

A Study to Assess the Prevalence and Socioeconomic Determinants of Anaemia Among Pregnant Women: A Cross-Sectional Study

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ABSTRACT

Introduction: Anaemia in pregnancy is a major public health problem, particularly in developing countries, and is associated with adverse maternal and fetal outcomes. It is influenced by multiple factors, including socioeconomic status, parity, and dietary practices. This study aimed to assess the prevalence of anaemia and its socioeconomic determinants among pregnant women.

Methodology: A hospital-based cross-sectional study was conducted among 300 pregnant women attending the antenatal clinic and inpatient department of Obstetrics and Gynaecology at a tertiary care hospital over six months. Participants were selected using convenient sampling. Data were collected using a structured questionnaire covering sociodemographic details, obstetric history, and dietary awareness. Haemoglobin levels were estimated, and anaemia was classified as per WHO criteria. Data were analyzed using descriptive statistics and Chi-square test, with $p < 0.05$ considered statistically significant.

Results: The overall prevalence of anaemia was 62.3%, with 25.3% mild, 28.3% moderate, and 8.7% severe anaemia. A significant association was observed between parity and anaemia ($\chi^2 = 58.116$, $p < 0.001$), with primigravida women showing higher proportions of moderate and severe anaemia. Dietary awareness was also significantly associated with anaemia ($\chi^2 = 105.087$, $p < 0.001$), with higher prevalence and severity among women lacking awareness of iron-rich foods.

Conclusion: Anaemia remains highly prevalent among pregnant women and is significantly associated with parity and dietary awareness. Strengthening nutritional education and antenatal care services is essential to reduce the burden of anaemia and improve maternal and fetal outcomes.

Keywords: Anaemia, Pregnancy, Prevalence, Socioeconomic determinants, Parity, Dietary awareness, Iron deficiency, Antenatal care

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INTRODUCTION:

Anaemia is one of the most prevalent nutritional deficiencies worldwide and continues to be a major public health concern, particularly in developing countries like India [1]. Despite being preventable and treatable, it remains highly prevalent among pregnant women due to increased physiological demands and underlying socioeconomic vulnerabilities. The World Health Organization estimates that the prevalence of anaemia in pregnancy ranges from 14% in developed nations to as high as 65–75% in India [2]. Anaemia in pregnancy is

defined as haemoglobin levels below 11 g/dL and is classified into mild, moderate, and severe forms based on severity [3]. Anaemia during pregnancy has serious consequences for both the mother and the fetus. It is associated with increased maternal morbidity and mortality, reduced work capacity, susceptibility to infections, and cardiac complications [4]. For the fetus, it can lead to adverse outcomes such as low birth weight, intrauterine growth restriction, preterm birth, stillbirth, and neonatal mortality [5]. Furthermore, iron deficiency anaemia has been linked to impaired cognitive development in children, contributing to long-term health and economic burdens [6].

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The etiology of anaemia in pregnancy is multifactorial. Nutritional deficiencies, particularly iron, folate, and vitamin B12 deficiency, are the primary causes [7]. In addition, infections such as malaria and helminthic infestations, along with chronic diseases, also contribute significantly to the burden of anaemia [8]. Socioeconomic determinants including low educational status, poverty, early marriage, high parity, and inadequate antenatal care further exacerbate the condition [9]. Poor dietary intake and lack of awareness regarding iron-rich foods also play a critical role in worsening anaemia among pregnant women [10].

Various public health interventions have been implemented to address this issue. In India, the Anemia Mukh Bharat initiative under the National Health Mission focuses on iron and folic acid supplementation, deworming, and behaviour change communication strategies [11]. However, the effectiveness of these programs is often limited by poor compliance, lack of awareness, and inequities in healthcare access. Globally, the prevalence of anaemia shows significant regional variation, with higher rates reported in South Asia and Africa due to nutritional deficiencies and inadequate healthcare infrastructure [12].

Therefore, assessing the prevalence and socioeconomic determinants of anaemia among pregnant women is essential for designing targeted interventions and improving maternal and fetal health outcomes.

Methodology

A hospital-based cross-sectional study was conducted to assess the prevalence and socioeconomic determinants of anaemia among pregnant women. The study was carried out in the Department of Obstetrics and Gynaecology at Sree Balaji Medical College and Hospital, Chennai. The duration of the study was six months, from July 2025 to December 2025.

The study population consisted of pregnant women attending the antenatal outpatient department and those admitted to the inpatient wards during the study period. A total of 300 pregnant women were included in the study. The sample size was determined based on feasibility and the expected prevalence of anaemia in pregnancy from previous studies. A convenient sampling technique was used to recruit participants who met the inclusion criteria.

Pregnant women of all gestational ages who were willing to participate and provided informed consent were included in the study. Women with known hematological disorders other than iron deficiency anaemia, those who were critically ill, and those who did not consent to participate were excluded from the study.

Data collection was carried out using a pre-tested structured questionnaire. Information regarding sociodemographic characteristics such as age, education, occupation, income, and residence was collected. Obstetric history including gravidity, parity, gestational age, and antenatal care visits was also recorded. Information related to dietary habits, awareness of iron-rich foods, and compliance with iron and folic acid supplementation was obtained.

