziness, 11(12.64%) complained of Palpitation and 37(42.5%) had sign of pallor (Table 2).

TABLE: 1 Clinico- demographic characteristics of participants (N = 87)

	Patient demographic characteristics	N (%)
Age		
	15-20 Years	27 (31.0 %)
	21-25 Years	30 (34.5 %)
	26- 30 Years	22 (25.3 %)
	31-35 Years	07 (08.0%)
Literacy		
	Illiterate	35(40.0 %)
	Primary Level	23(26.4 %)
	Secondary Level	27(31.0 %)
	Above Secondary Level	02(02.3 %)
Gravida		
	Primigravida	45 (51.7 %)
	Multigravida	42 (48.3 %)
Trimester		
	First	28 (32.2 %)
	Second	16 (18.4 %)
	Third	43 (49.4 %)
Anemia Grading		
	Mild Anemia	52(59.77 %)
	Moderate Anemia	31(35.6 %)
	Severe Anemia	4(4.59 %)

TABLE: 2 Symptoms and signs of participants (N = 87)

Symptoms/ Signs	Yes	No
Palpitation	11(12.64 %)	76 (87.35 %)
Pallor	37 (42.5%)	50 (57.47 %)
Generalized Body Weakness	39 (44.82 %)	48 (55.17 %)
Dizziness	26 (29.88 %)	61(70.11 %)

TABLE: 3 Age Group variation with severity of anemia (N=87)

Age Group	Mild Anemia	Moderate/Severe Anemia	p-value
16 - 20	11(40.7%)	16(59.3%)	0.02
21 - 25	21(70.0%)	9(30.0%)	
26 -30	17(77.3%)	5(22.7%)	
>30	3(37.5%)	5(62.5%)	

TABLE: 4 Trimester variation with severity of Anemia (N=87)

Trimester	Mild Anemia	Moderate/ Severe Anemia	P value
First Trimester	16(57.1%)	12(42.9%)	0.66
Second Trimester	11(68.8%)	5(31.3%)	
Third Trimester	25(58.1%)	18(41.9%)	

TABLE: 5 Parity and birth spacing variations with severity of Anemia

Gravida	Mild Anaemia	Moderate/Severe Anaemia	**P value**0.026
Primigravida	32 (71.1%)	13 (28.9%)	
Multigravida	20 (47.6%)	22 (52.4%)	
Birth spacing	**Mild Anaemia**	**Moderate/Severe Anaemia**	**P value**<0.001
< 2year	5(20.0%)	20(80.0%)	
>2 years	15(88.2%)	2(11.8%)	

In this study among age group 16 to 20 years female 11(40.17%) had mild anemia and 16 (59.3%) had moderate to severe anemia. In age group 21 to 25 years 21(70.0%) female had mild anemia and 9 (30.3%) females had moderate to severe anemia. Similarly, in age group 26 to 30 years 17(77.3%) female had mild anemia and 5 (22.7%) females had moderate to severe anemia. The P value in relation to age group with severity of anemia was found to be < 0.02 which is statically significant and hence suggests that age group of female 16 to 20 years 16(59.3%) and >30years 5(62.5%) years increase in severity of anemia in pregnancy (Table 3).

In this study it was found that in first trimester 16 (57.1%) females were mild anemic whereas 12(42.9%) had moderate to severe anemia. In females who presented in second trimester 11 (68.8%) had mild anemia whereas 5 (31.3%) had moderate to severe anemia. Similarly, those who presented in third trimester 25 (58.1%) had mild anemia and 18 (41.9%) had moderate to severe anemia. To analysis the p-value in this table which was found to be 0.66 this, is not statically significant and doesn't correlate the variation of anaemia in relation to trimester of pregnancy (Table 4).

In this study, it was found that in relation to gravida of pregnancy of Primigravida 32(71.1%) had mild anaemia and 13(28.9%) had moderate to severe anemia. Whereas in the case of multigravida 20(47.6%) had mild anemia and moderate to severe anemia was found in 22(52.4%). P value was calculated to be 0.026 which is statically significant. Hence it suggests that increase in number of gravida in female increases severity of anemia.

Similarly, in relation to birth spacing with < 2 years birth spacing 5(20.0%) had mild anemia and 20 (80.0%) had moderate to severe anemia and in female with birth spacing >2 years 15 (88.2%) had mild anemia and 2(11.8%) had moderate to severe anemia, calculated P value was <0.001 which is statically significant and this study suggests that >2 years of birth spacing helps in decreasing severity of anemia in pregnant women (Table 5).

DISCUSSION

In this study total of 87 anemic patient were included, among them 52 (59.77%) patients were found to be mild anemic, 31(35.6%) patients were found to have moderate anemia and 4(4.59%) were found have severe anemia. In Nepal, 41% of reproductive age women are anemic with highest prevalence in Province 2 (58%). The study done in Province 2 in 2021, in terms of severityof anemia, mild anemia was found in 96.8%, moderate anemia was 2.6% and 0.5% was severely anemic Umesh et al [1]. Prevalence of anemia in the study by MoHP [11]was(48%).In study done by Maskey et al. [2], the prevalence of anemia was found to be 46.6%, whereas mild and moderate anemic were 51.0% and 49.0% respectively. The prevalence of anemia among pregnant mothers was 68.6%, among them 60.6% were mild and 8.0% were moderately anemic. None of the study subjects were severely anemic in study done by Swetha and Prasad in 2018[5].

