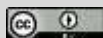


Original Article

Observation of Iron Status among Pregnant Women 

DOI: dx.doi.org

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International License](https://creativecommons.org/licenses/by/4.0/).**ABSTRACT**

Introduction: The observation of iron status among pregnant women in rural Bangladesh is an important issue as it can have a significant impact on the health and well-being of both the mother and the child. Iron deficiency anemia is a common problem among pregnant women in developing countries and can lead to a variety of complications during pregnancy, delivery, and postpartum.

Aim of the study: The aim of the study was to observe the general iron status of pregnant women in Rural Bangladesh. **Methods & Materials:** This prospective observational study was conducted at the Department of Gynaecology, Sonargaon Seba General Hospital, Sonargaon, Narayanganj, Bangladesh. The study duration was 1 year, during which period, data from a total of 113 pregnant women were collected who had been admitted to

the study hospital. **Results:** The study recruited 113 pregnant women in rural Bangladesh, the majority of them were between the ages of 15-25 and were housewives. The results showed that 77.88% had low hemoglobin levels, 55.75% had low ferritin levels, 67.26% were multi-gravida, the mean age was 22.99 years, the mean weight was 58.53 kg, the mean hemoglobin level was 10.824 mg/dl, and mean ferritin level was 17.35 mg/dl. **Conclusion:** The study found that the majority of the participants had low Hemoglobin and ferritin levels, indicating a concern for iron deficiency anemia. The results suggest that interventions, such as iron supplementation and nutrition education, are needed to improve the iron status of pregnant women in this population.

Keywords: Pregnancy, Childbirth, Ferritin, Iron, Anemia

(The Planet 2022; 6(2): 75-82)

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INTRODUCTION

Iron is an essential mineral that plays a critical role in the human body, particularly during the reproductive age [1,2]. Iron is required for the production of hemoglobin, a protein that carries oxygen in the blood. During pregnancy, the demand for iron increases as the body needs to support the growth and development of the fetus [3]. However, many women, particularly those living in developing countries, struggle to meet this increased demand due to a lack of access to iron-rich foods and poor nutrition [4-6]. The average iron count during reproductive age is around 12-15 mg/dL [7]. However, during pregnancy, the iron count drops due to the increased demand for iron to support the growth of the fetus. The iron level drops further as the pregnancy progresses, with the lowest levels being reached during the third trimester [8,9]. Iron deficiency is a common condition among pregnant women, particularly in developing countries. The World Health Organization (WHO) estimates that around 20% of pregnant women worldwide suffer from iron deficiency anemia [9,10]. In rural Bangladesh, the prevalence of iron deficiency anemia is even higher, with studies showing that up to 56% of pregnant women in this population have inadequate iron levels [11]. Iron deficiency anemia during pregnancy can lead to serious health consequences for both the mother and the baby. Maternal morbidity and mortality are increased in women with iron deficiency anemia, with a higher risk of infection, preterm labor, and postpartum hemorrhage [9,12,13]. The baby is also at risk, with a higher risk of low birth weight, developmental delays, and an increased

risk of neonatal mortality [14]. To manage iron deficiency anemia during pregnancy, a number of interventions can be implemented. Iron supplementation is the most common intervention, with the WHO recommending that all pregnant women receive 60-120 mg of elemental iron per day [15,16]. However, oral iron supplements can be poorly absorbed, and may cause gastrointestinal side effects such as constipation, nausea, and vomiting [17,18]. In some cases, intravenous iron may be given. Nutrition education can also be an effective intervention for managing iron deficiency anemia during pregnancy. Education on the importance of consuming iron-rich foods, such as red meat, fish, and leafy green vegetables, can help to improve the iron status of pregnant women [19,20]. Deworming programs, particularly for the treatment of hookworm, can also be effective in managing iron deficiency anemia during pregnancy. Hookworm is a common parasitic infection in developing countries, and it can cause chronic blood loss, leading to iron deficiency anemia. Deworming can help to reduce the burden of hookworm and improve the iron status of pregnant women [21]. Iron deficiency anemia is a common condition among pregnant women, particularly in developing countries like rural Bangladesh. It can lead to serious health consequences for both the mother and the baby, including increased maternal morbidity and mortality, low birth weight, and developmental delays. Interventions such as iron supplementation, nutrition education, and deworming programs can be effective in managing iron deficiency anemia during pregnancy. The present study was conducted to observe the general characteristics of Iron status

among the pregnant population of rural Bangladesh.

