

Original article:

Maternal outcome in pregnant women with anaemia

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Abstract:

Background: Anaemia in pregnancy is one of the most important and common public health problem not only in India but also in most of the South East Asian countries. Anaemia is the most common nutritional deficiency disorder in the world. There is predominance of iron deficiency anaemia (nutritional anaemia). In pregnancy, it is one of the leading causes responsible for maternal morbidity and mortality. **Objective:** To find out the maternal outcome in pregnant women with anaemia at MMIMSR during the study period with special reference to the severity of the disease. **Methods:** The study was conducted in Department of Obstetrics and Gynaecology, MMIMSR, Mullana, Ambala(India). The study was carried out between the period of October 2012 to September 2014. A total of 200 cases of moderate and severe anaemia were included in the study on the basis of simple random sampling method and 200 cases of non anaemic subjects were included to serve as controls for the anaemic group, during the study period. Hb gm/dl was taken as criteria for deciding anaemia cases and also to classify them according to the severity. Cases were classified according to WHO criteria. **Results:** Out of 200 cases of anaemia, 70% were moderately anaemic (Hb 7 – 9.9gm/dl) and 30% were severely anaemic (Hb < 7gm/dl). Microcytic hypochromic type of anaemia (82.5%) was more prevalent suggesting nutritional inadequacies as cause of anaemia. Higher incidence of preterm (17%), PPH (7.5%), maternal morbidity (14.5%) was found in anaemic group as compared to non anaemic controls. **Conclusion:** Anaemia in pregnancy has adverse maternal outcome in the form of maternal morbidity, preterm labour, and increased incidence of operative delivery.

Keywords: Anemia; Pregnancy; Microcytic hypochromic; Maternal outcome

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Introduction

Anaemia in pregnancy is one of the most important and common public health problems not only in India but also in most of the South East Asian countries. About 16% to 40% of maternal deaths occur due to anaemia. Anaemia also increases maternal morbidity significantly.

Most of the pregnant patients presenting to outpatient department have iron deficiency anaemia. Along with physiological causes, social causes are also

responsible for anaemia during pregnancy like early age at marriage, teenage pregnancy, ill spacing between two pregnancies and poor supplementation of iron, malnutrition, endemic diseases like malaria and worm infestations. Standards laid by WHO suggest haemoglobin below 11 gm/dl as anaemia. According to standards laid down, incidence of anaemia during pregnancy in India ranges from 65% to 75%¹.

The prevalence of anaemia all over the world is 51%

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and is as high as 87.5% amongst pregnant women in India.² Anaemia continues to take a heavy toll of maternal lives in India from direct as well as indirect deaths, from cardiac failure, haemorrhage, infections, pre-eclampsia, puerperal sepsis. According to the FOGSI – WHO study (1997), anaemia is responsible for 64.4% of maternal deaths in India.³ Anaemia, the most preventable cause of maternal mortality, should be eradicated from the female population in the coming years that will ensure better maternal and perinatal health, happy family and a healthy nation.

Aims and Objective

Aim

To study maternal outcome in cases of Moderate and Severe Anaemia.

Objective

Anaemia in pregnancy is one of the most important and common public health problem not only in India but also in most of the South East Asian countries. Anaemia is the most common nutritional deficiency disorder in the world. WHO has estimated that prevalence of anaemia in pregnant women is 14 per cent in developed and 51 per cent in developing countries and 65-75 percent in India.¹ About one third of the global population (over 2 billion) are anaemic.² India contributes to about 80 per cent of maternal deaths due to anaemia in South Asia.

The high prevalence of anaemia is recognized to be contributory to maternal mortality, under nutrition of the foetus and infant mortality.

Adverse effects of anaemia on the mother

The mother is at greater risk of death during the perinatal period. Anaemia is the major contributory or sole cause of death in 20-40% of cases, cardiac failure being a major cause of death.

During pregnancy

1. Pre-eclampsia (due to hypoproteinaemia).
2. Intercurrent infection (due to diminished resistance).
3. Cardiac failure (especially at 30-32 weeks).
4. Preterm labour

During labour

1. Uterine dysfunction (due to impaired myometrial contractility).
2. Postpartum haemorrhage (iron deficiency impairs myometrial contraction due to inhibition of cellular enzymes).
3. Cardiac failure (due to hypervolemia, myocardial depression).
4. Shock (inability to tolerate even average blood loss).
5. Abruptio placenta.

