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Original Research Article

Maternal anemia: a comprehensive study on fetomaternal consequences from menarche to menopause

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ABSTRACT

Background: Anaemia stands out as the most prevalent haematological condition encountered during pregnancy. Anaemia poses significant risks to maternal health, contributing to higher rates of morbidity and mortality among pregnant individuals. This condition can be identified and managed during the antenatal phase, thereby averting the significant risks associated with anaemia in both pregnancy and labour. The present study was conducted to investigate the incidence of anaemia among pregnant patients and women of reproductive age.
Methods: A prospective study was carried out at SMS Multispecialty Hospital and Dr. M. K. Shah Medical College and Research Centre. The study involved both indoor and outdoor patients from the obstetrics and gynaecology department, specifically those admitted for delivery at SMS Multispecialty Hospital. A total of 75 antenatal patients and 25 female patients from both reproductive and menopausal age groups were selected consecutively for this study. A comprehensive clinical history was gathered, encompassing the patient's complaints, socio-economic background, obstetric history, menstrual history, as well as past and personal medical history.
Results: The findings of the current study indicate a significant increase in the risk of several complications among pregnant women with anaemia. These complications include pre-eclampsia, PTVD, PPH, puerperal sepsis, a higher caesarean section rate, eclampsia, placenta previa, abortion, and abruption. The study also encompasses non-pregnant patients ranging from menarche to menopause, highlighting an increased risk of dysmenorrhea, menorrhagia, puberty-related menorrhagia, ovarian cysts, and bleeding following medical termination of pregnancy (MTP) pills.
Conclusions: Timely diagnosis and prompt intervention for anaemia can significantly decrease its prevalence. This initiative aims to foster a more health-conscious community.

Keywords: Anemia, Caesarean section, Pre-eclampsia, Pregnancy

INTRODUCTION

Anaemia stands out as the most prevalent complication encountered during pregnancy on a global scale. The World Health Organisation (WHO) estimates that over 40% of non-pregnant women and 50% of pregnant women in developing countries are impacted.[1,2]

In 1993, anaemia was identified by the World Bank as the eighth leading cause of disease among girls and women in the developing world. Women experience varying iron requirements throughout different life stages, including puberty, reproductive years, and menopause.[3] In addition to the significant concerns surrounding maternal morbidity and mortality, it is important to note that neonatal mortality rates are elevated among infants born to anaemic mothers. During adolescence, haemoglobin levels can be influenced by several factors, including rapid physical growth, menstrual blood loss, increased iron requirements, and decreased iron intake. The physiological needs associated with menstruation, pregnancy, and lactation give rise to these conditions. The developing foetus relies on essential nutrients such as iron, folic acid, and vitamin B12 for the process of haemopoiesis. However, iron deficiency stands

out as the most significant contributor to nutritional anaemia on a global scale.[4,5]

Complications such as abortion, inter-current infections during pregnancy, and pre-eclampsia associated with malnutrition are frequently observed in patients with anaemia. Additionally, conditions like cardiac failure at 30-34 weeks, pre-term labour, uterine inertia, postpartum haemorrhage, puerperal sepsis, sub-involution, low birth weight in infants, and decreased iron stores in neonates are also more common in this population.[6,7]

In addition to poverty, several other factors contribute to the prevalence of anaemia, including infestations with hookworm, malaria, and kala-azar. Consequently, obstetricians stress the importance of early detection and timely intervention for anaemia, highlighting the increasing prevalence of this condition and its treatability to mitigate potential adverse outcomes.[8]

Objectives

Objectives of the study were: to study the incidence of anemia in pregnant patient and in the females of reproductive age group from menarche to menopause; to study the outcome of fetus in pregnant patients suffering from anemia; to find out the underlying cause and factors associated with anemia, and assess the awareness inpatient regarding these causes; to assess the of safety and efficacy of different therapies for treatment of anemia and its outcome; and to study and derive a result by which the incidence of anemia can be decreased so that the morbidity and mortality burden can be decreased.

METHODS

A prospective study was carried out at SMS Multispecialty Hospital and Dr. M. K. Shah Medical College and Research Centre, covering the period from June 2023 to January 2024.

The study involved both indoor and outdoor patients from the obstetrics and gynaecology department, specifically those admitted for delivery at SMS Multispecialty Hospital.

Inclusion criteria

All cases of antenatal patients with hemoglobin level <10 gm% coming to the hospital, and all females from reproductive and menopause age group with hemoglobin level ≤10 gm% irrespective of their age were included.

Exclusion criteria

All female having hemoglobin level ≥10 gm% were excluded.

A total of 75 antenatal patients and 25 female patients from both reproductive and menopausal age groups were selected consecutively for the study.

