



## Research Article

# Prevalence of Anaemia Among Pregnant Women in Third Trimester and Its Effect on Pregnancy Outcome at Tertiary Level Teaching Hospital, Birgunj

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### ABSTRACT

**Background:** Anaemia in pregnancy is a global health challenge. It is the commonest medical disorder of pregnancy and a major cause of morbidity and mortality in developing countries. Main cause of anaemia in obstetrics is iron deficiency. There are specific risks for the mother and the fetus such as intrauterine growth retardation, prematurity, and blood transfusion. Hence, the importance of giving iron in the antenatal period and to be continued postnatally.

**Objectives:** The study was conducted to determine the overall prevalence of anaemia among pregnant women presenting in third trimester and its effect on pregnancy outcome.

**Methods:** This is a cross sectional descriptive

study done at National Medical College & Teaching Hospital from September 2015 to August 2016. During the study period 2048 pregnant women attended antenatal clinic in third trimester. Among 2048, 1200 were booked cases and out of these women with haemoglobin less than 11gm/dl were labeled as anaemia. The prevalence was calculated along with the maternal and fetal outcome.

**Result:** Among 2048, 1200 were booked cases, 368 (30.66%) were anemic, 66.30% were multigravida, 67.93% in age group of 21-30 years, 284 patients came for delivery. In 14.08% patients there was preterm labour, apgar score less than 7 in 66.19% babies. Majority of neonate weighed between 2.0 - 2.5kg (49.29%). Perinatal deaths were 2.81%.

**Conclusion:** Anaemia in pregnancy need awareness about early and regular antenatal care with oral iron supplementation. Correction of anaemia will reduce the maternal and fetal complications.

**Key words:** Anaemia, Haemoglobin, Pregnant women, Prevalence.

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## INTRODUCTION

Anaemia is a major public health problem especially among poorer segments of the population in developing countries.<sup>1</sup> It is one of the most prevalent nutritional deficiency problems affecting pregnant women. It is defined as quantitative or qualitative reduction of haemoglobin or circulating RBC's or both resulting in a reduced oxygen carrying capacity of blood to organs and tissues.<sup>2</sup> Anaemia in pregnancy is defined by the WHO as haemoglobin levels of less than 11 gm%,<sup>3</sup> 10.0-10.9 gm% as mild anaemia, 7.0-9.9 gm% as moderate anaemia and less than 7 gm% is severe anaemia.<sup>4</sup> According to Indian Council of Medical Research (ICMR), anaemia is defined as mild if Hb is 8 -11 gm/dl, moderate if Hb is 5 -8 gm/dl, and severe anaemia if Hb is less than 5 gm/dl.<sup>5</sup>

According to WHO, over 2000 million people are anaemic, with pregnant women most affected. In developing countries, prevalence rates in pregnant women are commonly estimated to be in the range of 40% - 60%.<sup>6</sup> Iron deficiency anaemia has been estimated to affect as many as 200 million people in

the world probably women.<sup>7</sup> Consequence of anaemia in pregnancy include maternal complications like the cardiac failure, infections (urinary tract infections, puerperal sepsis), post partum haemorrhage (PPH) and maternal mortality. Fetal complications include intrauterine growth restriction (IUGR), preterm birth, low birth weight baby leading to increased perinatal mortality.<sup>8,9</sup>

The most common symptoms of anaemia are the weakness, fatigue, dizziness, headache, loss of appetite, dysphagia, palpitation, dyspnoea, ankle swelling, irritability, shortness of breath, chest pain, pale skin, lips and nails, cold hands and feet, trouble concentrating.

Many researches in different parts of developing countries have documented iron deficiency as the leading cause of anaemia in pregnancy.<sup>10</sup> All pregnant women in areas of high prevalence of malnutrition should routinely receive iron and folate supplements, together with appropriate dietary advice, to prevent anaemia. The causes of anaemia during pregnancy are due to increased demand of iron, diminished intake of iron, diminished absorption and disturbed metabolism.

WHO recommends to give all pregnant women a standard dose of 60 mg iron + 400 µg folic acid daily for 6 months, if 6 months of treatment cannot be achieved during the pregnancy, either continue supplementation during the postpartum period or increase the dosage to 120 mg iron during pregnancy.<sup>11</sup>

The fact that anaemia is a completely preventable significant cause of maternal and fetal morbidity and mortality; this study aims to find out the prevalence of anaemia. The magnitude of effects in terms of complications

on the mother and the fetus in this study will alert the obstetrician to take preventive measures against anaemia and this will benefit both the mother and the fetus.

