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Original Article

Feto-maternal Outcome in 3rd Trimester Pregnant Patients with Severe Anaemia and Associated Risk Factors

Humaira Tabasum, Huziafa Gull, Shagufta Rather

Postgraduate Scholar, Department of Obstetrics and Gynaecology, Government Medical College, Srinagar, Jammu and Kashmir, India

Abstract

Background: The global prevalence of anemia during pregnancy is estimated by World Health Organisation to be 47.4%. The relative risk of maternal mortality associated with moderate anemia was 1.35% and for severe anemia was 3.51%. The maternal mortality risk increases 8–10 fold when Hb falls <5 g/dL. The prevalence of anemia among all age groups is high in India. Every second woman is anemic (55%).

Objectives: To assess feto-maternal outcome in 3rd trimester pregnant patients with severe anaemia and associated risk factors.

Materials and Methods: A total of 400 pregnant patients in third trimester with severe anemia were enrolled for the study after obtaining the proper informed consent. The study population included all admitted pregnant women beyond 28 weeks with Hb between 4 and 6.9 g/dL. The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of Statistical Package for Social Sciences (SPSS) Version 20.0 (SPSS Inc., Chicago, Illinois, United States of America).

Results: Majority of study women were severely anaemic 188 (90.8%) while 19 (9.2%) had very severe anaemia. The most common age group affected was 30–34 years in 84 (40.6%) with a mean age of 28.6 ± 3.98 years. Inter pregnancy interval of <2 was seen in 113 (64.9%) patients while 62 (35.4%) had >2 years inter pregnancy interval. In first and second stage of labour maternal exhaustion was observed in 10 (4.8%) patients, 9 (4.3%) had congestive heart failure (CHF), 8 (3.9%) had precipitate labour and 6 (2.9%) experienced prolonged second stage. Primary postpartum hemorrhage was seen in 68 (32.9%) patients in the third stage of labour, CHF in 7 (3.4%) patients and retained placenta in 5 (2.4%) patients. The mode of delivery was normal vaginal delivery in 94 (45.4%) patients followed by caesarean section in 86 (41.5%) patients while 27 (13%) women having instrumental vaginal delivery.

Conclusion: Anemia control program should be executed more resourcefully in this vital segment of population.

Key words: Feto-maternal, Inter-pregnancy interval, Severe anemia

INTRODUCTION

The World Health Organisation (WHO) defined anemia in pregnancy as haemoglobin concentration of <11 g/dL.[1] Anemia is the commonest hematological disorder that occurs in pregnancy. The Centres for Disease Control recommends that haemoglobin in pregnant women should not be allowed to fall below 10.5 g/dL in the second trimester taking into account the physiological changes of pregnancy.[2] The global prevalence of anemia during pregnancy is estimated by WHO to be 47.4%.[3] According to recent analysis by WHO India is included in the list of countries with high prevalence of anemia in pregnant women (>40%).[3] The relative risk of maternal mortality associated with moderate anemia was 1.35% and for severe anemia was 3.51%.[4] The maternal mortality risk increases 8–10 fold when Hb falls <5 g/dL.[5] The prevalence of anemia among all age groups is high in India. Every second woman is anemic (55%).[6]

Margaret Balfour was credited as the first to draw the attention to anaemia in pregnancy in India.[7] The weight of evidence supports advisability of routine iron supplementation during pregnancy.[8] Absorption of

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Corresponding Author: Dr. Huziafa Gull, PG Scholar, Department of Obstetrics and Gynaecology, Government Medical College, Jammu and Kashmir, India.

exogenous iron is regulated by the state of body store. In women entering pregnancy with adequate iron stores, there is little absorption of iron in the first trimester. The stores are exhausted in late pregnancy due to increased demand, and accordingly the iron absorption increases from 7.2% in the first trimester to 66.1% in the third trimester.[9]

WHO recommends daily administration of 200 mg of ferrous sulfate (containing 60 mg of elemental iron) along with 400 μg of folic acid starting in second trimester of pregnancy. The National Nutritional Anemia Control Programme of India recommends 100 mg of elemental iron 500 μg of folic acid for prophylaxis for minimum of 100 days starting in second trimester and double this dose for the treatment i.e. 200 mg of elemental iron plus 1mg of folic acid.[6]

Aims and Objectives

- To study the fetomaternal outcome in pregnant patients in third trimester with severe anemia (Hb <7 g/dL)
- To determine the risk factors associated with severe anemia in third trimester patients.