During puerperium

There is increased risk of:

1. Subinvolution
2. Puerperal sepsis
3. Failing lactation
4. Peripheral venous thrombosis
5. Pulmonary embolism
6. Cardiac failure

So, present study was carried out to observe the effects of anaemia on maternal outcome and its prevalence.

Material and Method

The present study was conducted in Department of Obstetrics and Gynaecology, MMIMSR, Mullana, Ambala. The study was carried out between the period of October 2012 to September 2014.

The objectives of the study were

- a. To find out the situation and causes of anaemia in pregnant women at MMIMSR during the study period with special reference to the severity of the disease.
- b. To find out the maternal outcome.

A total of 200 cases of moderate and severe anaemia were included in the study on the basis of simple random sampling method and 200 cases of non anaemic subjects were included to serve as controls for the anaemic group, during the study period.

Inclusion criteria

Hb gm/dl was taken as criteria for deciding anaemia cases and also to classify them according to the severity.

Antenatal women with moderate anaemia (Hb-7-9.9gm/dl)

Antenatal women with severe anaemia (Hb < 7gm/dl).

Antenatal women with moderate and severe anaemia otherwise having no other medical problem.

Exclusion criteria

Antenatal women with no anaemia (Hb \geq 11gm/dl)

Antenatal women with mild anaemia (Hb-10-10.9 gm/dl)

Antenatal cases with other associated diseases were excluded.

Cases of bad obstetric history for any other reason.

Methods

All study subjects were studied in full details with reference to age, literacy, socio economic status, diet, detailed obstetric and menstrual history. Present pregnancy details regarding the number of antenatal visits, ill health, chronic infection or infestation any time during pregnancy were studied.

Mode of delivery, intrapartum and postpartum

complications were studied.

Women were investigated for:-

Complete haemogram.

Urine Routine Examination and Microscopy:

Stool Routine Examination and Microscopy:

Peripheral Blood Smear for evidence malarial parasite.

Serum iron and serum total iron binding capacity to know the iron stores.

Serum Iron/Folate/Haemoglobin Electrophoresis (when required)

Any Other Investigations as and when required.

Only Hb was done in the control group.

All the study subjects were followed up till they were discharged from the hospital.

Present pregnancy details – parity, interval between conception, number of ANC visits, and any associated medical disorder were studied.

Mode of delivery and any operative interference if required were also studied. Intra partum, post partum and puerperal complications were studied.

Results

The study subjects were divided into two groups.

200 cases of moderate and severe anaemia

200 non anaemic controls

Table-1 Distribution of study subjects according to age

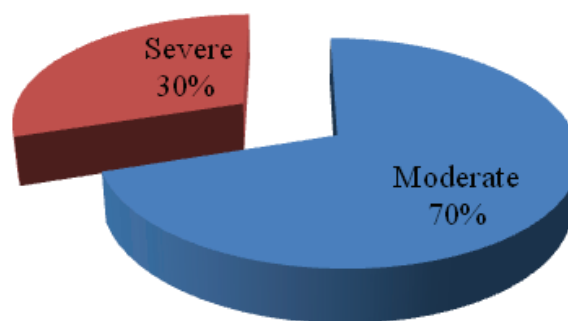
Age (years)	Cases		Controls	
	N=200	%	N=200	%
≤ 19 Yrs.	31	15.5	28	14
20-29 Yrs.	158	79	164	82
≥ 30 Yrs.	11	5.5	8	4
Total	200	100	200	100

CC = 0.061, P = 0.691 (NS)

Table - 2 Distribution of cases according to the severity of anaemia

Severity of anaemia	No. of cases (N=200)	%
Moderate	140	70
Severe	60	30
Total	200	100

Graph 1: Showing severity of anaemia



It is observed that out of 200 anaemia cases 70% were moderately anaemic and 30% were severely anaemic.

