Original Research Article

Maternal and Perinatal Outcome in Anaemia Complicating Pregnancy

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Abstract

Background: Anaemia in pregnancy is one of the most common problems faced by obstetricians, especially in developing countries. It is frequently severe and contributes to maternal mortality and reproductive health morbidity. This study was done with the objective to find out the maternal and perinatal outcome in anaemia complicating pregnancy.**Material & Methods:** This was a prospective study which was conducted in the department of Obstetrics and Gynaecology. J K Lon Mother and Child Hospital, Kota from April 2019 to March 2020 to find out the effect of moderate, severe and very severe anaemia on maternal and foetal morbidity and mortality. After applying the inclusion and exclusion criteria, 400 patients were included in this study.**Results:** Iron deficiency anaemia was found to be the most common type of anaemia in pregnant women. Adverse maternal outcome was observed in the form of high incidence of preterm delivery (34.75 %), Congestive cardiac failure (6.75%), atonic PPH (2%), maternal infections and maternal mortality. Adverse perinatal outcome includes high incidence of low birth weight (47.13%), NICU admission (24.44%), jaundice (20.70%), IUGR (15.96%) and perinatal mortality. Lower the haemoglobin values, higher was the incidence of complications in both mother and neonate.**Conclusion:** Maternal anaemia is very high in the region in and around Kota. Regular antenatal checkups and appropriate intervention at the right time can prevent anaemia and also improve the fetomaternal outcome of pregnant mothers.

Keywords: Anaemia, haemoglobin, atonic PPH, IUGR, Congestive cardiac failure

Introduction

Anaemia is a major public health problem worldwide. It is the commonest haematological disorder in pregnancy especially in developing countries. WHO has defined anaemia in pregnancy as haemoglobin concentration less than 11g/dL and haematocrit <33%[1].Global prevalence of anaemia during pregnancy is estimated by WHO to be 47.4%. According to the recent WHO figures, India is included in the list of countries with high prevalence of anaemia in pregnant women (>40%)[2].Nutritional Iron Deficiency, accounting for more than half the cases in non-malarial areas, is the commonest cause of anaemia during pregnancy[3,4]. Iron deficiency starts in childhood, worsens in adolescence and gets aggravated in pregnancy. Thus, this is one of the major challenges an obstetrician faces in his/her career. In India, it is frequently severe and contributes to maternal mortality and reproductive health morbidity. Anaemia is associated with 22% maternal death around the world[5].The worldwide maternal mortality is estimated to be 239 per 100, 000 live birth (WHO-2015). Most of these occur in developing countries and the risk of dying in pregnancy and childbirth is 50 – 100 times greater than that of women in the developed countries. These large differences in risk are primarily due to the differences in available obstetric care for women living in areas with inadequate antenatal and delivery care facilities[6]. Anaemia was the direct cause of maternal deaths in 3.7% of cases in Africa and 12.8% of cases in Asia[7]. Globally, Iron Deficiency Anaemia (IDA) is considered directly (20%) and indirectly (50%) responsible for maternal death and fetomaternal morbidity[8].The aim of this study is to find out the maternal and perinatal outcome in anaemia complicating pregnancy.

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Material & Methods

This was a prospective study conducted in patients who were admitted in J K Lon Mother and Child Hospital from the month of April 2019 till March 2020. Patients of all three trimesters, with moderate, severe and very severe anaemia were included in the study. Patients with mild anaemia and patients with low haemoglobin levels whose pregnancy ended in abortion or turned out to be a molar pregnancy were excluded from the study. Out of all the anaemic patients, 400 patients with moderate to severe anaemia and 401 babies (including one twin delivery) were included in this study. ICMR classification was used for grading of anaemia.

Mild anaemia had Hb - 10-10.9g/dL
Moderate anaemia had Hb - 7- 9.9g/dL
Severe anaemia had Hb - 4-6.9g/dL
Very severe anaemia had Hb- <4g/dL.

Patients included in the study were investigated for haematocrit values, PBF, stool examination, complete urine examination. Special investigations such as X-ray chest and ECG were done wherever required. All patients were studied in detail including their literacy, socioeconomic status, occupation, parity, interval between conception, history of abortions, MTP and outcome of previous pregnancy. Present pregnancy details including number of antenatal visits, ill health, chronic infection or infestation any time during pregnancy were studied. Mode of interference if done were studied. Intrapartum, postpartum and puerperal complications were noted.

