



A STUDY ON MATERNAL AND FETAL OUTCOME IN THE SETTING OF MATERNAL ANEMIA: A STUDY OF 436 CASES

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ABSTRACT

Anaemia is very common hematological disorder in pregnancy and also commonest public health problem in India. Iron deficiency is more common cause of anemia in pregnancy in India. Though most of anemia in pregnancy are preventable and curable, it is still major cause of mortality and morbidity in pregnancy, i.e. both to the mother and the fetus. Present study was carried out in Cama and Albles Hospital, Mumbai where 436 cases were studied over the span of 12 months. Anemia is a major burden in developing countries like India and especially in India. In present study where its maternal and fetal outcome studies, with comparison with many similar studies, it is found out that it has vast effect in maternal and fetal mortality and morbidity, but with supplementary treatment of ferrous sulphate and folic acid, vitamin c, deworming, parenteral iron and blood transfusion after the early diagnosis, many lethal maternal and fetal outcomes are preventable. Factors like preterm rupture of membranes are identified earlier and hence the maternal outcome like puerperal infection, wound infection, increased morbidity are prevented.

KEYWORDS : Anemia, Maternal and Fetal Outcome, Perinatal morbidity, Socio Demographic factors, Types degree and causes of anemia.

INTRODUCTION

Anaemia is very common hematological disorder in pregnancy and also commonest public health problem in India. Hence very important matter of concern in pregnancy regarding the mortality and morbidity associated with the degree of the severity of anaemia. In India the mortality is high up to 167 deaths per 1 lac live births.¹ According to the severity many maternal and perinatal complications and outcomes happens mostly in uncorrected cases.

Iron deficiency is more common cause of anaemia in pregnancy in India. Though most of anaemias in pregnancy are preventable and curable, it is still major cause of mortality and morbidity in pregnancy, i.e. both to the mother and the fetus. In India, the prevalence of anaemia in pregnancy is more because of below poverty line population, illiteracy, multiple pregnancy and poor antenatal facilities.

Incidence of anaemia varies from 40% to 80 % among the pregnant women in India. The Prevalence of anaemia in middle income group is 20 to 30%, whereas in lower income group it is 60 to 70%² and also in slum areas in India where there are a lots of hygiene issues, anaemia is more common due to parasitic infestation, mostly due to hook worm, incidence almost comprising to 90%.

DEFINITION

Anaemia is defined as decrease in oxygen carrying capacity of blood due to fall in hemoglobin, either due to decreased synthesis of RBCs or increased destruction or loss of RBCs due to any other reason.

During pregnancy, hemoglobin concentration less than 11gm% is considered as anaemia. According to WHO, hemoglobin concentration less than 11gm% is considered as anaemia. As per Kalaivani K., JCMR categorization is mild is 8-10.9, moderate – 5 to 8 and severe below 5 gm%. But for study purpose, Anemia will be classified into by Indian Council of Medical Research (ICMR) 1989.

Severe: Hb less than 7gm%

Moderate: Hb 7-9gm%

Mild: Hb 9-10.9gm%

Centre for disease control (U.S.A. 1990) has defined anamia as a hemoglobin concentration less than 11gm% in first and third trimester and less than 10.5gm% in second trimester.⁴

AIMS AND OBJECTIVES

Present study was carried out in Cama and Albles Hospital, Mumbai. 436 cases were studied over the span of 12 months.

Objectives were as follows,

1. To study maternal and fetal outcome with mother having Hb < 11 gm%.
2. To find out the relationship between maternal anaemia and perinatal morbidity and mortality.
3. To study socio-demographic factors.
4. To study types, degree, and causes of anaemia.

MATERIALS AND METHODS

1. Hemoglobin estimation of all patients attending ANC clinics were done during their first and second trimester visits.
2. Patient with hemoglobin less than 11 gm% studied.
3. Complete history with details regarding age, symptoms, parity was taken.
4. Detailed examination – general examination, per abdomen, per vaginal examination taken.
5. Complete hematological profile wherever available, taken, e.g.

