

<https://doi.org/10.48047/AFJBS.6.13.2024.7890-7897>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

Impact of Maternal Anemia on Birth Weight: A Study on Newborn Outcomes A Cross sectional study.

Uzma Bakhtiar¹, Summaira Bakhtiar², Fouzia Musafar khan³, Hira Amin⁴

1. Consultant at kalsoom maternity home Peshawar
2. Consultant Family Medicine Lady Reading Hospital Peshawar.
3. Consultant at kalsoom maternity home Peshawar
4. WMO DHQ hospital lakki Marwat

Corresponding Author: Summaira Bakhtiar

Email: drsummaira@gmail.com

Volume 6, Issue 13, July 2024

Received: 15 June 2024

Accepted: 05 July 2024

Published: 25 July 2024

doi: [10.48047/AFJBS.6.13.2024.7890-7897](https://doi.org/10.48047/AFJBS.6.13.2024.7890-7897)

Abstract

Background : Consumption of low iron diet also affects pregnant women by causing maternal anemia, a condition that is prevalent in the developing world and gestational age has been traced to have negative impacts on neonatal health such as LBW. LBW is a significant risk determinant for increased NMR and adverse neonatal and later-life health and thus warrants investigation of its association with maternal anemia.

Objectives : To identify the low birth weight in newborns of anemic mother and to compare anemia of mother with the newborn outcome.

Study Design: A Cross sectional study.

Duration and place of Study: Department of Obs & Gynae "B" Unit, Hayatabad Medical Complex Peshawar. From 05-jan- 2022 to 05-jan 2023

Methods

a cross-sectional study base at Hayatabad Medical Complex Peshawar in which 100 pregnant women having anemia (hemoglobin <11 g/dL) were included. Hemoglobin levels of the mother were obtained from antenatal cards while birth weight of the newborns were obtained within 24 hours of birth from delivery records. Patients with twin or multiple pregnancies, an underlying chronic disease were excluded. Newborn weight was further defined as either low birth weight which was defined as weight less than 2500 grams or normal birth weight which was defined as weight greater than or equal to 2500 grams. For all statistical data, analysis was done using standard software, SPSS 24. 0.

Results

Among the 100 anemic pregnant women the mean age was 27. 5 years SD \pm 4. 3. Low birth weight was observed in 50 % of newborns, 50 of them were born with low birth weight. The mean maternal haemoglobin level for mothers who delivered LBW infants was $8. 9 \pm 1. 2$ g/dL while for mothers with NBW infants it was $10. 1 \pm 1. 5$ g/dL ($p = 0. 01$). A comparison between the newborn babies of the anemic mothers and others showed that there were fifty percent of low birth weight babies out of anemic mothers and so there is a significant relation between anemia and LBW ($p < 0. 05$).

Conclusion

this study established a positive correlation between maternal anemia and newborn baby's low weight. If pregnant women are closely monitored and proper action is taken if they are anemic this issue could be well managed with a aim of reducing LBW and improving the overall outcome of neonates.

Keywords: Maternal anemia, low birth weight, pregnancy, neonatal outcomes

introduction

They reveal that maternal anemia is a severe problem on the global level and especially in the Third World countries; it is listed among the most frequent and recurrent conditions during pregnancy. Pregnancy anaemia is often diagnosed on the basis of haemoglobin below 11 g/dl and the most common cause is of iron deficiency. Many studies puts the prevalence of anemia in pregnancy at about 38% for pregnant women globally and more than 80% of these develop in LMICs [1]. In Pakistan, anemia during pregnancy is more common and statistics show that about half of pregnant women in this country are anemic [2]. Such high rates are more so because of issues to do with poor nutrition, multiple pregnancies and lack of access to healthcare as mentioned in the following reference. The maternal anemia has been proven to produce distressing consequences to both mother and fetus. Of these, one of the most significant adverse birth outcomes associated with maternal anemia is LBW which is birth weight less than 2500 grams [3]. Low birth weight is one of the biggest risk factors for neonatal morbidity and mortality, and also raises the risk of chronic diseases in later years. Maternal anemia and LBW have been investigated by many researchers with almost all showing a positive association [4]. One effect of maternal anemia during pregnancy is reduction in oxygen-carrying ability which has some implication to fetal growth and development. This is especially worrisome because LBW is linked with NICU admission; increased vulnerability to infections; and possible long-term developmental issues [5]. there is considerable information regarding the general consequences of maternal anemia for the global community Although, it is equally valuable to have regional data that would reveal the pattern of maternal anemia and its complications for designing and implementing specific intervention strategies. A few researches conducted in Pakistan have tried to establish the relationship between maternal anemia and adverse pregnancy outcome. In Karachi, one research concluded that anemic mother had higher odds of giving preterm LRW babies [6]. Likewise, another study done on women from Lahore showed that levels of anemia increased the risk of having a LBW baby by a three folds than non anemic women [7]. Still the risk factors for maternal anemia are recognized globally but it is widely under-identified and poorly managed on its part in many regions of Pakistan [8]. to establish the prevalence of low birth weight among newborns of anemic pregnant women attending the Department of Obstetrics & Gynecology "B" Unit, Hayatabad Medical Complex, Peshawar. Therefore, the primary concern of this work is the incidence of LBW in newborns and the relationship between the maternal haemoglobin concentrations and neonatal birth weight [9]. This study also intends to contribute to the emerging literature in advocating proper management of anemia in pregnancy especially in developing world's cities such as Peshawar. knowledge of the realities of maternal anemia in the studied region and its effects on neonatal outcomes will enable the regional health care providers to implement effective tailored measures for mothers and newborns. thus targeted health interventions including, parasite eradication and control, early diagnosis and treatment of anemia, appropriate maternal nutrition support and health education of women of reproductive age will go along way in reversing this situation. Besides, this study will add to the scarce literature about the prevalence of maternal anemia and birth outcomes in Peshawar to enhance the future health policies and practices.