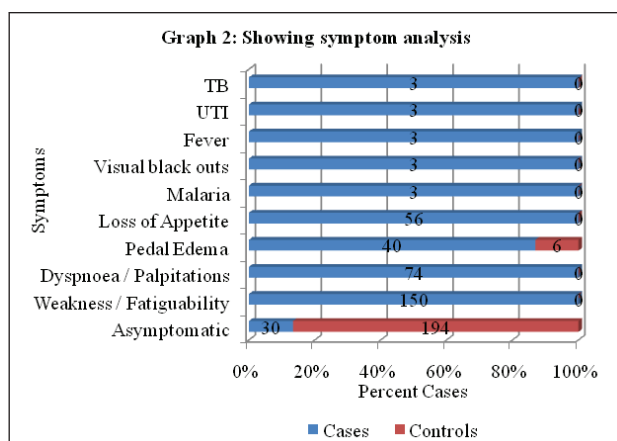
Table - 3 Symptom analysis of anaemic cases and control group

Symptoms	Cases		Controls	
	N = 200	%	N = 200	%
Asymptomatic	30	15	194	97
Weakness / Fatiguability	150	75	0	0
Dyspnoea / Palpitations	74	37	0	0
Pedal Edema	40	20	6	3
Loss of Appetite	56	28	0	0
Malaria	3	1.5	0	0
Visual black outs	3	1.5	0	0
Fever	3	1.5	0	0
UTI	3	1.5	0	0
TB	3	1.5	0	0

p<0.001 (HS)

85% of anaemic women had symptoms suggestive of anaemia. The common symptoms were weakness/ fatiguability in 75%, dyspnoea/ palpitations in 37% and pedal edema in 20% of anaemic cases.

97% of the control group were asymptomatic and only 3% had pedal edema due to associated gestational hypertension.



85% of anaemic women had symptoms suggestive of anaemia. The common symptoms were weakness/fatiguability in 75%, dyspnoea/ palpitations in 37% and pedal edema in 20% of anaemic cases. 97% of the control group were asymptomatic and only 3% had pedal edema due to associated gestational hypertension.

Table - 4 Relationship of grade of anaemia with different mean blood parameters

Blood parameters (Mean value)	Moderate (N = 140)	Severe (N = 60)
PCV (%)	27.0	19.2
MCV (fl)	76.0	61.8
MCH (pg)	22.37	17.91
MCHC (%)	27.4	25.1
S. Iron (mg/dl)	59.74	60.15
S. TIBC (mg/dl)	447.44	477.20

This table shows that mean PCV was 27.0% in the moderate anaemic group and 19.2% in the severely anaemic group.

The mean MCV was 76.0fl in the moderately anaemic and 61.8fl in the severely anaemic group.

The mean MCH was 22.37pg in the moderately anaemic and 17.91pg in the severely anaemic group. The mean MCHC was 27.4% in the moderately anaemic and 25.1% in the severely anaemic group.

This shows that MCV, MCH and MCHC are all reduced in iron deficiency anaemia, which is the commonest type of anaemia in pregnancy.

The mean S. Iron was 59.74 mg/dl in the moderately anaemic and 60.15 mg/dl in the severely anaemic group.

The mean S. TIBC was 447.44 mg/dl in the moderately anaemic and 477.20 mg/dl in the severely anaemic group.

This shows that as the iron stores decrease in iron deficiency anaemia, serum total iron binding capacity increases.

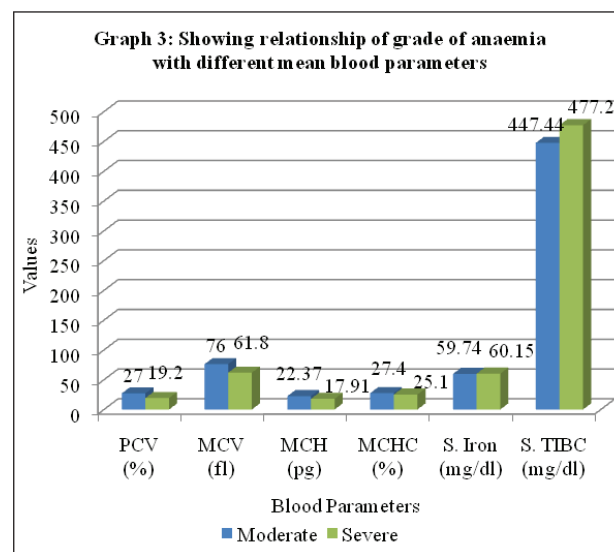


Table - 5 Type of anaemia in cases based on peripheral smear

Type of blood picture	Frequency	%
Microcytic hypochromic	165	82.5
Dimorphic	35	17.5
Total	200	100

Maximum cases had microcytic hypochromic anaemia accounting for 82.5% of cases.

Dimorphic anaemia was present in the balance 17.5% of the cases.