- Hemoglobin concentration
- Complete blood count
- Blood indices
- Peripheral blood smear
- Serum ferritin
- Urine and stool examination

6. Most patients delivered vaginally.

7. Caesarian sections done mostly for obstetrical indications.

OBSERVATION AND RESULTS

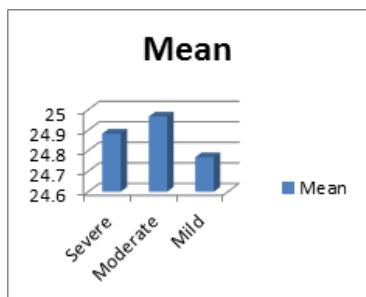
	Severe		Moderate		Mild	
	Count	Column N %	Count	Column N %	Count	Column N %
LOWER	6	35.3%	55	26.4%	38	18.0%
UPPER LOWER	11	64.7%	102	49.0%	125	59.2%
LOWER MIDDLE	0	.0%	31	14.9%	33	14.7%
Upper middle	0	.0%	16	7.7%	7	3.8%
Upper	0	.0%	4	1.9%	8	4.3%

Age:

	N	Mean	Std. Deviation	Minimum	Maximum
Severe	17	24.8824	3.75637	19.00	32.00
Moderate	208	24.9663	3.99684	18.00	41.00
Mild	211	24.7678	4.37723	18.00	38.00
Total	436	24.8670	4.16893	18.00	41.00

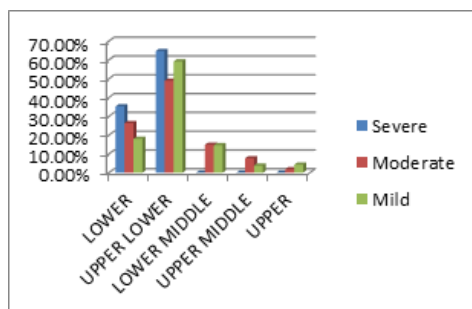
ANOVA result:

	Sum of Squares	df	Mean Square	F	p-value
Between Groups	4.134	2	2.067	.118	.888
Within Groups	7556.150	433	17.451		
Total	7560.284	435			



Interpretation: Since p-value for the ANOVA is greater than that of 0.05 indicates no significance of difference in different haemoglobin groups

Socioeconomic status:



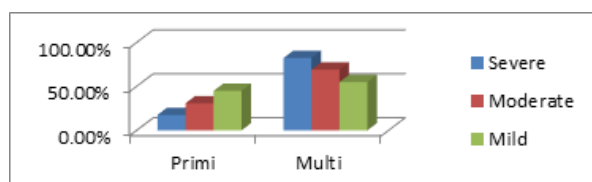
Chi-square test result:

	Value
Chi-square	15.687
Df	8
p-value	.047*

Interpretation: Since p-value for the chi-square test is less than that of 0.05 indicates significance of association between Socio-economic status and Anaemia. The severe anaemic are in Lower and Upper lower.

Gravidity against Anaemia:

	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
Primi	3	17.6%	64	30.8%	95	45.0%
Multi	14	82.4%	144	69.2%	116	55.0%



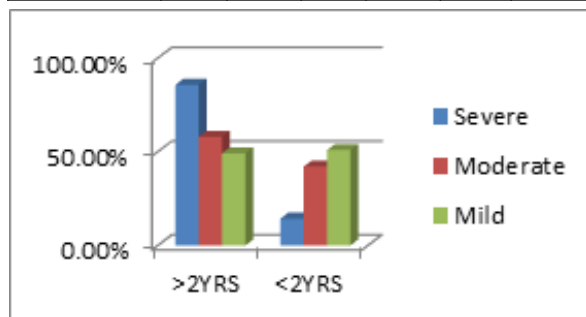
Chi-Square test value:

Test Statistics	
	Value
Chi-Square	11.998
Df	2
p-value	.002*

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the gravidity is significantly associated with anaemia. 82.4% of the severe cases are in multi gravidas.

Duration:

Duration Bet ⁿ pregn.	Hb					
	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
>2YRS	12	85.7%	84	57.9%	57	49.1%
<2YRS	2	14.3%	61	42.1%	59	50.9%



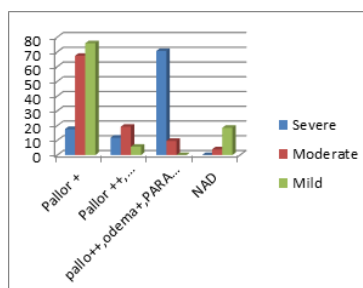
Pearson Chi-Square:

	Value
Chi-square	7.425
Df	2
p-value	.024*

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that anaemic status is significant with duration between two pregnancies. It is observed that the severe and moderate anaemia is observed with duration less than 2 years

Signs against Anaemia:

	Severe		Moderate		Mild	
	No. of cases	%	No. of cases	%	No. of cases	%
Pallor +	3	17.65	140	67.31	160	75.83
Pallor ++, PARANY CHIA+	2	11.76	40	19.23	12	5.69
pallo++, odema+, PARANY CHIA+	12	70.59	20	9.62	0	0.00
NAD	0	0.00	8	3.85	39	18.48
Total	17		208		211	



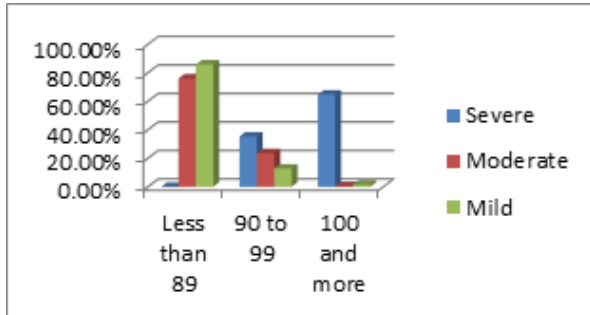
Chi-Square test

	Value	df	P-value
Pearson Chi-Square	155.794	6	.000

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that anaemic status is significantly associated with typical signs. 75% mild cases are in the Pallor+. All the severe anaemic cases are with "pallor++,oedema+,PARONYCHIA+" cases.

Tachycardia:

	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
Less than 89	0	.0%	158	76.0%	181	85.8%
90 to 99	6	35.3%	49	23.6%	27	12.8%
100 and more	11	64.7%	1	.5%	3	1.4%



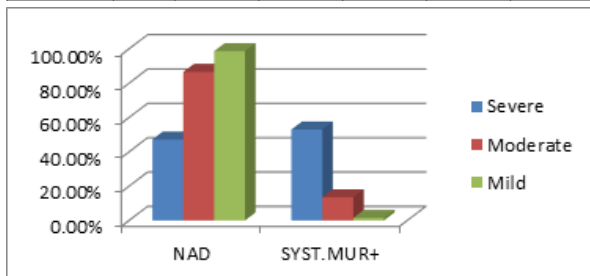
Pearson Chi-Square Tests:

	Value
Chi-square	217.326
Df	4
p-value	.000*

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that anaemic status is significantly associated with pulse count. The higher pulse count is observed in severe anaemic patients. All the patients with severe anaemia are observed with pulse count 100 or more than 100.

Cardio-vascular System

	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
NAD	8	47.1%	180	86.5%	208	98.6%
SYST.MUR+	9	52.9%	28	13.5%	3	1.4%



Chi-Square test value:

Test Statistics	
	Value
Chi-Square	58.887
Df	2
p-value	.000*

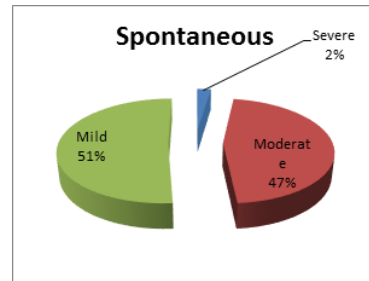
Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the CVS is significantly associated with anaemia. Severe is significant with SYST. MUR+. The proportion of mild in SYST is 4.6% of all the mild cases. Remaining all 98.6% cases are of NAD.

SYSTEMIC MURMUR AND ASSOCIATED WITH CARIAC FAILURE

	Count
No. of cases	3

PROM ASSOCIATED WITH LEAKING PV

	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
Spontaneous	2	2.4%	39	46.4%	43	51.2%



Chi-Square test result:

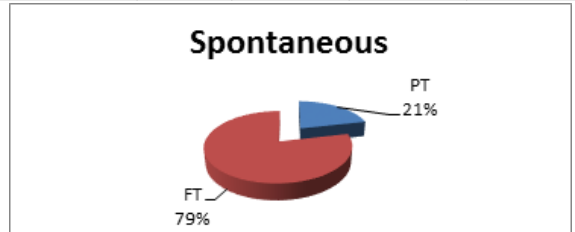
Test Statistics	
	Value
Chi-Square	36.5
Df	2
p-value	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 28.0.

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the spontaneous cases are not equally distributed in the mild, moderate and severe status but the cases of spontaneous are significant in mild category.