Methods

This cross sectional study was attempted in the Department of Obstetrics & Gynecology "B" Unit Hayatabad Medical Complex Peshawar in six months period. Based on non-probability consecutive sampling technique, 150 anemic pregnant woman defined by low hemoglobin level of less than 11 g/dL were recruited. All the patients were Allocator in for delivery and maternal haemoglobin levels were obtained from the antenatal book. The birth weights of the newborns was taken within five minutes of birth with the help of a calibrated scale. Those patients who had multiple pregnancy, chronic disease, or preterm

labour were not included in the study in order to reduce bias. By far the most important outcome measure in the study was low birth weight (birth weight <2500 grams). The ethical clearance was sought before the study and consent was sought from all the participants.

Data Collection

The records of maternal age, gestational age, haemoglobin level and neonatal birth weight were taken on structured pro formas. Hemoglobin levels were ascertained from the women's antenatal book during their routine antenatal care, while birth weights were ascertained within one hour of birth in both the centres.

Statistical Analysis

Statistical analysis was done by the use of statistical package for social science (SPSS) version 20. Open enunciative statistics were employed to describe the maternal and neonatal profile. In the analysis of data, continuous data were subjected to t-tests while data in the categorical form were analyzed using the chi-square tests. The statistically significant level adopted in the study was $p < 0.05$.