## **MATERIALS & METHODS**

### **Study Design**

This study was a cross sectional descriptive hospital based study. The study was conducted at NMCTH Birgunj, Nepal. This is a tertiary level teaching hospital. The study period was twelve months from September 2015 to August 2016. Ethical clearance was obtained from the Institutional Review Committee of National Medical College. The study population included booked pregnant women in third trimester attending our antenatal clinic and emergency department of obstetrics and gynaecology of NMCTH. Booked patients in our study were accepted as minimum 3 or more antenatal visits. The age of the patients ranged from 18-45 years. The study group was subjected to detailed history taking, general examination and systemic examination. Gestational age was calculated by LMP and confirmed by USG. These patients were sent for haemoglobin estimation. Haemoglobin was estimated using cyanmethemoglobin method. Out of these whose haemoglobin was less than 11gm/dl were labelled as anaemic. They were further categorized as mild, moderate and severe anaemia according to WHO classification. The prevalence of anaemia was calculated based on number of anaemic patients attending antenatal clinic in third trimester out of the total number of booked pregnant women who attended in the third trimester. The anaemic patients were given oral iron supplementation either single or double dose according to the severity of anaemia. Patients with haemoglobin less than 7gm/dl in third trimester were advised for

blood transfusion. With the onset of labour, close maternal and fetal monitoring was carried out. Labour events of all anaemic patients and mode of their deliveries were recorded. Any intrapartum or postpartum significant maternal complications were noted. Finally, the fetal outcome in terms of weight of the baby, APGAR score and any admission to NICU were also recorded. Written and informed consent were obtained. These mothers were discharged on iron and folic acid supplementation and with an advice to follow up after 6 weeks.

### **Selection Criteria**

All participants who meet inclusion criteria in study period enrolled in study.

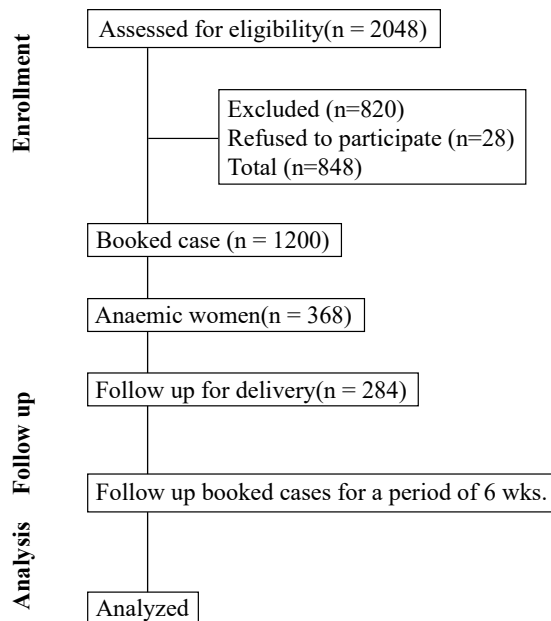
**Inclusion criteria** - All pregnant booked women attending antenatal clinic in third trimester, age between 18-45 years, booked women coming for delivery, all pregnant women diagnosed as anaemic with haemoglobin <11 gm/dl.

**Exclusion criteria** - Unbooked cases, multiple gestation, pregnancy induced hypertension, all medical disorders like diabetes, hypertension, Smoker or alcoholic, haemoglobinopathies (e.g. thalassemia).

### **Data analysis:**

The data collected were entered daily. Analysis of the data was done by using SPSS version 20 software. These findings were then presented in the form of tables, graphs and diagrams using Microsoft Excel 2007. SPSS version 20 was the software used for calculation and tabulation of data. The final results were discussed and the conclusion was derived.

**Figure 1: Consort diagram showing the flow of participants through each stage**



## RESULTS

Total number of pregnant women attending antenatal clinic in third trimester at NMCTH during the period (1year) were 2048. In this booked case were 1200 women, and out of these booked cases, 368 were anaemic. Only 284 anaemic pregnant women came for delivery in the hospital. In this study, the prevalence of anaemia was calculated based on 368 anaemic women out of 1200 booked cases which was 30.66%.

