

ORIGINAL ARTICLE

Association of Low Ferritin Level of new Born with Iron Deficiency Anemia in MothersSAIQA ZAHOOR¹, AQSA LATIF², HAMDAD KHAN³, MAIDA KHALID⁴, SYEDA ZAINAB KANWAL BUKHARI⁵, SHAZIA AMBREEN⁶¹Associate professor, Hayatabad Medical Complex, Peshawar²Consultant Gynae & Obstetric, Afridi medical complex and teaching hospital, Peshawar^{3,4,5,6}Trainee medical officer (Hematology), Hayatabad Medical Complex, PeshawarCorresponding author: Aqsa latif, Email: aqsalatif91@gmail.com**ABSTRACT****Background:** Iron deficiency and iron-deficiency anemia (IDA) affect around 2 billion individuals all over the globe. IDA is a problem for pregnant women in developing countries.**Objective:** To assess the association of low ferritin level of new born with iron Deficiency Anemia in Mothers**Methodology:** The current descriptive study was carried out at the Hematology Department, Hayatabad Medical Complex, Peshawar from January 2022 to July 2022. All the data including age, gender and lab parameters was documented in a proforma designed for this research. IBM SPSS version 23 was employed for analysis of data.**Results:** In the current research, totally 150 antenatal mothers having hemoglobin ≤ 10.5 gm/dl were enrolled. The mean age of our study participants was 26 years with standard deviation of ± 1.56 . Among pregnant women with iron deficiency, the overall frequency of low ferritin level was 90 (60%). In distribution of women based on severity of low ferritin levels amongst 90 women, 41 (45.56%) women were observed with mild low ferritin levels, 43 (47.78%) women were observed with moderate low ferritin levels while 6 (6.66%) women were observed with severe low ferritin levels.**Conclusion:** In the present research, it was shown that there was a high frequency of low ferritin levels in newborns amongst women with iron deficiency anemia during pregnancy. Based on our findings we concludes that low ferritin level of newborns is strongly associated with the with iron Deficiency Anemia in Mothers.**Keywords:** Iron Deficiency Anemia; Ferritin levels; Pregnancy**INTRODUCTION**

Iron deficiency and iron-deficiency anemia (IDA) affect around 2 billion individuals all over the globe ¹. Anemia has long attracted attention from individuals all across the globe. It is a relatively common haematological disorder in developing and poor countries, particularly in susceptible population like females, children and adolescents who are of reproductive age ². Iron deficiency anemia (IDA) is a problem for pregnant women in developing countries because their bodies often have low or depleted amounts of iron at the beginning of the pregnancy. The severity of anemia is usually severe, and it commonly coexists with maternal malnutrition ³. It is possible that the normal maternal-fetal iron homeostasis will be disrupted in these circumstances due to the conflicting needs of the mother and the developing fetus ⁴⁻⁶. There are a variety of consequences that might occur for both the mother and the fetus, including premature delivery, intrauterine growth retardation, postnatal and newborn death ⁴. Since maternal iron is the major source of iron for newborns up to the age of six months, it makes sense to investigate how IDA during pregnancy affects the developing fetus and its children ⁷. Only a lot of studies have ferritin-level information during certain gestational ages. Median ferritin levels have been found to be 45 g/l between weeks 14 and 16 of pregnancy and 200 g/l by week 39 of pregnancy ⁸. Fetuses without pathologic maternal fetal conditions who had percutaneous umbilical blood sampling showed an increase in average plasma ferritin from 17.7g/l at 18-20 weeks of gestation to 56.8g/l at 32-35 weeks of gestation ⁹. Preterm infants whose birth weights fell between 600 and 2,000 gram were also found to exhibit this pattern. The goal of this research was to evaluate the relationship between mothers' iron deficiency anemia and newborns' low ferritin levels. The newborn's haematological condition is impacted by maternal anemia, which may not be evident at delivery but becomes clear after two to three months. This highlights the importance of preventing maternal anemia for the health of both mothers and their children.

