Original Research Article

Moderate to severe maternal anaemia in pregnancy and its impact on perinatal outcome in tertiary care hospital

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ABSTRACT

Background: Anaemia is the commonest medical disorder in pregnancy and has a varied prevalence, etiology and degree of severity in different populations. The purpose of this study was to evaluate the prevalence of maternal anaemia in pregnancy and its impact on perinatal outcome.
Methods: This was a prospective observational study conducted in department of obstetrics and gynecology JLN Hospital Ajmer, Rajasthan, India from October 2015 to December 2016. Total 325 pregnant women were included in the study who fulfilled the inclusion criteria and found to have moderate to severe anaemia.
Results: Prevalence of anaemia in pregnancy was 80% in present study. Perinatal mortality was 13.3% in moderate anaemia and in severe anaemia 42%. In present study maximum 56% of cases were in the age group of 20-25 years, and maximum number of cases were primigravida (33.84%). Out of 225 cases of moderate anaemia only 50 cases (22.22%) had antenatal check-up once or twice. Out of 225 cases of moderate anaemia, 66.66% cases were rural and 33.33% cases were of urban group. Fetal outcome in present study was in form of 49.23% premature birth with 33.12% perinatal mortality.
Conclusions: Maternal anaemia in pregnancy is associated with illiteracy, low socioeconomic status, multiparity, inadequate antenatal care and rural geographic area. Severe anaemia was associated with high perinatal mortality.

Keywords: Haemoglobin, Maternal anaemia, Perinatal outcome, Severe anaemia

INTRODUCTION

Anaemia is the commonest medical disorder in pregnancy and has a varied prevalence, etiology and degree of severity in different populations being more common in non-industrial countries.[1] World Health Organization definition for diagnosis of anaemia in pregnancy is a haemoglobin concentration of less than 11 g/dl (7.5 mmol/l) and a hematocrit of less than 0.33.[2] The World Health Organization uses the following haemoglobin cut offs to define anaemia in pregnant women. 90 to 109 g/l for mild anaemia, 70 to 89 g/l for moderate anaemia and lower than 70 g/l for severe anaemia. In India, more than 90% of anaemia cases are estimated to be due to iron deficiency because high iron requirement during pregnancy are not easily fulfilled by dietary intake especially when iron bio-availability is poor.[3] Estimates from the World Health Organization report that from 35% to 75% (56% on an average) of pregnant women in developing countries and 18% of women from industrialized countries are anaemic.[4] The prevalence of anaemia is high in central Asia and reported as 61-91% in India.[5,6]

Maternal anaemia in pregnancy is commonly considered as risk factor for poor pregnancy outcome and can

threaten the life of mother and fetus.[7] Severe maternal anaemia has poor outcome of neonates in the form of low birth weight, prematurity, IUGR, IUD and birth asphyxia.[8] However, the extent to which the maternal haemoglobin concentration affects the fetal outcome is still uncertain. Some studies have shown a strong association between low haemoglobin level before delivery and an adverse outcome, while other studies have not shown significant association. Thus, the purpose of this study was to evaluate the prevalence of maternal anaemia in pregnancy and its impact on perinatal outcome.

METHODS

This was a hospital based prospective observational study conducted in department of obstetrics and gynecology JLN Hospital Ajmer, Rajasthan, India from October 2015 to December 2016. Minimum sample size of 261 was calculated at 95% confidence interval, 80% study power, alfa error 0.05% with occurrence of perinatal mortality 22.2% in moderate and severe maternal anaemia as per reference article.[9]

Study included all the women with gestational age between 20-41 weeks who admitted in delivery room with anaemia and singleton pregnancy. Women with multiple pregnancy, thalassemia minor, history of addiction, TORCH and malaria infection, past history of preterm delivery, complications, or medical illness except anaemia, were excluded from the study. 1000 pregnant women were admitted in labour room had undergone haemoglobin estimation and routine investigations. Total 325 pregnant women were included in study who fulfilled the inclusion criteria and found to have moderate to severe anaemia. Moderate anaemia had Hb 7-8.9 gm% and severe anaemia had Hb <7 gm%.

A predesigned proforma was used to obtain relevant information's. All cases were studied in full details regarding literacy, age residence, education, socioeconomic status, parity, interval between conception, history of abortions and outcome of previous pregnancy. Patient with moderate to severe anaemia were investigated for haematocrit value, peripheral blood film, serum iron, total iron binding capacity, stool examination, complete urine examination. Wherever required, special investigations such as x-ray chest, ECG and USG abdomen were done. Perinatal outcome was judged by detailed neonatal examination at birth and during hospital stay. Neonatal examination included weight, length, gestational age, assessment, intra uterine growth retardation, still birth and intra uterine death assessment.

