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Clinical profile of moderate and severe anemia cases complicating pregnancy of gestational age 28 weeks and above

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Abstract
In India, data from the National Family Health Survey 1998/1999 (International Institute of Population Sciences and ORC Macro 2000) on anemia of women of reproductive age describe that more than one third of Indian women have a body mass index (BMI) <18.5 kg/m^2, reflecting chronic energy and micronutrient deficit. The prevalence of anemia among all women in the Indian sample was 52%. Of these, 15% of these are classified as moderately anemic and 2% as severely anemic. A pre-structured interview schedule was used to collect information on age, educational qualification, socio-economic status, dietary history, occupation, detailed medical history. A complete clinical examination was done. Clinical evidence of fetal growth restriction and assessment of liquor was done. The previous records of hemoglobin value, obstetric reports ultrasound scan reports reviewed. There were 42.9% primigravida, 40% second gravida, and 5.7% fourth gravida. There were 2 previous one caesarean and 1 previous two caesarean. Two study subjects had previous one abortion. Among primigravida, there was 48% with moderate anemia, and 36% with severe anemia, there was no statistically significant difference between incidence of moderate and severe anemia in primagavidaa and multigravida.

Keywords: clinical profile, moderate and severe anemia, pregnancy

Introduction
Anemia is defined as the condition in which there is deficiency of hemoglobin in the blood. According to WHO, anemia in pregnancy is defined as hemoglobin level below 11gm/d in first and third trimester and less than 10.5 gm/dl in second trimester [1]. The definition of anemia recommended by the Centre for Disease Control and Prevention is a hemoglobin (Hb) or hematocrit (Hct) value less than the fifth percentile of the distribution in a healthy reference population based on the stage of pregnancy.

Classification derived from an iron-supplemented population lists the following levels as anemic: Hemoglobin levels below 11 g/dl in the first trimester; 10.5 g/dl in the second trimester; and 11 g/dl in the third trimester. This is the standard to be accepted in India. Expert group also agreed upon the ICMR classification for severity of anemia [2].

The Indian Council of Medical Research (ICMR) classify anemia as mild anemia (10-10.9 gm%) moderate anemia (7-10 gm%), severe anemia (<7gm%), very severe (< 4gm%).

A study on' Prevalence of anemia in Kerela state, Southern India' by Rakesh P *et al.* published on May, 2017 where they studied a total of 10 studies in addition to two major survey reports- National Family Health Survey (NFHS) and District Level Household Survey (DLHS), prevalence of anemia among adolescents from recent study reports was around 30% and prevalence of severe anemia was less than 1% in all studies. Anemia among tribal women and children were in the range of 78.3% to 96.5% [3].

According to the World bank data base, the prevalence of anemia among pregnant women in India was 50% in 2016 [4].

In India, data from the National Family Health Survey 1998/1999 (International Institute of Population Sciences and ORC Macro 2000) on anemia of women of reproductive age describe that more than one third of Indian women have a body mass index (BMI) <18.5 kg/m $^{[2]}$, reflecting chronic energy and micronutrient deficit. The prevalence of anemia among all women in the Indian sample was 52%. Of these, 15% of these are classified as moderately anemic and 2% as severely anemic [5, 6].

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Methodology
Patients fulfilling inclusion criteria were included in the study after obtaining informed consent. Then they were categorised into moderate and severe anemia depending on their hemoglobin level. All hemoglobin level was estimated by Sahli's method. Moderate anemia was defined as hemoglobin in between 7-10gm% and severe anemia if hemoglobin <7gm%.

Sahli's method: N/10 of HCL is taken into Sahli'stube, upto 10th level of scale, then 0.02ml of blood is added into it by Sahli's pipette, this will cause lysis of blood cells and hemoglobin will be released, which will combine with HCL and form acid hematinin which is tan coloured. This tube is put in hemometer and drop of distilled water is added continuously and is stirred with stirrer until it has exactly the same colour as the comparision standards. Then the reading is taken when colour matches. Hemoglobin value is expressed as gm/dl or gm%.

After confirming anemia, serum ferritin, peripheral smear study, and RBC indices were sent to confirm iron deficiency anemia. Previous blood reports for glucose tolerance test and thyroid function test, liver and renal function test were checked and sent immediately if not done. If any report came back as abnormal, patient is excluded from the study group.