**Table 1: Distribution of anaemia types according to parity**

Parity	Severe	Moderate	Mild	Total
Primigravida	7 (1.9%)	28 (7.6%)	89 (18.20%)	124 (33.69%)
Multigravida	12 (3.2%)	81 (22.01%)	151 (41.03%)	244 (66.30%)
Total	19 (5.1%)	109 (29.61%)	240 (65.21%)	368

The results showed that there were 124 anaemic primigravida (33.69%) whereas 244 anaemic

multigravida (66.30%) as given in Table 1. Multigravida patients were more anaemic than primigravida patients. Mild anaemic patients were 240 (65.21%), moderately anaemic 109 (29.61%) and severely anaemic were only 19 (5.1%) as shown in Table 1.

240 patients (65.21%) had haemoglobin range between 10 – 11 gm/dl, 63 patients (17.11%) had haemoglobin between 9 – 10 gm/dl, 32 patients(8.69%) had haemoglobin between 8 – 9 gm/dl, 14 patients(3.8%) had haemoglobin between 7 – 8 gm/dl, 10 patients(2.71%) ranged between 6 – 7 gm/dl and 9 patients (2.44%) had haemoglobin less than 6 gm/dl. Fifty-eight cases (15.76%) of anaemia were admitted and given blood transfusion. The mean haemoglobin level among anaemic women was 9.29 gm%. Only 36 (9.7%) women out of 368 anaemic mother were less than 20 years of age, majority 144 (39.13%) of women were in the age group of 21-25 years and only 25 women (6.7%) were more than 36 years-old. Anaemia was more prevalent in the reproductive lower age group (21-25 years) than in the upper age groups (> 26 years).

**Table 2: Different factors of pregnant women affecting anaemia**

Characteristics	No. of cases (368)	Percentage
<b>Haemoglobin Range</b>		
10-11 gm/dl	240	65.21%
9-10 gm/dl	63	17.11%
8-9 gm/dl	32	8.69%
7-8 gm/dl	14	3.8%
6-7 gm/dl	10	2.71%
5-6 gm/dl	6	1.63%
<5 gm/dl	3	0.81%
<b>Age group</b>		
18-20 years	36	9.7%
21-25 years	144	39.13%

26-30 years	106	28.80%
31-35 years	57	15.48%
36-45 years	25	6.7%
<b>Educational status</b>		
Higher education	86	23.36%
Primary education	134	36.41%
Illiterate	148	40.21%
<b>Occupation</b>		
Farmer	98	26.63%
Labour	168	45.65%
Service/Employed	42	11.41%
Household	60	16.30%
<b>Mode of deliveries n = 284</b>		
<b>in anaemic patients</b>		
Vaginal delivery	224	78.87%
Caesarean section	42	14.78%
Instrument delivery	18	6.33%
<b>Maternal complications</b>		
Preterm labour	40	14.08%
Postpartum haemorrhage	32	11.26%
Abruptio placentae	9	3.16%
Placenta praevia	17	5.98%
Postoperative fever & infection	6	2.11%
Cardiac failure	3	1.05%
Maternal mortality	1	0.35%
<b>Fetal complications</b>		
Apgar score <7	163	57.39%
Low birth weight	40	14.08%
Intrauterine growth restriction	20	7.04%
Intrauterine fetal death	4	1.40%
Perinatal death	8	2.81%
Birth Asphyxia	2	0.70%

There were 86 higher education patients (23.36%), 134 were having primary education

(36.41%) and 148 were illiterate (40.21%). The results showed that anaemia was prevalent more in the less educated class and illiterate group.

According to the occupation housewives were 60 (16.30%), farmers were 98 (26.63%), labour 168 (45.65%) while service holders were 42 (11.41%). The higher number of anaemic patients in labour and farmer group reflect the relationship of anaemia with low socioeconomic group.

Out of 284 anaemic patients who came for delivery in the hospital, vaginal deliveries were 224 cases (78.87%) in present study. Caesarean section was done in 42 cases (14.78%) for obstetrical indications. Instrumental delivery was conducted in 18 cases (6.33%).

The maternal complications observed in this study were preterm deliveries 40 (14.08%), PPH 32 (11.26%), abruptio placenta 9 (3.16%), placenta praevia 17 (5.9%), cardiac failure 3 (1.05%), maternal mortality 1 (0.35%), post operative complications like fever and wound infections 6 (2.11%).

