Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Obstetrics and Gynaecology

Effects of Iron Deficiency Anaemia in Pregnancy Outcome: A Single-Center Study

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DOI: 10.36347/sjams.2023.v11i02.004 | **Received:** 17.12.2022 | **Accepted:** 29.01.2023 | **Published:** 03.02.2023

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Abstract **Original Research Article**

Background: Maternal anaemia especially iron deficiency anaemia has become a common problem worldwide. It is associated with adverse pregnancy outcomes like preterm birth, low birth weight and increases incidence of postpartum haemorrhage (PPH). Hence, this study aimed to find the association between maternal iron deficiency anaemia and pregnancy outcome. ***Methods:*** This retrospective cross-sectional study was conducted at the department of Obstetrics and Gynaecology in Kumudini Women's Medical College, Tangail, Bangladesh. The study was conducted during the period of July 2019-January 2020. A total of 93 pregnant women were found to be anemic through this whole trial. ***Result:*** In this study, 52% patients had mild level anaemia, 32% had moderate and 16% had severe anaemia. Patients who had severe anaemia significantly suffered from preeclampsia (46.7%), PPH (26.7%), need a blood transfusion during/within 24 hours of delivery (100%), prolonged labor (53.3%), fetal distress (53.3%), placenta praevia (86.7%), low birth weight (86.7%), preterm delivery (40.0%), stillbirth (13.3%) and early neonatal death (within 24 hours) (13.3%). All the complications were strongly associated with severity of anaemia (p value=0.000) except prolonged labour (p-value=0.04). ***Conclusion:*** This study concludes that iron deficiency anaemia has significant impact on pregnancy outcome. Hence, iron supplementation can be an effective way for improving IDA among the pregnant anaemic women. Also, proper antenatal care is important so that early detection and treatment of IDA can be possible.

Keywords: Anaemia, Iron Deficiency Anaemia, Pregnancy Outcome.

INTRODUCTION

Iron is a vital micronutrient in human health and insufficiency of iron leads to anaemia along with a myriad of serious consequences [1]. Iron deficiency anaemia (IDA), which affects millions of individuals worldwide, especially pregnant women, is brought on by inadequate iron intake or malabsorption. Pregnant women are known to be the group which is the most susceptible to IDA due to the increased iron requirements during pregnancy. Pregnant women with Hb less than 11 g/dl are considered anaemic [2]. According to estimates from the World Health Organization (WHO), 38% of pregnant women have anaemia [3]. However, the incidence and causation of anaemia in pregnancy vary depending on the region [3]. Anaemia is more common in underdeveloped countries than developed ones, where it can range from 35-75% [4]. World Health Organization reports that between 35% and 75% (18% on average) of pregnant women in developed and underdeveloped nations are anaemic [5]. IDA during pregnancy can have a negative impact on both the mother and the fetus. IDA is linked to decreased physical performance, increased degree of weariness, decreased cognitive function, higher risk of infection and hospitalization, and hindered lactation in mother [6]. Additionally, anaemia during pregnancy increases the risk of perinatal mortality and morbidity [7, 8]. Moreover, negative effects on the fetus including spontaneous abortion, early delivery, intrauterine fetal mortality, low birth weight, petite for gestational age neonates, cognitive impairment, etc. are also seen [9]. Children with low hemoglobin levels are more likely to experience long- term delays in their mental and motor development, as well as problems paying attention, being easily distracted, being more prone to infection, and having atypical appetites (pica) [10]. Oral iron supplementation is a successful method of treating IDA

in pregnant women [11]. Many nations have implemented programs to provide iron and folic acid supplements to expectant mothers in the hopes that raising Hb levels will have some positive effects. On the contrary, numerous randomized control studies (RCTs) and meta-analyses have shown that routine iron supplementation is not very beneficial [12] A few studies have also shown that an increase in Hb above a specific threshold may actually have negative effects [13]. Hence, more study is needed to fill this study gap. This present study aimed to find the association between maternal iron deficiency anaemia and pregnancy outcome.

