ORIGINAL ARTICLE
EFFECT OF MATERNAL ANAEMIA ON BIRTH WEIGHT

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Background: Anaemia is a common medical problem in pregnancy. The extent up to which, maternal anaemia effects maternal and neonatal health is still uncertain. Maternal anaemia is commonly considered a risk factor for low birth weight (LBW) babies. Some studies have demonstrated a strong association between low haemoglobin before delivery and LBW babies. However, others have not found a significant association. Therefore, there is insufficient information to assess the overall adverse impact of anaemia during pregnancy. The aim of this study was to determine whether maternal anaemia would affect the birth weight of the baby and compare this with that of non-anaemic mothers. It was a cross-sectional comparative study carried out at the maternity ward of Fauji Foundation Hospital, Rawalpindi. **Methods:** One hundred subjects divided into two groups each containing 50 subjects on the basis of consecutive non probability sampling were included in the study. Group-A included 50 Anaemic pregnant women and Group-B 50 non-anaemic pregnant women. Information was collected by direct interviewing method through a precoded structured questionnaire. The Hb level and birth weights were taken from the labour room record. **Results:** The mean age of the mothers in anaemic group was found to be older than the non anaemic group, i.e., (29.44 versus 27.98), though the difference was statistically non significant. The number of low birth weight infants (64%) was statistically very highly significantly more (*p*<0.001) in the anaemic group of mothers than the non anaemic group (10%). **Conclusion:** The results of this study show an association of maternal anaemia in pregnancy with increased risk of LBW babies.
Keywords: Maternal anaemia, Perinatal outcome, Low birth weight.

INTRODUCTION

Anaemia in pregnancy is a common problem and 50% pregnant women in developing countries are suffering from anaemia; 20% of the maternal deaths are directly or indirectly related to anaemia. According to WHO criteria Haemoglobin concentration of less than 11 gm/dl and haematocrit of <0–33 is declared as anaemia in pregnancy.[1] Anaemia is a critical health concern because it effects growth and development of neonates. Prevalence of anaemia in developing countries is 56%, it is even higher in the Central Asia, reported as being 80% in India.[2] Anaemia causes maternal morbidity and mortality, and also affects the perinatal outcome, it can also cause maternal infections, post partum haemorrhage and pre-eclampsia. Pregnant anaemic mothers often complain of body aches and easy fatigability.

In Pakistan common causes of anaemia are poor economic conditions, illiteracy, lack of health seeking behaviour, repeated pregnancies, gender bias and worm infestation. Previous studies in Pakistan shows iron deficiency as the main factor responsible for anaemia in pregnancy.[3] Anaemia is a common problem in pregnant women especially in developing countries like Pakistan, ranging from 8% to 33%, and increases the risk of LBW and IUGR.[4]

Low birth weight is a major determinant of mortality, morbidity and disability in infancy and childhood and has a long term impact on health outcomes in adult life.

Across the world, neonatal mortality is 20 times more likely for low birth weight (LBW) babies compared to heavier babies (≤2.5 kg).[5] It is also established as an important risk factor for neonatal morbidity.[6,7] The cohort of LBW (birth weight <2.5 Kg) babies is likely to reflect two effects, namely a short gestational age (preterm births) and small for gestational age (SGA).

A strong relationship was found between maternal anaemia and low birth weight babies.[8] The findings were in agreement with other studies of anaemic pregnant women carried out in Pakistan[9] and Syria[10]. Women can develop iron deficiency anaemia from the loss of blood during menstruation and from repeated pregnancies; it can also be caused by a lack of iron in the diet. During pregnancy, women may develop anaemia because the growing foetus may draw upon the mother's iron for the development of RBC's and other tissues.[11]

There is variation in the data from different studies about the association of maternal anaemia on adverse pregnancy outcomes and there is insufficient information to asses the overall adverse impact of anaemia during pregnancy. The aim of the study was to determine whether maternal anaemia would affect the birth weight of the baby and compare this with that of non-anaemic mothers.

MATERIALS AND METHODS

This was a comparative cross-sectional study, comparing the effect of maternal anaemia on birth weight of the baby with that of non-anaemic mothers. This study took place at the Maternity ward of Fauji Foundation Hospital, Rawalpindi and was carried out from May 2009 to October 2009. Sample size was 100 divided into two groups each containing 50 subjects. Group-A included 50 anaemic pregnant women and Group-B 50 non-anaemic pregnant women. Sampling technique was consecutive non-probability. Inclusion criteria was all pregnant women 16 years and older and a singleton pregnancy with a complete medical record. In Group A pregnant women having haemoglobin levels <11 g/dl in labour and in Group-B pregnant women having haemoglobin levels ≥11 g/dl in labour were included in this study. All women with a past history of preterm delivery, obstetrical complications or any medical illness, except anaemia, were excluded from the study in order to control for the confounding factors. As preterm delivery can recur in the next pregnancy, a past history of preterm delivery can cause preterm delivery, rather than anaemia.

