

Comparative Study of Hypochromic Microcytic Anaemia in Primigravida and Multigravida in Interior Sindh

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ABSTRACT

Objective: To evaluate the frequency of hypochromic microcytic anaemia commonly due to iron deficiency in female primigravida and multigravida patients. This also entails comparing both groups in the context of hemoglobin, MCV and RDW as study tools.

Study Design: Cross sectional analytical study.

Place and Duration of Study: This study was conducted at the Obstetrics Department, Peoples Medical College Nawabshah from July 2008 to Oct 2008.

Materials and Methods: This cross sectional study was carried out on 200 women (100 primigravida & 100 multigravida) with anaemia in their third trimester of pregnancy attending the Obstetrics Department, Peoples Medical College Nawabshah from July 2008 to Oct 2008. Hemoglobin, MCV and RDW levels were assessed in all cases. Data was analyzed using SPSS and students t test was used for evaluation of significance

Results: Mean Haemoglobin $\pm$ SD in Primigravida(Group A, n=100) and Multigravida(Group B, n=100) were 7.85 ± 1.33 and 6.26 ± 1.65 with ranges 3.1-10.9 and 3.2-10.4 gm/dl respectively. Mean MCV $\pm$ SD in Group A and B were 63.95 ± 4.71 and 62.08 ± 4.97 with ranges 54.4-73.7 and 48.2 -73.7 fl respectively. Mean Red Cell Distribution Width (RDW, SD) $\pm$ SD in Group A and B of anaemic patient were 19.83 ± 3.05 and 21.31 ± 3.32 with ranges 14.0-27.4 and $14.0-29.2 \times 10^3/\mu\text{l}$ respectively. The results were significant in both groups.

Conclusions: In Interior Sindh both primigravida and multigravida females are at high risk of developing iron deficiency anaemia and more so in multigravida.

Recommendations: Aggressive health measures need to be taken to control this major public health problem in Interior Sindh in particular and in the country as a whole especially in remote areas by promotion of regular consumption of food rich in iron and folates. The identification and treatment of severely anaemic patients with provision of iron supplement, improving personal hygiene, pure water supply and early antenatal diagnosis and follow up can decrease the prevalence of anaemia in pregnant women nationally and internationally. Need of the days remains the preparation and implementation of national nutrition plan with a special emphasis of controlling iron deficiency anemia during pregnancies.

Key Words: Hypochromic Microcytic Anaemia, Primigravida, Multigravida

INTRODUCTION

An estimated 2000 million people suffer from anaemia making it the world's most common nutritional disorder.¹ Iron deficiency anaemia is one of the most common public health problems being faced by the developing world and common cause of anaemia around the globe is iron deficiency. The female population of the world suffers more from iron deficiency during pregnancies. Sound epidemiologic information is mandatory for any public health intervention.

Various epidemiological studies both national and international showed that mortality ratio is high in female during gestational period in Pakistan as compared to India and other countries. Higher mortality in Asian women may be attributed to their lower economic status and consequently inadequate treatment.

It is also observed that there is higher mortality among women especially multigravida as compared to primigravida, due to factors like frequent childbearing, malnutrition, family stress and lack of health education specifically about balanced diet.^{2,3} Anaemia is very common in pregnant ladies and according to WHO, anemia during pregnancy is defined as Haemoglobin less than 10.0 gm/dl.⁴

Anaemia has been classified on clinical terms as acute or chronic. The most practical way to classify anaemia is using the red cell indices and morphology. Hypochromic microcytic anaemia (MCV <70 fl) by far is most common variety encountered during clinical practice.