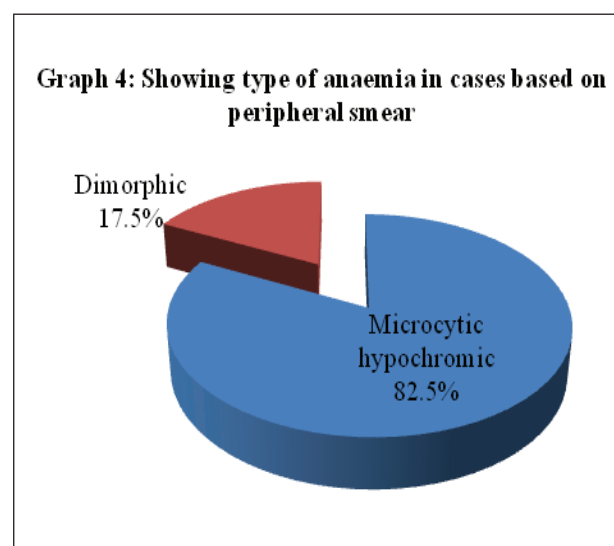


Table - 6 Table showing labour outcome of study subjects

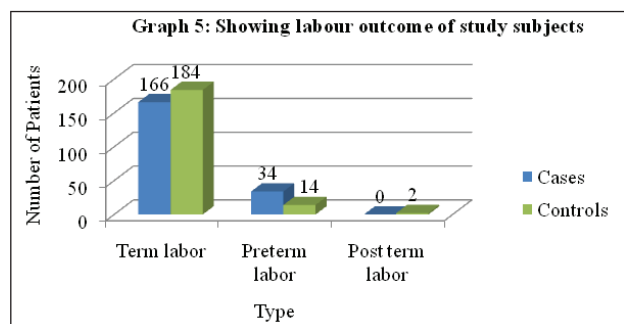
Labour Outcome of study subjects	Cases		Controls	
	N = 200	%	N = 200	%
Term labor	166	83	184	92
Preterm labor	34	17	14	7
Post term labor	0	0	2	1
Total	200	100	200	100

CC = 0.231; P = 0.004 (HS)

Out of 200 anaemic cases, 83% of women had term labor and 17% had preterm labor.

In the non anaemic controls, 92% of women had term labor, 7% had preterm labor and 1% had post term labor.

Thus, incidence of preterm labor is more in anaemic cases i.e. 17% compared to only 7% in the control group.



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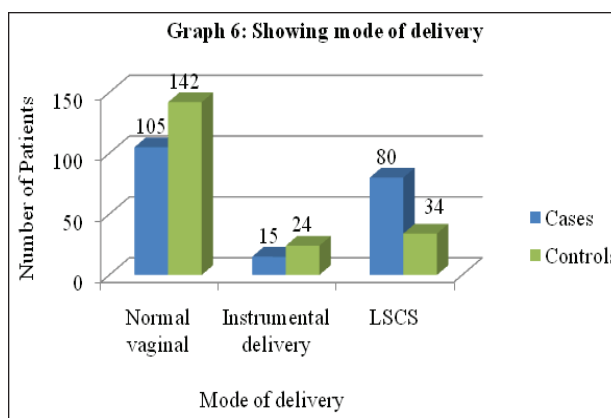
In the non anaemic controls, 92% of women had term labor, 7% had preterm labor and 1% had post term labor. Thus, incidence of preterm labor is more in anaemic cases i.e. 17% compared to only 7% in the control group.

Table - 7 Mode of delivery in the study subjects

Mode of delivery	Cases		Controls	
	N = 200	%	N = 200	%
Normal vaginal	105	52.5	142	71
Instrumental delivery	15	7.5	24	12
LSCS	80	40	34	17
Total	200	100	200	100

CC = 0.340; P < 0.001 (HS)

71% of women in the control group had normal vaginal delivery as against only 52.5% in the anaemic group.



71% of women in the control group had normal vaginal delivery as against only 52.5% in the anaemic group.

40% in the anaemic group underwent cesarean section as against only 17% in the control group.

12% of women in the control group and 7.5% in the anaemic group had instrumental vaginal delivery.