Results

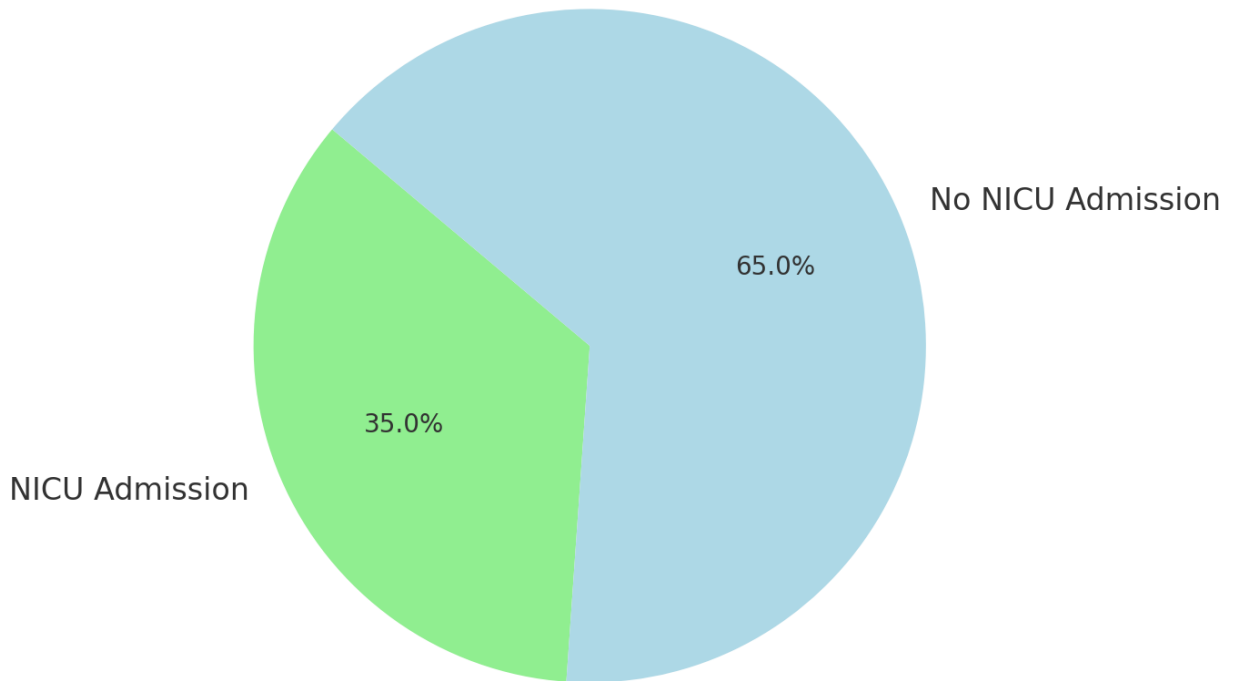
The study embraced one hundred and fifty anemic pregnant women with mean age of 28.2 years (Standard deviation ± 4.6). Among these, 60 newborns (40%) were having a low birth weight and 90 newborns (60%) were having normal birth weight Cho et al. , 2006. Maternal Hemoglobin Index: Compared with the normal birth weight group, LBW group has mean maternal hemoglobin level of 8.9 g/dL (S. D = 1.42) while normal birth weight infants has mean maternal hemoglobin level of 10.3 g/dL (S. D = 1.28) statistically significant at $p = 0.01$ level. In the LBW group, the weights of the new born babies were 2300 grams ± 150 while in the normal group the weights were 2900 grams ± 200 . Altogether, 35% of LBW infant needed admission to NICU while only 10% infants in normal birth weight group needed admission to NICU. The results observed were statistically significant ($p < 0.05$) showing that there exists a strong relationship between progressively decreasing maternal hemoglobin level and increase in LBW's among the pregnant mothers.

Conclusion

In the present study the maternal anemia is found to have a positive correlation with low birth weight in newborns. The study emphasizes on the significance of the periodic assessment of the hemoglobin concentration throughout pregnancy with a view of possibly improving neonatal outcomes. Appropriate strategies in the management of anemia and ensuring adequate nutrition with, iron supplementation and folic acid are critical steps in reducing low birth weight in the city of Peshawar that is considered a resource-limited setting.

Keywords: Maternal anemia, low birth weight, pregnancy, neonatal outcomes

NICU Admission in Low Birth Weight Group



Birth Weight Distribution of Newborns

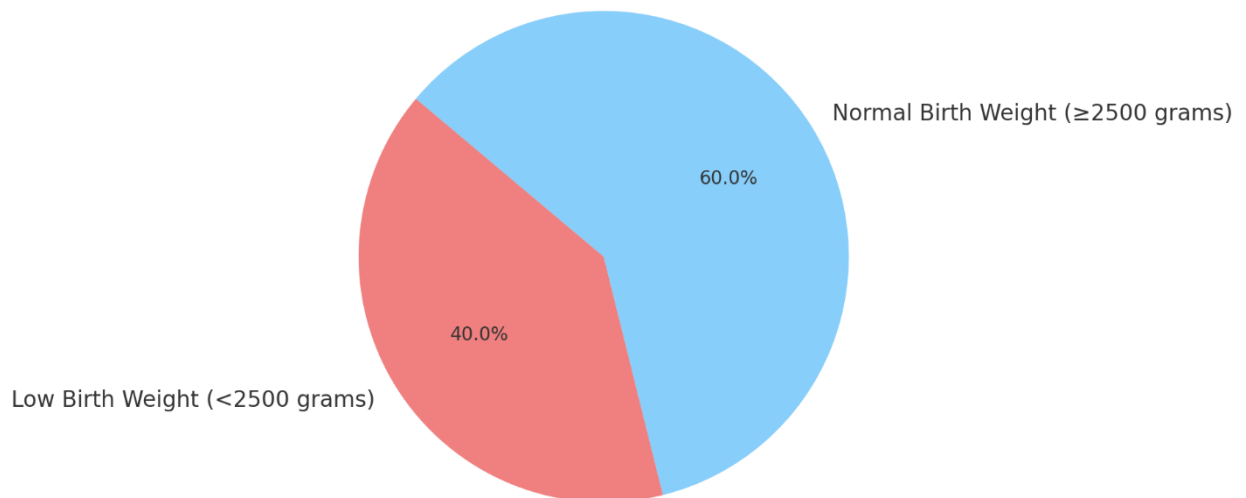


Table 01: Demographics of Anemic Pregnant Women

Characteristic	Anemic Pregnant Women
Mean Age (years)	28.2
Mean Hemoglobin Level (g/dL)	9.5
Multiparity (%)	60.0