The most common causes of hypochromic microcytic anemia are iron deficiency and Thalassemia, while other less common causes are chronic disorders like

sideroblastic anaemias, Lead poisoning and aluminum toxicity.⁵

The iron deficiency and iron deficiency anemia during pregnancy is frequently seen in women in developing countries. The reason being that increased requirement of iron in pregnancy is not met by diet. Pregnancy is a period of increased metabolic demands, changes in women physiology and requirement of growing foetus.²⁵

During pregnancy inappropriate diet and some iron metabolic disorder will leave harmful effects on primigravida and multigravida women resulting in hypertension, dyspnoea, anoxia and difficult labor and even may prove fatal for the foetus like preterm delivery, retardation in intrauterine growth, mental retardation and abnormal organ development.⁶

Hypochromic microcytic anaemia is said to occur, when the patient has low hemoglobin level and red cells are smaller than normal. It is detected by measuring mean red cell volume and mean red cell hemoglobin.⁵ The hypochromia of RBCs prompt further studies including TIBC, ferritin level and serum iron capacity level.⁷

The red cell distribution width which provides a quantitative measure of heterogeneity of red cells in the peripheral blood is a part of routine investigation and along with MCV provides the useful guide in the differential diagnosis of anemia.¹¹ Red cell distribution width (RDW) is utilized to know the diversity of red cell size and shape and is more sensitive indicator than MCV to establish possible origin of microcytic hypochromic anemia, both should be used together in early diagnosis.²⁴

A Progressively falling blood haemoglobin level is a common antenatal problem and attributed to early haemodynamic changes during pregnancy, including generalized vasodilatation, increase in plasma volume and increase in red blood cell volume and increase in red blood cell 2-3 diphospho-glycerate (2-3 DPG) concentration.⁸

The mechanism responsible for the characteristic microcytic hypo chromic features of iron deficient erythrocytes is due to deficiency of a haem regulated 2 alpha kinase, HRI which controls the synthesis of alpha and beta globin chain in erythroid cells and inhibit the translation inhibition factor elf 2 alpha when the intracellular concentration of haem is decreased.⁹ Iron deficiency and anemia affect 50% or more of pregnant women.²⁰

Women with iron deficiency anaemia give birth to premature and low birth weight babies with a high mortality rate or still births as compared to non-anaemic women.²³

This study was planned to evaluate the frequency of hypochromic microcytic anaemia in female patients during gestational period comparing primigravida versus multigravida.

MATERIALS AND METHODS

This cross sectional study was carried out on 200 women with anaemia in their third trimester of pregnancy attending the Obstetrics Department, Peoples Medical College, Nawabshah from July 2008 to Oct 2008.

All pregnant women with haemoglobin less than 10 gm/dl, MCV less than 70 fl and RDW greater than 14.5 were included in the study.

The subjects with normal MCV and RDW and hemolytic anemia and on iron supplements were excluded.

The anaemia was diagnosed on the basis of clinical findings coupled with CBC on Sysmax K-1000. The red cell morphology was established on Romonowskys stained blood smears.

Data analysis was done on SPSS and student's t test was applied to find p value.¹⁰

RESULTS

The 200 pregnant women with anemia in their third trimester were selected. They were divided into two groups: 100 primigravida with anemia were placed in Group A and 100 multigravida with anemia in Group B. MCV, Hemoglobin and RDW levels of all 200 cases were done. The mean and standard deviation of all the parameters were calculated and compared for determination of significance.

Mean Haemoglobin gm/dl $\pm$ SD in Group A (Primigravida) and Group B (Multigravida) were 7.85 $\pm$ 1.33 and 6.26 $\pm$ 1.65 with ranges 3.1-10.9 and 3.2-10.4 gm/dl respectively. The comparisons of two groups showed greater fall in hemoglobin in multigravida(Group B) and the difference between two groups was found statistically highly significant. (Table 1 & Fig. 1).

