Comparison of Fetal Birth Weight Between Anaemic and Non Anaemic Pregnant Women

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Abstract

Objective: The objective was to compare the fetal birth weight between anaemic and non anaemic pregnant women.

Methods: This cross sectional, comparative study was conducted with a total of 200 pregnant women, 100 anaemic and 100 non anaemic, delivering in the labour ward of Abbasi Shaheed Hospital of Gynae unit 1. Study duration was one year from October 2005-September 2006. Pregnant women with singleton, term and gravidity up to 5 were included while twin, grand multi para, intrauterine growth retardation (IUGR), preterm and women with co-morbids were excluded. Data was recorded on a special form. Maternal blood was drawn for haemoglobin estimation and fetal birth weight was recorded after delivery. Results were analyzed by using SPSS 10 on computer.

Results: The mean fetal birth weight in anaemic pregnant women was 2338 ± 266 gm and in non anaemic pregnant women it was 3081 ± 307 gms with p-value 0.000. Out of 100 anaemic pregnant women 25% were mild, 65% were moderate and only 10% were severely anaemic. The mean birth weight of moderately anaemic was 2184 ± 89 gms and of severely anaemic women was 1990 ± 73 gms with p = 0.000.

Conclusion: This study shows that anaemic pregnant women who have haemoglobin level of less than 11 gms/dl deliver low birth weight babies as compared to non anaemic pregnant women who have haemoglobin levels greater than or equal to 11 gms/dl.

Keywords: Anaemia, pregnancy, fetus, low birth weight, intra uterine growth retardation.
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Introduction

Anaemia is the commonest medical disorder in pregnancy particularly in the developing countries with possible detrimental effects on fetus and mother[1]. Anaemia is a condition of low levels of haemoglobin in the blood. The World Health Organization (WHO) definition for diagnosis of anaemia in pregnancy is haemoglobin concentration of less than 11 gm/dland a hematocrit of less than 33%[2].

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Anaemia increases perinatal morbidity by increasing preterm deliveries, intrauterine growth retardation, low foetal iron stores, iron deficiency anaemia and cognitive and effective dysfunction in the infant. It is also responsible for 40-60% of maternal deaths in non industrialized countries[2,3].

Mild anaemia may not have any effect on pregnancy and labor. Moderate anaemia may cause increased weakness, lack of energy, fatigue and poor performance. Severe anaemia however is associated with poor outcome. The women may have palpitation, breathlessness and tachycardia. Increased incidence of preterm labour, preeclampsia and sepsis has been associated with anaemia[1].

The fetal iron stores will depend on the serum iron level of the mother during pregnancy[4]. The con-

sequences of iron deficiency anaemia are serious with poor pregnancy outcome like preterm birth, decreased growth rate and impaired motor development[5].

Anaemia and iron deficiency can induce maternal and fetal stress, which stimulates the synthesis and release of corticotrophin releasing hormone (CRF). Elevated CRF concentration is a major risk factor for preterm labor, pregnancy induced hypertension, preeclampsia and premature rupture of membranes. CRF also increases fetal cortisol production and cortisol may inhibit longitudinal growth of the fetus. An alternative mechanism could be that iron deficiency increases oxidative damage to erythrocytes and the fetoplacental unit[6].

In the developing countries, low birth weight is common mainly because of impaired intrauterine growth. Low birth weight is a major determinant of child morbidity and mortality[7] and may also increase the risk of infectious and chronic diseases in adolescence and adulthood[8]. Consequently, low birth weight is one of the global health problems, particularly because individuals born with low weight are at an increased risk of stunted growth and malnourished in the reproductive age. Thus they are at increased risk of maternal morbidity and mortality and of delivering low birth weight babies[9]. The general measures to control iron deficiency anaemia include improvement of dietary practice, food fortification, and environmental sanitation, control of infections and oral supplementation of medicinal iron daily[5].

The purpose of this study was to identify the effects of low maternal haemoglobin level and its consequences on fetal birth weight.

Patients and Methods

This cross sectional, comparative study was conducted with a total of 200 pregnant women, of all ages, 100 anaemic and 100 non anaemic, delivering in labour ward, Gynae Unit I of Abbasi Shaheed Hospital. Study duration was one year from October 2005 to September 2006.