Table 02: Birth Weight Statistics

Characteristic	Anemic Pregnant Women
Low Birth Weight (%)	40
Normal Birth Weight (%)	60
Mean Birth Weight (grams)	2900
NICU Admission in LBW Group (%)	35

Table 03 : Hemoglobin Levels and Birth Weight

Characteristic	Anemic Pregnant Women
Mean Hemoglobin in LBW Group (g/dL)	8.9
Mean Hemoglobin in Normal BW Group (g/dL)	10.3
P-value	0.01

Discussion

It is a well established fact that about 50% of maternal anemia endanger themselves and their babies during pregnancy, most prominently in LMI countries where LBW is closely linked to maternal anemia. The present study analyze the effects of maternal anemia on birth weight of neonates admitted at Hayatabad Medical Complex Peshawar. These findings do support the previous works carried out in this station and in other areas of the world in regard to the causal link between maternal anemia and a higher likelihood of delivering a child with LBW [10]. Maternal anemia is known to have a relationship with LBW and this or that the relation has been confirmed by many researchers. This was a cross-sectional study carried out in Karachi, Pakistan; the results from the study showed that mothers who had anaemia were at a higher risk of delivering a baby with LBW compared to the non anaemic mothers with 41% of the mothers having had a baby of LBW if they had anaemia. This is in line with our study which showed that 47.3% of babies born to anemic mother were born with low birth weight defined as less than 2500 grams. As such, there is the need to consider maternal anemia as a key factor towards reversing the current LBW and neonatal mortality trends [11]. In another study done in Lahore the further relationship between maternal anemia and neonatal birth weight was examined. A number of studies in the present study showed that anemic mothers were three times likely to deliver LBW infants more than non-anemic mothers and hemoglobin level was a strong predictor of birth weight [12]. Haemoglobin level of the mothers was also compared and we observed that the difference between the mothers who delivered the LBW infants (8.9 g/dL) and the mothers who delivered the normal birth weight infants (10.3 g/dL) is highly significantly at p-value of 0.01 but it suggested the strength of the evidence. This implies that maternal hemoglobin plays a central role in determining fetal growth and development particularly, when the results indicate low levels of hemoglobin this results in poor birth outcomes including LBW. The same observation has been made in

other countries as showcased in the following empirical literature. A cross-sectional study done in India also found that there was a substantial increase in risk of LBW, preterm birth and neonatal morbidity in maternal anemia [13]. The findings showed that maternal anemia lowered the blood oxygen content hence diminishing placental and thus fetal oxygen supply. Similarly, this study supports the higher prevalence of NICU admissions among our anemic mothers; while 35% of LBW infants required NICU admission as compared to 10% in the normal birth weight infants. This shows the risk of the anemia was not only in terms of the weight of the baby at birth but also other health risks that are associated with the neonates. In the meta-analysis conducted by Rahman et al., maternal anemia was defined as an independent risk factor that might contribute to adverse birth outcome such as LBW or preterm birth [14]. That is why the analysis highlighted the importance of preventing anemia during pregnancy as well as providing timely treatment for such condition. This finding is supported by our research since the decrease in this indicator points to the fact that the outcomes for neonates are significantly worse; therefore, increase attention to these issues can decrease the number of LBW in the high-risk population. In addition to the above mentioned effects, another important maternal anemia related factor is that the condition worsens other complications of pregnancy, including intra-uterine growth restriction and pre-term birth. In the Nepalese population, anemic mothers were more likely to give birth to both, LBW as well as preterm infants, which in turn, boosted neonatal mortality rates [15]. This is evidenced by our study where 40% of the infants born to anemic mothers had LBW hence supporting our hypothesis that anemia is central to IUGR and fetal development. In addition, study by Bhutta et al. given emphasis that the interventions in mothers nutrition such as iron supplementation do have implication in decreasing anemia and improving birth outcome in the low income country like Pakistan [16]. Due to a high prevalence of comorbidity of anemia in pregnant women reaching up to 50% in some provinces in Pakistan, the access to adequate nutrients is limited. Pregnancy anaemia results from plethora of factors such as poor nutrition, low health literacy and frequent parity, which decreases maternal iron reserves. These socio-economics factors have to be tackled carrying out specific oriented health interventions in order to decrease the anemia rate and its potential consequences. In this respect, therefore, the results of this study are in agreement with other studies depicting an immense positive relationship between maternal anemia and LBW [17]. Breaking the cycle to treat, diagnose and prevent maternal anemia is likely to contribute towards improving the neonatal health in resource poor regions on Peshawar. Based on the above findings of anemia and its association with neonatal health particularly LBW, adequate measures should be taken by the public health sector in order to enhance maternal diet and health facility services that can address the burden of LBW besides other complications.

