International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Study of Anemia in Late Gestational Period and its Correlation with Maternal and Fetal Outcome

Prachi Patil[1], Sujata R Kanetkar[2], Nanda Patil[3], Ghadge Neha[4]

[1]MBBS Student, Department of Pathology, Krishna Vishwa Vidyapeeth, Karad

[2]Professor and Head, Department of Pathology, Krishna Vishwa Vidyapeeth, Karad.

[3]Professor, Department of Pathology, Krishna Vishwa Vidyapeeth, Karad

[4]Tutor, Department of Pathology, Krishna Vishwa Vidyapeeth, Karad
Corresponding Author Email: *nehananaji.369[at]gmail.com*

Abstract: ***Introduction: Anemia in pregnancy is major cause of maternal and fetal morbidity in the developing countries affects pregnancy outcome. Though National nutritional anemia control programme has been implemented in India, there is 50 - 65% of prevalence of anemia during pregnancy in our country. Aims and objectives: To assess maternal anemia in late gestational period and correlation with the soceo - demographic factors and fetal and maternal outcome. Materials and methods: Study population was pregnant women having anemia in third trimester of pregnancy. The cases were diagnosed as anemia and graded according to the hemoglobin percentage. Correlation was done with socioeconomic status, maternal history and laboratory investigations. Results: Age group range from 19 years to 40 years, in which 43% cases had maternal anemia during late gestational period.51%of cases were having moderate anemia. Mean hemoglobin percentage was 8.5 g/dl. Iron deficiency anemia was the major subtype of anemia. Low birth weight and prematurity were frequent fetal outcomes, while predominant maternal outcomes included are preeclampsia and premature rupture of membranes. Keywords: Anemia, late gestational period, maternal outcome, hematological investigations.***

Keywords: Anemia, late gestational period, maternal outcome, hematological investigations.

1. Introduction

Anemia in pregnancy is defined by WHO as condition in which hemoglobin concentration of a woman during pregnancy is <11g/dL. Anemia is considered as a major cause of maternal and fetal morbidity and mortality in the developing countries. Anemia also affects pregnancy outcome in mothers ([1, 2, 3, 4]). India is the first developing country to implement National Nutritional Anemia Control Program for prevention of anemia in pregnant women. National Health Policy 2017 also addressed malnutrition and micronutrient deficiency interventions. Despite of these effects, there is 50 - 65% of prevalence of anemia among pregnant women in India ([5]). Identification of risk factors which contribute to anemia in pregnant women is vital for its prevention and control. Present study was undertaken to evaluate anemia among pregnant women in late gestational period, to find out factors associated with the anemia and outcome of pregnancy in case of maternal anemia.

2. Aims and Objectives

Aim: To assess maternal anemia in late gestational period.

Objectives: To study socio - demographic factors associated with maternal anemia and to correlate the findings with fetal and maternal outcome

3. Materials and Methods

Study design -
The study was cross - sectional and was conducted in tertiary care centre within a period of 3 months from April 2022 to June 2022.

Study population –
- Inclusion Criteria - All post - natal cases having anemia in third trimester of pregnancy were included.
- Exclusion Criteria - Pregnant women with diabetes mellitus, hypertension and other co - morbidities. Patients with hematological malignancies.

Sample size – 100 patients with maternal anemia in third trimester of pregnancy were evaluated within the period of three months from April 2022 to June 2022.

Sample procedure –
Pregnant women delivered at our hospital with hemoglobin level <11g/dL in third trimester of pregnancy were included in the study. Detailed history including obstetric history, socio - economic status and laboratory investigations was recorded.

Pregnancy outcome was noted.

The degree of anemia was graded as mild (Hb - 10 - 10.9g/dl), moderate (Hb - 7 - 9.9g/dl) and severe (Hb - <6.9g/dl). The anemia was classified based on hematological investigations.

Human subject protection -
Informed consent of cases was taken before collection of sample. Ethical clearance was taken from the Institute Ethical committee.

Data collection procedure and tools -
Data was collected and analyzed using SPSS software.

4. Results

100 patients with maternal anemia in third trimester of pregnancy were evaluated within the period of three months from April 2022 to June 2022. We found 43% cases (100 out of 232) having maternal anemia during this period. Though 66 cases were ANC registered, 52 out of them were registered in third trimester (78%).

Table 1: Age distribution of cases

Age group (yrs)	No. of cases
19 - 30	93
31 - 40	5
>40	2
Total	100

Table 2: Distribution of Cases on the Basis of Degree of Anemia

Degree of anemia	No. of cases
Mild anemia (Hb 10 - 10.9g/dL)	47
Moderate anemia (Hb 7 - 9.9 g/dL)	51
Severe anemia (Hb 4 - 6.9 g/dl)	2
TOTAL	100

Table 3: Correlation of Age of Patient with Severity

Age in yrs	Mild anemia	Moderate anemia	Severe anemia	Total
19 - 30	45	47	1	93
31 - 40	2	3	1	5
> 40	-	2	-	2
TOTAL	47	51	2	100

88%of cases were from rural area, while considering literacy 66% cases were literate. Considering soceoechonomic status of patients, 28% of cases were from class III category, 27% cases were from class II, 25% of cases were from class IV, 8% and 2% cases belong to class V and I category. Considering gravity, 37% cases belong to gravida 1 and gravid 2, while 22%, 3% and 1% cases belong to gravida 3, gravida 4, and gravida 5 respectively.