METHODS & MATERIALS

This prospective observational study was conducted at the Department of Gynaecology, Sonargaon Seba General Hospital, Sonargaon, Narayanganj, Bangladesh. The study duration was 1 year, during which period, data from a total of 113 pregnant women were collected who had been admitted to the study hospital. Data was collected through face-to-face interviews after obtaining informed consent from the participants, and ethical approval was also obtained from the ethical review committee of the study hospital. Interviews were conducted using a structured questionnaire to collect information on demographic characteristics, dietary intake, and obstetric history, and a physical examination was to measure hemoglobin levels and ferritin levels from blood samples. The collected data were analyzed using the statistical analysis software SPSS V.25.

Inclusion Criteria

- Married pregnant women
- Participants who had been at the beginning of their third trimester
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Participants who had been pregnant for <27 weeks.
- Pregnant women with pre-diagnosed blood disorders or other forms of anemia
- Pregnant women currently under iron supplementation medications

- Unable to answer the criteria question.
- Exclude those affected with other chronic diseases.

RESULTS

Among the participants, 36.28% had been between the age of 15-20 years, while 38.05% had been between the ages of 21-25 years. 18.58% had been between the ages of 26-30 years, while 7.08% had been between the ages of 31-35 years (Table I).

Table I: Age distribution of the participants (n=113)

Age Range	n	%
15-20	41	36.28%
21-25	43	38.05%
26-30	21	18.58%
31-35	8	7.08%
Age Range	16-34	
Mean Age	22.99 ± 4.55	

The age range of the participants was 16-34 years, and the mean age was 22.99 years, with a 4.55 standard deviation.

Table II: Occupation distribution of the participants (n=113)

Occupation	n	%
Business	3	2.65%
Housewife	109	96.46%
Teacher	1	0.88%

Occupation-wise, almost all the participants (96.46%) had been housewives, except 2.65% businesswomen and 1 teacher (Table II).

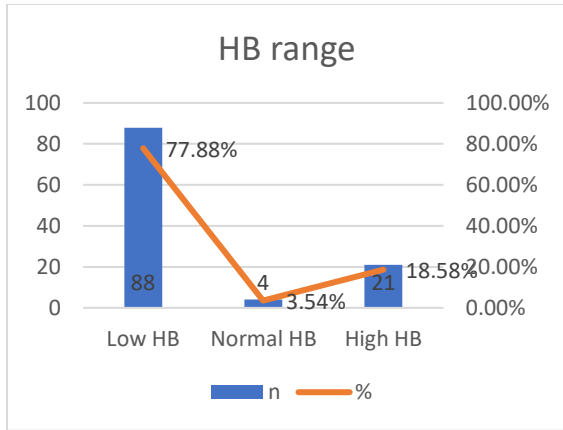


Figure 1: Distribution of participants by HB range (n=113)

Among the participants, the majority (77.88%) had low HB levels, while only 3.54% had HB values within the normal range. 18.58% of the participants had HB values above the normal range (Figure 1).

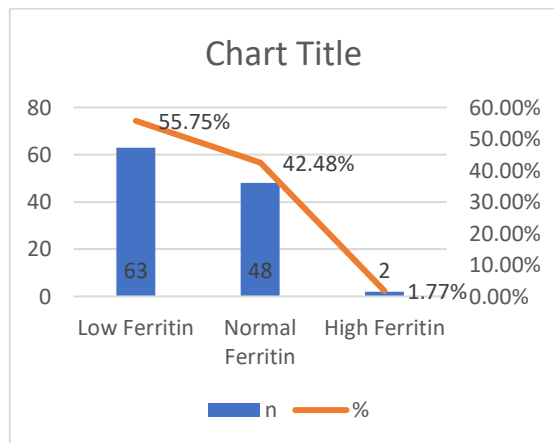


Figure 2: Distribution of participants by ferritin range (n=113)

In terms of Ferritin levels, it was observed that over half the participants (55.75%) had low ferritin levels, with 42.48% having normal levels of ferritin, and 1.77% having high ferritin levels (Figure 2).