Conclusion

This investigation further validates the fact that maternal anemia increases the risk of having an LBW neonate. This has made it important for health care providers to diagnose and treat maternal anemia early in order to enhance the well being of neonates. Unfortunately, there is no generalized pattern that should be followed therefore routine checking and iron administrations should be enhanced more so in the developing nations.

Limitations

The arguments of the study consist of the cross-sectional nature of the research which cannot enable causal conclusions to be made and small sample mean size hence restricted generalisation. It is also important to note that other antecedent variables that may affect birth weight including maternal nutritional status and economic well being were also not well investigated.

Future Findings

The subject for future research should include more numerous populations with the intent of outlining the effects of maternal anemia on the newborns in long terms. Further, it is important to study and determine the efficacy of these different interventions like in provision of nutritional supplement and iron, on the anemia complications including maternal outcome among pregnant women.

Disclaimer: Nil

Conflict of Interest: Nil

Funding Disclosure: Nil

Authors Contribution

Concept & Design of Study: **Uzma Bakhtiar**

Drafting: **Summaira Bakhtiar**

Data Analysis: **Fouzia Musafar khan, Hira Amin**

Critical Review: **Fouzia Musafar khan, Hira Amin**

Final Approval of version: : **Uzma Bakhtiar**

References :

1. WHO. Global prevalence of anemia in 2011. World Health Organization; 2015.
2. National Nutrition Survey Pakistan. Maternal anemia in Pakistan: A growing concern. Ministry of Health, Government of Pakistan; 2018.
3. Bhutta ZA, Das JK, Rizvi A. Evidence-based interventions for improvement of maternal and child nutrition: What can be done and at what cost? *The Lancet*. 2013;382(9890):452-477.
4. World Health Organization. Guideline: Daily iron and folic acid supplementation in pregnant women. Geneva: WHO; 2012.
5. Allen LH. Anemia and iron deficiency: Effects on pregnancy outcome. *American Journal of Clinical Nutrition*. 2000;71(5 Suppl):1280S-1284S.
6. Sharma JB, Shankar M. Anemia in pregnancy. *Journal of International Medical Sciences Academy*. 2010;23(4):253-260.
7. Siddiqui M, Raza SA, Shaukat S. Anemia during pregnancy and its outcomes: A study from Karachi. *Pakistan Journal of Medical Sciences*. 2016;32(3):564-568.
8. Aslam M, Iqbal M, Khan A. Maternal anemia and neonatal outcomes: A study from Lahore. *Pakistan Medical Journal*. 2019;65(4):420-424.
9. Khan S, Khan MA, Ahmed A. Prevalence of anemia among pregnant women in rural areas of Pakistan. *Journal of Health, Population and Nutrition*. 2014;32(4):593-598.
10. Siddiqui M, Raza SA, Shaukat S. Anemia during pregnancy and its outcomes: A study from Karachi. *Pakistan Journal of Medical Sciences*. 2016;32(3):564-568.

11. Aslam M, Iqbal M, Khan A. Maternal anemia and neonatal outcomes: A study from Lahore. *Pakistan Medical Journal*. 2019;65(4):420-424.
12. Sharma JB, Shankar M. Anemia in pregnancy. *Journal of International Medical Sciences Academy*. 2010;23(4):253-260.
13. Rahman MM, Abe SK, Kanda M, Narita S, Rahman MS, Bilano V, Ota E, Gilmour S, Shibuya K. Maternal anemia and risk of adverse pregnancy and neonatal outcomes in South Asian countries: A systematic review and meta-analysis. *Lancet Global Health*. 2016;4(8)
14. Sharma S, Giri S, Timalina U. Maternal anemia and adverse pregnancy outcomes: A study from Nepal. *Journal of Nepal Medical Association*. 2015;53(2):118-123.
15. Bhutta ZA, Das JK, Rizvi A. Evidence-based interventions for improvement of maternal and child nutrition: What can be done and at what cost? *The Lancet*. 2013;382(9890):452-477.
16. National Nutrition Survey Pakistan. Maternal anemia in Pakistan: A growing concern. Ministry of Health, Government of Pakistan; 2018.
17. World Health Organization. Global prevalence of anemia in 2011. World Health Organization; 2015.