Table No. 1: Comparison of haemoglobin in Group A and Group B

S No.	Study group	Mean $\pm$ SD	Range gm/dl	No. of cases
1	Group A (Primigravida)	7.85 $\pm$ 1.33	3.1-10.9	100
2	Group B (Multigravida)	6.26 $\pm$ 1.65	3.2-10.4	100

Statistical analysis Group A versus Group B: p <0.001 (HS)

Mean MCV $\pm$ SD in Group A and B were 63.95 $\pm$ 4.71 and 62.08 $\pm$ 4.97 with range 54.4-73.7 and 48.2 -73.7 fl respectively. The comparison of Group A and B showed relatively greater decrease MCV in Group B and difference between two groups was found statistically significant. (Table 2 and Fig. 2)

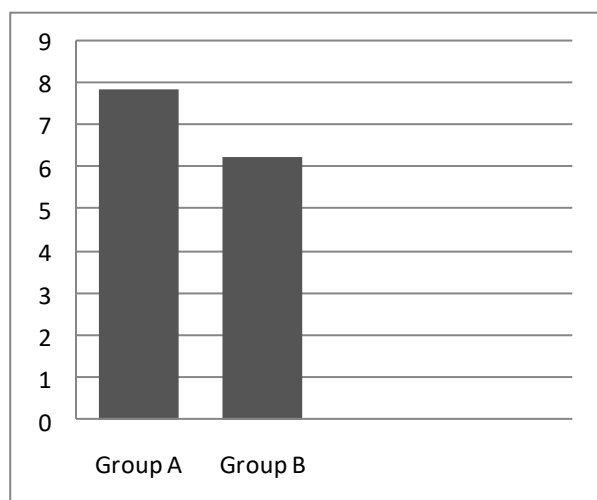


Fig 1: Comparison of mean hemoglobin in Group A and Group B

Table No.2: Comparison of Mean Corpuscular Volume (MCV) in Group A and B

S. No.	Study group	Mean $\pm$ SD	Range fl	No. of cases
1	Group A (Primigravida)	63.95 $\pm$ 4.71	54.4-73.7	100
2	Group B (Multigravida)	62.08 $\pm$ 4.97	48.2-73.7	100

Statistical analysis Group A versus group B: $p < 0.01$ (S)

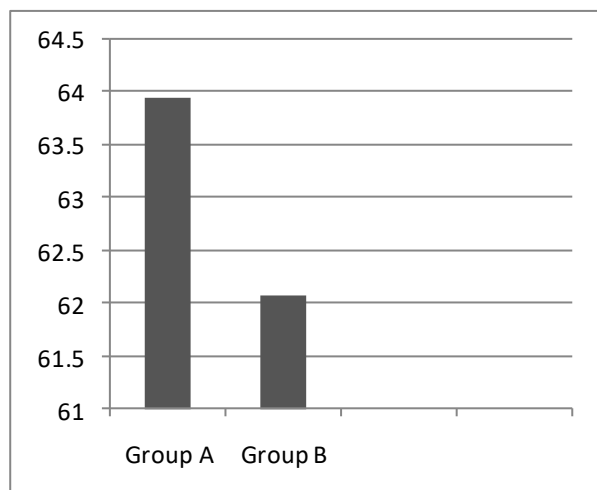


Fig. 2: Comparison of mean MCV in Group A & B

Mean Red Cell Distribution Width (RDW) $\pm$ SD in Group A and B of anaemic patient were 19.83 $\pm$ 3.05 and 21.31 $\pm$ 3.32 with ranges 14.0-27.4 and 14.0-29.2 $\times 10^3$ / μ l respectively.

There was rise in RDW in both groups but Group A showed relatively less rise. The difference between two groups was found highly significant statistically. (Table 3 and Fig. 3)

Table 3: Comparison of Red Cell Distribution Width (RDW) in Group A & B

S.No.	Study group	Mean RDW $\pm$ SD	Range	No. of cases
1	Group A (Primigravida)	19.83 $\pm$ 3.05	14.0-27.4	100
2	Group B (Multigravida)	21.31 $\pm$ 3.32	14.0-29.2	100

Statistical Analysis Group A versus group B: $p < 0.001$ (HS)

