Prevalence of Anemia and the Influence of Nutritional and Economic Status on Pregnant Women in Meerut City

Prem Kumar * , Sartaj Ahmod , Anuradha Davey , Komal Saxen

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Article

Prevalence of Anemia and the Influence of Nutritional and Economic Status on Pregnant Women in Meerut City

Prem Kumar [1,*], Sartaj Ahmad [2], Anuradha Davey [3] and Komal Saxena [4]

[1] Department of Liberal Arts & Humanities, Swami Vivekananda Subharti University, Meerut, Uttar Pradesh, India

[2] Faculty of Liberal Arts & Humanities, Swami Vivekananda Subharti University, Meerut, Uttar Pradesh, India

[3] Department of Community Medicine, Swami Vivekananda Subharti University, Meerut, Uttar Pradesh, India

[4] Department of Obstetrics and Gynecology Nursing, Swami Vivekananda Subharti University, Meerut, Uttar Pradesh, India

* Correspondence: premmohfw22@gmail.com

Abstract

Background: Anemia during pregnancy remains a significant public health concern, especially in low- and middle-income countries. It contributes to adverse maternal and fetal outcomes and is influenced by multiple socioeconomic, dietary, and obstetric factors. This study aimed to assess the prevalence of anemia and its associated risk factors among pregnant women attending antenatal care in Meerut City. Methods: A cross-sectional study was conducted among 210 pregnant women attending antenatal care services at an Urban Primary Health Center (UPHC) in Meerut City. Data on sociodemographic characteristics, obstetric history, dietary habits, knowledge regarding anemia, and supplementation adherence were collected using a pre-tested semi-structured questionnaire. Hemoglobin levels were measured to classify anemia severity. Bivariate analysis identified factors associated with anemia, and variables with $p < 0.10$ were included in a multivariable logistic regression model. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were calculated. Statistical significance was set at $p < 0.05$. Results: Out of the total 210 respondents, the overall prevalence of anemia among pregnant women was 63.8%, with 28.6% having mild anemia, 31.4% moderate anemia, and 3.8% severe anemia. Anemia was significantly more prevalent among women from low-income households ($p < 0.001$), those with lower educational attainment ($p = 0.002$), poor dietary intake ($p < 0.001$), and limited knowledge of anemia and its sources ($p = 0.000$). A significant proportion (83.3%) of anemic women rarely consumed iron-rich foods such as meat, beans, and green leafy vegetables. Multivariable logistic regression analysis identified low household income (AOR = 2.7; 95% CI: 1.4–5.3; $p = 0.003$) and poor dietary intake (AOR = 3.5; 95% CI: 1.8–6.7; $p < 0.001$) as independent predictors of anemia after adjusting for age, parity, and gestational age. Conclusion: Anemia remains highly prevalent among pregnant women in this urban setting, primarily driven by low socioeconomic status, poor dietary diversity, and suboptimal nutritional practices. Strengthening antenatal care services with a focus on poverty alleviation, nutritional counseling, early antenatal care initiation, and enhanced iron and folic acid supplementation adherence is critical to reducing anemia burden and improving maternal and neonatal health outcomes.The study highlights a high burden of anemia among pregnant women in Meerut City, with nutritional inadequacy and economic deprivation being the major contributing factors. These findings emphasize the urgent need for integrated antenatal interventions focusing on improving maternal nutrition, dietary counselling, and addressing underlying socioeconomic inequalities. Strengthening existing national programs such as Anemia Mukt Bharat with local-level nutritional surveillance and community-based

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education can play a pivotal role in reducing the anemia burden among pregnant women in urban India.

Keywords: anemia in pregnancy; nutritional status; socioeconomic status; dietary diversity; iron intake; maternal health; Urban India; Meerut City

1. Introduction

Anemia during pregnancy is a widespread public health issue, particularly in developing countries like India, where it contributes significantly to maternal and fetal morbidity and mortality. Characterized by a reduced concentration of hemoglobin in the blood, anemia impairs the oxygen-carrying capacity of red blood cells, which is crucial for maintaining maternal and fetal health. According to the World Health Organization (WHO), anemia affects approximately 40% of pregnant women globally, with an even higher burden in South Asia. In India, the National Family Health Survey (NFHS-5) reported that more than 50% of pregnant women are anemic, underscoring the urgency of addressing this condition as a national priority.