A pre-structured interview schedule was used to collect information on age, educational qualification, socio-economic status, dietary history, occupation, detailed medical history. A complete clinical examination was done. Clinical evidence of fetal growth restriction and assessment of liquor was done. The previous records of hemoglobin value, obstetric reports ultrasound scan reports reviewed.

Gestational age was corrected according to first trimester dating scan for those who has irregular cycles and gestational age according to last menstrual period was used if patient remembers their date of last menstrual period with previous regular cycles with dating scan corresponding to first trimester scan.

Obstetric ultrasound was done in Department of Radio Diagnosis, with an image point color Doppler machine (Logiq P5) with a convex probe, 3.5 MHz transducer and an electronic caliper system. Patient in recumbent position, fetal biometry and liquor assessment and Doppler study of umbilical and middle cerebral artery was done.

Results
The study group consisted of age between 18 to 35 years and gestational age in between 28 to 40 weeks. Half of the study subjects (51.4%) were in the age group 21-25 years, and 28.6% were in the age group 26-30 years.
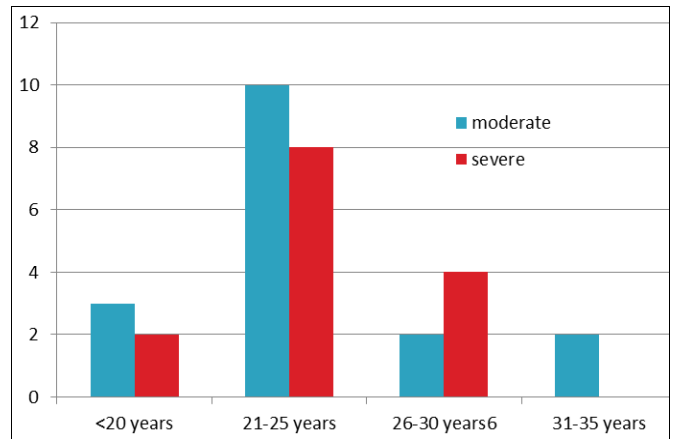
**Graph 1:** Age distribution of Moderate and severe anemia

The mean gestational age for group 1 was 35weeks 5days+/-2.5 days and mean gestational age for group 2 was 37weeks 3days +/-1 day.
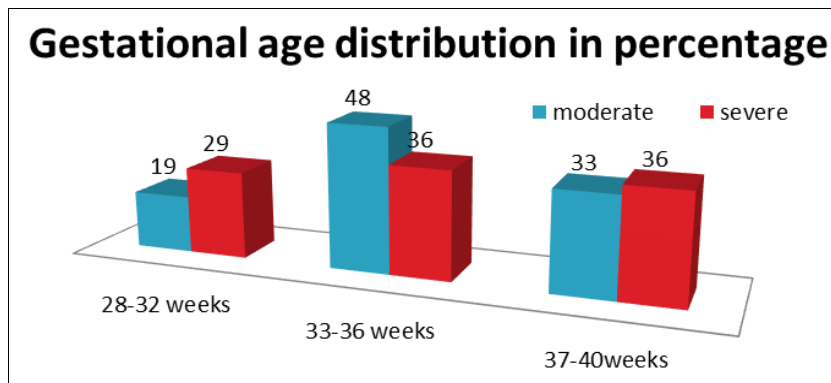
Graph 2: Showing Gestational age distribution in percentage

74.3% of study group's occupation of husband was manual labourers and 77.1% of them belonging to upper lower socio economic status and 20% belong to lower socio economic class according to modified Kuppuswamy classification.
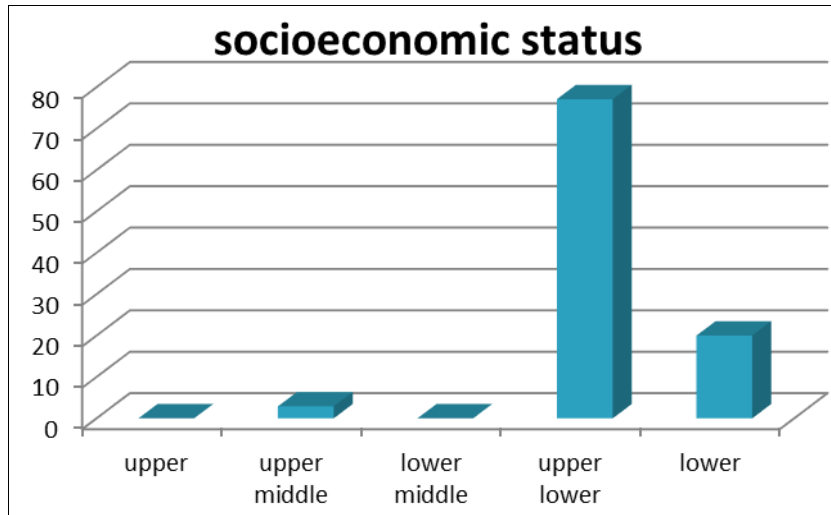
Graph 3: Socio-economic status distribution in percentage.