Clinical examination of all participants was performed, and relevant findings were noted. Laboratory investigations included estimation of haemoglobin levels using standard methods available in the hospital laboratory. Anaemia was diagnosed and classified according to World Health Organization criteria. Haemoglobin levels less than 11 g/dL were considered indicative of anaemia. Based on severity, anaemia was categorized as mild (10.0–10.9 g/dL), moderate (7.0–9.9 g/dL), and severe (<7 g/dL).

The collected data were entered into Microsoft Excel and analyzed using appropriate statistical software. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize the data. The prevalence of anaemia was calculated as the proportion of pregnant women with haemoglobin levels below 11 g/dL.

Inferential statistical analysis was performed to determine the association between anaemia and various socioeconomic and obstetric factors. The Chi-square test was used to assess the association between categorical variables such as parity, dietary awareness, and anaemia status. A p-value of less than 0.05 was considered statistically significant.

Ethical clearance for the study was obtained from the Institutional Ethics Committee prior to the commencement of the study. Written informed consent was obtained from all participants after explaining the purpose and procedure of the study. Confidentiality and anonymity of the participants were strictly maintained throughout the study.

Results

The present study included a total of 300 pregnant women to assess the prevalence of anaemia and its association with parity and dietary awareness.

The overall distribution of anaemia showed that 76 (25.3%) participants had mild anaemia, 85 (28.3%) had moderate anaemia, and 26 (8.7%) had severe anaemia, while 113 (37.7%) women were found to be non-anaemic. Thus, the overall prevalence of anaemia (mild, moderate, and severe combined) in the study population was 62.3%, indicating that anaemia remains a significant public health concern among pregnant women. (Table 1)

Table 1: Distribution of Anaemia Categories Among Pregnant Women

Anaemia Category	Frequency (n)	Percentage (%)
Mild	76	25.3
Moderate	85	28.3
Normal	113	37.7
Severe	26	8.7
Total	300	100

With respect to parity, the majority of participants belonged to the “one parity” group (138; 46.0%), followed by multigravida women (94; 31.3%) and primigravida women (68; 22.7%). This indicates that a larger proportion of the

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study population had experienced at least one prior pregnancy. (Table 2)

Table 2: Distribution of Parity Among Study Participants

Parity	Frequency (n)	Percentage (%)
Primi	68	22.7
One	138	46.0
Multi	94	31.3
Total	300	100

Dietary awareness regarding iron-rich foods was equally distributed among the participants, with 150 (50.0%) women reporting awareness and 150 (50.0%) lacking awareness. This reflects a gap in knowledge among half of the study population, which may influence anaemia status. (Table 3)

Table 3: Distribution of Diet Awareness Among Study Participants

Diet Awareness	Frequency (n)	Percentage (%)
Yes	150	50.0
No	150	50.0
Total	300	100

A statistically significant association was observed between parity and anaemia status ($\chi^2 = 58.116$, $df = 6$, $p < 0.001$). Among primigravida women, a higher proportion had moderate (50.0%) and severe anaemia (14.7%), with only 11.8% being non-anaemic. In contrast, multigravida women showed a higher proportion of normal haemoglobin levels (62.8%) and a lower prevalence of severe anaemia (3.2%). Women with one prior pregnancy had a relatively balanced distribution across anaemia categories. These findings suggest that parity plays an important role in determining anaemia status, with primigravida women being more vulnerable to moderate and severe forms of anaemia. (Table 4)

Table 4: Association Between Parity and Anaemia Category (n = 300)

Parity	Mild (%)	Moderate (%)	Normal (%)	Severe (%)	Total	χ^2 value	df	p-value
Primi	16 (23.5)	34 (50.0)	8 (11.8)	10 (14.7)	68	58.116	6	<0.001

One	37 (26.8)	42 (30.4)	46 (33.3)	13 (9.4)	138			
Multi	23 (24.5)	9 (9.6)	59 (62.8)	3 (3.2)	94			
Total	76	85	113	26	300			

Similarly, a highly significant association was found between dietary awareness and anaemia status ($\chi^2 = 105.087$, $df = 3$, $p < 0.001$). Among women who lacked awareness of iron-rich diets, a large proportion had moderate (48.7%) and severe anaemia (15.3%), while only 14.0% were non-anaemic. In contrast, among women who were aware of iron-rich diets, the majority (61.3%) were non-anaemic, and only a small proportion had severe anaemia (2.0%).