The questionnaire for this study consists of demographic and socioeconomic profile, education level, antenatal history, obstetric history and birth weights of the babies.

Information was collected by direct interviewing method through a pre-coded structured questionnaire. Every subject was approached personally, briefed about the purpose of study, taken into confidence and reassured about the confidentiality of their information. Verbal informed consent was taken before the start of study, each question was explained in Urdu or in the language they understood and questionnaire was filled on the spot so as to get unbiased remarks. The Hb level and birth weights were taken from the labour room record.

Data was analysed using SPSS-12. Descriptive statistics were used to calculate means and standard deviations for numerical data. These were compared using t-test at a confidence level of 95%. Frequencies were calculated for categorical data. These were compared using χ^2 test, and $p<0.05$ was statistically significant.

RESULTS

The results are summarised in Figure-1 and Table-1. Figure-1 shows simple bar chart of the anaemic and non-anaemic mothers in different ages. When the ages of the mothers in both the groups were compared, the mean age of the anaemic group was found to be older than the non-anaemic group, (29.44 versus 27.98). However, the difference between the two groups was statistically non-significant ($p=0.146$). The age for the anaemic mothers

ranged between 18 and 38 years, and age of non-anaemic mothers ranged between 20 and 40 years.

Table-1 shows that whether the infant had low birth weight at birth in anaemic and non anaemic mothers. The difference between the two groups was found to be statistically very highly significant ($p<0.001$) in our study, as 64% of mothers delivered a low birth weight baby in the anaemic group as against 10% in the non anaemic group.
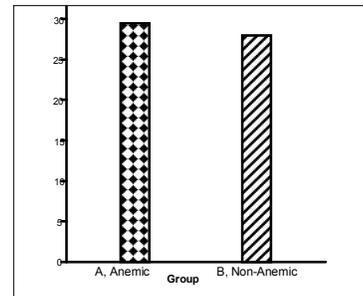

Figure-1: Mean ages of the mothers in anaemic and non-anaemic groups

Table-1: Low and normal birth weight babies of the anaemic and non-anaemic mothers

Group	Underweight	Normal
A: Anaemic (n=50)	32 (64%)	18 (36%)
B: Non-Anaemic (n=50)	5 (10%)	45 (90%)
p-Value	0.001*	

*Significant

DISCUSSION

Anaemia in pregnancy is an important public health problem worldwide. WHO estimates that more than half of pregnant women in the World have a haemoglobin level indicative of anaemia (<11.0 g/dl), the prevalence may however be as high as 56 to 61% in developing countries.[4]

As it is estimated that about 7.3 million perinatal deaths occur annually in the world, most of these in developing countries especially Asia[12], one could assume many of these could be prevented by correcting maternal anaemia. Prematurity and birth anoxia are the main causes of perinatal deaths in Pakistan. In the studied population, prematurity was the leading cause of perinatal death but less frequent than in other hospitals in Pakistan[13], indicating poor resuscitation facilities and neonatal care in the country. Severe anaemia (<8 g/dl) is associated with birth weight values that are 200–400 g lower than in women with higher (>10 g/dl) haemoglobin values, but these researchers generally have not excluded other factors that might also have contributed to both LBW and the severity of anaemia.[14]

Low birth weight, i.e., <2.5 Kg is widely used as an indicator of newborn health. The association of LBW has been studied with a variety of factors relates to geo-demographics, maternal health and pregnancy

history in various studies. Anaemia which is a common problem in pregnant women in developing countries like Pakistan increases the incidence of low birth weight.

Badshah et al[15] in their study found that the predicted incidence figures for low birth weight babies show an increase among the Tribal areas of Pakistan in anaemic mothers, with a highly significant difference ($p<0.01$) in the incidence of low birth weight babies among the anaemic mothers compared to non anaemic mothers. Their study showed that anaemic mothers are at increased risk of small for gestational age infants compared to non anaemic mothers. The results of a study in Ahmedabad, India by Mavalankar et al[16], were also consistent with Badshah et al[15], with reference to the effect of maternal anaemia on low birth weight.

Lone et al[11] in a multivariate analysis of their study population showed that the risk of low birth weight babies in the anaemic population was 1.9 times higher (95% CI= 1.0–3.4).

Jones et al[17] also found an increased incidence of low birth weight babies in anaemic mothers, however the difference from the non anaemic group in their study was non significant ($p=0.11$).

The results of our study were also consistent with the above mentioned studies, showing that the majority of anaemic mothers gave birth to low birth weight babies, with a very highly significant difference ($p<0.001$) from the non anaemic group.

The management and control of anaemia in pregnancy is enhanced by the availability of local prevalence statistics, which is however not adequately provided in Pakistan.

CONCLUSION

The results show the association of maternal anaemia in pregnancy with increased risk of LBW babies. Our study also shows that anaemia in pregnancy is still a major health problem. The improvements achieved in the developed world may largely be due to more effective diagnosis and treatment.

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