In this study age group of female16 to 20 years were 16(59.3%) and >30years 5(62.5%) has been foundincrease in severity of anemia in pregnancy. Generally, it is believed that anemia in pregnancy increases with rising parity and maternal age. This study is consistent with study done in Eastern Nepal by Maskey et al., [2]. Besides the general body weakness with advanced

maternal age, older women are expected to be multigravida who may induce anemia by reducing maternal iron reserves at every pregnancy and by causing blood loss at each delivery Okubeetal., [18]. This finding is in contrast with results from other studies conducted by Bondevik et al., [28]. They revealed that a higher prevalence of anemia was found in young pregnant mothers.

In this study seen that in Primigravida had moderate to severe anemia 13(28.9%) and in multigravida 22 (52.4%) indicating that increase in parity increases severity of anemia. This result is similar to study done in Madhesh Province by Umesh et al., [1]. Similar result was observed in study done by Maskey et al., in 2014 [2] with p-value of <0.01 indicating Multigravida women had higher prevalence of anemia and severity of anemia in compared to Primigravida women. This finding is consistent with the findings from other studies conducted in India by Nivedita and Fatima [27] and in Nepal by Makhoul et al., [8] and in Abrihaet al. 2014 [14], in Ethiopia by Haidar [29], revealed that the odds of repeated pregnancies more than two were 2.3 times greater among pregnant mothers as compared to those who have less than two numbers of pregnancies. This is due to the fact that short intervals between births may not provide women with enough time to replenish lost nutrient stores before another reproductive cycle begins [30]. The study conducted by Vivekietal et al. [21], Alene and Dohe [20] reported that increased number of pregnancies is positively associated with the risk of developing anemia. This could be due to the possibility of sharing of resources with the fetus. The study conducted by Viveki et al.,[21] and Alene and Dohe [20] reported that increased number of pregnancies is positively associated with the risk of developing anemia.

Similar findings were reported in other studies such as in India by Lokare et al. [26], in Bangladesh Kamruzzaman et al. [22]and in Ethiopia [24]. The study conducted in Nigeria found that a high prevalence of anemia among un-educated pregnant women can be explained in part by the fact that their diets lack adequate amounts of iron, adherence to cultural taboos that often lead to selection of food types for pregnant women leading to nutritional deficiencies such as iron and vitamin B12 deficiency Anorluet al. [31]. In the study done by Lokare et al. [26], it was found that the pregnancy-related anemia was significantly higher in those with low education levels. They also reported that as literacy level increases the severity of anemia decreases.

In this study it was found that in relation to Birth spacing in females of total 87 participants 42 (48.27%) were multigravida and among them <2 years Birth spacing of pregnant women has 5(20.0%) mild anemia and 20(80.0%) had moderate to severe anemia. And, in female with birth spacing > 2 years 15(88.2%) had mild anemia and 2(11.8%) had moderate to severe anemia, P value was <0.001 which is statically significant and this study suggests that > 2 years of birth spacing helps in decreasing severity of anemia in pregnant women. Similar result was found in study done in Karnataka India by Swetha and Prasad in 2018 [5], where p-value was calculated 0.02 which is statically significant.

In this study it was found that in first trimester 16(57.1%) of females were mild anemic whereas, 12(42.9%) had moderate to severe anemia. In females who presented in second trimester 11(68.8%) had mild anemia whereas, 5(31.3%) had moderate to severe anemia. Similarly, those who presented in

third trimester 25(58.1%) had mild anemia and 18(41.9%) had moderate to severe anemia and P value was found to be 0.66which is not statically significant and doesn't correlate the variation of anemia in relation to trimester of pregnancy. Although statistically not significant, prevalence of anemia was seen to increase with advancing gestational age which is supported by a study conducted in India by Viveki et al. [21]. This contrasts a study done among pregnant women in Ethiopia Alene and Dohe [20], Vietnam Aikawa et al. [32] and in Nepal Makhoul et al. [8] found that increased gestational age is significantly associated with the risk of developing anaemia. This could be explained by the fact that when the gestational age increases the mother becomes weak and the iron in the blood is shared with the foetus in the womb therefore decreasing the iron binding capacity of the mother's blood Alene and Dohe [20]. The Study conducted by Siteti et al. [17] revealed that the majority of pregnancy related anaemia cases were recorded in second trimester of pregnancy. Due to the cross-sectional design and methodology, this study prevented cause/effect relationships to be established between the presence of maternal anemia and the associated factors.

CONCLUSION

Clinico-demographic factors such as age, education, parity, and nutritional status were strongly associated with anemia in pregnancy. There is a need for enhanced public health strategies to address the causes of anemia, including better antenatal care, nutritional supplementation, and health education, to reduce the adverse outcomes for both mothers and infants.

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