A detailed history including parity, gestational age and history of any disease like hypertension, diabetes etc was recorded followed by complete clinical examination to exclude factors which can affect fetal birth weight like multiparity, preterm and post term pregnancies, diabetes mellitus, hypertension and multiple pregnancies.

The available antenatal laboratory reports of complete blood picture for haemoglobin (Hb) level, random blood sugar for diabetes and ultrasound pelvis for confirmation of gestational age, number of pregnancies or any congenital abnormalities were recorded.

On the basis of above information along with inclusion and exclusion criteria, subjects were divided in two groups as the anaemic and non anaemic pregnant women. Both the groups were matched with parity<5, in all would be term, singleton pregnancy with no history of maternal disease. The newborns of all these pregnant women were followed after delivery to record their birth weight in grams.

Data was analyzed by using SPSS version 10. Relevant descriptive statistics, frequencies and percentages were computed for presentation of qualitative variables like fetal outcome, sex of baby etc. Chi-square test was applied to compare these variables between two groups. Quantitative variables like haemoglobin level, fetal birth weight etc were presented as mean ± standard deviation. Student's t-test was applied to test the null hypothesis at $p < 0.05$ level of significance.

Results

A total of 200 pregnant women were studied. Out of these 100 women, i.e 50% were anaemic and 100 i.e 50% were non anaemic women, taking Hb<11 gms/dl as the cut off value.(Among 100 anaemic pregnant women 65% were mild, 32% were moderate and only 3% were severely anaemic).

The mean fetal birth weight in anemic pregnant women was 2338 ± 266 gms and in non ane-

mic pregnant women it was 3081 ± 307 gms with p-value 0.000. The mean birth weight of moderately anemic was 2184 ± 89gms and of severely anemic women was 1990 ± 73gms with p-value of 0.000 (Table1).

Among the mildly anaemic pregnant women 45(70%) delivered babies with normal birth weight and 20(30%) delivered low birth weight babies. In moderately anaemic group 5(16%) babies were of normal birth weight and 27(84%) were low birth weight babies. In severely anaemic women 3(100%) babies were low birth weight Fig.1. The relationship between maternal haemoglobin levels and fetal birth weight is shown Fig 2.

Discussion

The results of the study have shown increased risk of low birth weight babies among anaemic pregnant women as compared to non anaemic pregnant women.

This indicates that anaemia in pregnancy effects the fetal development especially weight gain, a significant relationship between different degrees of anaemia and low birth weight was observed in our study.

Mark P et al[10] in their study concluded that there is an optimal range of lowest haemoglobin concentration in pregnancy and on either side of this range perinatal mortality is increased. The effect of lowest haemoglobin is largely mediated through association with preterm and fetal growth restriction.

Khan MM[11] in a recent study concluded that mothers with nutritional or iron deficiency anaemia tend to deliver prematurely with low birth weight babies as compared to non anaemic mothers. As among 50 anaemic pregnant women 32(64%) had low birth weight babies as compared to 50 non anaemic women delivered only 5(10%) had low birth weight babies. These results are consistent with our study. In this study mean birth weight was lowered in anaemic group as compared to non anaemic. Babies were labeled low birth weight after their weight had been compared to babies of same gestation.

Fareh et al[12] studied the obstetric impact of anaemia in pregnancy in a population and found the cause of anaemia was iron deficiency in about 91% of the subjects. They found that complications like post partum haemorrhage in 3%, preterm 4% and fetal growth restriction occurred more frequently in women suffering from iron deficiency anaemia.

In a study carried out by Saeed GA et al[13], it was noted that haemoglobin levels less than 11 gms/dl during the second trimester of pregnancy, was associated with a greater incidence of preterm births, birth of small for gestational age babies and a significantly increased risk of low APGAR score than non anaemic patients and those with anaemia during third trimester of pregnancy. Our study also showed low birth weight babies delivered by anaemic pregnant women.

Sohail et al[14] in their study conducted in Services Hospital Lahore, identified that 60% of pregnant women were anaemic. Anaemia is more common in women with less education, belonging to low socioeconomic group and having increased parity. Iron deficiency was found in 72.2% of anaemic women.

Mahe Munir Awan et al[15] in their study in Multan, identified 96% of women having haemoglobin level of <11gms/dl. Microcytic hypochromic anaemia was found in 76% of women. Fetal loss was seen in 32%.They concluded that a comprehensive approach is required regarding health education and treatment of anaemia in pregnancy.