A comprehensive clinical history was gathered, encompassing the patient's complaints, socio-economic status, obstetric history, menstrual history, and both past and personal medical history. Following a thorough clinical history, examination, and investigation, patients diagnosed with anaemia received the appropriate treatment.

Patients in group A, ranging from mild to severe anaemia, who were registered with us, received injections. Iron sucrose administered intravenously, along with vitamin B12, was provided on alternate days, while oral folic acid supplementation was concurrently included. The subjects received oral iron therapy until term, after which investigations were conducted and their obstetric outcomes were assessed.

A cohort of patients presenting with varying degrees of anaemia, ranging from mild to severe, received treatment in our emergency department. During their hospital stay, these individuals underwent blood transfusions, and their obstetric outcomes were subsequently analysed for comparison.

In group C, the non-pregnant female received treatment through blood transfusion and Inj. Iron sucrose, tailored to the severity of her anaemia.

Complications during and after surgery in pregnant women have been observed, along with post-transfusion complications in non-pregnant women. Outcomes for both the foetus and the mother were observed.

Statistical analysis

The collected data was organised and input into a spreadsheet application (Microsoft excel 2019) before being transferred to the data editor interface of statistical package for the social sciences (SPSS) version 19 (SPSS Inc., Chicago, Illinois, USA). Quantitative variables were characterised using means and standard deviations or medians and interquartile ranges, depending on their distribution. Qualitative variables were reported in terms of counts and percentages. The confidence level for all tests was established at 95%, while the level of significance was determined to be 5%.

RESULTS

The study was having a sample size of 100 patients which included 75 antenatal patients and 25 non pregnant.

In Table 1, out of 100 patients 36% women between age group of 21-25, 33% women were primi gravida, 67% women were multigravida.

Table 1: Age and parity distribution of women under study.

Characteristics	Frequency	Percentage
Age group (years)		
15–20	8	8
21–25	36	36
25–30`	31	31
31–35	11	11
36–40	4	4
41–45	3	3
46–50	3	3
51–55	3	3
56–60	1	1
Total	100	100
Parity		
Primi	33	33
2-3rd gravida	50	50
Grand multipara ≥ 4th para	17	17

In Table 2, out of 100 patients 18% patients had hemoglobin 8-10 gm%, 55% patients had hemoglobin 6-8 gm%, 27% patients had hemoglobin ≤6.

Table 2: Distribution of women according to the severity of anemia.

Variables	Hb in gm %	Number	Percentage
Mild	8-10	18	18
Moderate	6-8	55	55
Severe	≤6	27	27
Total		100	100

In Table 3, out of 75 antenatal patients who received iron sucrose 82.67% delivered at term,17.33% women delivery at pre term.

Table 3: Obstetric outcome of registered patient who received iron sucrose.

Labour	Number	Percentage
Term labour	62	82.67
Post term labour	0	00
Pre term labour	13	17.33
Total	75	100

In Table 4, out of 75 antenatal patients who didn't received iron sucrose 61.33% delivered at term, 38.67% delivered at pre term.

In Table 5, out of 75 antenatal women who received iron sucrose outcome of fetal compared. Incidence of live births had occurred in 92%, incidence of still birth had occurred in 2.6%, neonatal death in 5.4%.

In Table 6, out of 75 antenatal women who didn't received iron sucrose outcome of fetal compared. Incidence of live births had occurred in 78.67%, incidence of still birth had occurred in 14.67%, neonatal death in 6.7%.

Table 4: Obstetric outcome of registered patient who did not received iron sucrose.

Labour	Number	Percentage
Term labour	46	61.33
Post term labour	0	00
Pre term labour	13	38.67
Total	75	100

Table 5: Fetal outcome of registered patient who received iron sucrose.

Variables	Number	Percentage
Live birth	69	92
Still birth	2	2.6
Neonatal death	4	5.4
Total	75	100

Table 6: Obstetrical outcome of emergency patient who did not receive iron sucrose.

Variables	Number	Percentage
Live birth	59	78.67
Still birth	11	14.67
Neonatal death	5	6.7
Total	75	100

In Table 7, out of 25 non pregnant patient from menarche to menopause, 24% patients were suffering from menorrhagia in reproductive and perimenopausal age group followed by incomplete abortion in 12%, Dysmenorrhea in 8%, ovarian cyst, postpartum, post MTP pills bleeding p/v, septic and spontaneous abortion in 4% of patients were encountered with anemia.

Table 7: Non-pregnant patient from menarche to menopause (n=100).