MATERIALS AND METHODS

After obtaining the ethical clearance from the Institutional Ethical Committee, a prospective, cross sectional, observational study was conducted in Postgraduate Department of Obstetrics and Gynaecology at Government Lalla Ded hospital Srinagar over a period of 18 months. A total of 400 pregnant patients in third trimester with severe anemia were enrolled for the study after obtaining the proper informed consent. The study population included all admitted pregnant women beyond 28 weeks with Hb between 4 and 6.9 g/dL. The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of Statistical Package for Social Sciences (SPSS) Version 20.0 (SPSS Inc., Chicago, Illinois, United States of America). Continuous variables were expressed as Mean ± SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar and pie diagrams.

RESULTS

Majority of study women were severely anaemic 188 (90.8%) while 19 (9.2%) had very severe anaemia. The most common age group affected was 30–34 years in 84 (40.6%) patients followed by 25–29 years in 74 (35.7%) patients, 38 (18.4%) patients were 20–24 years while >35 years was the age of 11 (5.3%) patients. Mean age of the patients was 28.6 ± 3.98 years. 135 (65.2%) were multigravida, 40 (19.3%) were grand multi gravid a while 32 (15.5%) were primigravida. 135 (65.2%) patients belonged to joint family while 72 (34.8%) were from nuclear family.

Inter pregnancy interval of <2 was seen in 113 (64.9%) patients while 62 (35.4%) had >2 years inter pregnancy interval. Underlying comorbidities were seen in 49 patients including 26 (12.6%) hypertensives, 17 (8.2%) hypothyroids while 6 (2.9%) patients had SLE. Outcomes like preterm labour was seen in 59 (28.5%) patients followed by fetal growth restriction in 30 (14.5%) patients, placenta previa in 17 (8.2%) patients, abruption placenta was seen in 14 (6.8%) women, pre-eclampsia in 11 (5.3%) patients while 7 (3.4%) patients had CHF. In first and second stage of labour maternal exhaustion was observed in 10 (4.8%) patients, 9 (4.3%) had CHF, 8 (3.9%) had precipitate labour and 6 (2.9%) experienced prolonged second stage. Primary postpartum hemorrhage (PPH) was seen in 68 (32.9%) patients in the third stage of labour, CHF in 7 (3.4%) patients and retained placenta in 5 (2.4%) patients. The mode of delivery was normal vaginal delivery in 94 (45.4%) patients followed by caesarean section in 86 (41.5%) patients while 27 (13%) women having instrumental vaginal delivery.

During puerperium maternal outcomes include sepsis in 55 (26.6%) women, delayed lactation in 14 (6.8%) women, secondary PPH in 11 (5.3%) women, wound gaping in 6 (2.9%) patients and 4 (1.9%) women in intensive care admission. Neonatal intensive care (NICU) admission was observed in 65 (31.4%) women while intrauterine growth restriction was the final outcome in 30 (14.5%) patients. Need for blood transfusion was seen in 182 (87.9%) women during intrapartum period, 168 (81.2%) during antenatal period and 117 (56.5%) women during puerperium. Majority of women 187 (90.3%) had blood transfusion once, followed by twice in 148 (71.5%) women, 76 (36.7%) women needed it thrice while >3 blood transfusion was required in 28 (13.5%) women. Hemoglobin levels (g/dL) at hospital discharge were 7–8 g/dL in majority of patients 136 (65.7%). There were 37 (17.9%) patients having 6–7 g/dL while 34 (16.4%) had 8–9 g/dL of hemoglobin at discharge [Tables 1 and 2].

DISCUSSION

The prevalence of anaemia among pregnant women in a study by Tomar *et al*.,[10] was 82.9%, although similar to other studies like Toteja *et al*.,[11] 84.9%, Gautam *et al*.,[12] in 96.5%. Kapil and Sareen[13] found 78.8%. However, lower prevalence of anaemia was reported by Ritu and Pinky[14] observed it in 51.0%. Number of studies have been done

Table 1: Distribution of study patients as per anemia grading, age, gravida, type of family, inter pregnancy interval and iron/folic acid supplementation and obstetric outcome

Patient characteristics	Number	Percentage
Anemia Grade		
Severe anemia	188	90.8
Very severe anemia	19	9.2
Age distribution		
20–24	38	18.4
25–29	74	35.7
30–34	84	40.6
≥35	11	5.3
20–24	38	18.4
Mean±SD (Range)=28.6±3.98 (20–37 years)		
Gravida		
Primigravida	32	15.5
Multigravida	135	65.2
Grand multigravida	40	19.3
Type of family		
Nuclear family	72	34.8
Joint family	135	65.2
Inter pregnancy interval		
≤2 years	113	64.6
>2 years	62	35.4
Comorbid illnesses		
Hypertension	26	12.6
Hypothyroidism	17	8.2
Obstetric Outcome		
Placenta previa	17	8.2
Pre eclampsia	11	5.3
Fetal growth restriction	30	14.5
Premature rupture of membranes	14	6.8
Preterm labour	59	28.5
Congestive heart failure	7	3.4
Abruptio placenta	14	6.8