The causes of anemia in pregnancy are multifactorial, with iron deficiency being the most common contributor. However, nutritional inadequacies, poor dietary habits, recurrent infections, and limited access to health services also play a critical role. In addition to biological and health-related factors, the socioeconomic context of a woman significantly influences her vulnerability to anemia. Low-income households often lack access to nutritious food, healthcare, and education, which exacerbates the risk of anemia during pregnancy. Thus, the interplay between nutrition and economic status becomes a crucial determinant in the prevalence and severity of anemia among expectant mothers.

Meerut City, a rapidly urbanizing region in western Uttar Pradesh, presents a unique demographic profile characterized by socioeconomic diversity, nutritional transition, and varying access to antenatal care services. Despite its proximity to the National Capital Region (NCR), significant disparities in maternal health indicators persist. Limited research has been conducted to explore how both nutritional and economic determinants contribute to anemia in pregnant women in this specific urban setting.

Understanding the prevalence of anemia in this region, alongside the contributing nutritional and economic factors, is essential for informing targeted interventions. Nutritional education, supplementation programs, and economic empowerment initiatives can significantly reduce the incidence of anemia if appropriately tailored to the local context. Furthermore, identifying vulnerable groups within the urban population can help policymakers design more effective and equitable health strategies.

This study aims to assess the prevalence of anemia among pregnant women in Meerut City and examine how their nutritional status and economic position contribute to this condition. By exploring these associations, the research seeks to provide evidence-based recommendations that can guide public health policy, improve maternal health outcomes, and reduce the burden of anemia in similar urban contexts.

2. Background of the Study

Anemia in pregnancy remains a critical concern globally and is especially prevalent in South Asia, where nutritional deficiencies and socioeconomic inequities converge to impact maternal health. The World Health Organization (WHO) identifies anemia—primarily iron deficiency anemia—as a major contributor to adverse pregnancy outcomes including preterm birth, low birth weight, and maternal mortality.

Several cross-sectional studies have consistently reported high anemia prevalence among pregnant women across diverse settings. For example, Abriha et al. (2014) in Ethiopia and Tibambuya

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et al. (2019) in Ghana found anemia rates exceeding 40%, largely attributed to poor dietary intake and low socioeconomic status. Similarly, in India, Kumari et al. (2019) observed that maternal anemia significantly increased the risk of adverse birth outcomes such as low birth weight and preterm delivery.

In urban settings, dietary habits play a pivotal role in anemia prevalence. Grover et al. (2020) linked anemia in urban Haryana to low consumption of iron-rich foods and poor dietary diversity. Similarly, Diamond-Smith et al. (2016) highlighted that persistent anemia among poor pregnant women in Chandigarh stemmed from both nutritional deficits and limited access to quality health care services.

The impact of economic status is equally profound. Sappani et al. (2023) demonstrated that severe and moderate anemia among Indian women of reproductive age was significantly associated with poverty, lack of education, and limited autonomy. Pathak et al. (1999) and Kapil et al. (1999) reported that anemia prevalence was disproportionately higher among women living in urban slums compared to the general population, with inadequate iron intake and poor sanitation being key factors.

More recent findings by Chakrabarti et al. (2018) and Samuel et al. (2013) suggest that even in urban and semi-urban contexts, consumption of foods containing iron absorption inhibitors (like phytates and tannins) further compounds the problem, despite supplementation programs. Mithra et al. (2013) and Vindhya et al. (2019) further noted low compliance with iron-folic acid (IFA) supplementation, especially among women with lower literacy and financial instability.