Another study conducted by Mandones F[16], highlighted the prevalence of anaemia in Chile. A multivariable logistic regression model studied the possible effect of anaemia on fetal growth. The prevalence of anaemia was 10.9% and 14.5% using the WHO and Centre for Disease Control (CDC) criteria, respectively. The mothers' nutritional status was significantly associated with anaemia.

Fig. 1 : Maternal Haemoglobin levels in relation with fetal birth weight at a tertiary care hospital of Karachi

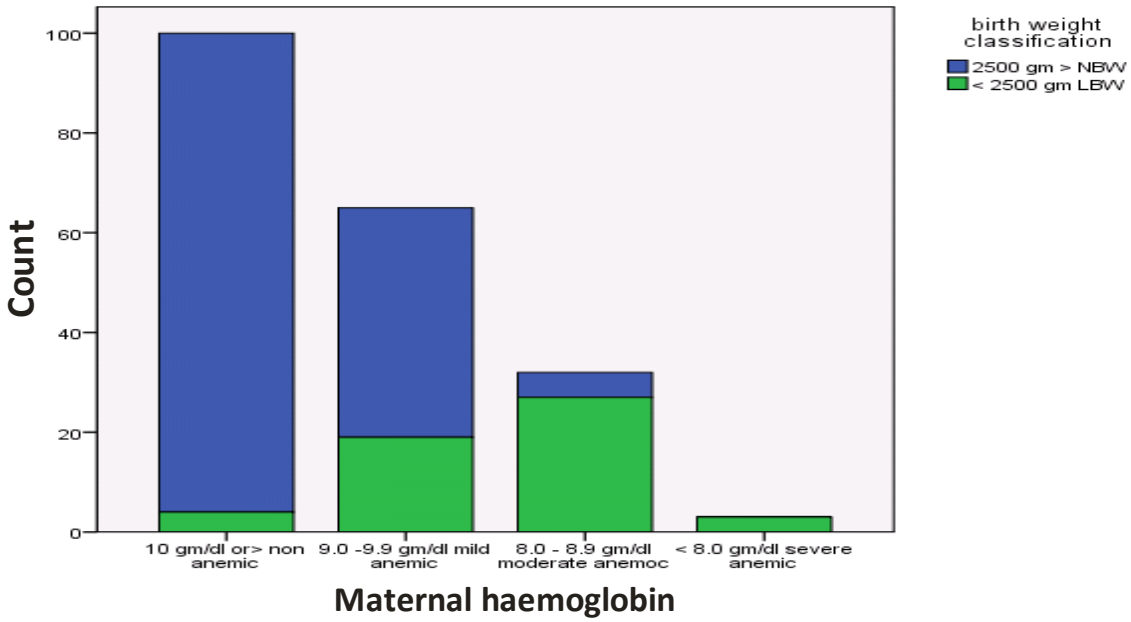

Fig. 2 : Relationship between maternal haemoglobin levels with fetal birth weight at a tertiary care hospital of Karachi