MATERIALS AND METHODS

The current descriptive study was carried out at the Hematology Department, Hayatabad Medical Complex, Peshawar for a duration of six months from January 2022 to July 2022. The ethical approval of the study was taken from the IRB of the hospital. A total of 160 patients were enrolled in our study by using sample

size calculator of WHO. The criteria for inclusion in our study were all the antenatal mothers having age 20-30 years, primigravida and multigravida females with hemoglobin level ≤ 10.5 gm/dl at term in ward and females want to participate in our research while all the females with Pregnancy-induced hypertension, antepartum hemorrhage, diabetes, HIV, kidney diseases, heart diseases, females with multiple pregnancy and female who received transfusion of blood were not included in our research. The informed consent was taken from all the participants of the current research. Blood was drawn from the umbilical cord soon after it was clamped and from the mother's veins while she was in labor (or before a caesarean delivery, if necessary) so that a complete blood count (CBC) could be performed to measure mother and the newborn's haemoglobin and serum ferritin levels. All the data including age, gender and lab parameters was documented in a proforma designed for this research. IBM SPSS version 23 was employed for analysis of data. Age and laboratory parameters were documented as mean (\pm SD) while gender and frequency of ferritin low level in patients were documented as percentage and frequency.

RESULTS

In the current research, totally 150 antenatal mothers having hemoglobin ≤ 10.5 gm/dl were enrolled. The mean age of our study participants was 26 years with standard deviation of ± 1.56 . Based on age distribution, 30 (20%) participants were 20-25 years while 120 (80%) patients were observed in 26-30 years age group. (Figure 1) Based on hemoglobin level of participants with iron deficiency anemia, 52 (34.67%) women were observed with mild iron deficiency anemia, moderate iron deficiency anemia was observed in 87 (58%) women while 13 (8.67%) women were observed with severe iron deficiency anemia. (Figure 2) Among pregnant women with iron deficiency, the overall frequency of low ferritin level was 90 (60%).(Figure 3) In distribution of women based on severity of low ferritin levels amongst 90 women, 41 (45.56%) women were observed with mild low ferritin levels, 43 (47.78%) women were observed with moderate low ferritin levels while 6 (6.66%) women were observed with severe low ferritin levels. (Figure 4)

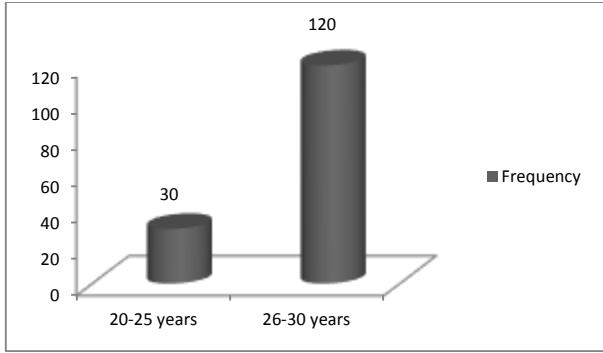


Figure 1: Distribution of participants based on age

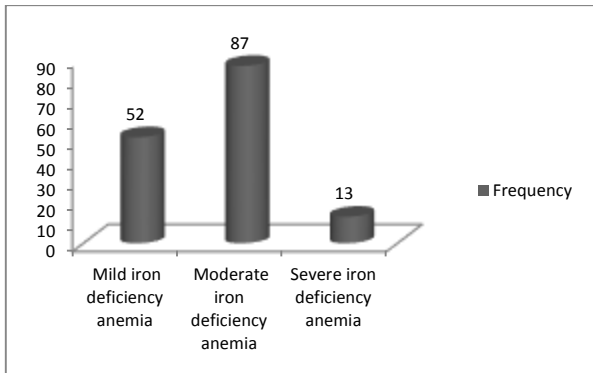


Figure 2: Participants (mothers) distribution based on hemoglobin level

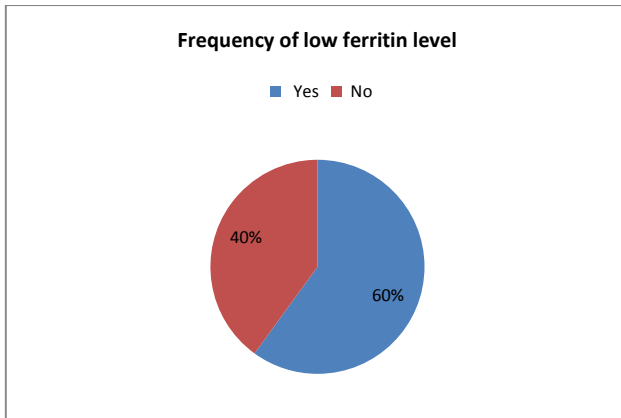


Figure 3: Frequency of low serum ferritin level of newborn in women with iron deficiency anemia