The fetal outcome was measured in terms of condition of the baby at birth, weight of the baby and apgar score given. Among fetal complications, it was found that preterm babies were more common in anaemic patients in our study. The babies with APGAR less than 7 were 163 (57.39%) and the rest of the babies were given good apgar score, low birth weight babies were 40 (14.08%), IUGR babies were 20 (7.04%), perinatal deaths were 8 (2.81%), intrauterine fetal death were 4 (1.40%) and birth asphyxia 2 (0.70%).

**Table 3: Relation of baby weight with degree of anaemia**

Age (years)	No.	%	Mild anaemia	Moderate anaemia	Severe anaemia	≤2.0kg baby wt.	2-2.5kg baby wt.	2.5-3.5kg baby wt.	>3.5k baby wt.
18-20	22	7.46%	9 (3.16%)	11 (3.87%)	2 (0.70%)	2	8	9	-
21-25	107	37.67%	83 (29.22%)	21(7.39%)	3(1.05%)	14	52	46	3
26-30	94	33.09%	58 (20.42%)	35 (12.32%)	1(0.35%)	6	58	18	5
31-35	44	15.49%	29(10.21%)	12(4.22%)	3(1.05%)	4	13	19	3
36-45	17	5.98%	11(3.87%)	4(1.40%)	2(0.70%)	2	9	10	3
TOTAL	284	100%	190(66.29%)	83(29.22%)	11(3.85%)	28(9.85%)	140(49.29%)	102(35.91%)	14(4.92%)

Weight of the baby was classified into four groups. Total of 28 babies were less than 2 kilogram (9.85%), 140 babies (49.29%) weighed between 2-2.5 kg, 102 babies weighed between 2.5-3.5 kilogram (35.91%) and 14 babies weighed more than 3.5 kilogram (4.92%) as shown in Table 3.

## DISCUSSION

The prevalence of anaemia as seen in this study was 30.66% it is an indication that anaemia during pregnancy is still a major problem. The prevalence was comparable with what was obtained in similar studies of Nepal (42.5%),<sup>12</sup> Haryana (51%)<sup>5</sup>. The study findings are however in contrast to reports from other countries, 66% in Burkina Faso Meda et al.,<sup>13</sup> 50.8% in Anthony Wemakor et al.(Ghana),<sup>14</sup> Jharkhand (76%).<sup>15</sup> It is suggested that the variations may be attributed to different causes of anaemia and dietary differences, population differences, study design and difference in methodology used in determining haemoglobin levels. Also, these women were likely to be on haematinics, correction of anaemia in previous trimester, regular antenatal check up which might have improved their haemoglobin levels.

According to WHO classification for degree of anemia, among anemic pregnant women, 19 (5.1%) were severely anemic. The proportion of severe anemia in this study was

higher compared to similar studies in Nigeria 2014 (0.3%),<sup>16</sup> Sudan 2010 (2.1%)<sup>17</sup> and Tanzania 2011 (2.1%).<sup>18</sup> Mainly, this might be due to the method used for measurement of Hb level of pregnant women. The study conducted in Nigeria used packed cell volume or hematocrit for identification of anemic cases,<sup>16</sup> but in our case, Hb was measured using cyanmethemoglobin method.

It was evident that anaemia was significantly associated with socioeconomic status of our study subjects. The prevalence of pregnancy related anaemia was higher amongst those with low socioeconomic status. It is suggested that women in low socioeconomic classes are likely to be poorly educated and often have financial constraints, they are more likely to suffer the adverse effects of poor / inadequate nutrition, acute / chronic infections and worm infestations associated with anaemia. Furthermore, some cases of maternal anaemia often have its origin in a woman's life before pregnancy. Therefore, expectant women in the low socioeconomic class may have chronic iron deficiency anaemia even before pregnancy that may be aggravated by the demands of the fetus during pregnancy.

The level of anaemia ranged from low to moderate with nineteen cases of severe anaemia detected. Severe pregnancy related anaemia is commonly associated with

parasitic infections (malaria, intestinal worms) during pregnancy. It is suggested that the low incidence of severe anaemia in the study subjects could be an indication of positive outcome of the ongoing infectious disease intervention strategies undertaken by country public health department in the study area. An aggressive public health awareness campaign on the importance of proper sanitation and the need to seek appropriate treatment of parasitic infections in pregnancy could explain the low prevalence of anaemia subjects with tertiary and university education.<sup>19</sup>

The other possible reason for high prevalence of anaemia amongst the uneducated and economically deprived expectant 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. The end results are nutritional deficiencies such as iron and vitamin B12 deficiency. This explains why low level of education and socioeconomic status are important risk factors in pregnancy related pregnancy.<sup>20</sup> In a related study in Ethiopia the rate of anaemia was higher among illiterate pregnant mothers and those who did not practice family planning. In Uganda, Kiwanuka et al.<sup>21</sup> reported 84.4 percent of anaemic mothers and multiparity, poor socioeconomic and educational status were the principal reasons for a high prevalence of anaemia.