OBJECTIVE OF THE STUDY

The objective of this study was to find the association between maternal iron deficiency anaemia and pregnancy outcome.

MATERIALS AND METHODOLOGY

This retrospective cross-sectional study was conducted at the department of Obstetrics and Gynaecology in Kumudini Women's Medical College, Tangail, Bangladesh. The study was conducted during the period of July 2019- January 2020. A total of 93 pregnant women were found to be anaemic through this whole trial.

Inclusion Criteria

- The pregnant anaemic women attending in the inpatients department of the hospital were included in this study.

Exclusion Criteria

- Pregnant anaemic women with chronic disease, history of surgeries other than caesarean sections and incomplete clinical history were excluded from this study.

All the data required for this study were obtained from the Hospital's obstetrics and gynecology department record. Information about all clinical and epidemiological data, as well as their demographic characteristics, was all necessary for this study. The analysis was performed using the SPSS version 25 program. Both descriptive and inferential statistical methods were applied. For the inferential analysis, the association between the dependent variable, clinical characteristics and severity of anaemia was examined using the Chi-square test whereas the significance level was set at 0.05.

RESULT

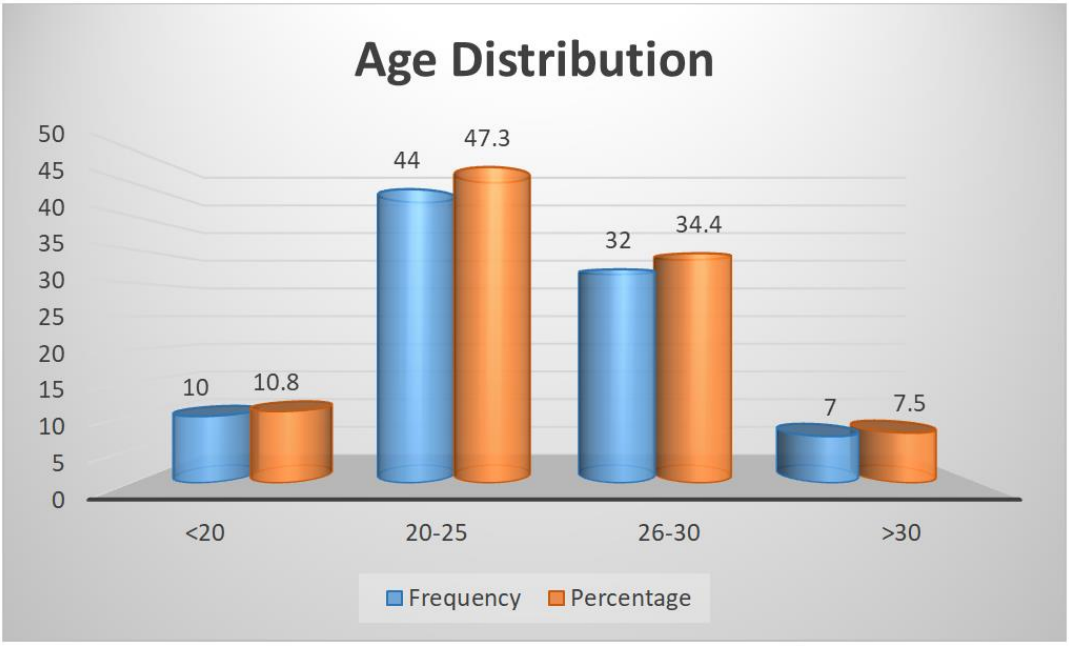

Figure 1: Age distribution of the study patients

Figure 1 shows the age distribution of the study patients where 10(10.8%) patients were less than 20 years, 44(47.3%) were aged between 20- 25 years, 32(34.4%) were 26-30 years, and 7(7.5%) were greater than 30 years.