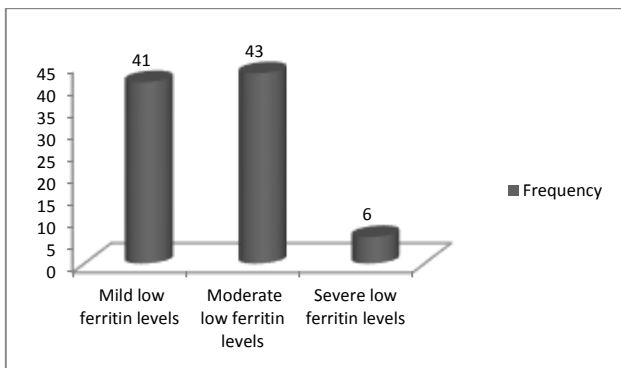


Figure 4: Participants (Newborn) distribution based on severity of low level of ferritin

DISCUSSION

In underdeveloped nations, iron deficiency (ID) is the most frequent micronutrient deficiency¹⁰. ID is also the leading cause of nutritional anemia. Due to the higher metabolic needs of pregnancy, which are brought on by the growing placenta, fetus, and maternal tissues, as well as the related nutritional concerns, pregnant women are more susceptible to ID¹¹.

In the current research, totally 150 antenatal mothers having hemoglobin ≤ 10.5 gm/dl were enrolled. The mean age of our study participants was 26 years with standard deviation of ± 1.56 . Based on age distribution, 30 (20%) participants were 20-25 years while 120 (80%) patients were observed in 26-30 years age group. In accordance with our study, another study carried out by Gerald Obai et al. reported predominance of patients in their study in age group 20-25 years¹². Another study done by Berhan EF et al. reported that 77.5% of their study participants were observed in range of 20-25 years¹³. Other studies also reported similar findings to our study^{14,15}.

Based on hemoglobin level of participants with iron deficiency anemia, 52 (34.67%) women were observed with mild iron deficiency anemia, moderate iron deficiency anemia was observed in 87 (58%) women while 13 (8.67%) women were observed with severe iron deficiency anemia. In accordance with our study, another study carried out by NB Shaikh et al. reported that mild, moderate and severe iron deficiency anemia amongst their study participants was observed in 31.52%, 61.41% and 7.07% women respectively¹⁶. Another study done by Qazi et al. reported mild anemia in 52.5% participants, mild anemia in 27.5% and severe anemia in 19.9% which is consistent with our findings¹⁷. In accordance with our study, another study carried out by Vanamala et al reported that mild, moderate and severe iron deficiency anemia amongst their study participants was observed in 34.3%, 58% and 7.8% women respectively¹⁸. Another study carried out by Kefiyalew et al. reported majority of the patients with moderate anemia¹⁹.

Among pregnant women with iron deficiency, the overall frequency of low ferritin level was 90 (60%). In distribution of women based on severity of low ferritin levels amongst 90 women, 41 (45.56%) women were observed with mild low ferritin levels, 43 (47.78%) women were observed with moderate low ferritin levels while 6 (6.66%) women were observed with severe low ferritin levels. In accordance with our study, another study carried out by NB Shaikh et al. reported that mild, moderate and severe Low ferritin level in newborns were observed in 48.15%, 45.37%, and 6.48% respectively¹⁶. Another study piloted by Shams et al. reported that 43.5% of the newborns were in range of 12–30 ng/ml Serum ferritin levels²⁰. Women during pregnancy in Pakistan have been found to be at risk for anemia due to dietary inadequacies and poverty, as well as other variables including menstruation, malaria, intestinal helminthes infection, and drugs that decrease hemopoiesis. Anemia was more likely to occur in pregnant women who did not take iron supplements throughout their pregnancies compared to those women who take supplements²¹. Due to the increased iron needed to support the mother's rising blood volume and the fast development of the baby and placenta, iron insufficiency may occur during pregnancy, which might explain these problems.

CONCLUSION

In the present research, it was shown that there was a high frequency of low ferritin levels in newborns amongst women with iron deficiency anemia during pregnancy. Pregnant women and their children in Pakistan face a serious health risk due to anemia. Based on our findings we concludes that low ferritin level of newborns is strongly associated with the with iron Deficiency Anemia in Mothers.