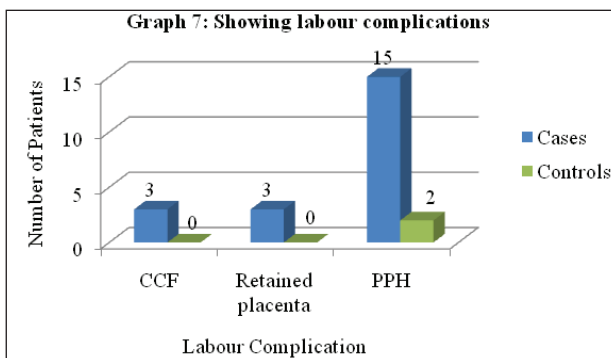
40% in the anaemic group underwent cesarean section as against only 17% in the control group.

12% of women in the control group and 7.5% in the anaemic group had instrumental vaginal delivery.

Table - 8 Table showing the complications of labour

Labor complication	Cases (N=200)		Controls (N=200)	
	No. of cases	%	No. of cases	%
CCF	3	1.5	0	0
Retained placenta	3	1.5	0	0
PPH	15	7.5	2	1

CC = 0.062; P = 0.679 (NS)



15 patients in anaemic group developed Post Partum Haemorrhage.

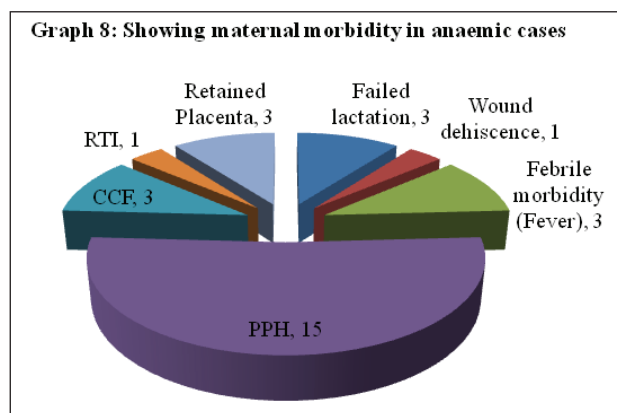
2 patients in the control group had Atonic Post Partum Haemorrhage.

- 3 patients in anaemic group had Retained Placenta, which required manual removal.
- 3 patients of anaemic group also developed CCF during labor.

Thus, labor complications are more common in anaemia.

Table - 9 Table showing the maternal morbidity in the anaemic cases

Maternal morbidity	Cases (N = 200)	
	No. of cases	%
Failed lactation	3	1.5
Wound dehiscence	1	0.5
Febrile morbidity (Fever)	3	1.5
PPH	15	7.5
CCF	3	1.5
RTI	1	0.5
Retained Placenta	3	1.5
Total	29	14.5



In the anaemic group, 3 patients had failed lactation, 1 patient had wound dehiscence which required secondary suturing, 3 patients had febrile morbidity, 15 patients had PPH, 1 patient had respiratory tract infection, 3 patients had CCF and 3 patients had retained placenta.

Thus, overall maternal morbidity was 14.5% in the anaemic group. There were no maternal deaths in the study subjects.

Discussion

Majority of study subjects in the present study belonged to the age group of 20-29 years, 79% in

cases and 82% in the controls group (table no-1). This is comparable to the study conducted by Khandait DW et al (2001)¹⁶; in which 70% of the cases belonged to 20-29 years age group.

Studies conducted by Malhotra P et al⁵ and Sanha H et al⁷ also concluded similar results. In the present study, 85% of anaemic women had symptoms suggestive of anaemia. The common symptoms were Weakness / Fatigueability in 75%, Dyspnoea / Palpitations in 37%, Loss of Appetite in 28% and Pedal Edema in 20% cases. Malaria, fever, UTI, TB and visual blackouts were present in 1.5% cases. (table no-3)

Sharma JB⁴ studied that anaemic patients complain of weakness, exhaustion and lassitude, indigestion and loss of appetite. Palpitation, dyspnoea, giddiness, edema and rarely anasarca and even congestive cardiac failure can occur in severe cases.

In the present study, (table no-4) the mean PCV, MCV, MCH, MCHC and S. Iron and S.TIBC are comparable that to that studied by Agarwal V.²³

In the present study mean PCV was 27% in moderate anaemia and 19.2% in severe anaemia. In the study conducted by Agarwal V, mean PCV was 21.6% in moderate and 14.9% in severe anaemia.

Blood parameters (Mean value)	Moderate (N = 140)	Severe (N = 60)
PCV (%)	27.0	19.2
MCV (fl)	76.0	61.8
MCH (pg)	22.37	17.91
MCHC (%)	27.4	25.1
S. Iron (mg/dl)	59.74	60.15
S. TIBC (mg/dl)	447.44	477.20

In the present study mean MCV was 76fl in moderate and 61.8fl in severe anaemia. Mean MCV was 83.5fl in moderate and 75.3fl in severe anaemia in study by Agarwal V.