Study subjects in the lower age brackets had higher anaemia prevalence (21-30 years). This finding is comparable to related observation. While mothers aged more than 35 had the lowest prevalence. However, the higher the mother's attained level of formal education, the lower the observed prevalence of anaemia. One study also found that staying up late can

cause anemia in pregnant women.<sup>22</sup>

The mean haemoglobin level among anaemic pregnant women was 9.29 gm% in our study, which is less than in study by Mengi V et al.<sup>23</sup> with mean haemoglobin 10.19gm%.

Abruptio placentae was present 3.16% in this study which is comparable to M. Rohilla<sup>24</sup> (3.12%). Placenta praevia was observed in 5.98% of cases which is much lesser comparable to the study of Awasthi et al.<sup>25</sup> Folate deficiency and possibly iron deficiency anaemia could be the predisposing factor for abruptio placentae.

In this study the prevalence of preterm delivery was 14.08% which was lesser than the study done by Rohilla et al.<sup>24</sup> (18.75%), Riffat Jaleel<sup>26</sup> (23.5%), Singhal<sup>27</sup> (32%), Ranju<sup>28</sup> (22%) and Shalini<sup>29</sup> (42.8%) but higher than the study conducted by Awasthi et al.<sup>25</sup> (9.5%). In our study, significant proportion (11.26%) of patients had postpartum haemorrhage which was comparable to Riffat Jaleel et al.<sup>26</sup> (9.8%). Ghimire found that pregnancy induced hypertension is five times more common in severe anaemia and significant proportion of patients had postpartum haemorrhage with severe maternal anaemia.<sup>30</sup> Wandabwa J has also indicated severe anemia as a predictor of postpartum haemorrhage.<sup>31</sup> We also observe that severely anemic patients developed wound infection in 2.1% cases, which is lesser than the study done by Riffat Jaleel et al.<sup>28</sup> where it is only 7.8% but it is very minimal in comparison with study done by Dare FO and colleague 69.2%.<sup>32</sup> Low incidence of wound infection in our study may be because of the correction of anaemia by giving blood transfusion in patients with haemoglobin less than 7 gm/dl.

Regarding IUGR, there were only 7.04% IUGR babies in our study which was less compared to the findings of Rohilla et al.<sup>24</sup> (33.33%), Riffat Jaleel<sup>26</sup> (27.8%) but comparable to Singhal et al.<sup>27</sup> (6.62%). This study found severe anemia significantly increases the risk of neonatal complication. Regarding APGAR score we observed 57.39% of neonate had less than seven in five minutes in women which is higher than 11.2% of Jaleel R and Khan A.<sup>26</sup>

The booked patient benefits from focused antenatal care objectives, which although not yet scientifically proven to reduce maternal and fetal morbidity/mortality, have obvious benefits in terms of risk assessment, active management, correction of modifiable conditions, and boosting the psychological support and family preparedness for a new child.

### LIMITATIONS

The study was hospital based and findings might not be representative of the general population. Moreover, the study was confined only to the third trimester and hence patients who were anaemic pre pregnant or in early trimester were liable to be not accounted. Routine deworming and testing stool for parasitic infections were not in our study protocol.

### CONCLUSION

The overall prevalence of anaemia in the present study was 30.66%. Age, socio-economic status, literacy of women, parity and birth interval were the major determinants that contributed to the problem of anaemia. This can be achieved by routine screening for anaemia in adolescent girls from school age, encouraging iron rich foods, providing iron supplementation. Also, early booking and screening for anemia in antenatal clinics,

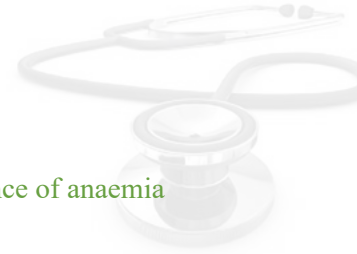
providing iron supplements to these anemic women. All these strategies of preventing anaemia will help in reducing the maternal and fetal complications associated with anaemia.

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