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A Hospital Based Observational Study Assessing the Impact of Maternal Anemia on Perinatal Outcome

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ABSTRACT

The present study aimed to find the impact of maternal anemia on perinatal outcomes. The present study was conducted in the field practicing area of the Community Medicine department for a period of one year and 100 pregnant women were included in the study. The majority (43 and 39%) of pregnant women fell into the age groups of 25-29 and 20-24 years respectively. Only 9% of the pregnant women were <20 years old, while 9% were older than 30 years. With higher levels of education, there was a reduction in the severity of anemia, however, this difference did not reach statistical significance. 44% of the women were second gravid. The majority of pregnant women had moderate levels of anemia, accounting for 49% of cases, while mild anemia was seen in 45% of women and severe anemia in 4% of women. Iron deficiency anemia, which accounts for 69% of cases, is the most common kind of anemia among pregnant women. Sickle cell anemia comes in second at 16%, while other causes account for 11% of cases. The prevalence of different maternal outcomes associated with anemia indicates that the most often seen result is low birth weight, accounting for 31% of cases, followed by early delivery at 24%. The prevalence of different foetal outcomes in anemic mothers is as follows: preterm birth (15%), admission to the neonatal intensive care unit (13%) and foetal growth restriction (9%). Treating anemia before conception is crucial since it is a significant factor contributing to adverse outcomes for both the foetus and the mother. It is necessary to enhance health education initiatives and ensure sufficient consumption of iron-rich food during pregnancy to improve maternal and foetal outcomes.

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Key Words

Anemia, prevalence, pregnant women, preterm delivery, LBW, stillbirth

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INTRODUCTION

Anemia is a prevalent nutritional deficiency illness that often affects pregnant women. The prevalence rate in affluent nations is 14%, whereas in underdeveloped countries it is 51%. In India, the prevalence rate ranges from 65-75%[1,2]. The majority of the recorded cases of anemia in women occur during the third trimester of pregnancy. This is because the demand for iron increases to 6.6 mg per day during this time, due to a disproportionate rise in plasma volume and red cell mass. This leads to hemodilution, which in turn reduces the amount of hemoglobin. Anemia during pregnancy is often linked to adverse pregnancy outcomes and may result in maternal complications such as Prolonged labor and is associated with a higher occurrence of post-partum hemorrhage, as well as an increased risk of premature delivery, low birth weight, small-for-gestational age babies and prematurity[3-5].

According to the World Health Organization (WHO)[6], the occurrence of anemia among pregnant women in underdeveloped nations is on average 56%, with variations ranging from 35-100% across various areas globally. Currently, it is among the most often seen nutritional disorders worldwide. It is most common in women who are of reproductive age, especially during pregnancy. One study done on a significant population found that 87% of pregnant women in India suffer from anemia[7]. The precise impact of maternal anemia on maternal and newborn health remains unknown[8]. The occurrence of iron shortage during pregnancy is believed to be the result of a combination of circumstances, including reduced iron availability before to pregnancy, the increased iron needs of the developing foetus and the growth of the mother's plasma volume[9,10]. Maternal anemia during pregnancy is well recognized as a risk factor for adverse pregnancy outcomes and poses a danger to the lives of both the mother and the foetus[11,12]. The WHO classifies anemia based on hemoglobin (HB) concentrations, with a value of <11 g dL^{-1} being suggestive of anemia. A concentration of 10-10.9 g dL^{-1} is considered mild anemia, whereas a value of 7-9.9 g dL^{-1} is considered moderate anemia and HB concentration below 7 g dL^{-1} is classified as severe anemia. The precise impact of maternal anemia on maternal and newborn health remains unknown[13]. The occurrence of iron shortage during pregnancy is believed to result from a variety of causes, including reduced iron availability before pregnancy, the iron needs of the developing foetus and the growth of the mother's plasma volume[14]. The objective of this research is to determine the impact of maternal anemia on perinatal outcomes.

MATERIALS AND METHODS

The present study was conducted in the field practicing area of the Community Medicine Department of Siddhartha Medical College, Vijayawada, Andhra Pradesh, this study was carried out for a period of one year and included 100% women by following a convenient sampling technique.