In the present study mean MCH was 22.37pg in moderate and 17.91pg in severe anaemia. Mean MCH was 26.2pg in moderate and 22.6 pg in severe anaemia in study conducted by Agarwal V.

In the present study mean MCHC was 27.4% in moderate and 25.1% in severe anaemia. This is comparable to study by Agarwal V, in which mean MCHC was 26.4% in moderate and 24.4% in severe anaemia.

In the present study mean S.Iron was 59.74 mg/dl in moderate and 60.15 mg/dl in severe anaemia. In

the study conducted by Agarwal V, mean S.Iron was 54.2 mg/dl in moderate and 28.19 mg/dl in severe anaemia.

In the present study, mean S.TIBC was 447.44 mg/dl in moderate and 477.20 mg/dl in severe anaemia (table no-4). In the study by Agarwal V, mean S.TIBC was 320.62 mg/dl in moderate and 419.34 mg/dl in severe anaemia.

Thus, iron stores decrease in iron deficiency anaemia and serum total iron binding capacity increases.

Peripheral smear examination tells us about the type of anaemia and is important in the management. The present study correlates with study conducted by Awasti et al.²⁴

In the present study majority, 82.5% of subjects had microcytic hypochromic anaemia (table no-5) as compared to 17.5% subjects having dimorphic anaemia. This is comparable to study conducted by Awasthi et al, in which 22% subjects had dimorphic anaemia and 66.57% had microcytic hypochromic anaemia.

Awan MM et al⁹ also found that 76% of the cases had microcytic hypochromic anaemia.

Similarly, in the study conducted by Rao P Srinivasa et al⁸, it was concluded that, anaemia in 1st trimester of pregnancy was endemic and microcytic, hypochromic anaemia is most common.

83% of women had term labour and 17% had preterm labour (table no-6). In the non anaemic controls, 92% of women had term labour, 7% had preterm labour.

In the study carried out by Levy A et al²¹ concluded that 10.7% anaemic cases had preterm delivery.

In the study done by Malhotra M¹¹ et al, it was concluded that anaemic caes had 4 fold higher risk of preterm labour.

El Guindi W et al¹³ found that Maternal anaemia was found to be significantly associated with more frequent preterm birth (29.2% vs 9.2%).

Ali AA et al¹⁵ concluded that, the risk of preterm delivery increased significantly with the severity of anaemia.

Bakhtiar UJ et al²⁰ found that the risk of pre term delivery was 3.4 times more in anaemic mothers.

In the present study, 52.5% of anaemic patients had normal vaginal delivery while 71% of controls delivered vaginally. 7.5% of anaemic group and 12% of controls had instrumental delivery. 40% of anaemic group as against only 17% of control group underwent LSCS (table no-7). This is comparable to the studies conducted by Sangeeta VB et al¹⁹, which concluded that in the anaemic group 57% had normal delivey vs 81% in non anaemic controls. Anaemic

cases had 43% operative, induced labour vs 19% in non anaemic controls.

Similarly, Levy A et al²¹ concluded that there was higher risk for caessarean section among anaemic women (20.4%vs 10.3%).

In the study done by Malhotra M¹¹ et al, it was concluded that anaemic cases had 4-6 fold higher risk of prolonged labour and LSCS.

Ugwuja E et al¹⁴ also concluded that maternal anaemia was associated with increased incidence of delivery through caessarean section.

Bondevik GT et al¹⁷ studied that the risk of operative deliveries was significantly increased in women with severe anaemia in the first trimester.

Anaemic patients may not tolerate even the normal blood loss during delivery and leads to complications like PPH.

In the present study, incidence of PPH was 7.5% in the anaemic cases as compared to 1% in the non anaemic controls. 1.5% cases had CCF and 1.5% cases had retained placenta (table no-8). No patient in the control group had CCF and retained placenta. Thus, labour complications are more common in anaemic patients. This is comparable to studies conducted by Awasthi A et al²⁴ and Agarwal P²².

In the study conduted by Agarwal P, the incidence of PPH was reported to be 10% and incidence of retained placenta was 4%. In the study by Awasthi Aet al, incidence of retained placenta was 2.09%.