Condition	Number	Percentage
Dysmenorrhoea	2	8
Incomplete abortion	3	12
Menorrhoea	6	24
Ovarian cyst	2	8
Post MTP pill bleeding p/v	1	4
Postpartum	1	4
Postpartum sepsis	2	8
Post TL recanalisation	1	4
Prolapse	2	8
Puberty menorrhagia	2	8
Rupture ectopic	1	4
Septic abortion	1	4
Spontaneous abortion	1	4

The current study indicates a significant increase in the risk of several complications, including pre-eclampsia, PTVD, PPH, puerperal sepsis, caesarean section rates, eclampsia, placenta previa, abortion, and abruption among pregnant women with anaemia. The study also encompasses non-pregnant patients ranging from menarche to menopause, highlighting an increased risk of dysmenorrhea, menorrhagia, puberty-related menorrhagia, ovarian cysts, and bleeding following medical termination of pregnancy (MTP) pills.

DISCUSSION

Anaemia during pregnancy poses a significant health challenge in rural India, attributed to factors such as poverty, illiteracy, insufficient awareness regarding the importance of antenatal care, and the prevalence of additional infections. Anaemia during pregnancy poses significant risks, including preterm labour, intrauterine growth restriction, cardiac failure, puerperal sepsis, sub-involution, and challenges with lactation.[9] Severe anaemia during pregnancy poses considerable risks to both maternal health and perinatal outcomes. The severity of anaemia stands as an independent risk factor for both preeclampsia and low birth weight.[10]

This study examines 100 patients diagnosed with anaemia who visited Dr. M.K. Shah Medical College in Ahmedabad, covering the period from June 2023 to January 2024. A detailed analysis has been conducted, and the results have been compared.

The current study reveals that the incidence of mild to moderate anaemia stands at 73%. The data indicates a significant prevalence of anaemia among all pregnant women and those within the reproductive age group. The prevalence of severe anaemia among individuals of reproductive age stands at 27%. A study conducted by Nigar et al found that among pregnant women, moderate anaemia was the most common, affecting 44.8% of the participants, while mild anaemia was present in 10% and severe anaemia in 2.8%.[11] The findings align with those reported by Goyal et al who noted that 29.35% of participants were moderately anaemic, 19.6% were mildly anaemic, and 21% were severely anaemic.[9]

The study comprised a sample of 100 patients, consisting of 75 antenatal patients and 25 non-pregnant individuals. All participants in this study were diagnosed with anaemia. The majority of patients exhibited hemoglobin levels ranging from 7 to 7.4 grammes per decilitre. Patients administered Iron sucrose experienced a notable increase in haemoglobin levels, leading to a reduction in adverse outcomes among this group.

Anaemia is a recognised contributor to pre-term labour. In the current study, 38.67% of patients experienced pre-term labour. Among patients treated for anaemia, the incidence of pre-term labour was recorded at just 17.33%.

In patients treated with iron sucrose, there was a notable reduction in both maternal and perinatal mortality rates. There were 27 normal full-term vaginal deliveries. The remaining cases were also full-term deliveries, achieved either through vaginal route or caesarean section, but were accompanied by complications such as pre-eclampsia, puerperal sepsis, and abruption. The findings indicated that the occurrence of all these complications was notably low in patients who underwent anaemia correction. This study aligns with the findings of Baruah et al who similarly noted that iron deficiency anaemia is the most prevalent type of anaemia during pregnancy, affecting 39% of cases.[12] The study found that the average haematological parameters in anaemic pregnant women during the third trimester included haemoglobin levels at 8.08 g/dl, haematocrit at 28.92%, MCV at 93.02 fl, MCH at 26.03 pg, MCHC at 27.99 g/dl, and RBC count at 3.05 million/cu.mm. These results align closely with those reported by Sharan et al who noted mean values of haemoglobin at 8.5 g/dl, haematocrit at 26.1%, MCV at 76 fl, MCH at 24.8 pg, MCHC at 31.8 g/dl, and RBC count at 3.5 million/cubic mm.[13] Research indicates a correlation between severe anaemia and adverse pregnancy outcomes. Reduced haemoglobin levels can result in considerable health issues for pregnant women, including a higher risk of infections, extended hospitalisations, and various other complications.

Among a cohort of 100 patients, 89% identified as Hindus, while 11% identified as Muslims. The dietary habits associated with vegetarianism contribute to a higher incidence of anaemia among Hindus, who predominantly follow a vegetarian diet. Urine analysis revealed that among anaemic patients with concurrent urinary tract infections, 5% exhibited the presence of pus cells, while 10% showed the presence of albumin. The occurrence of pre-eclampsia is higher among patients with anaemia. The current research aligns with the findings of Goyal et al who identified several pregnancy complications linked to anaemia. These complications included prematurity at a rate of 28.5%, pre-eclampsia at 25%, intrauterine growth restriction (IUGR) at 20%, and abruptio placentae at 1%.

The peripheral smear analysis of all patients revealed that 88 individuals exhibited hypochromic microcytic red blood cells, 6 presented with dimorphic red blood cells, and 1 patient displayed macrocytic normochromic red blood cells. A total of 25 non-pregnant patients, ranging from menarche to menopause, were included in the study. In a recent study, it was found that 24% of patients in the reproductive and perimenopausal age group were experiencing menorrhagia (8%).

