

The Effect of Maternal Anaemia on Birth Weight of Newborns in DHQ Rawalpindi

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Abstract

Background and Aim: A leading health issue of poor countries is anemia in pregnant women which causes increased maternal and fetal morbidity [1]. Anemia as indicated by low haemoglobin is considered to be a predictor of preterm birth and low-birth weight [2]. Some studies support this association whereas others do not. Thus, to confirm the harmful effects of maternal anemia on the neonate, this study was conducted. The study aimed at identifying anemia as a cause of low birth weight by comparing the weight of newborns of anemic mothers with the non-anemic.

Methods: It was a cross sectional comparative study carried out in DHQ Hospital Rawalpindi. About 150 patients were taken, with 75 patients in each group by consecutive non-probability sampling. Anemic mothers were allocated to group A whereas the non-anemic to Group B. The information was collected on a proforma through a questionnaire as well as information collected from the labour ward record.

Results: The mean age of the mothers in the anaemic group was found to be similar to that of the non anaemic group, i.e. (26.40 versus 25.85). The number of low birth weight infants (24%) in the Group A was statistically very high and significant ($p < 0.001$) than the non anaemic group (0%).

Conclusion: Maternal anemia in our study has a statistically significant association with increased risk of low weight in the newborns.

Keywords: Perinatal Outcome; Low Birth Weight; Maternal Anemia

Introduction

Anemia a global health issue affects pregnant women belonging to the developing countries to a greater extent. Although in pregnant women, the prevalence of anemia, across the globe is 36.5% but in low and middle class income countries it rises to 56% and in South Asia it is 48% [3]. The commonest causes of anemia in pregnant females are poor socio-economic conditions, illiteracy, dietary deficiencies, multiparity and worm infestations [4]. All these issues are mostly manifestations of poverty that is prevalent in developing countries.

According to WHO a haemoglobin of < 11 g/dl or a Hct of < 33% is considered as anemia [1,5]. Due to the physiological increase in plasma in pregnancy the threshold has been decreased to 11 g/dl as compared to 12 g/dl for a non pregnant female. Gestational anemia leads to not only maternal complications but has fetal implications as well. Severe anemia i.e. Hb of < 7g/dl in pregnant or post partum women doubled the risk of maternal mortality in these women [6]. Detrimental effects of gestational anemia can often be observed, like preterm labour, PPRM, low birthweight, SGA fetus, low apgar score or even intrauterine fetal demise [7].

Anemia is a treatable and preventable disease. However, the limitations are the time needed for the manifestations to be evident [8]. To avoid the complications of anemia in a pregnant woman early and timely iron replacement strategies need to be implemented. In almost 50% of the cases of anemia, iron deficiency is the cause mostly due to inadequate intake and depleted stores along with increased demand due to pregnancy [9]. In non-pregnant females of reproductive age, the need for iron is 1.5 mg/dl but in pregnant females it is 45 mg/dl [10]. Thus, the provision of iron rich diet being essential. Iron is required in increased amounts especially in the later half of pregnancy, when the fetus grows at a rapid pace leading to SGA in cases of iron deficiency [11]. Suboptimal Hb and ferritin levels usually lead to low birth weight [12]. In this study we aim to identify the implication of maternal anemia on neonatal birthweight.

Material and Methods

A comparative cross-sectional study conducted in DHQ hospital affiliated with Rawalpindi medical university Rawalpindi. About 150 patients were taken, with 75 patients in each group by consecutive non-probability sampling. Anemic mothers were allocated to Group A whereas Group B had the non-anemic Group B. A Hb concentration level of < 11 g/dl was considered as anemic whereas Hb of > 11 gm/dl as no- anemic. The information was collected on a proforma through a questionnaire as well as information collected from the labour ward record. All pregnant women with singleton pregnancies were included. Those with a history of preterm labour; high order pregnancy, obstetric conditions and medical problems e.g. hypertensive disorders and gestational diabetes were excluded from this study.

Results

The bar chart (Figure 1) depicts the mean ages in anemic and non-anemic mothers. The mean ages of the mothers in both the groups were comparable (26.40 versus 25.85) no statistically significant difference was observed between the two groups (p = 0.572). The age range was 17 and 40 years, for the group A and 20 and 37 years for the group B.