PROM and Term:

	PT		FT	
	Count	%	Count	%
Spontaneous	18	21%	66	79%



Chi-Square test value:

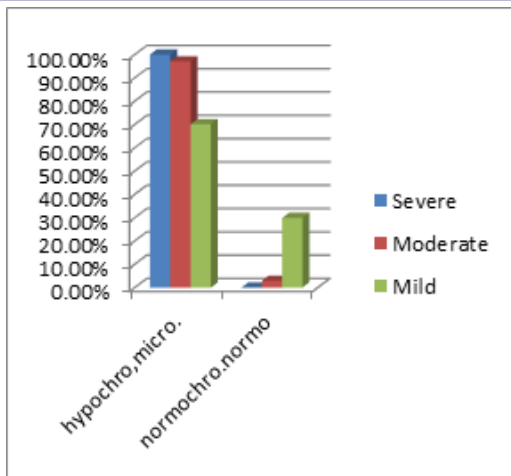
Test Statistics	
	Value
Chi-Square	27.429
Df	1
p-value	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 42.0.

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the spontaneous cases are not equally distributed in the Pre-term and Full term but the cases of spontaneous are significant in full term.

RBC MORPHOLOGY:

	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
hypochromic, microcytic	17	100.0%	202	97.1%	148	70.1%
normochromic, normocytic	0	.0%	6	2.9%	63	29.9%

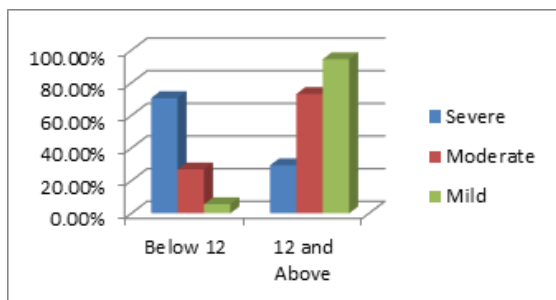


Test Statistics	
	Value
Chi-Square	60.534
Df	2
p-value	.000*

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the RBC morphology is significantly associated with anaemia. The severe and moderate anaemia is significant with hypochromic, microcytic.

SERUM FERRITIN:

	Severe		Moderate		Mild	
	Count	Column N %	Count	Column N %	Count	Column N %
Below 12	12	70.6%	54	26.9%	10	5.6%
12 and Above	5	29.4%	147	73.1%	168	94.4%



Chi-Square test value:

Test Statistics	
	Value
Chi-Square	57.736
Df	2
p-value	.000*

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the S-Ferritin is significantly associated with anaemia. The severe anaemia is significant with S-Ferritin below 12.

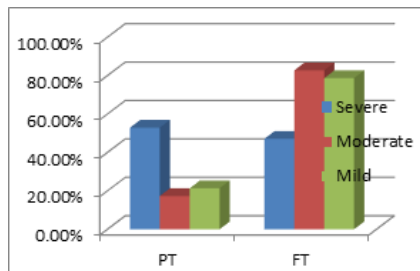
Anaemia classification

	No. of cases
Iron Deficiency anaemia	415
Sickle cell anaemia	3
Thalassemia anaemia	5
Megaloblastic anaemia	13

Interpretation; 95.18 % iron deficiency anaemia,0.68% sickle cell,1.14%Thalassemia,2.98% megaloblastic anaemia

**Maternal Outcome:
Term against Anaemia:**

	Severe		Moderate		Mild	
	Count	Column N %	Count	Column N %	Count	Column N %
PT	9	52.9%	36	17.3%	45	21.3%
FT	8	47.1%	172	82.7%	166	78.7%



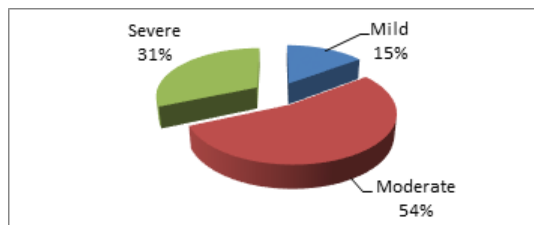
Pearson Chi-Square:

	Value	df	P-value
Pearson Chi-Square	12.299	2	.002

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the term is significantly associated with severe anaemia.