Table III: Distribution of participants by gravida history (n=113)

Obstetric History	n	%
Primi Gravida	37	32.74%
Multi Gravida	76	67.26%

Among the present study participants, 67.26% had been multi gravida, and 32.74% had been primi gravida (Table III).

Table IV: Distribution of participants by mean ± SD values of variables (n=113)

Variables	Mean	SD
Age	22.99	4.55
Weight	58.53	10.472
Hemoglobin	10.824	10.538
Ferritin	17.35	48.38

Among the participants, the mean age was 22.99 years with 4.55 SD, the mean weight was 58.53 ± 10.47 kg, the mean hemoglobin was 10.824 ± 10.54 mg/dl, and the mean ferritin level was 17.35 ± 48.38 mg/dl (Table IV).

DISCUSSION

The present study aimed to observe the iron status among pregnant women in rural Bangladesh. A total of 113 pregnant women were recruited and participated in the study. The results showed that the majority of the participants were between the ages of 15-25, with 96.46% of the participants being housewives, only 2.65% being businesswomen, and 1 was a teacher. The overall high population of younger participants is not uncommon, as many women of Bangladesh tend to marry early on [22-24]. Although child marriage is

illegal, in some rural areas of Bangladesh, the practice of child marriage still exists [25,26]. The distribution of participants' occupations also reflects the general social structure of Bangladesh, where the majority of married women are housewives. There are various factors in play for this prevalence, but a large portion of it consists of marital restrictions [27-30]. In terms of clinical factors, both hemoglobin and ferritin levels were recorded for each participant and were compared with the normal range of age-matched women. Both HB and ferritin are markers that are used to assess the iron status in the body [31]. Hemoglobin is a protein in red blood cells that binds to oxygen and carries it to the body's tissues, and when iron levels are low, the body cannot produce enough of it, leading to anemia [32]. Ferritin is a protein that stores iron in the body, and when iron levels are low, ferritin levels decrease [31,33]. Together, measuring both HB and ferritin levels can provide a more comprehensive assessment of iron status, and can help identify iron deficiency anemia which is characterized by low hemoglobin and low ferritin levels. The study found that the majority of the participants (77.88%) had low Hemoglobin (HB) levels, while only 3.54% had normal HB levels, and 18.58% had above-normal HB levels. Similarly, in terms of Ferritin levels, 55.75% of the participants had low ferritin levels, 42.48% had normal levels, and only 1.77% had high ferritin levels. These findings were not uncommon, as various other studies have observed a significant change in serum ferritin and blood hemoglobin levels among pregnant mothers [11,12,34-37]. Many local studies conducted in Bangladesh have also observed a similar change in

serum ferritin during the period of pregnancy, and it has also been associated with abnormal outcomes in pregnancy [11,12,36]. The results of this study demonstrate that iron deficiency anemia is a significant concern among pregnant women in rural Bangladesh. The majority of the participants had low HB and ferritin levels, indicating that they were not meeting the increased iron demands of pregnancy. These findings suggest that interventions such as iron supplementation and nutrition education may be needed to improve the iron status of pregnant women in this population. The study also highlights that multi-gravida has a higher risk of Iron deficiency anemia and interventions should be targeted towards them. Additionally, further research is needed to understand the underlying causes of iron deficiency anemia in this population and to develop effective interventions to address the problem.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The study found that a large number of women are found to be iron deficient, specially in the third trimester of pregnancy, in a village near the capital of Bangladesh. The study highlights the utmost importance of routine monitoring and screening of iron status at every trimester of pregnancy. This can help the treatment to be started early, mitigating the deleterious consequences of anemia. The study also shows that concerned areas such

as low socioeconomic areas, multigravidas, faulty dietary habits, pregnancy at early age etc. should be focused more. Further research is necessary to determine the cause of iron deficiency, as well as to determine the appropriate use and dosage of iron supplementations at different trimester of pregnancy. We should focus with our full strength to prevent iron deficiency from all corners of the country.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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