Modified Kuppuswami's classification was used to classify in upper, middle and lower socioeconomic status. The study was conducted according to the guidelines and approved by institutional research review board. Written informed consent was taken from all patients at the time of enrolment.

Statistical analysis

Information of cases under study was arranged in systemic manner in MS-excel sheet. Appropriate statistical analysis was done using frequencies, cross tabulation and percentages. Conclusion was made as per the respective level of significance.

RESULTS

Out of 1000 cases admitted in labour room 325 cases had moderate to severe anaemia and they were studied to find out the prevalence of anaemia and perinatal outcome.

Table 1: Prevalence of anaemia in pregnancy.

Degree of anaemia	Number of cases	Percentage
No anaemia	200	20%
Mild	475	47.5%
Moderate	225	22.5%
Severe	100	10%
Total	1000	100%

Prevalence

In the present study 475 patients were found to have mild anaemia (Hb 9 -11%) which accounted for 47.5% of the total cases observed. 22.5% had moderate anaemia (Hb 7 - 8.9%). Severe anaemia (Hb <7 gm%) was observed in 10% of cases. So, overall prevalence of anaemia in pregnancy was 80% in present study (Table 1).

Table 2: Degree of anaemia and perinatal mortality.

Degree of anaemia	No. of cases (%)	Perinatal mortality No. of cases (%)
Moderate	225 (22.5%)	30 (13.3%)
Severe	100 (10%)	42 (42%)

Degree of anaemia

Perinatal mortality was 13.3% in moderate anaemia and very high in cases of severe anaemia 42% (Table 2).

Age

In present study maximum 56% of cases were in the age group of 20-25 years. 30.76% cases were in age group 26-30 years and 8.5% cases were above 30 years of age. Only 4.6% of cases were below 20 years of age. Perinatal mortality was maximum between 20-30 years of age (Table 3).

Parity

In the present study maximum number of cases were primigravida i.e. 33.84%, 25.53% cases were P1 and 24.00% cases were P2. Highest perinatal mortality was found in P6 or more; 75% (Table 3).

Table 3: Different factors of pregnant women affecting perinatal mortality.

Variables	No. of cases (%)		Perinatal mortality No. of cases (%)
Age (years)			
< 20	15 (4.6%)		4 (1.23%)
20-25	182 (56%)		29 (8.92%)
26-30	100 (30.76%)		29 (8.92%)
> 31	28 (8.5%)		10 (3.07%)
Parity			
P0-P2	269 (82.76%)		50 (15.38%)
P3-P5	52 (16.0%)		19 (5.84%)
> P6	4 (1.23%)		3 (0.92%)
Antenatal visit			
Moderate Anaemia	Yes	50 (22.22%)	3 (6%)
	No	175 (77.77%)	30 (17.14%)
Severe Anaemia	Yes	10 (10%)	2 (20%)
	No	90 (90%)	37 (41.11%)
Residence			
Moderate anaemia	Rural	150 (66.66%)	22 (14.66%)
	Urban	75 (33.33%)	8 (10.66%)
Severe anaemia	Rural	75 (75%)	33 (44%)
	Urban	25 (25%)	9 (36%)
Socioeconomic status			
Low	200 (61.53%)		54 (27%)
Lower middle	100 (30.76%)		16 (16%)
Upper middle	25 (7.69%)		2 (8%)
Educational status			
Illiterate	160 (49.23%)		48 (30%)
Primary	100 (30.76%)		20 (20%)
Middle	40 (12.30%)		3 (7.5%)
High school to graduation	25 (7.69%)		1 (4%)

Antenatal check-up

Out of 225 cases of moderate anaemia only 50 cases (22.22%) had antenatal check-up once or twice. 175 (77.77%) cases had no previous antenatal check-up. Out of 50 cases of moderate anaemia who had antenatal visits perinatal mortality was 6% while in 175 cases who had no antenatal visit perinatal mortality was 17.14%. Out of 100 cases of severe anaemia, 90% had no previous antenatal visit and 10% had one or two antenatal visit. Perinatal mortality was 20% in cases who had previous antenatal visit and 41.11% in cases who had no previous antenatal visit (Table 3).