Similarly, Toshina V¹⁰ found that incidence of PPH was 9.8% anaemic cases.

Malhotra M¹¹ et al also concluded there was 4-6 fold higher risk of prolonged labour and PPH in anaemic women.

Thus, in the present study, total maternal morbidity was 14.5% (table no-9). In the anaemic group, 7.5% cases had PPH. 1.5% cases had CCF, failed lactation, retained placenta and febrile morbidity each. 0.5% cases had Wound dehiscence and respiratory tract infection each. There was no maternal mortality in the present study.

Rohilla M et al¹⁸ studied that in the anaemic cases, 9.37% had congestive cardiac failure and 8.33% had puerperal pyrexia.

Similarly, Lindsay H Allen¹² concluded that greater extent of haemorrhage, late episiotomy wound healing and various puerperal infections were seen in anaemic cases.

Summary

In the present study, among various causes of anaemia, 90% were nutritional in origin. Iron deficiency was the commonest nutritional anaemia followed by folic

acid deficiency.

Anaemia in pregnancy was found to be associated with adverse maternal and perinatal outcome like preeclampsia, preterm labour. It causes direct as well indirect deaths in form of cardiac failure, haemorrhage, infection and pre-eclampsia. In India, anaemia is directly responsible for about 20% of maternal deaths.

In India, anaemia in pregnancy is aggravated by increased requirements during pregnancy, blood loss at delivery, infections in the antenatal and postnatal periods and the early advent of next pregnancy perpetuates it.

The present study was conducted in Department of Obstetrics and Gynaecology, MMIMSR, Mullana, Ambala(India). The study was carried out between the period of October 2012 to September 2014. A total of 200 cases of moderate and severe anaemia were included in the study on the basis of simple random sampling method and 200 cases of non anaemic subjects were included to serve as controls for the anaemic group, during the study period.

Cases were classified into mild (10 – 10.9gm/dl), moderate (7 – 9.9gm/dl) and severe (< 7gm/dl) anaemia according to WHO Criteria. Majority of study subjects were in the age group of 20-29 years – 79% in cases and 82% in controls. This is not statistically significant.

85% of the anaemic women had symptoms suggestive of anaemia. The common symptoms were easy fatigability followed by dyspnoea and palpitations, loss of appetite and pedal edema. This is statistically highly significant.

Out of 200 cases of anaemia, 70% were moderately anaemic and 30% were severely anaemic.

The mean PCV, MCV, MCH, MCHC and RBC count are all reduced in anaemia patients indicating that iron deficiency is the commonest type of anaemia in pregnancy.

The mean S. Iron was 59.74 mg/dl in moderate anaemia and 60.15 mg/dl in the severely anaemic group. The mean S.TIBC was 447.44 mg/dl in moderate anaemia and 477.20 mg/dl in the severely anaemic group. This shows that as iron stores decrease in iron deficiency anaemia, serum total iron binding capacity increases.

Microcytic hypochromic anaemia was the commonest

type of anaemia (82.5%).

71% of the controls and 52.5% of the cases had normal vaginal delivery. This is statistically highly significant.

40% of cases as against 17% in the control group underwent LSCS. The most common indication for LSCS in cases was foetal distress. This is statistically highly significant.

The maternal morbidity was 14.5% in the anaemic group with no morbidity in the control group. 7.5% cases in itn anaemic group had PPH.

There was no maternal death in the study subjects.

Therefore, efforts need to be directed not only to correct anaemia but to prevent anaemia in the entire women folk of the country.

Proper antenatal care is the basic requirement for prevention, early detection and treatment of anaemia. Adequate Iron and folic acid supplementation during pregnancy in iron deficient mothers improves iron status during pregnancy and postpartum period, thus providing some protection against iron deficiency in the subsequent pregnancy. Ensuring maternal iron sufficiency during gestation is the most cost effective method of preventing perinatal iron deficiency and related morbidities.

Delivery of anaemic patients should be conducted preferably in a well equipped institution where facilities of intensive care units and blood bank are available. Registration of births and maternal deaths should be strictly done and analysis of the deaths should improve our knowledge regarding measures for prevention of such mishaps.

Conclusion

From the present study under discussion, it is concluded that anaemic antenatal cases suffering from moderate and severe anaemia carried adverse effects on pregnancy outcome in the form of maternal morbidity, preterm labour, increased incidence of operative delivery.

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Conflict of interest: None declared.

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