Neonatal outcome was studied by detail neonatal examination at birth and during hospital stay. Maternal and fetal morbidity and mortality were also noted.

Results

12,088 antenatal patients were admitted in J K Lon Mother and Child Hospital in toto during our study period. Of these, 7115 patients were found to be anaemic. Thus, the incidence of anaemia was found to be 58.86 % in our hospital, which was quite high. Maximum number of these patients were mildly anaemic. 400 patients had moderate to severe anaemia and were included in this study. Out of these 400 patients, 79.75 % (319) of them were moderately anaemic, 16.25 % (65) of them were severely anaemic and 4 % (16) of them were very severely anaemic (Table 1). Most of them belonged to the age group of 26-30 years.

Table 1: Distribution of cases according to haemoglobin among patients of various age group

Age (Yrs)	Haemoglobin (gm/ dL)			Total Cases
	7- 9.9	4- 6.9	<4	
≤20	15	5	1	21 (5.25%)
21-25	103	17	1	124 (31%)
26-30	123	26	4	153 (38.25%)
≥30	78	17	7	102 (25.50%)
TOTAL	319 (79.75%)	65(16.25%)	16(4%)	400(100%)

Adverse maternal outcome was observed in the form of preterm delivery in 34.75% of cases, congestive cardiac failure (CCF) in 6.75 % of cases, atonic PPH in 2% cases, maternal mortality and infections in 1.5% of the cases and pulmonary thromboembolism in 0.5% of the cases (Table 2). Out of 27 patients who had CCF, 23 of them had compensated failure whereas 4 of them had decompensated failure. Out of 6 cases of maternal mortality, 4 patients expired due to decompensated heart failure and the remaining two patients expired due to pulmonary thromboembolism. It was also found that anaemic mothers were also prone for infections in the form of puerperal sepsis, wound gaping, lower respiratory tract infections and urinary tract infections. Thus, in this study, preterm delivery was found to be the most common maternal complication in anaemic mothers.

Table 2:Distribution of cases according to Adverse Maternal Outcomes among anaemic mothers

Maternal Outcomes	No. of Patients	Percentage %
Preterm Delivery	139	34.75
Congestive Cardiac Failure (CCF) Compensated CCF Decompensated CCF	27 23 4	6.75
Atonic PPH	8	2
Infections (Puerperal sepsis, Wound Gaping, LRTI, UTI)	6	1.5
Maternal Mortality	6	1.5
Pulmonary Thromboembolism	2	0.5

Adverse foetal outcomes were observed in the form of low birth weight (47.13%), NICU admissions in 24.44% babies, jaundice in 20.70 % of the babies, IUGR in 15.96% of the babies, seizure and hypoxic ischaemic encephalopathy in 2% of them and ARDS in 1.5% of the babies. 4% of the babies died in utero (Table 3). Thus, low birth weight was found to be the most common adverse foetal outcome in anaemic mothers according to this study.

Table 3: Adverse Foetal Outcomes in newborns of anaemic mothers

Foetal Outcomes	No. of Newborns	Percentage %
Low Birth Weight	189	47.13
NICU	98	24.44
Jaundice	83	20.70
IUGR	64	15.96
IUD	16	4
Seizure, HIE	8	2
ARDS	6	1.5

It was observed from this study that there were 17 cases of perinatal mortality (4.25%). Out of them, 7 (43.75%) belonged to the category of very severe anaemia. This shows that lower the haemoglobin, higher is the chances of perinatal mortality in the newborns (Table 4).

Table 4: Perinatal mortality among newborns of anaemic mothers

	Haemoglobin (gm %)			Total
	<4	4- 6.9	7-9.9	
Total no of patients	16	65	319	400
Perinatal mortality	7	6	4	17
Percentage (%)	43.75	9.23	1.25	4.25

Discussion

Anaemia is one of the most prevalent issues in pregnant women in developing countries like India. The prevalence of anaemia during pregnancy varies considerably because of differences in socioeconomic conditions, lifestyles, and health-seeking behaviours across different cultures[9]. In this study, out of the 400 patients, 79.75 % (319) of them were moderately anaemic, 16.25 % (65) of them were severely anaemic and 4 % (16) of them were very severely anaemic. Majority of anaemic patients in the study belonged to the age group 26-30 years and 21-25 years. This was comparable to the result of study done by Agarwal KN et al[10]but was in contrast to the study done by Mangla et al[11] where they found that the severity of anaemia was higher in women below 19 years or more than 30 years of age . It was observed from this study that 34.91% (88 patients) of all the anaemic mothers went into preterm delivery. Similar result was seen in the study published by S-W Yi et al in