Geographic distribution

Out of 225 cases of moderate anaemia, 66.66% cases were rural and 33.33% cases were of urban group. Perinatal mortality was 14.66% in rural group and 10.66% in urban group. In severe anaemia out of 100 cases 75% were rural and 25% were urban. Perinatal mortality was 44% in rural and 36% in urban population (Table 3).

Socioeconomic status

Out of 325 cases of anaemia 61.53% cases were of low socioeconomic class, 30.76% cases were of lower middle and only 7.69% cases were of upper middle class. Perinatal mortality was 27% in low class, 16% in lower middle class and 12% in upper middle class (Table 3).

Educational status

Out of 325 cases of anaemia 49.23% cases were illiterate, 30.76% cases had primary education. 12.30% cases had education up to VIII class and 7.69% cases had education up to graduation. Perinatal mortality was 30% in illiterate group as compared to 4% in literate or educated group (Table 3).

Type of anaemia

Out of 325 cases of moderate and severe anaemia peripheral blood film showed microcytic hypochromic anaemia in 180 cases (55.38%), dimorphic anaemia in 80 cases (24.61%), normocytic normochromic anaemia in 35 cases (10.76%), normocytic hypochromic anaemia in 27 cases (8.30%) and haemolytic anaemia in 3 cases (0.92%). Perinatal mortality was 17.5% in dimorphic, 25.55% in microcytic hypochromic, 17.14% in normocytic normochromic and 22.22% in normocytic hypochromic anaemia (Table 4).

Table 4: Perinatal mortality in association with type of anaemia.

Type of anaemia	No. of cases (%)	Perinatal mortality No. of cases (%)
Dimorphic anaemia	80 (24.61%)	14 (17.5%)
Microcytic hypochromic anaemia	180 (55.38%)	46 (25.55%)
Normocytic normochromic anaemia	35 (10.76%)	6 (17.14%)
Normocytic hypochromic anaemia	27 (8.30%)	6 (22.22%)
Haemolytic anaemia	3 (0.92%)	0 (0%)

Fetal outcome

Fetal outcome in present study was in form of 49.23% premature (gestation age <37 weeks) birth with 33.12% perinatal mortality. There was 21.53% of mature babies with normal birth weight with 7.14% perinatal mortality and 29.23% of mature with low birth weight babies (weight <2.5 kg) with 14.73% perinatal mortality (Table 5).

Table 5: Fetal outcome in anaemia patients.

New born baby	No. of cases (%)	Perinatal mortality No. of cases (%)
Mature with normal birth weight	70 (21.53%)	5 (7.14%)
Mature with low birth weight	95 (29.23%)	14 (14.73%)
Premature	160 (49.23%)	53 (33.12%)

DISCUSSION

Prevalence

In the present study mild anaemia accounted for 47.5% of the total cases, 22.5% had moderate anaemia and severe anaemia was observed in 10% of cases. So overall prevalence of anaemia in pregnancy was 80% in present study. Modok GC et al, observed prevalence of anaemia (81.5%) and moderate to severe anaemia in 12% cases.[10] Nair M et al, observed anaemia in (34.9%) cases with moderate anaemia 32.8% and severe anaemia 2.1%.[9] AL Mehaisen L et al, observed anaemia in (34.2%) case and moderate to severe anaemia 3%.[11] Lokare PO et al, studied anaemia in (87.2%) with moderate anaemia 54.5% and severe anaemia 7.9%.[12] Agrawal KN et al, also studied slightly higher prevalence (>90%).[13] A high prevalence of anaemia in pregnant women is multifactorial in origin. Often these factors interact and amplify each other. The single most important cause for the wide spread anaemia is inadequate iron intake in diet and coupled with poor bioavailability of iron because of low amount of ascorbic acid.

Degree of anaemia

Perinatal mortality was 13.3% in moderate anaemia and 42% in cases of severe anaemia. Donade U et al, found that incidence of perinatal death was 12.2% in moderate anaemia and 36% in severe anaemia which is comparable with this study.[14] Nair M et al, observed perinatal mortality 22.2% including 3.1% in moderate anaemia and 19.1% in severe anaemia. DasGupta S et al, observed severe anaemia was responsible for 13% perinatal mortality.[15]

Parity

In the present study maximum number of cases were p0 (33.84%), 25.53% cases were p1 and 24.00% cases were p2. Highest maternal and perinatal mortality was found in p6 or more; 75% each. Satyanarayan M et al, reported 28% cases of anaemia in 2nd and 3rd gravida each, 16% in primigravida and 10% in nulliparous women.[16] Rathee S et al, observed a higher incidence of severe anaemia in primipara than multipara being 28.33% and 17.76% respectively.[17] Repeated and closely spaced pregnancies, prolonged period of lactation and poor dietary habits are responsible for depleted iron reserves in the body with each successive pregnancy and this reflects as severe anaemia and high perinatal mortality.