Of 35 study subjects, 7 subjects were in the lower economic status group, of which 57% were in severely anemic group.
Of all the study subjects, 21 were taking mixed diet and 3 were vegetarians. 11 were non-vegetarians.

Chart 4: Diet distribution

Also 80% Hindu, 5.7% Muslim and 14.3% of Christians was the religion distribution in the study group.
There were 42.9% primigravida, 40% second gravida, and 5.7% fourth gravida. There were 2 previous one caesarean and 1 previous two caesarean. Two study subjects had previous one abortion. Among primigravida, there was 48% with moderate anemia, and 36% with severe anemia, there was no statistically significant difference between incidence of moderate and severe anemia in primigravida and multigravida.
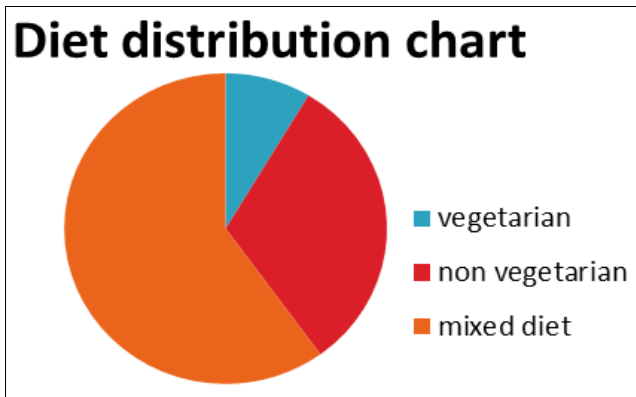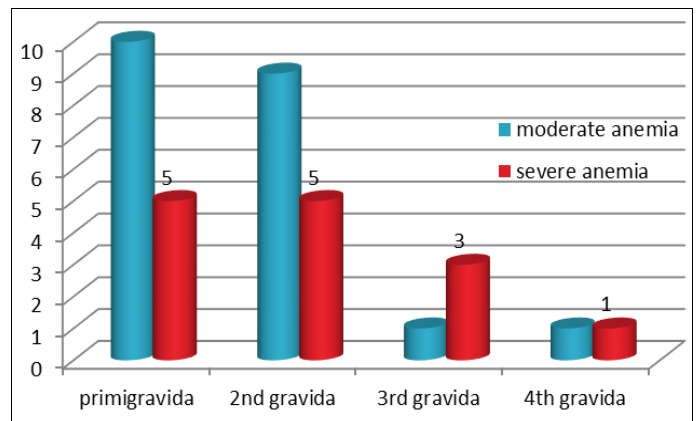

Chart 5: Showing gravida and severity of anemia

All the study subjects were not having any known co morbidities. All of them had no previous history of anemia in previous pregnancy, and no history of blood transfusion and no history of iron injection of any form in past.
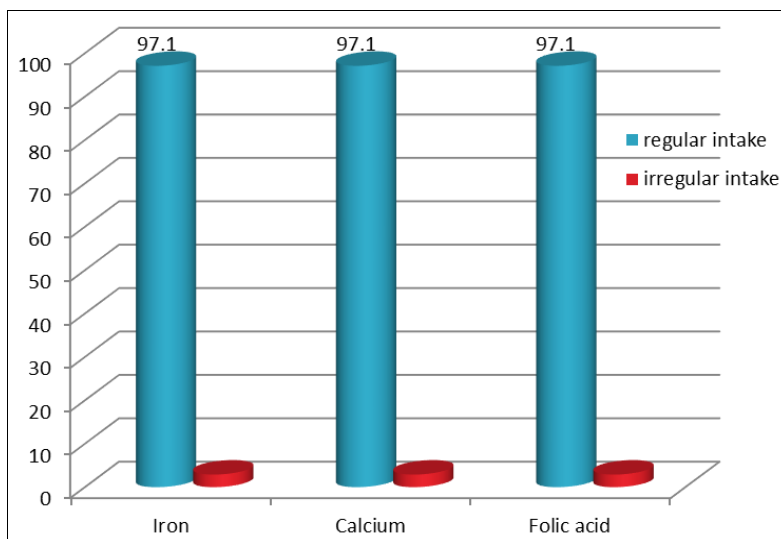

Chart 6: Showing regularity of iron, calcium and folic intake in percentage

Of all 35 subjects, there was 1 patient who did not take iron and folic acid supplement due to non-compliance to the drugs, accounting for 2.9 percentage.