European Journal Of Clinical nutrition, which concluded that moderate to severe anaemia before pregnancy was associated with preterm birth[12]. Similarly, ShobooRahmati et al did a systematic review and meta-analysis of the relation between maternal anaemia during pregnancy with preterm birth and found that there was a significant relationship between maternal anaemia during pregnancy and premature birth (1.56 [95% CI: 1.25-1.95]). But this relationship was found significant in first trimester and not significant in second and third trimester[13].It was observed that, lower the haemoglobin, higher is the risk of heart failure. Out of 400 anaemic patients, heart failure was seen in 27 patients (6.75%). Patients with moderate anaemia did not have heart failure. But, out of the 16 patients with very severe anaemia (Hb<4 gm%), 9 of them were in heart failure (56.25%). Out of these, 6 patients had compensated heart failure whereas the remaining 3 patients had decompensated heart failure. This result was comparable to the study done by Gupta N et al which concluded that with the increase in the degree of anaemia, susceptibility to heart failure increases[14].It was observed that lower the haemoglobin level in pregnant woman, higher is the risk of atonic PPH. Out of all the anaemic patients, maximum percentage of atonic PPH occurred in patients with very severe anaemia. 18.75% of the patients (3 out of 16 patients) with Hb less than 4 gm % had atonic PPH compared to 0.94% of patients (3 out of 319 patients) with moderate anaemia and 3.08 % of patients (2 out of 65 patients) with severe anaemia. This was similar to the study conducted by Kaima A. Frass in general hospital in Yemen in which they concluded that there was strong correlation between low Hb levels and postpartum blood loss and hence their study supported the association between Hb<10 gm% and PPH[15].This study was also comparable to the study done by Kavle J A et al in Tanzania, where they found a strong association between moderate-to-severe anaemia at 28 weeks gestation (on average) and greater severity of blood loss at delivery and postpartum[16].In this study, the maternal mortality rate was found to be higher in pregnant females with very severe anaemia. 5 out of 16 patients (31.25 %) who had very severe anaemia had maternal mortality. Perinatal mortality was found to be higher in very severely anaemic mothers (43.75%). Similar result was found in the study conducted by Ashram Khatana et al[6] where perinatal mortality and maternal mortality in severe anaemia were found to be 42% and 16% respectively. In this study, it was found that newborns, whose mother were very severely anaemic, had high incidence of NICU admission compared to those mothers who had moderate anaemia. Fetal outcome of this study was compared with the study by Ren et al[17]and Gupta N et al[14], which showed increased risk of low birth weight, preterm birth and intrauterine growth restriction in patients with low haemoglobin concentration. Similarly, Kidanto et al reported increased incidence of preterm and intra uterine growth restriction with increased degree of severity of anaemia and the result is similar to this study[18]

Conclusion

It can be concluded from this study that the incidence of anaemia is very high in the region in and around Kota. Nutritional anaemia is one of the most important cause for anaemia in pregnant women. Low socioeconomic state, higher parity, unawareness regarding the need of regular and early antenatal care and inadequate diet; all has contributed to the development of anaemia in these patients. Lower the haemoglobin, higher was the incidence of maternal mortality and morbidity including delayed wound healing, sepsis, atonic PPH. CCF and pulmonary thromboembolism were found to be the cause of mortality in mothers with severe anaemia in this study. This study clearly shows that lower the haemoglobin, higher is the incidence of low birth weight, preterm labour, NICU admission of newborn and perinatal mortality. Hence, if adequate measures are taken to improve the maternal nutrition status right from the pre pregnant state and if the supplementation of essential haemopoietic factor is started at the right time, it can at least minimize the severity of anaemia if not completely prevent it. Anaemia is preventable cause of death by special emphasis on prior antenatal visits, early diagnosis and targeted treatment as birth preparedness, skilled management of severe grades of anaemia detected late in pregnancy through blood transfusion and parenteral iron therapy so that these become the hallmark of good obstetric practice and result in appreciable decrease in maternal and perinatal mortality rates in hospitals. Health education to improve the utilisation of available facilities and improvement in health care delivery system to cater to the needy, right at their doorsteps might thus go a long way in reducing adverse obstetric outcomes associated with maternal anaemia.