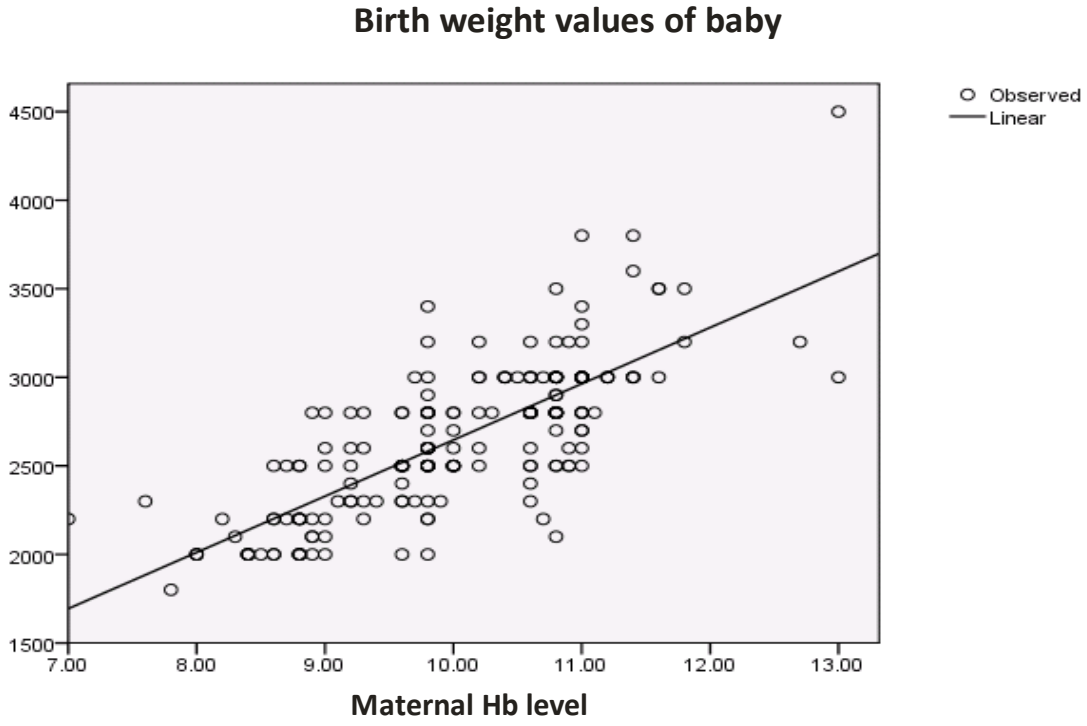

Table 1. Mean fetal birth weight in Non Anaemic and Anaemic pregnant women at a tertiary care hospital of Karachi

	Mean fetal birth weight (gms)	p- value
Non Anaemic N=100	3081 ± 307	0.000
Anaemic N=100	2338 ± 266	0.000

In a recent study in 2010 by Akhter et al[17], conducted at Bangabandhu Sheikh Mujib Medical University (BSMMU) Dhaka, concluded that, iron deficiency anaemia (IDA) during pregnancy had a significantly adverse affect on the fetal outcome. The maternal Hb showed a significant correlation with placental weight (r=0.40; p<0.001), birth weight (r=0.35; p<0.001), APGAR score (r=0.52; p<0.001), gestational age (r=0.61; p <0.001) and birth asphyxia.

Thus different studies have been done highlighting the importance of iron supplementation pre pregnancy as well as during pregnancy so as to reduce the risk of anaemia in pregnancy.

Mishra V et al[18] while studying the effects of iron supplementation during pregnancy found that it is associated with significantly higher birth weight. Prenatal iron supplementation can improve pregnancy outcome and promote child survival in developing countries.

Another study conducted by Sieqa Riz A M et al[19], identified the effect of prophylactic iron supplementation on birth out come and concluded that prophylactic iron supplementation that is begun in early pregnancy among low income women in United States may have benefits beyond reduction of iron deficiency anaemia in pregnancy.

Macedo A[20] in his study identified the importance of routine iron supplementation in pregnancy and concluded that routine iron supplementation in uncomplicated pregnancy increases or maintains the levels of blood iron and ferritin and results in a substantial reduction of women with low haemoglobin. Women who show signs or symptoms of anemia at any time during pregnancy should be evaluated so as to reduce its effects on fetal growth. In another study in 2010 conducted by Nadia Mudher[21] identified a significant relation between maternal anaemia and fetal birth weight. That among 50 anaemic women 35(70%) with mild anaemia had mean birth weight 3.1 ± 0.35 kg, 11(22%) with moderate anaemia had 2.7 ± 0.29 and 4(8%) with severe anaemia had 2.2 ± 0.25 kg. while 40 non anaemic women had mean birth weight of 3.3 ± 0.40 kg. When these results are related with our study it is seen that in our study the mean birth weight of moderately anemic was 2184 ± 89 gms (2.2 ± 0.8 kg) and of severely anemic women was 1990 ± 73 gms (1.9 ± 0.7 kg), hence, the birth weight was lower in the present study. Also, it was seen that in our study 100% of the low birth weight babies were born to severely anaemic women.

It is our recommendation supported by the present study and previous studies done have shown the importance of iron prophylaxis, hence, every women of child bearing age must take iron, multi vitamins along with a nutritious and well balanced diet. During pregnancy women should have regular antenatal visits including haemoglobin level measurement and should be advised to take iron supplementation properly. Health education regarding improvement of dietary habits, use of iron plus multi vitamin supplementation and importance of family planning is necessary to improve health status of mother and child in our local population.

Conclusion

This study has shown that anaemic pregnant women with haemoglobin level less than 11 gms/dl will deliver low birth weight babies as compared to non anaemic pregnant women who have haemoglobin levels greater than or equal to 11 gms/dl.

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