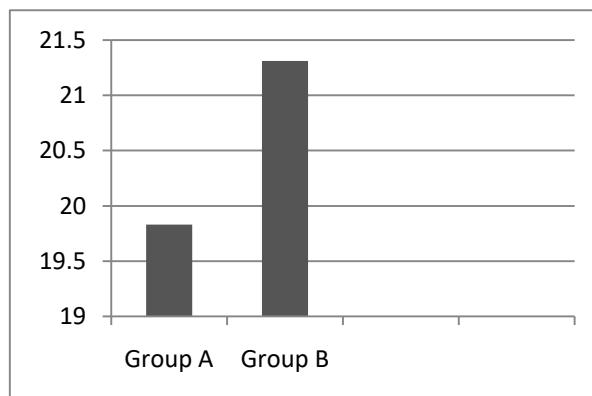


Fig. 3: Comparison of Red Cell Distribution Width (RDW) in Group A & B

DISCUSSION

The prevalence of iron deficiency anemia has been reported nationally and internationally, with little difference between developed and non developed countries. Iron deficiency is considered to be one of the main nutritional deficiency disorders affecting large fraction of population such as pregnant women, children and adults.¹²

In Pakistan especially Interior Sindh and focally in rural areas like Tharparker, Cholistan, the gastro-intestinal diseases are very common due to impure drinking water resulting into deficient storage of nutrients in the subjects.¹³

Due to the lack of awareness about balanced diet and health education, mostly the rural women are affected. Due to the low literacy rate in such remote areas the pregnant women does not understand the importance of iron intake during lactation and pregnancy and thereby suffer from anaemias and at times troublesome features and major public health challenges. The iron deficiency anemia is the most common nutritional deficiency in the world. Estimates suggest that two million people worldwide are iron deficient.¹⁴

Because of increased iron requirements during pregnancy and growth pregnant women and infants are recognized as the group most vulnerable to iron deficiency anemia.¹⁵ In pregnant women with significant anaemia may have an increased risk for poor

pregnancy outcome particularly if they are anaemic in the first trimester of pregnancy.¹⁶

In children severe anaemia can impair growth, motor and mental development, and increased risk for stroke.¹⁷ The elderly subjects also has adverse effect on the heart by heart attack and dementia.¹⁸ The dietary studies in pregnant women out of our study population have showed prevalence of iron deficiency is 93%.¹⁹

The combination of anaemia and heart failure can increase the risk of death in those mothers who are already suffering from heart disease. The mortality rate 30-60% in those patients with heart failure whose haemoglobin levels are low and already suffering from myopathies or other cardio vascular disease.²⁰ It is also observed that renal diseases especially infections and iron deficiency anemia increase the risk and enhance the mortality rate in anaemic subjects.²¹ Infections are more common in anaemic subjects²² and effect of maternal anaemia on foetal parameters.²³

In the present study, we carried out simple haematological test to diagnose anemia like hemoglobin level, MCV & RDW and which showed significant differences. Both groups carry chances of becoming anaemic, primigravida due to early marriage and multigravida due to consecutive pregnancies without gap with severe nutritional deficiency in both groups.

CONCLUSION

Our diet contains less meat as a source of iron purely due to economic reasons while pulses and 'chaptis' provide more phytate and fibre. We presume that higher parity coupled with less intake of oral iron and supplements remain the major cause of anaemia during gestation.

This holds more true in Interior Sindh due to less per capita income and poverty. Female population, both primigravida and multigravida are at high risk of developing iron deficiency anaemia and more so in multigravida.

RECOMMENDATIONS

Enthusiastic health measures need to be taken to control this major health problem in Interior Sindh in particular and in the country as a whole especially in remote areas by promotion of regular consumption of food rich in iron and folic acid. The identification and treatment of severely anaemic patients with provision of iron supplement, improving personal hygiene, pure water supply and early antenatal diagnosis and follow up can decrease the prevalence of anaemia in pregnant women nationally and internationally. Need of the days remains the preparation and implementation of national nutrition plan with a special emphasis of controlling iron deficiency anemia during pregnancies.

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