We included all the women who fulfilled the following:

Inclusion criteria:

- Attended the outpatient clinic before 16 weeks of gestation
- Age 16 years and above
- Singleton pregnancy
- Had complete medical records of the pregnancy

Women with a history of preterm delivery, obstetric complications, medical illnesses, except anemia, were excluded.

Data collection was conducted using the hospital's records, after ethical approval from the institutional ethics committee and informed consent. The individuals were categorized based on the WHO criteria. Hemoglobin levels were measured using Sahli's technique. Information on therapy, such as oral iron, intravenous iron, blood transfusion, as well as the methods of delivery and maternal and perinatal outcomes, were obtained from the records.

Anemia exposure was defined as having a hemoglobin level below 11 g dL^{-1} during labor and on two earlier occasions in the present pregnancy. On the second day after giving birth, women were questioned in the local language. The information obtained from the interviews, as well as the medical records, were documented using a pre-designed questionnaire. Height and weight were documented at every prenatal appointment, while hemoglobin levels were assessed during the first visit, at 28-32 weeks, at 33-37 weeks, and during birth. Women with a hemoglobin level below 11 g dL^{-1} were given oral iron. Those with a hemoglobin level below 7 g dL^{-1} in the third trimester were provided with either a blood transfusion or intravenous iron treatment. The medical records were examined to gather data on gestational age at delivery, perinatal outcome (including live birth, stillbirth and intrauterine death), as well as information on intrauterine growth retardation (IUGR) and the specific type of IUGR. The health condition of the newborn, as well as the occurrence and reasons behind perinatal death, were recorded.

Data analysis: The data were recorded in an Excel sheet, descriptive analysis was performed and results were expressed in numbers and percentages.

RESULTS

Most (43 and 39%) of the pregnant women were in the 25-29 and 20-24 years of age group. Only 9% of the pregnant women were <20 years of age and 9%

Table 1: Demographic details of the study participants

Age in years	No. of percentage
<20	9 (9)
20-24	39 (39)
25-30	43 (43)
>30	9 (9)
Education	
Illiterate	13 (13)
Primary	15 (15)
Middle	21 (21)
High school	29 (29)
Intermediate	21 (21)
Graduate	1 (1)
Parity status	
Primi gravida	31 (31)
Second gravida	44 (44)
Multigravida	25 (25)
Degree of anemia	
Mild	45 (45)
Moderate	49 (49)
Severe	6 (6)

Table 2: Distribution of study participants based on anemia.

Type of Anemia	No. of percentage
Iron Deficiency Anemia	69 (69)
Sickle cell anemia	16 (16)
Thalassemia	1 (1)
Dimorphic anemia	2 (2)
Megaloblastic anemia	1 (1)
Others	11 (11)

Table 3: Maternal outcome among the study participants

Complication during pregnancy	No. of percentage
Low birth weight.	31 (31)
Obstructed labor	1 (1)
Prolonged labor	3 (3)
Premature delivery	24 (24)
Preeclampsia	3 (3)
PPH	2 (2)
LSCS	36 (36)

Table 4: Fetal outcome among the study participants

Fetal outcome	No. of percentage
Full term delivery	62 (62)
Preterm delivery	15 (15)
IUD	1 (1)
FGR	9 (9)
NICU admission	13 (13)

were >30 years. As the level of education increased, the severity of anemia decreased although the difference is not statistically significant. Most of the patients were second gravid i.e. 44%. Most of the pregnant women were moderately anaemic i.e. 49% followed by mild (45%) and severe (4%) respectively. Among pregnant women, the most common type of anemia is Iron deficiency anemia (69%) followed by Sickle cell anemia (16%) and other causes (11%).

The distribution of various maternal outcomes related to anemia is mostly found to be low birth weight (31%) followed by premature delivery (24%). The distribution of various fetal outcomes in anemic mothers in the form of preterm (15%) followed by NICU admission (13%) and FGR (9%).