These findings clearly indicate that lack of dietary awareness is strongly associated with higher prevalence and severity of anaemia. Overall, both parity and dietary awareness were found to be significant determinants of anaemia among pregnant women in this study. (Table 5)

Table 5: Association Between Diet Awareness and Anaemia Category (n = 300)

Diet Awareness	Mild (%)	Moderate (%)	Normal (%)	Severe (%)	Total	χ^2 value	df	p-value
No	33 (22.0)	73 (48.7)	21 (14.0)	23 (15.3)	150	105.087	3	<0.001
Yes	43 (28.7)	12 (8.0)	92 (61.3)	3 (2.0)	150			
Total	76	85	113	26	300			

Discussion

The present study assessed the prevalence of anaemia and its socioeconomic determinants among pregnant women and found an overall prevalence of 62.3%, indicating that anaemia continues to be a major public health concern. This finding is consistent with studies conducted in similar settings. Sinha et al. reported a high prevalence of anaemia among pregnant women in rural India, emphasizing its widespread burden [3]. Likewise, Omote et al. observed a

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high prevalence of anaemia among antenatal attendees in Nigeria, further highlighting that anaemia in pregnancy is a persistent global issue, particularly in low- and middle-income countries [2].

In the present study, moderate anaemia (28.3%) was the most common form, followed by mild (25.3%) and severe anaemia (8.7%). This pattern is comparable to the findings of Rauf et al., who reported that moderate anaemia constituted the largest proportion of cases among pregnant women [5]. The relatively lower proportion of severe anaemia in the present study may be attributed to improved antenatal screening and early intervention strategies, although the overall burden remains high.

The distribution of parity showed that most participants belonged to the “one parity” group (46.0%), followed by multigravida (31.3%) and primigravida (22.7%). A statistically significant association was observed between parity and anaemia status ($p < 0.001$). In this study, primigravida women had a higher proportion of moderate (50.0%) and severe anaemia (14.7%), whereas multigravida women had a higher proportion of normal haemoglobin levels (62.8%). These findings differ from those reported by Shah T et al., who found that anaemia was more common among multigravida women due to repeated pregnancies leading to depletion of iron stores [13]. The variation observed in the present study may be due to better antenatal care utilization and increased awareness among multigravida women compared to primigravida women.

However, similar to the present findings, Qiao et al. identified parity as an important determinant of anaemia, with increased risk associated with higher gravidity and multiple pregnancies [14]. This suggests that while parity influences anaemia, its effect may vary depending on access to healthcare, nutritional status, and awareness levels.

Dietary awareness was found to be a crucial factor influencing anaemia in the present study. A highly significant association was observed between awareness of iron-rich diet and anaemia status ($p < 0.001$). Among women who lacked awareness, a large proportion had moderate (48.7%) and severe anaemia (15.3%), whereas among those who were aware, the majority (61.3%) were non-anaemic. These findings are consistent with the study by Oyelese et al., who reported that inadequate dietary intake and poor awareness were strongly associated with higher prevalence of anaemia among pregnant women [15]. Similarly, Marshall et al. emphasized the importance of proper nutrition during pregnancy in preventing anaemia and improving maternal and fetal outcomes [10].

The role of socioeconomic factors in the development of anaemia has also been widely documented. In the present study, lack of dietary awareness reflects underlying issues such as poor education and limited access to nutritional information. This is supported by Amarasinghe et al., who found that low educational status and poor socioeconomic conditions significantly contributed to anaemia among pregnant women [8]. Furthermore, global evidence suggests

that anaemia is more prevalent in regions with limited healthcare access and poor nutritional status [12].

Public health interventions such as iron and folic acid supplementation programs have been implemented to address anaemia in pregnancy. However, their effectiveness depends on compliance and awareness. Dutta et al. highlighted that poor adherence to supplementation and lack of awareness remain major barriers in controlling anaemia among pregnant women in India [11]. This aligns with the findings of the present study, where lack of awareness was strongly associated with higher prevalence of anaemia.

Therefore, the findings of the present study are consistent with existing literature, confirming that anaemia in pregnancy is influenced by multiple factors including parity, dietary awareness, and socioeconomic conditions. The significant association observed with dietary awareness highlights the need for strengthening health education and nutritional counseling as part of routine antenatal care. Addressing these determinants through targeted interventions can play a crucial role in reducing the burden of anaemia and improving maternal and fetal health outcomes.

This study has certain limitations. Being a hospital-based cross-sectional study, the findings may not be generalizable to the wider community. The use of convenient sampling may introduce selection bias. Causal relationships between variables could not be established due to the study design. Dietary practices and awareness were self-reported, which may lead to recall bias. Additionally, other factors such as micronutrient deficiencies and infections were not assessed, which could influence anaemia status.

Conclusion

The present study highlights that anaemia remains a significant public health problem among pregnant women, with a high prevalence of 62.3%. Moderate anaemia was the most common form observed. The study identified parity and dietary awareness as important determinants of anaemia. Primigravida women were found to be more vulnerable to moderate and severe anaemia, while multigravida women showed relatively better haemoglobin status. A strong association was observed between lack of awareness of iron-rich diets and increased severity of anaemia.

These findings emphasize the need for strengthening antenatal care services with a focus on early screening, nutritional education, and counselling. Improving awareness regarding iron-rich foods and ensuring compliance with iron and folic acid supplementation can play a crucial role in reducing the burden of anaemia. Targeted interventions addressing socioeconomic factors are essential to improve maternal health and pregnancy outcomes.

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