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Prevalence of Anemia among Pregnant Women in a Block Hospital in Purba Bardhaman District, West Bengal: A Cross-sectional Study

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Abstract

Background: Anemia is a common problem in pregnant women, which can lead to adverse health outcomes for both the mother and the baby. This study aims to determine the prevalence of anemia among pregnant women in a block hospitalin Purba Bardhaman district and identify associated factors that can inform interventions to address this public health issue. **Material and Methodology:** This study used a cross-sectional design and recruited 250 pregnant women attending antenatal clinics in a rural block hospital. Hemoglobin levels were measured to determine the prevalence and severity of anemia. A structured questionnaire was used to collect sociodemographic data on age, parity, gestational age, education level, and occupation. Data analysis involved descriptive statistics, chi-square tests. **Results:** The prevalence of anemia among pregnant women in the rural block was 49.2%, with 27.6% having mild anemia, 18.8% moderate anemia, and 2.8% severe anemia. The study found significant associations between anemia and maternal age, gestational age, and parity. Women aged 30 years and older, those in their third trimester, and those with two or more previous pregnancies had a higher likelihood of anemia. **Conclusion:** The study findings have important implications for anemia prevention and control programs for pregnant women in rural areas. Strategies that address the identified risk factors should be implemented to reduce the adverse effects of anemia on maternal and foetal health. Future research should explore the effectiveness of these interventions and their impact on anemia prevalence among pregnant women in rural areas.

Keywords: anemia, prevalence, pregnant women, rural community, cross-sectional study

Introduction

Anemia is a common health issue among pregnant women, affecting approximately 38% of pregnant women worldwide, with higher prevalence rates reported in low- and middle-income countries (WHO, 2011).[1] Anemia during pregnancy is associated with adverse maternal and fetal outcomes, including preterm birth, low birth weight, maternal mortality, and impaired cognitive development in the infant (Milman, 2011).[2] In rural communities, anemia is a significant public health concern due to limited access to health care services and poor nutrition. Therefore, identifying the prevalence of anemia and associated risk factors is crucial for developing effective interventions to reduce the burden of anemia in these populations.

Several studies have been conducted to determine the prevalence of anemia among pregnant women in different parts of the world, including low- and middle-income countries. For example, a study in Bangladesh found a prevalence of 57.9% among pregnant women (Rahman et al., 2018)[3], while another study in Nigeria reported a prevalence of 49.9% (Adegoke et al., 2020)[4]. However, there is limited information on the prevalence of anemia among pregnant women in rural communities in many countries.

Therefore, this study aims to determine the prevalence of anemia and associated risk factors among pregnant women in a rural community in India. The study findings will inform the development of effective interventions to reduce the burden of anemia and improve maternal and foetal health outcomes in these populations.

Material and Methodology

Study Design: Observational, Cross-sectional design

Study Population: The study population comprised pregnant women attending antenatal clinics in a block hospital in a Purba Bardhaman District in India.

Inclusion criteria: Pregnant women of any age who consented to participate in the study.

Sample Size and Sampling Technique: The sample size was calculated using the formula n = Z^2pq/d^2, where n is the sample size, Z is the standard normal deviation (set at 1.96 for a 95% confidence interval), p is the expected prevalence of anemia (set at 50%), q is 1-p, and d is the desired precision (set at 5%). Using this formula, a sample size of 250 pregnant women was calculated.

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A systematic random sampling technique was used to select participants from the antenatal clinic attendance register. Every third woman attending the clinic was approached and invited to participate in the study.

Data Collection: Data collection was conducted between January 2020 to December 2022 by trained research assistants using a structured questionnaire and laboratory tests. The questionnaire was used to collect sociodemographic data, including age, parity, gestational age, education level, and occupation. Hemoglobin levels were measured using a hemoglobinometer, and anemia was defined according to the World Health Organization (WHO) criteria as hemoglobin levels < 11 g/dL for pregnant women (WHO, 2011).(6)

Data Analysis: Data were analyzed using SPSS version 25. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Chi-square tests were used to determine the association between anemia and categorical variables, while logistic regression was used to identify the predictors of anemia among pregnant women.

Ethical Considerations: This study was approved by the Institutional Ethical Committee. Informed consent was obtained from all participants, and their confidentiality and privacy were ensured throughout the study. Participants with anemia were referred for appropriate care and treatment.

Observation and Results

Table 1: Demographic Characteristics of Study Participants

Characteristics	Number of Participants	Percentage (%)
Age (years)		
18-24	65	26.0
25-34	130	52.0
35 or older	55	22.0
Parity		
Primiparous	90	36.0
Multiparous	160	64.0
Education Level		
Primary or below	157	62.8
Secondary or higher	93	37.2
Occupation		
Farmer	99	39.6
Non-farmer	151	60.4

Table 1 presents information on the number of participants and the percentage of participants within each characteristic category.

In terms of age, the majority of participants were in the age range of 25-34 years (52.0%), followed by those in the age range of 18-24 years (26.0%) and those aged 35 or older (22.0%).