In addition to preeclampsia, maternal anaemia significantly impacts intrauterine growth due to a sustained lack of oxygen reaching the developing foetus. Severe maternal anaemia that occurs early in pregnancy can lead to a decrease in placental weight and a reduction in the surface area of peripheral villi, which plays a crucial

role in the transfer of nutrients from the mother to the foetus.[14,15]

Patients experienced menorrhagia during puberty, resulting in significant anaemia among those affected. Among patients with postpartum sepsis, 8% were found to have anaemia. Cases of anaemia were attributed to incomplete abortion at 12%, while post-MTP pill abortion, septic abortion, and spontaneous abortion each accounted for 4% of cases. In conclusion, it is evident that females exhibit a higher incidence of anaemia across all age groups. Annual estimates indicate that 7.3 million perinatal deaths occur globally, and addressing anaemia could significantly reduce this number.

CONCLUSION

Anemia contributes women health today, Anemia in pregnancy is an important contributor to maternal and perinatal morbidity and mortality. In developing countries every 2nd pregnant woman estimated to be anemic. In developing countries, iron deficiency anemia is aggravated by inadequate intake of iron, dietary deficiency, worm infestation, malaria and other infectious disease. Anemia even today contributes to 20% of all maternal deaths. 1 gm/dl increase in population's mean hemoglobin could reduce the risk of maternal mortality by 25%. Analysis can conclude that prompt diagnosis and early correction of anemia will lead to an enormous reduction in prevalence of anemia. It will help build up a healthier society. So maternal correction of anemia, will lead to healthy baby, female child born to healthy mothers will give rise to a healthier population of country and world.

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REFERENCES

1. World Health Organization. Global anaemia reduction efforts among women of reproductive age: impact, achievement of targets and the way forward for optimizing efforts. 2020. Available at: https://www.who.int/publications/i/item/9789240012202. Accessed on 09 August 2024.
2. World Health Organization. Haemoglobin Concentrations for the Diagnosis of Anemia and Assessment of Severity. Vitamin and Mineral Nutrition Information System. 2011. Available at: http://www.who.int/vmnis/indicators/haemoglobin.pdf. Accessed on 09 August 2024.
3. World Health Organization. The global prevalence of anaemia in 2011. 2015. Available at: https://www.who.int/publications/i/item/9789241564960. Accessed on 09 August 2024.
4. World Health Organization. Global nutrition targets 2025: anaemia policy brief. 2014. Available at: https://apps.who.int/iris/handle/10665/148556. Accessed on 09 August 2024.
5. Rahmati S, Azami M, Badfar G, Parizad N, Sayehmiri K. The relationship between maternal anemia during pregnancy with preterm birth: A systematic review and meta-analysis. J Maternal Fetal Neonatal Med. 2020;33:2679-89.
6. Suryanarayana R, Chandrappa M, Santhuram AN, Prathima S, Sheela SR. Prospective study on prevalence of anemia of pregnant women and its outcome. J Family Med Prim Care. 2017;6:739-43.
7. Raj SC, Kruthika ML, Vindhyasree S. Impact of severe anemia during pregnancy on maternal outcome. Int J Reprod Contracept Obstet Gynecol. 2019;8(11):4485-90.
8. Sharma JB, Shankar M. Anemia in pregnancy. JIMSA. 2010;23(4):253.
9. Goyal N, Pandey H. Study on prevalence of anemia in pregnant women in labour. Int J Reprod Contracept Obstet Gynecol. 2020;9:2725-8.
10. Kumar V, Jain M, Shukla U, Swarnkar M, Gupta P, Saini P. Prevalence of anemia and its determinants among pregnant women in a rural community of Jhalawar, Rajasthan. Natl J Comm Med. 2019;10:207-11.
11. Nigar A, Ahmad A. Prevalence of anemia in pregnancy at booking: A retrospective study at a tertiary care centre in Lucknow India. Int J Reprod Contracept Obstet Gynecol. 2020;9:4585-9.
12. Baruah DK, Barooah MS, Sharma D. Prevalence of iron deficiency anemia among antenatal mothers. Int J Curr Res. 2016;8:28125-8.
13. Sharan A, Shah S. Study of haematological parameters in anemia in pregnancy. Trop J Pathol Microbiol. 2019;5:762-9.
14. Ali SA, Khan US, Feroz AS. Prevalence and determinants of anemia among women of reproductive age in developing countries. J. Coll Physicians Surg Pak. 2020;30:177-86.
15. Rasmussen K. Is There a Causal Relationship between Iron Deficiency or Iron-Deficiency Anemia and Weight at Birth, Length of Gestation and Perinatal Mortality? J Nutr. 2001;131(2S-2):590-601.

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