REFERENCES

1. Mantadakis E, Chatzimichael E, Zikidou P. Iron deficiency anemia in children residing in high and low-income countries: risk factors,

- prevention, diagnosis and therapy. *Mediterr J Hematol Infect Dis*. 2020;12(1).
2. Dalal E, Shah J. A comparative study on outcome of neonates born to anemic mothers versus non anemic mothers. *National journal of medical research*. 2014;4(04):270-3.
 3. Kumar A, Rai AK, Basu S, Dash D, Singh JS. Cord blood and breast milk iron status in maternal anemia. *Pediatrics*. 2008;121(3):e673-e7.
 4. Terefe B, Birhanu A, Nigusie P, Tsegaye A. Effect of maternal iron deficiency anemia on the iron store of newborns in Ethiopia. *Anemia*. 2015;2015.
 5. Ozdemir H, Akman İ, Demirel U, Coskun S, Bilgen H, Ozek E. Iron deficiency anemia in late-preterm infants. *Turk J Pediatr*. 2013;55(5):500-5.
 6. El-Farrash RA, Ismail EAR, Nada AS. Cord blood iron profile and breast milk micronutrients in maternal iron deficiency anemia. *Pediatr Blood Cancer*. 2012;58(2):233-8.
 7. Chaparro CM. Setting the stage for child health and development: prevention of iron deficiency in early infancy. *The Journal of nutrition*. 2008;138(12):2529-33.
 8. Siddappa AM, Rao R, Long JD, Widness JA, Georgieff MK. The assessment of newborn iron stores at birth: a review of the literature and standards for ferritin concentrations. *Neonatology*. 2007;92(2):73-82.
 9. Carpani G, Marini F, Ghisoni L, Buscaglia M, Sinigaglia E, Moroni G. Red cell and plasma ferritin in a group of normal fetuses at different ages of gestation. *Eur J Haematol*. 1992;49(5):260-2.
 10. Krafft A, Huch R, Breymann C. Impact of parturition on iron status in nonanaemic iron deficiency. *Eur J Clin Invest*. 2003;33(10):919-23.
 11. Picciano MF. Pregnancy and lactation: physiological adjustments, nutritional requirements and the role of dietary supplements. *The Journal of nutrition*. 2003;133(6):1997S-2002S.
 12. Obai G, Odongo P, Wanyama R. Prevalence of anaemia and associated risk factors among pregnant women attending antenatal care in Gulu and Hoima Regional Hospitals in Uganda: A cross sectional study. *BMC Pregnancy Childbirth*. 2016;16(1):1-7.
 13. Feleke BE, Feleke TE. Pregnant mothers are more anemic than lactating mothers, a comparative cross-sectional study, Bahir Dar, Ethiopia. *BMC hematology*. 2018;18(1):1-7.
 14. Sapre SA, Raihatha NS, Bhattacharjee RS. Severe anemia in late pregnancy: a retrospective study at a tertiary care rural medical college in Gujarat, India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2018;7(3):1113.
 15. Maka SS, Tondare SB, Tondare MB. Study of impact of anemia on pregnancy. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017;6(11):4847-51.
 16. Shaikh NB, Naz F, Hassan N, Memon S, Shaikh MS, Shaikh S. Association Of Iron Deficiency Anemia In Mothers With Low Ferritin Level Of New Born. *Journal of The Society of Obstetricians and Gynaecologists of Pakistan*. 2021;11(3).
 17. Qazi RA, Wagan F, Taqi T, Hashmi IQJ, Hashmi KK, Hashmi AR, et al. Prevalence of Anemia in pregnancy at District Shaheed Benazir Abad, Sindh. *PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES*. 2018;12(3):1114-6.
 18. Vanamala V, Rachel A, Pakyanadhan S. Incidence and outcome of anemia in pregnant women: a study in a tertiary care centre. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2018;7(2):462-7.
 19. Kefiyalew F, Zemene E, Asres Y, Gedefaw L. Anemia among pregnant women in Southeast Ethiopia: prevalence, severity and associated risk factors. *BMC Res Notes*. 2014;7(1):1-8.
 20. Shams S, Ahmed Z, wadood A. Prevalence of iron deficiency anemia in pregnant women of Mardan district. *Pakistan J Preg Child Health*. 2017;4:356.
 21. Wagura P, Wasunna A, Laving A, Wamalwa D, Ng'ang'a P. Prevalence and factors associated with preterm birth at kenyatta national hospital. *BMC Pregnancy Childbirth*. 2018;18(1):1-8.