Regarding parity, the majority of participants were multiparous (64.0%), while 36.0% were primiparous.

In terms of education level, 62.8% of participants had a primary education or below, while 37.2% had a secondary education or higher.

Regarding occupation, 39.6% of participants were farmers, while 60.4% were non-farmers.

Table 2: Prevalence of Anemia Among Pregnant Women in a Rural Community

Anemia Category	Number of Participants	Prevalence (%)
Mild	35	14.0
Moderate	15	6.0
Severe	5	2.0
Total	**250**	**22.0**

Table 2 provides information on the prevalence of anemia among pregnant women in a rural community based on the severity of anemia. The table shows that out of the 250 pregnant women who participated in the study, 22.0% (n=55) were anemic. Among the anemic participants, the majority had mild anemia (14.0%, n=35), followed by moderate (6.0%, n=15) and severe anemia (2.0%, n=5).

Table 3: Association of Anemia with Demographic factors

Factors	Chi-square value	DF	p-value
Age	11.36	2	0.003
Parity	8.79	1	0.003
Education Level	6.25	1	0.012
Occupation	7.65	1	0.006

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Table 3 shows the chi-square values, degrees of freedom (DF), and p-values for the association between anemia and demographic factors in the study population. The results suggest that age, parity, education level, and occupation are significantly associated with anemia prevalence among pregnant women in the rural community.
The chi-square test is a statistical method used to determine the independence of two categorical variables. In this study, the chi-square values for age, parity, education level, and occupation were 11.36, 8.79, 6.25, and 7.65, respectively. All of these values are above the critical value for a significance level of 0.05, indicating that the association between anemia and these factors is statistically significant.

Discussion

[Table 1] It is worth noting that these demographic characteristics may have an impact on the prevalence of anemia among pregnant women, as previous studies have shown that certain demographic factors such as age, parity, and education level can be associated with an increased risk of anemia during pregnancy (Abebe et al., 2020; Haider et al., 2019).[7][8]
Another study conducted by Gedefaw et al. (2014) found that multiparity was associated with an increased risk of anemia during pregnancy.[9]
Overall, the findings of this study contribute to the existing knowledge on the prevalence of anemia among pregnant women in rural communities and highlight the importance of considering demographic factors when assessing the risk of anemia during pregnancy.
[Table 2] The prevalence of anemia in this study is consistent with previous research conducted in rural areas. A study by Kalaivani et al. (2018)(10) found that the prevalence of anemia among pregnant women in rural India was 21.7%, which is comparable to the prevalence reported in this study. Another study by Ahmed et al. (2021)(11) conducted in rural Bangladesh found that the prevalence of anemia among pregnant women was 23.6%.
The categorization of anemia severity in this study is in line with the World Health Organization (WHO) classification, which defines mild anemia as a hemoglobin level between 10-10.9 g/dL, moderate anemia as a hemoglobin level between 7-9.9 g/dL, and severe anemia as a hemoglobin level below 7 g/dL. This classification allows for consistent comparison and interpretation of anemia prevalence across different studies.
Overall, Table 2 provides valuable information on the prevalence of anemia among pregnant women in a rural community, highlighting the need for interventions and strategies to prevent and manage anemia during pregnancy.
[Table 3] These findings are consistent with previous studies that have reported similar associations between anemia and demographic factors. For instance, a study conducted in rural India found that anemia was significantly associated with age, parity, and education level among pregnant women (Gupta et al., 2018). (12) Similarly, a study in Ethiopia found that anemia was significantly associated with maternal age, educational level, and occupation (Gebremedhin et al., 2014).(13)
The results of this study are consistent with previous research that has shown a significant association between anemia and demographic factors such as age, parity, education level, and occupation among pregnant women in both rural and urban areas (Abu-Ouf& Jan, 2008; Mbule et al., 2013; Nisar et al., 2011). (14)(15)(16) These findings suggest that targeted interventions addressing these factors may be effective in reducing the prevalence of anemia among pregnant women in rural communities.
Overall, the findings from this study suggest that demographic factors play a significant role in the prevalence of anemia among pregnant women in rural communities. Therefore, interventions aimed at addressing anemia in this population should consider these factors to be effective.

Limitations of Study

1. **Small sample size:** The sample size of the study was relatively small, which may limit the generalizability of the results to other populations.
2. **Selection bias:** The study recruited participants from a single rural community, which may not be representative of other rural communities in the same region or country. Also, the study only included pregnant women who attended antenatal care, which may introduce selection bias.
3. **Self-reported data:** The study relied on self-reported data for some variables, such as occupation and education level, which may be subject to recall bias.
4. **Lack of information on potential confounders:** The study did not collect information on some potential confounders, such as dietary intake and previous history of anemia, which may affect the prevalence of anemia among pregnant women.
5. **Lack of data on iron supplementation:** The study did not collect data on iron supplementation among pregnant women, which may affect the prevalence of anemia.

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