Table 2: Maternal outcome, fetal outcome and blood transfusion, number of blood transfusion and haemoglobin levels

Patient characteristics	Number	Percentage
Maternal outcome in 1st and 2nd stage of labour		
CHF	9	4.3
Maternal exhaustion	10	4.8
Prolonged second stage	6	2.9
Precipitate labour	8	3.9
Maternal outcome in 3rd stage of labour		
Primary PPH	68	32.9
CHF	7	3.4
Retained placenta	5	2.4
Mode of delivery		
Normal vaginal delivery	94	45.4
Instrumental vaginal delivery	27	13.0
Caesarean section	86	41.5
Maternal outcomes during puerperium		
Secondary PPH	11	5.3
Sepsis	55	26.6
Wound gaping	6	2.9
ICU admission	4	1.9
Delayed lactation	14	6.8
Fetal outcome		
IUGR (Low birth weight)	30	14.5
NICU admissions	65	31.4
IUD (still birth)	17	8.2
Blood transfusion		
During antenatal period*	168	81.2
During intrapartum period	182	87.9
During puerperium	117	56.5
No. of Transfusions		
1	187	90.3
2	148	71.5
3	76	36.7
>3	28	13.5
Haemoglobin Levels		
6–7	37	17.9
7–8	136	65.7
8–9	34	16.4

*Third trimester. NICU: Neonatal intensive care, ICU: Intensive care, PPH: Postpartum hemorrhage

on anemia in pregnancy worldwide. The aim of this study is to determine the risk factors associated with severe anemia in third trimester pregnant patients in our set up and its effect on feto-maternal outcome. In our study 207 Kashmiri pregnant women in their 3rd trimester with severe anemia admitted in our hospital were taken. Majority of study women were severely anemic 188 (90.8%) while 19 (9.2%) had very severe anemia. Severity of anemia was also reported in 42.7% by Nonterah *et al*.[15]

In our study, most common age group affected was 30–34 years in 84 (40.6%) patients followed by 25–29 years in 74 (35.7%) patients, 38 (18.4%) patients were 20–24 years while >35 years was the age of 11 (5.3%) patients. Mean age of the patients was 28.6 ± 3.98 years with a range of 20–37 years. This is in agreement with previous studies, Nonterah *et al*.,[15] also confirmed that most common age group affected was 20–34 years in 80.2% (n = 406), 35–49 years in 13.2% (n = 67) while 6.6 (n = 33) patients age was <20 years. Mirzaie *et al*.,[16] in their study found 20–29 years as the most common age group affected in 62.7% followed by 28.9% patients in the age group of 30–39 years. Tomar *et al*.,[10] also confirmed that most common age group affected with anaemia was 22–25 years (44.7%) followed by 44.7% women who belonged to 18–21 years. Shridevi[17] evaluated the prevalence of anemia in 600 women in which majority i.e. 58.3% (n = 350) belonged to 20–25 years, 20.8% (n = 125) were aged between 26 and 30 years, 12.5% (n = 75) were aged 31–35 years while 8.3% (n = 50) aged between 18 and 19 years.

In our study, the risk factors encountered were dietary habits, parity, type of family, interpregnancy interval, iron folic acid supplementation, socio-economic status and education level. Low dietary intake of iron was seen in (96.1%), multi parity (65.2%), joint family type (65.2%), short inter-pregnancy interval <2 years (64.9%), non-consumption of iron/foic acid 64.7%, low socioeconomic status (63.8%), illiterates combining 35.7%.

139 (67.1%) patients belonged to rural areas while 68 (32.9%) were from urban areas. Similar results were also reported in literature 72.4% (Nigar and Ahmad, 2014)[18] and 61.8%, (Tulu *et al*., 2019).[19]

In our study Multigravida women were 65.2% which corresponds well with a study done by Ali *et al*.,[20] (75.2%). Joint family status is the risk factor in severe anaemia in our study and corresponds well with the literature 66.6% (Shridevi, 2018),[17] 46.9% (Tomar *et al*.,[10] 24.6% (Sumitra and Kumar, 2017),[21] short inter-pregnancy interval <2 years as the causative factor of severe anaemia confirmed by literature (Tomar *et al*., 2017[10]; Okube *et al*., 2016).[22] Iron/Folic acid supplementation was not taken by 21.9% followed by 44.70% women who took the iron/folic acid tablets for <2 months only (Tomar *et al*., 2017).[10] Lower middle class socioeconomic status is another risk factor for severe anaemia as is seen by Tomar *et al*.,[10] As in other studies, severity of anaemia was inversely related to educational status,[12,23,24] socio-economic status.[12]

A study by Chowdhury *et al*.[25] in Bangladesh also found that education of women was significantly associated with anemia in pregnancy, whereas in a study by Singh *et al*.[26] observed an insignificant association between anemia and parity. In a similar study conducted by Obse *et al*.[27] in Ethiopia parity >5 has a significant association with anemia. In a similar study conducted by Bekele *et al*.[28] Ethiopia birth interval was significantly associated with anemia with an odds ratio of 3.