There were 34.3% of study subjects whose BMI was below normal range. There was no subjects who are overweight, and 65.7% were having BMI within normal range.

Among those with BMI below normal, 57% were severely anemic and only 19% were moderately anemic.
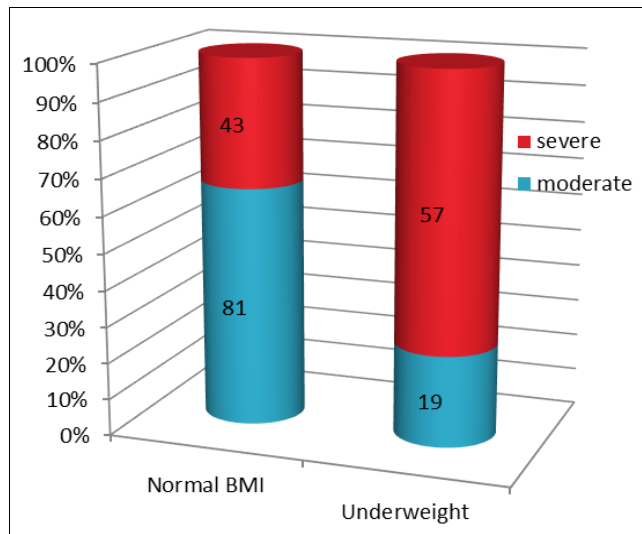

Chart 7: Body mass Index distribution in percentage

On clinical examination, 36% of group 2 were found to have 4 weeks disparity between their period of gestation and fundal height. While 71% of group 1 has their fundal height corresponding to gestational age.

Likewise, on measuring symphysio fundal height, in group 1, 81% has their symphysio fundal height corresponding to gestational age and, 36% of group 2 had a lag of 4cms from the expected gestational age.

Table 1: Showing Symphysio fundal height in moderate and severe anemia in relation to gestational age

Symphysio fundal height	Degree of anemia				Total		χ^2	Df	P
	Group 1		Group 2						
	N	%	N	%	N	%			
Corresponding to POA	17	81	0	0	17	48.6	25.556	3	0.000
POA< 2 cms	2	9.5	8	57	10	28.6			
POA<3 cms	2	9.5	1	7.1	3	8.6			
POA <4 cms	0	0	5	36	5	14.3			
Total	21	100	14	100	35	100			

Discussion

Half of the study subjects (51.4%) were in the age group 21-25years, and 28.6% were in the age group 26-30 years. This is probably due to common age group for pregnancy being between 21-30 years, and may not be related with the incidence of anemia in this age group.

There was no statistically significant relationship between the parity and severity of anemia (p=0.4). This is similar to the findings obtained by Aishat L.adamu *et al.*, where they suggest that multiparous women have repeated access to anemia control interventions such as iron/ folate supplement and deworming etc [7].

There was significant relationship between socio economic status and severity of anemia, 57% of subjects who belong to lower socio economic group were in severely anemic group.

This is similar to the findings of Amardeep *et al.* where they found severe anemia in 63.8% of low socio economic group [8]. T. Jain *et al.* also observed the same.

Body mass index was also found to be associated with severity of anemia. Of 34.3% of study subjects whose BMI was below normal range, 57% were severely anemic and only 19% were moderately anemic.

Severe anemia was found to be strongly associated with fetal growth restriction. Fetal growth restriction was observed in 37.1% of the total study group. Of which 78.6% were in severe anemia group, which was statistically significant. (<0.001). The mean estimated fetal weight was also markedly reduced in severe anemia group (1860.86+/-704.06 grams) comparing with moderate group (2320.14 +/-503.4 grams), with *p*<0.05.

Conclusion

On clinical examination, 36% of group 2 was found to have 4 weeks disparity between their period of gestation and fundal height. While 71% of group 1 has their fundal height corresponding to gestational age.

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