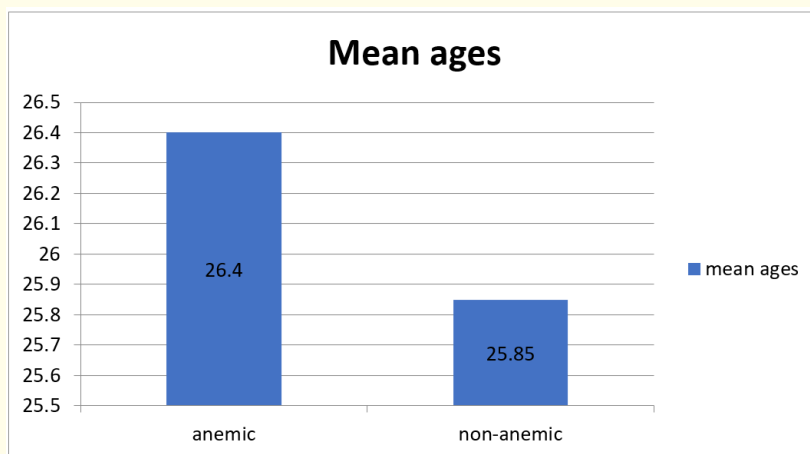


Figure 1: Mean age of anemic and non-anemic mothers.

The birth weights in the two groups is demonstrated in table 1.

Group	Low birthweight	Normal weight
A (n = 75)	18 (24%)	57 (76%)
B (n = 75)	0 (0%)	75 (100%)
p-value	< 0.001*	

Table 1: Birth weights in the group A and group B.

*Significant.

Discussion

Maternal anemia a very common health problem seen globally especially in the poor and developing countries of the world. Maternal anemia leads to multiple complications in the mother e.g. antepartum haemorrhage, preterm labour and post-partum haemorrhage. In the fetus the complications are manifested as SGA, reduced birthweight, low apgar score and intrauterine fetal death. Both the groups had almost the same mean age. Even the extremes of age were not seen to have any association with the haemoglobin level [7].

However, a statistically significant association between the birth-weight and level of haemoglobin in the two groups was observed. The birth weight was significantly less in the anemic group. These results were comparable with a study carried out by Shah., *et al.* (2022) in Hyderabad [13]. Another study by Anwar and Razzaq (2019) also supported our results of low birth weights associated with anemia [14]. The results of another study carried out in (2011) in Fauji Foundation hospital also showed a substantial association of gestational anemia with reduced birth weights in neonates [15].

A systematic review carried out by Figueiredo., *et al.* in 2018 demonstrated maternal anemia to be a predisposing factor for reduced weights of neonates at birth. Confirmation of the results was also done by a meta-analysis of the mean weights of neonates at birth, depicting low birth weights in anemic women as compared to non anemic mothers. The studies selected were carried out in different countries of the world [16].

Our study depicted low birth weight in 18% of the newborns. This study was conducted in District headquarters hospital, a public hospital catering mostly for the low socio-economic strata of the society. The major factors seen were multiparity, poverty and inadequate intake of iron along with improper antenatal follow-up in anemic mothers.

The biological explanation of the association of maternal anemia as a cause of neonatal low birth weight is not completely comprehensible [17]. Studies proposing predisposition of growth restriction in anemic mothers justify maternal anemia leading to low birth weight as well [18]. Physiological anemia to ascertain extent being due to increased plasma levels, however failure to increase the haematological cells exacerbating the condition. Another theory proposes change in the angiogenesis of placenta predisposing towards fetal hypoxia. The elevated vascular resistance and abnormal trophoblastic invasion and growth due to inadequate haemoglobin provision leads eventually to insufficient oxygen supply and thus to growth restriction or low birth weight in the newborn [20].

Although a number of research studies have depicted the relationship of gestational anemia with reduced weight of neonates at birth [21,22], on the other hand many other studies whose outcome was low birth weight disproved it [23-25]. However, studies conducted on large sample sizes about 290,622 pregnant females demonstrated a definite association supporting our results [26].

Conclusion

To conclude, it is evident that, although this study was restricted to a particular population, but it was clear that maternal anemia was definitely associated with low birth weight and this had statistical significance. These research ventures will contribute towards planning to counsel mothers for regular antenatal checkups and intake of iron supplements to avoid preventable causes of low birth weights.

Limitations of the Study

Studies with larger sample size are required for the results to be more authentic, which were a limitation in this study.

Conflict of Interest

None.

Authors' Contributions

The study was conceived, planned and designed by RA; data was collected and analysed along with drafting of the manuscript. HM analysed and interpreted the data. Both authors appraised and approved the manuscript.

Funding Support

None.

Availability of Data

Labour room record from DHQ Hospital acquired after following the permission procedure.

Ethics Approval and Consent

Ethical review clearance was acquired from the Institutional Review Board of District Headquarters hospital. An informed consent for participation in the data contribution was obtained from the mothers, prior to data collection.

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