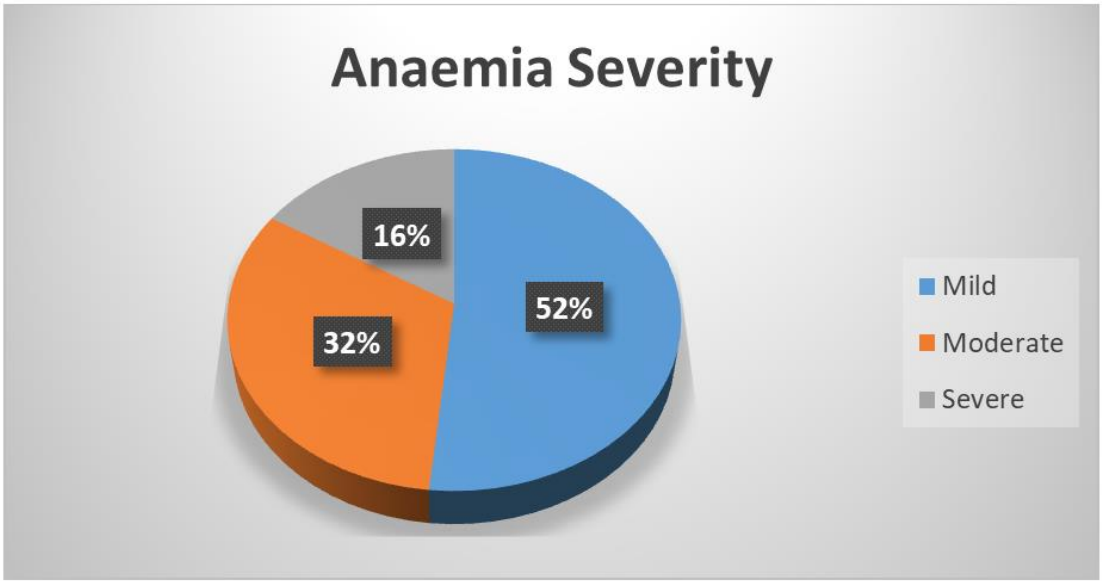

Figure 2: Anaemia severity of the study patients

In this study, 52% patients had mild level anaemia, 32% had moderate and 16% had severe anaemia.

Table 1: Socio-demographic characteristic and clinical presentation of the study patients

Variables		**N**	**Percentage**
Socio economic status	Lower	71	76.3
	Middle	17	18.3
	Higher	5	5.4
Parity	Primigravida	31	33.3
	Multi-gravida	62	66.7
Mode of Delivery	NVD	35	37.6
	CS	58	62.4
Iron supplements taken	Yes	71	76.3
	No	22	23.7
ANC	Yes	75	80.6
	No	18	19.4

In this study, 71(76.3%) of patients had lower socio-economic status, 17(18.3%) had middle and 5(5.4%) had higher socio-economic status. In parity, 31(33.3%) patients were primigravida and 62(66.7%) were primigravida. Caesarean section (CS) was more prevalent (62.4%) than NVD, 71(76.3%) patients took iron suppliments, and 75(80.6%) visited for antenatal care.

Table 2: Pregnancy outcome of the study patients

Pregnancy Outcome	**Severity of Anaemia**						**p-value**
	Mild		Moderate		Severe		
	N	Percentage	N	Percentage	N	Percentage	
Preeclampsia	0	0.0	1	3.3	7	46.7	0.000
PPH	0	0.0	1	3.3	4	26.7	0.000
Blood transfusion during/within 24 hours of delivery	5	10.4	9	30.0	15	100.0	0.000
Prolonged labor	0	0.0	12	40.0	8	53.3	0.04
Fetal distress	2	4.2	7	23.3	8	53.3	0.002
Placenta Previa	2	4.2	7	23.3	8	53.3	0.002
Low birth weight	8	16.7	9	30.0	13	86.7	0.001
Preterm delivery	9	18.8	6	20.0	6	40.0	0.002
Stillbirth	0	0.0	1	3.3	2	13.3	0.001
Early neonatal death (within 24 hours)	0	0.0	0	0.0	2	13.3	0.000

Table 2 shows the pregnancy outcome of the study patients. Patients who had severe anaemia significantly suffered preeclampsia (46.7%), PPH (26.7%), need a blood transfusion during/within 24 hours of delivery (100%), prolonged labour (53.3%), fetal distress (53.3%), placenta praevia (86.7%), low birth weight (86.7%), preterm delivery (40.0%), stillbirth (13.3%) and early neonatal death (within 24 hours) (13.3%).