Underlying comorbidities were seen in 49 patients including 26 (12.6%) hypertensives, 17 (8.2%) hypothyroids while 6 (2.9%) patients had SLE. It closely correlated with a study conducted by Turner *et al*.,[29] where the prevalence of anemia in subjects with hypertension, diabetes, and hypothyroidism was 8.1%, 4.1%, and 3%, respectively.

Anemia in pregnancy has bearing on fetal outcome as well.in our study 65 (31.4%) babies were admitted in NICU mostly because of prematurity, 30 (14.5%) were low birth weight (LBW) and 17 (8.2%) were still births. There is a substantial amount of evidence showing that maternal iron deficiency anemia in early pregnancy can result in LBW subsequent to preterm delivery (Abu-Ouf, 2015).[30] A study by Sangeetha and Pushpalatha[31] in Bangalore reported highest (63%) prevalence of LBW among pregnant women, whereas Marahatta observed least (16.6%) (Marahatta, 2007[32] and Sangeetha and Pushpalatha[31] The other fetal complications among pregnant women in the present study include premature delivery (0.2%) and birth asphyxia (0.5%).

Maternal anemia is considered as risk factor for poor pregnancy outcomes and it threatens the life of fetus. Available data from India indicate that maternal morbidity rates are higher in anemic women (Kalaivani, 2009;[5] Ivan and Mangaiarkkarasi, 2013;[33] Singh *et al*.,).[34] About 35.6% of the women had maternal and fetal morbidity lower segment cesarean section (LSCS), abortions, obstructed labor, PPH, preeclampsia, prolonged labor, LBW, and birth asphyxia were commonly seen among anemic pregnant women.

Suryanarayana *et al*.,[35] did a study in which majority of the fetal and maternal complicationswere observed in anemic women. Out of 15 participants who underwent LSCS and 60% were anemic. Similarly, 80% of participants who had abortions, 40% of obstructed labor, 86% of PPH, 71.4% of preeclampsia, and all the women with prolonged labor were anemic. Around 25% of women delivered low birth babies, 57% of LBW babies, 69% of abortions/stillbirths, and all the newborn with birth asphyxia occurred in mothers who were anemic.

Studies in India demonstrated that the high proportion maternal deaths are due to anemia in pregnant women (Iyengar, 2012).[36]

Studies have reported 100% women in severe anemia group received blood transfusion (Kaul *et al*., 2017;[37] Batar *et al*., 2015;[38] Yadav, 2018).[39]

Hinderaker SG *et al*., (2001)[40] has reported an incidence of pre-eclampsia and eclampsia as 8.2% and 3.3% respectively in severe anemia. Other studies have reported Pre eclampsia in 20%, 22.3% anemic women respectively (Yadav, 2018[39] and Batar *et al*., 2015).[38]

The susceptibility of women with severe anaemia to preeclampsia could be explained by a deficiency of micronutrients and antioxidants. A reduction in serum levels of calcium, magnesium and zinc during pregnancy might be possible contributors to the development of preeclampsia (Singla *et al*., 1997).[41]

Besides pre-eclampsia, the effect of maternal anaemia on intrauterine growth is attributed to chronic deprivation of oxygen to the developing fetus. Severe maternal anaemia, if present from early gestation, may be associated with reduced placental weight and surface area of peripheral villi which, is a determinant of nutrient transport from the mother to the fetus (Kozuki *et al*., 2012).[42] FGR was seen in 10% cases in our study, however, Yadav, 2018)[39] has reported its incidence as 20%.

NICU admissions were significantly more in group A compared to group B (36% vs. 8%) in a study by Singh *et al*.,[43] Batar *et al*., (2015)[38] also has observed high NICU

admissions of 43.08% in babies of anemic women. Thus, a higher rate of neonatal complications has been observed in neonates of severely anemic women probably due to chronic deprivation of oxygen from maternal blood.

CONCLUSION

Socioeconomic determinants constitute most of the anemia cases and, hence, should be considered as major risk factors of anemia in women attending for delivery. To improve maternal and fetal outcome, it is recommended that the primary health care has to be strengthened, prevention, early diagnosis, and treatment of anemia in pregnancy to be given priority. Prevalence of anemia among pregnant women was high, spacing between pregnancies will have a significant impact on hemoglobin status of pregnant women. Iron-folic acid supplementation is available under the national health program, it is important to consider and address other risk factors when designing and implementing target interventions for anemia.

They concluded that anemia control program should be executed more resourcefully in this vital segment of population. Awareness of above said factors is more important to prevent anemia rather than early diagnosis and treatment.

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