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Reference

1. Tabrizi FM, Barjasteh S. Maternal hemoglobin levels during pregnancy and their association with birth weight of neonates. Iranian journal of pediatrichematology and oncology. 2015; 5(4):211.
2. De Benoist B, Cogswell M, Egli I, McLean E. Worldwide prevalence of anaemia 1993-2005; WHO Global Database of anaemia.
3. Who U. Unu. Iron deficiency anaemia: assessment, prevention and control, a guide for programme managers. Geneva: World Health Organization. 2001, 1-14.
4. Murphy JF. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization,2011(WHO/NMH/NHD/MNM/11.1;http://www. who.int/vmnis/indicators/haemoglobin. pdf, accessed 1 December 2012). 4. International Anemia Consultative Group. Report of the 2001 International Anemia Consultative Group Symposium. Why is iron important and what to do about it: a new perspective. Washington, DC, INACG Secretariat, 2002: 1-50
5. Stoltzfus RJ, Mullany L, Black RE. Iron deficiency and global burden of disease. Comparative Quantification of Health Risks: The Global and Regional Burden of Disease due to 25 Selected Major Risk Factors, 2002.
6. Khatana A, Yadav K. Study of fetomaternal outcome in patients of moderate and severe anaemia in> 28 week pregnancy. J Med SciClin Res. 2017;5:25071-6.
7. Khan KS. Wojdyla D, Say L, Gulmezoglu AM, Van Look PF. WHO analysis of cause of maternal death: a systematic review. Lancet. 2006;367(9516):1066-74.
8. Ezzati M, López AD, Rodgers A, Vander Hoorn S, Murray CJ. Comparative Risk Assessment Collaborting Group. Selected major risk factors and global and regional burden of disease. Lancet. 2002;360:1342-70.
9. Breymann C, Visca E, Huch R, Huch A. Efficacy and safety of intravenously administered iron sucrose with and without adjuvant recombinant human erythropoietin for the treatment of resistant iron-deficiency anemia during pregnancy. American journal of obstetrics and gynecology. 2001;184(4):662-7.
10. Agarwal KN, Agarwal DK, Sharma A, Sharma K, Prasad K, Kalita MC, Khetarpaul N, Kapoor AC, Vijayalekshmi L, Govilla AK, Panda SM. Prevalence of anaemia in pregnant & lactating women in India. Indian journal of medical research. 2006;124(2):173.
11. Mangla M, Singla D. Prevalence of anaemia among pregnant women in rural India: a longitudinal observational study. Int J Reprod Contracept Obstet Gynecol. 2016;5(10):3500-5.
12. Yi SW, Han YJ, Ohrr H. Anemia before pregnancy and risk of preterm birth, low birth weight and small-for-gestational-age

birth in Korean women. European journal of clinical nutrition. 2013;67(4):337-42.
13. Rahmati S, Delpishe A, Azami M, Hafezi Ahmadi MR, Sayehmiri K. Maternal Anemia during pregnancy and infant low birth weight: A systematic review and Meta-analysis. International Journal of Reproductive BioMedicine. 2017; 15(3):125-34.
14. Gupta N, Gupta S, Lalchandani A, Diwedi S, Singh J. Relationship of degree of anemia as direct or indirect causes of heart failure and its impact on maternal and fetal outcome. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2017;3(4):982-5.
15. Frass KA. Postpartum hemorrhage is related to the hemoglobin levels at labor: Observational study. Alexandria Journal of Medicine. 2015;51(4):333-7.
16. Kavle JA, Stoltzfus RJ, Witter F, Tielsch JM, Khalfan SS, Caulfield LE. Association between anaemia during pregnancy and blood loss at and after delivery among women with vaginal births in Pemba Island, Zanzibar, Tanzania. Journal of health, population, and nutrition. 2008;26(2):232.
17. Ren A, Wang J, Ye RW, Li S, Liu JM, Li Z. Low first-trimester hemoglobin and low birth weight, preterm birth and small for gestational age newborns. International Journal of Gynecology & Obstetrics. 2007;98(2):124-8.
18. Kidanto HL, Mogren I, Lindmark G, Massawe S, Nystrom L. Risks for preterm delivery and low birth weight are independently increased by severity of maternal anaemia. SAMJ: South African Medical Journal. 2009;99(2):98-102.

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