DISCUSSION

According to WHO recommendations, anaemia during pregnancy is defined as hemoglobin levels below 11 g/dl. Anaemia is characterized by hemoglobin levels that range from 10 to 10.9 g/dl for mild anaemia, 7 to 9.9 g/dl for moderate anaemia, and fewer than 7 g/dl for severe anaemia. Anaemia is a common pregnancy complication in developing countries like Bangladesh. The chances of getting pregnant can vary for anaemic persons, according to other research of a similar nature [14]. In this study, we found a relationship between pregnancy anaemia and poor outcomes for the mother and the newborn. Mild anaemia affected 52% of participants, 32% had moderate anaemia, and 16% had severe anaemia. The age range of the bulk of the anaemic study participants in the current study (47.3%) was 20 to 25. This was comparable to the findings of Alli R *et al.,* [15] where 40% of the women were anaemic. Anaemia is thought to be more likely to occur in people with low socioeconomic position, with poor nutrition being the main contributor. While 100% of the women in the study by Alli R *et al.,* are from the low socioeconomic category, only 76.3% of the anemic women in the current study are from that group [15]. The results of the current study also agreed with those of Rangnekar *et al.,* whose investigation found that 67% of anaemic women belonged to a low socioeconomic category, indicating a close association between low socioeconomic conditions and pregnant anaemia [16]. This study reported that severe anaemic women had higher risk in pregnancy outcome than who had moderate or mild anaemia. 35% of pregnant women in an Indian large retrospective cohort investigated by Nair *et al.,* had moderate-to-severe anaemia [17]. In this present study low birth weight (86.7%) and early neonatal death (within 24 hours) (13.3%) were found which has a significance association with IDA (p-value 0.04 and 0.000). In a related study, low birth weight and perinatal death where negative neonatal outcomes are also found to be associated with anaemia [17]. In our study preterm delivery was reported in 40.0% cases. Whereas other studies [15, 18] have also reported low birth weight and preterm delivery due to anaemia. While there was no correlation between severe anaemia and maternal mortality in our study, Parks *et al.,* identified a substantial link between severe anaemia, PPH, and newborn mortality [18]. Other investigations conducted in Bangladesh and in poor nations like Tanzania and Sudan have produced similar results [17, 19–25]. Low birth weight, fetal anaemia, stillbirth, and preterm labour are among the negative neonatal outcomes linked to maternal anaemia in these nations [17, 19–25]. The present study found that preeclampsia was present in 46.7% cases while PPH in 26.7%. In relation to our study, preeclampsia, PPH, and CS delivery are examples of maternal unfavorable outcomes that have been documented in the literature [18, 24, 26]. Despite being rare and continuing to reduce in affluent nations, nutritional anaemia during pregnancy is nonetheless linked to poor maternal outcomes [27]. All the 100% patients with severe anaemia of this study need a blood transfusion during/within 24 hours of delivery. In line with our study, a Scottish retrospective cohort claimed that maternal anaemia has apparently been linked to an increased incidence of antepartum hemorrhage, severe obstetric hemorrhage, the requirement for blood transfusions, and maternal death [27]. Moreover, antenatal anaemia was linked to premature birth and NICU hospitalization in Finnish multiparous women [28]. Less than half of the German women who were diagnosed with iron-deficiency anaemia were taking a therapeutic dose of supplemental iron during their pregnancies, according to Demuth *et al.,* [29].

CONCLUSION

Anaemia is the prevalent medical condition in pregnancy which exists worldwide and is a very common problem in most of the developing countries. Iron supplementation during pregnancy in women who are iron deficient improves iron status both during and after delivery, providing some protection against iron deficiency in later pregnancies. Hence, the best way to avoid perinatal iron deficit and associated morbidities is to ensure maternal iron sufficiency throughout the pregnancy. For the prevention, early detection, and treatment of anaemia, proper prenatal care is a fundamental pre requisite.

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