DISCUSSIONS

Pregnant women in underdeveloped countries frequently suffer from anemia. The pregnancy outcomes exhibit variability based on the kind of anemia. Research has shown variations in results between iron deficiency and physiological anemia during pregnancy[12]. In societies with a low prevalence of anemia among non-pregnant women, the main reason for anemia during pregnancy is probably the increase in plasma volume. This kind of anemia is not linked to worse delivery outcomes[13]. Maternal hemoglobin levels during pregnancy have a U-shaped connection with low birth weight (LBW) and preterm delivery, with high rates of LBW seen at both low and high concentrations of maternal hemoglobin. However, part of this correlation may be due to the use of "lowest hemoglobin" instead of a hemoglobin number that is adjusted for the stage of pregnancy.

With the rise in education level, the severity of anemia reduced, albeit the observed difference is not statistically significant. Approximately 44% of the patients were second gravid. The majority of pregnant women had moderate anemia, accounting for 49% of cases, while mild anemia accounted for 45% and severe anemia accounted for 4%. This was consistent with the findings of Alli *et al*.[14] where the prevalence of anemia among women in the same age group was 40% and Upadhyay *et al*.[15] where it was 46.7%. Maternal anemia is recognized as a risk factor for adverse pregnancy outcomes and poses a danger to the survival of the foetus. Available data from India suggest that anemic women had higher rates of maternal morbidity[7,16]. Anemia is a prevalent factor contributing to maternal mortality in India, responsible for 20% of all maternal fatalities[17]. The prevalence of different foetal outcomes in anemic mothers is as follows: preterm birth (15%), admission to the Neonatal Intensive Care Unit (NICU) (13%) and foetal growth restriction (FGR) (9%). These findings align with the observations made by Upadhyay *et al*.[15] where the rates of preterm births were 20%, intrauterine growth restriction (IUGR) was 11.5% and intrauterine death (IUD) was 3%. Similarly, Awasthi *et al*.[18] reported rates of PT (9.5%), IUGR (37.5%) and IUD (8%). These results are also consistent with the study conducted by Rangnekar *et al*.[19] which reported rates of PT (73%), IUGR (4%) and IUD (16%)[15]. The most prevalent form of anemia among pregnant women is iron deficiency anemia, accounting for 69% of cases. Sickle cell anemia is the second most frequent kind, making up 16% of cases. The remaining 11% of cases are caused by other factors. This distribution of anemia types is consistent with the findings of research conducted by Lagoo *et al*.[20] which reported a 17% prevalence of sickle cell anemia in Chhattisgarh. The Cochrane review of 2009 indicates that microcytic hypochromic anemia caused by a lack of iron is the most common kind of anemia, accounting for 76% of cases. This is followed by anemia caused by a shortage in folate (20%) and a combination of iron and folate in

sufficiency (20%)[20,21]. The prevalence of different maternal outcomes associated with anemia was examined, with low birth weight being the most often seen (31%), followed by preterm delivery (24%), consistent with the findings of the research conducted by Nair *et al*[22].

CONCLUSION

Anemia is often overlooked among pregnant women in our rural population and impoverished groups in our cities. However, this is a significant concern for both the mother and the child and should be addressed as a matter of urgency. To enhance the health outcomes for both mothers and foetus, it is advisable to enhance primary health care services, with a particular focus on promoting the intake of iron and folic acid throughout pregnancy. To mitigate these consequences, it is essential to implement early screening for anemia and provide appropriate, efficacious treatment and counseling.