Table 4: Correlation of Gravidity with Severity of Anemia

Gravidity	Mild	Moderate	Severe	Total
G1	18	19	-	37
G2	12	24	1	37
G3	14	7	1	22
G4	2	1	-	3
G5	1	-	-	1

Table 5: Hematological Findings in cases of Maternal Anemia -

Parameter	Normal Range	Minimum	Maximum	Mean
Hb	12 - 16g/dL	6.3	10.9	8.5
PCV	36 - 48%	20.7	35.9	28.5
MCV	87+_ 7 fL	54.1	102.2	65.2
MCH	29 - 31pg	22.9	30.1	26.2
MCHC	34 - 36g/dL	21.8	38.9	24.2
Se. Iron	60 - 170µg/dL	41.9	84.2	69.2
TIBC	240 - 450µg/dL	398	480	344
Se. Ferritin	24 - 307 ng/mL	9	31	21.4

Table 6: Etiological Classification of Anemia

Type of Anemia	No. of cases	Mild anemia	Moderate anemia	Severe anemia
Iron deficiency	88	40	46	2
Vit. B - 12/ Folate deficiency	12	7	5	-
TOTAL	100	47	51	2

Table 7: Fetal Outcome in Cases of Maternal Anemia

Fetal outcome	Mild anemia	Moderate anemia	Severe anemia	Total
Low birth weight	8 (17.02%))	12 (23.52%)	-	20
IUD	-	3 (5.88%)	1 (50%)	4
Fetal distress	-	2 (3.92%)	-	2
IUGR	1 (2.12%)	1 (1.96%)	-	2
Prematurity	12 (25.53%)	8 (15.68%)	-	20

Table 8: Maternal Outcome & severity of anemia

Outcome	Mild	Moderate	Severe	Total
Pre - eclampsia	2	6	-	8 (32%)
PROM	3	4	-	7 (28%)
Oligo - hydramnios	1	2	-	3 (12%)
Eclampsia	1	2	-	3 (12%)
PPH	-	1	1	2 (8%)
Pl accreta	-	1	-	1 (4%)
Pl previa	1	-	-	1 (4%)
TOTAL	8	16	1	

5. Discussion

Indian Council of Medical Research [ICMR] considers hemoglobin levels below 11 g/dL as a cutoff point for anemia during the pregnancy ([6]). Degree of anemia is graded as mild [Hb - 10 - 10.9g/dL], moderate [7 - 9.9g/dL], severe [<6.9 g/dL]. Among the various causes of anemia in pregnant women, iron deficiency is the most common type. Similar results are found in our study where 88% cases were iron deficiency anemia ([7]). This could be due to dietary iron deficiency, child bearing at an early age, repeated pregnancies, short pregnancy interval, poor access to antenatal care and no iron supplementation ([8]). During pregnancy, the requirement of iron increases to meet the demands of the growing fetus and placenta with the expanded maternal blood volume. ([9]) Other causes of anemia are inadequate intake of Vitamin B - 12 and folate, worm infestation, chronic infections like malaria, tuberculosis and excess consumption of coffee and tea. ([10, 11]) Our study revealed Megaloblastic anemia as the second common cause. In our study, 51% cases had moderate anemia. Similar observation has been made by Nigar ef al ([2]). National surveys have revealed that there is reduction in severity of anemia in pregnant women. In our study, we found only **2** cases of severe anemia. This could be due to improved ante - natal care, health education regarding proper diet. Globally, 56% of pregnant women belong to low and middle income group ([6]). In our study, this was 61%. The most common age group in cases of maternal anemia is 20 - 30 years in various studies ([6]). In our study, 93% cases were in this age group. Our study, revealed higher frequency of anemia in rural population as observed by other studies ([4]). Higher prevalence of anemia was found in primigravida and second gravida pregnant women. The results were similar to NFHS 3 reports and study done by Agarwal al. This can be due to close inter - pregnancy interval and not

taking iron prophylaxis [12]. Maternal anemia is a predisposing risk factor for IUGR and perinatal death. This can be due to oxidative stress due to low hemoglobin levels and hypoxia, increased cortisol levels [13, 14]. Fetal complications due to maternal anemia in pregnancy are pre - maturity, intra - uterine growth retardation, fetal distress and intra - uterine death. ([10, 15]. In our study, most common complication was low birth weight in 20% cases Due to the lack of essential nutrients, the metabolic capacity of pregnant women's cells decreases, affecting fetal development and growth, leading to LBW [16]. Amongst cases of moderate anemia, 23.5% cases (12/51) presented with low birth weight and in 17% (8/47) cases of mild anemia, low birth weight was observed. Other fetal complications were intra - uterine death, fetal distress, prematurity and IUGR. Similar findings have been noted by other authors. [5]. Maternal complications in anemia during pregnancy are pre - eclampsia, eclampsia, pre - mature rupture of membranes, maternal infections, oligohydramnios, post partum hemorrhage and placental abnormalities [17]. Most common maternal complications in our study was pre- eclampsia followed by PROM, oligohydramnios, eclampsia, PPH, placenta accreta and placenta previa [18]. They were more common in cases of severe anemia (50%) followed by moderate (33.3%) and mild anemia (19.14%).