Antenatal check-up

Out of 225 cases of moderate anaemia only 50 cases (22.22%) had antenatal check-up once twice. 175 (77.77%) cases had no previous antenatal check-up. Out of 50 cases of moderate anaemia who had antenatal visit perinatal mortality was 6% while in 175 cases who had no antenatal visit perinatal mortality was 17.14%. Out of 100 cases of severe anaemia, 90% had no previous antenatal visit and 10% had one or two antenatal visits. Perinatal mortality was 20% in cases who had previous antenatal visit and 41.11% in cases who had no previous antenatal visit. Dasgupta S et al, reported that severe anaemia accounted 13% of perinatal mortality about 85.9% of mothers did not receive adequate antenatal care services.

Geographic distribution

Out of 225 cases of moderate anaemia, 66.66% cases were rural and 33.33% cases were of urban group. Perinatal mortality was 14.66% in rural group and 10.66% in urban group. In severe anaemia out of 100 cases, 75% were rural and 25% were urban. Perinatal mortality was 44% in rural and 36% in urban population. Devi NB et al, reported anaemia in 53.55% in rural and 46.45% in urban population.[18] This is due to fact that diet in India is predominantly cereal based and iron absorption is very poor due to presence of iron inhibitors.

Socioeconomic status

Out of 325 cases of anaemia 61.53% cases were of low socioeconomic class, 30.76% cases were of lower middle and only 7.69% cases were of upper middle class. Perinatal mortality was 27% in low class, 16% in lower middle class and 12% in upper middle class. Rathee S et al, reported incidence of anaemia 94.11% lower class. Rangnakar et al, observed severe anaemia (67%) in lower class and (9%) in upper middle class.[19]

Educational status

Out of 325 cases of anaemia 49.23% cases were illiterate, 30.76% cases had primary education. 12.30% cases had education up to VIII class and 7.69% cases had education up to graduation. Perinatal mortality was 30% in illiterate group as compared to 4% in literate or educated group. Rathee S et al, studied (35.29%) illiterate, 51.76% had primary education, 11.76% had middle and 1.17% were matriculate.

Type of anaemia

Perinatal mortality was 17.5% in dimorphic, 25.55 in microcytic hypochromic, 17.14% in normocytic normochromic and 22.22% in normocytic hypochromic

anaemia. Satyanarayan M et al, observed microcytic hypochromic anaemia (68%), dimorphic anaemia (30%) and megaloblastic anaemia (2%). Sinha M et al, studied iron deficiency anaemia (65%), dimorphic anaemia (18.3%), haemolytic anaemia (11.6%) and megaloblastic anaemia (5%).[20]

Fetal outcome

Fetal outcome in present study was in form of premature 49.23% birth with 33.12% perinatal mortality. There was 21.53% of mature babies with normal birth weight with 7.14% perinatal mortality and 29.23% of mature with low birth weight babies with 14.73% perinatal mortality. Rangnakar AG et al, reported prematurity in severe anaemia (82.4%) and LBW babies (82.4%). Devi NB et al reported prematurity in (47.87%) and (12.77%) of mature with low birth weight babies. Nair M et al, reported low birth weight babies (29.2%) in moderate anaemia and (60%) in severe anaemia. Rathee S et al, observed low birth in (61.75%) cases. Stephan G et al, reported preterm 0.5% and low birth weight 3.6%.[21] This low occurrence of negative pregnancy outcome compared to other studies might have occurred due to loss to follow up and diabetes and pre-eclampsia were not included in study.

CONCLUSION

Maternal anaemia in pregnancy is associated with illiteracy, low socioeconomic status, multiparity, inadequate antenatal care and rural geographic area and play a significant role both in maternal and perinatal mortality. It has also been observed that severe anaemia was associated with high perinatal mortality. There is a need to educate and provide various health measures to rural illiterate and poor population so as to raise the health standard of villagers and thereby reduce the prevalence of anaemia and feto maternal morbidity and mortality. Knowledge about adverse effect of anaemia can be delivered through media, pamphlets and doctors will enable women to seek early antenatal check-ups. If adequate measures are taken to improve maternal nutrition status from early weeks of pregnancy and supplementation of essential factors can at least minimize the severity of anaemia and then it will help in reducing perinatal mortality.

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