REFERENCES

1. Marahatta, R., 2007. Study of anemia in pregnancy and its outcome in nepal medical college teaching hospital, kathmandu, nepal. Nepal. Med. Coll. J., 9. 270-274.
2. Kalaivani, K., 2009. Prevalence and consequences of anemia in pregnancy. Indian. J. Med. Res., 130. 627-633.
3. Haider, B.,A.I. Olofin and M. Wang, 2013. Anemia, prenatal iron use, and risk of adverse pregnancy outcomes: systematic review and meta-analysis. Bmj., Vol. 21 .10.1136/bmj.f3443
4. Kavle, J.,A.R.J. Stoltzfus and F. Witter, 2008. Association between anemia during pregnancy and blood loss at and after delivery among women with vaginal births in pemba island, zanzibar, tanzania. J. Health. Popul. Nutr., 26: 232-240.
5. C.R.R.M., 2008. Center for Reproductive Rights. Maternal mortality in India: using International and Constitutional Law to Promote Accountability and Change Center for Reproductive Rights., New York., ISBN-31: 1-890671-38-X 978-1-890671-38-9,
6. W.H.O, 1992. The Prevalence of Anemia in Women: A Tabulation of Available Information. 2nd Ed. Edn., Geneva,
7. Ahmad, M.,O. and U. Kalsoom, 2011. Effect of maternal anemia on birth weight. J. Ayub. Med. Coll. Abbottabad., 23: 77-79.
8. Cohen, J.H. and J.D. Haas, 1999. Hemoglobin correction factors for estimating the prevalence of iron deficiency anemia in pregnant women residing at high altitudes in bolivia. Rev. Panamericana. Salud. Pública., 6. 392-399.
9. DeMaeyer, E.,A.M. and Adiels-Tegman, 1985. The prevalence of anemia in the world. World. Health. Stat. Q., 38. 302-316.
10. Pappas, G.,T. and Akhtar, 2001. Health status of the Pakistani population: a health profile and comparison with the United States. Am. J. Public. Health., 91: 93-98.
11. Awour, I.E., Y. Abed and M. Ashour, 2012. Determinants and risk factors of neonatal mortality in the gaza strip, occupied palestinian territory: A case-control study. Lancet., 380: 25-26.
12. Duthie, S.J., P.A. King, W.K. To, A. Lopes and H.K. Ma, 1991. A case controlled study of pregnancy complicated by severe maternal anaemia. Aust. New. Zealand. J. Obstet. Gynaecology., 31: 125-127.
13. Whittaker, P., S. macphail and T. LIND, 1996. Serial hematologic changes and pregnancy outcome. Obstet. Gynecol., 88: 33-39.
14. Alli, R.,M. and Satyanarayana, 1985. Anemia complicating pregnancy. J. Obstet. Gynecol. Ind., 35: 335-358.
15. Upadhyay, C. and N. Upadhyay, 2017. Effect of anemia on pregnancy outcome: A prospective study at tertiary care hospital. Int. J. Reprod. Contraception. Obstet. Gynecol., 6: 5379-5383.
16. Ivan, E.A., 2013. Evaluation of anaemia in booked antenatal mothers during the last trimester. J. clin. diagno. res., Vol. 7. 10.7860/jcdr/2013/6370.3586
17. Singh, R.,R. Chauhan and D. Nandan, 2012. Morbidity profile of women during pregnancy: A hospital record based study in western UP. Ind. J. Comm. Health., 24: 342-346.
18. Awasthi, A. and R. Thakur, 2001. Maternal and perinatal outcome in cases of moderate and severe anemia. J. Obstet. Gynecol. Ind., 51: 62-65
19. Rangnekar, A.,G. and D. Rashmi, 1993. Fetal outcome in pregnancy anemia. J. Obstet. Gynecol. Ind., 43: 172-176.
20. Lagoo, J. and A. Lagoo, 2019. The study of the incidence of pregnant women with sickle cell disease. Int. J. Reprod. Contraception. Obstet. Gynecol., 8: 3950-3953.
21. Peña-Rosas, J.P. and F.E. Viteri, 2006. Effects of routine oral iron supplementation with or without folic acid for women during pregnancy. Cochrane. Database. Syst. Rev., Vol. 3. 10.1002/14651858.cd004736.pub2.
22. Nair, M., M.K. Choudhury, S.S. Choudhury, S.D. Kakoty, U.C. Sarma, P. Webster and M. Knight, 2016. Association between maternal anaemia and pregnancy outcomes: A cohort study in assam, India. BMJ. Global. Health., Vol. 1. 10.1136/bmjgh-2015-000026.