Post Partum Haemorrhage:

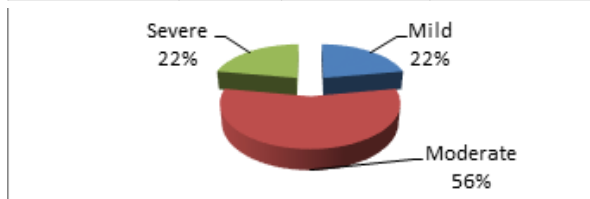
	Anaemia		
	Severe	Moderate	Mild
PPH	8	29	17
	14.81%	53.70%	31.48%



Interpretation; 53.70% cases of pph in moderate anaemia as comparative to other category suggests PPH more common in moderate anaemia besides early treatment

Wound Infection:

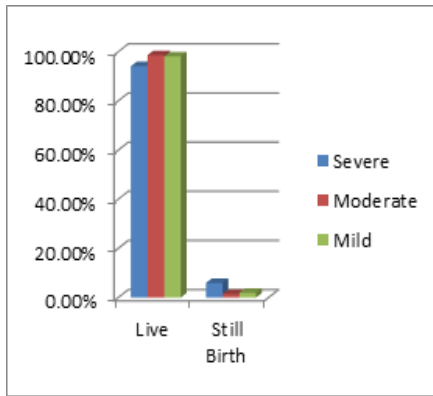
	Anaemia		
	Severe	Moderate	Mild
Wound Infection	2	5	2



Interpretation ;cases of mild moderate are higher compared to severe and mild, but not significant as per total count.

FETAL OUTCOME:

	Anaemia Status					
	Severe		Moderate		Mild	
	Count	Column N %	Count	Column N %	Count	Column N %
Live	14	82.3%	201	97.1%	202	95.7%
Still Birth	2	11.7%	3	1.4%	4	1.8%
NND	1	5.8%	4	1.9%	5	2.36



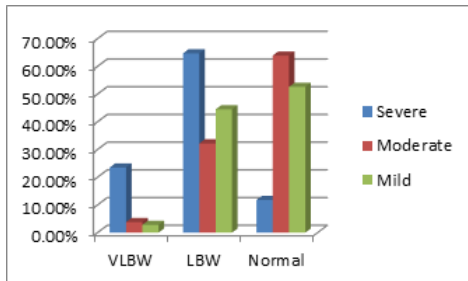
Chi-Square test value:

	Value
Chi-square	1.715
Df	2
p-value	.424

Interpretation: Since p-value for the chi-square is greater than that of 0.05 indicates that the Live/Still birth is not significantly associated with anaemia.

BIRTHWEIGHT:

	Severe		Moderate		Mild	
	Count	Column N %	Count	Column N %	Count	Column N %
VLBW	4	23.52%	8	3.8%	6	2.8%
LBW	11	64.70%	67	32.2%	94	44.5%
Normal	2	11.78%	133	63.9%	111	52.6%



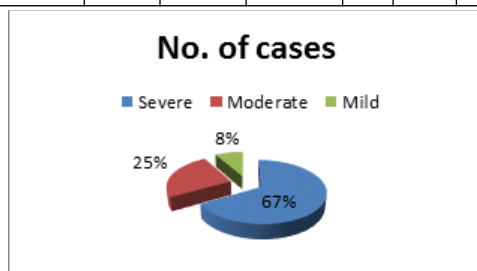
Chi-Square test value:

Test Statistics		Value
Chi-Square		31.923
Df		4
p-value		.000*

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates that the BIRTHWEIGHT is significantly associated with anaemia.

IUGR:

	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
No. of cases	8	66.67	3	25	1	8.33%



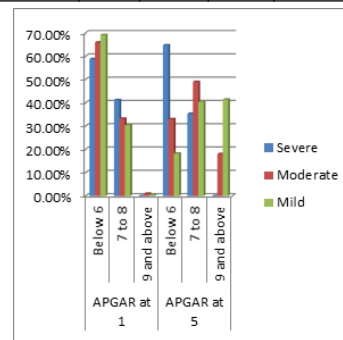
Chi-Square test:

Test Statistics		Value
Chi-Square		6.500
df		2
p-value		.039

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates significant cases of IUGAR in severe.

APGAR:

		Hb					
		Severe		Moderate		Mild	
		Count	%	Count	%	Count	%
APGAR R at 1	Below 6	10	58.8%	135	65.9%	143	69.1%
	7 to 8	7	41.2%	68	33.2%	63	30.4%
	9 and above	0	.0%	2	1.0%	1	.5%
APGAR R at 5	Below 6	11	64.7%	68	33.0%	37	18.2%
	7 to 8	6	35.3%	101	49.0%	82	40.4%
	9 and above	0	.0%	37	18.0%	84	41.4%



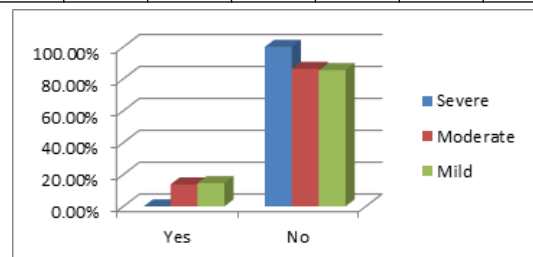
Chi-Square test:

	APGAR at 1	APGAR at 5
Chi-square	1.509	44.156
Df	2	2
p-value	.825	.000*

Interpretation: Since p-value for the chi-square is less than that of 0.05 indicates significance of association between APGAR at 5 and Anaemia. But the association is not significant at APGAR at 1 and anaemia.