6. Conclusion

Anemia in late pregnancy is still a public health problem which affects pregnancy outcome resulting in fetal and maternal morbidity and mortality. Iron deficiency is the most common cause of maternal anemia and is associated with socio - demographic factors. Interventions in implementation and further improvement of maternal health program plan like health education and iron supplementation before pregnancy is essential to reduce maternal anemia.

References

[1] Chowdhary HA, Ahmed KR, Jebunessa F, Akter J, et al. Factors associated with maternal anemia among pregnant women in Dhaka city. BMC Women Health 2015; 15: 77.
[2] Nigar A, Ahmad A. Prevalence of anemia in pregnancy at booking: a retrospective study at a tertiary care centre in Lucknow India. Int J Reproduc Contracep Obstet Gynecol.2020; 9 (11): 4586
[3] Ratre BK, Patel NP, Patel U, Jain R, et al - clinical and Epidemiological profile of anemia in central India. Int J Med Res Rev 2013; 2 (1); 45 - 52.
[4] Dr. Shriva Ganju. Maternal anemia, intra uterine growth restriction and neonatal outcomes. Int J Clin Obstet Gynaecol 2020: 4 (4): 152 - 155.
[5] Kalaivani K, Ramachandran P. Time trends in prevalence of anemia in pregnancy. Indian J Med Res.2018; 147 (3): 268 - 277.
[6] Balloch AJ, Cauchi MN. Reference ranges for hematology parameters in pregnancy derived from patient populations. Clin Lab Haematol 1993: 15: 7 - 14.
[7] Elstrott B, Khan L, Olson S, Raghunathan V, et al. The role of iron repletion in adult iron deficiency anemia and other diseases. Eur J Haematol. (2020) 104 (3): 153–61.
[8] AlemAZ, Efendi F, McKenna L, Felipe - DimogEB, et al. Prevalence and factors associated with anemia in women of reproductive age across low - and middle - income countries based on national data. Sci Rep. (2023) 13 (1): 20335.
[9] Celik Kavak E, Kavak SB. The association between anemia prevalence, maternal age and parity in term pregnancies in our city. Perinatal J 2017; 25 (1): 6 - 10.
[10] Bora R, Sable C, Wolfson J, Boro K, et al Prevalence of anemia in pregnant women and its effect on neonatal outcomes in Northeast India. J Maternal - Fetal Neonatal Med.2014; 27 (9): 887 - 91
[11] Zheng S. Retrospective analysis of clinical data of 883 cases of late - stage iron deficiency anemia in pregnant women. (master's thesis). Jilin University (2022).
[12] Chowdhury HA, Ahmed KR, Jebunessa F, Akter J, et al. Factors associated with maternal anaemia among pregnant women in Dhaka city. BMC Women's Health. (2015) 15: 77.
[13] Johnson A, Vaithilingan S, Avudaiappan SL. The interplay of hypertension and anemia on pregnancy outcomes. Cureus. (2023) 15 (10): e46390.
[14] Mulatie Z, Aynalem M, Getawa S. Hematological profiles of newborns of mothers with hypertensive disorders of pregnancy delivered at the university of Gondar comprehensive specialized hospital: a comparative cross - sectional study. BMC Pediatr. (2024) 24 (1): 17.
[15] Wang R, Xu S, Hao X, Jin X, Pan D, Xia H, Liao W, Yang L and Wang S (2025) Anemia during pregnancy and adverse pregnancy outcomes: a systematic review and meta - analysis of cohort studies. Front. Glob. Womens Health 6: 1502585.
[16] Sharma AJ, Ford ND, Bulkley JE, Jenkins LM, Vesco KK, Williams AM. Use of the electronic health record to assess prevalence of Anemia and iron deficiency in pregnancy. JNutr. (2021) 151 (11): 3588–95.
[17] Rukuni R, Bhattacharya S, Murphy MF, Roberts D, Stanworth SJ, Knight M. Maternal and neonatal outcomes of antenatal anemia in a Scottish population: a retrospective cohort study. Acta Obstet Gynecol Scand. (2017) 95 (5): 555–64.
[18] Tai W, Ma J. The influence of pregnancy anemia on pregnancy outcomes. JLogistics Support Coll CAPF (Med Edit). (2018) 09: 765–8.