NICU comparison:

	Anaemia					
	Severe		Moderate		Mild	
	Count	%	Count	%	Count	%
Yes	4	21.05%	28	13.8%	30	14.6%
No	15	78.94%	175	86.2%	176	85.4%



Chi-Square test value:

Test Statistics		Value
Chi-Square		2.516
Df		2
p-value		.284

Interpretation: Since p-value for the chi-square is greater than that of 0.05 indicates that the NICU admission is not significantly associated with anaemia.

CONCLUSION and DISCUSSION

Anemia is major burden in developing countries like India, especially in India. In present study where its maternal and fetal outcome studies, with comparison with many similar studies, it is concluded that it has vast effect in maternal and fetal mortality and morbidity, but with supplementary treatment of ferrous sulphate and folic acid, vitamin c, deworming, parenteral iron and blood transfusion after the early diagnosis, many lethal maternal and fetal outcomes are preventable. Factors like preterm rupture of membranes are identified earlier and hence the maternal outcome like puerperal infection, wound infection, increased morbidity are prevented.

- There was no relation found in age of pregnant women and anemia considering the mean study age of group which is 25.1 yrs, which was nearly equal to all grades of anemia
- Considering the socioeconomic status, anemia found more in lower economic groups, these may be related to inadequate diet ,poor hygiene, inadequate ANC visit and low education status.
- Regarding the multigravidas, anaemia found to be more relevant regarding the moderate and severe anemia also the spacing of child did matter in those where child was less than two years suggesting the iron storage lost and nutritional deficiency that did not fulfilled by repeated pregnancies.
- Symptoms of anemia and other complications were found to be relevant as per the literature, considering the physiology and pathogenesis of anemia.
- In my study significant relation found between anaemia and genital infection which was often associated with early rupture of membrane, but at tertiary care the infection was treated after early diagnosis hence considerable decrease in perinatal mortality.
- Of the investigations which were minimal as per the availability ay this center like RBC morphology and serum ferritin both showed high prevalence of iron deficiency anaemia, common investigation like stool r/m was not carried to for every patient ,this could be limiting factor for study ,but there were no worm infestation found as per complaints of patients, Serum ferritin was done as per the patient's economic status from outside did showed iron deficiency anaemia significantly in the study group.
- In this study prevalence of iron deficiency anaemia found to be very significant.
- Iugr was not so significant in the study group, that could be due to the ultra sonography limiting factor i.e manual error limiting of the study.
- The preterm delivery proportion found to be more in anaemia is confirmed in my study, Many other studies also found supportive to this study.
- In present study there was no significance found between stillbirth, neonatal death as per the per tertiary care nicu support considered, this was somewhat different outcome of this study found regarding many other study.
- As per many other studies the fetal outcome of low birth weight found in this study correct as the low hb in second trimester was corrected slowly as per patient compliance.
- In my study, strong relation found between pph and moderate anemia besides treatment with oxytocic as per previous study and knowledge of pph management in anemia which changed the outcome considerably.
- APGAR score at 1' and at 5" found to be significant in this study as per may other study confirming the fetal distress of maternal anemia.
- Wound sepsis was not significant the prompt treatment with antibiotic and supportive treatment.
- Over all 55 pt received blood and 10 pt received iron sucrose ,Blood was given to all pt admitted after 33 wks i.e.all 17 severe and some moderate admitted at term mostly undergone LSCS.

- Out of 451 cases 6 patients were had suffered from abortion which was not significant with the count and hence no outcome so 436 case taken for study.
- There was no case noted for maternal mortality in the study group at this tertiary care center.
- In my study pre-eclampsia or antepartum hemorrhage or shock cases were not found significant

In short, anemia complications , maternal and fetal outcomes are all dependent upon the severity and hence early diagnosis and preventive measures taken with oral iron is very useful. Anemia detected in last trimester is better to be treated with parenteral iron or blood transfusion preferably packed cell volume.

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