Collectively, these studies underscore that anemia among pregnant women is not solely a nutritional issue, but rather a complex condition influenced by a range of dietary, economic, cultural, and health system-related factors. However, there is limited evidence from cities like Meerut in western Uttar Pradesh, where urbanization, poverty pockets, and evolving dietary habits present a distinct context. This study aims to bridge that gap by examining both nutritional and economic determinants of anemia among pregnant women in Meerut City.

3. Methodology

This research study was conducted with the aim of assessing the prevalence of anemia among pregnant women in Meerut City, Uttar Pradesh, and examining the relationship between their nutritional status, economic position, and the occurrence of anemia. A systematic and comprehensive methodological approach was adopted to ensure the reliability, validity, and generalizability of the findings.

Study Design and Setting

This community-based cross-sectional study was conducted in Meerut City, western Uttar Pradesh, India. Meerut comprises 28 Government Urban Primary Health Centres (UPHCs) that provide antenatal care to women in urban and peri- areas. Data collection took place from April to June 2025.

Study Population and Sample Size

The target population was all pregnant women registered for antenatal care at the 28 UPHCs during the study period. A total sample of 210 pregnant women was determined sufficient to detect a 50% anemia prevalence with 95% confidence and 7% margin of error, accounting for a 10% nonresponse rate.

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Sampling Procedure

A multistage stratified random sampling approach was used:

- Stratification: All 28 UPHCs were included to ensure representativeness of the city's geographic zones.
- Allocation: The 210 participants were proportionately allocated to each UPHC based on the number of antenatal registrations in the preceding month.
- Participant Selection: From each UPHC, pregnant women were selected randomly from the ANC register using a simple random sampling method (lottery method or random number table), until the assigned number of participants for that center was reached.

➢ Inclusion and Exclusion Criteria

Inclusion:

- Pregnant women of any gestational age
- Registered for ANC at one of the 28 UPHCs
- Resident of Meerut City for ≥ 6 months
- Provided written informed consent

Exclusion:

- Known chronic diseases unrelated to anemia (e.g., renal failure, malignancy)
- Blood transfusion within the last month
- Inability to participate due to severe illness or communication barriers

Data Collection

- A pre-tested, structured questionnaire was administered through face-to-face interviews in the local language (Hindi) by trained female field investigators. The questionnaire had the following sections:

- Demographic details: age, marital status, parity, education, occupation, religion.
- Socioeconomic status: family income, housing conditions, and asset ownership.
- Obstetric history: gestational age, previous pregnancies, birth intervals, miscarriage history.
- Nutritional habits: daily meal patterns, food group intake, iron-rich food consumption, and supplement usage.
- Health services utilization: number of antenatal visits, iron-folic acid tablet distribution and consumption.
- Hemoglobin values were extracted from each woman's ANC record, reflecting in routine visits register hemoglobin meter testing recently conducted at the UPHC. Anemia was classified as per WHO criteria:
- Mild: 10.0–10.9 g/dL
- Moderate: 7.0–9.9 g/dL
- Severe: < 7.0 g/dL

Ethical Considerations

Ethical clearance was obtained from the Institutional Ethics Committee of Swami Vivekananda Subharti University Meerut, Uttar Pradesh, India all participants were informed about the objectives and procedures of the study, and written informed consent was obtained prior to data collection. Participation was entirely voluntary, and confidentiality of responses was strictly maintained. No invasive procedures were performed solely for the research purpose.

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Statistical Analysis

Data were entered and analyzed using advance excel & JASP (Jeffreys's Amazing Statistics Program) is a free and open-source statistical software program

- Descriptive statistics: Means (± SD) for continuous variables; frequencies (%) for categorical variables.
- Bivariate analysis: Chi-square tests assessed associations between anemia status and categorical factors (socioeconomic and dietary variables).
- Multivariable logistic regression: Variables significant at $p < 0.10$ in bivariate analysis were entered into the model to identify independent predictors of anemia, adjusting for age, parity, and gestational age. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported.Statistical significance: Set at $p < 0.05$ for all tests.

4. Results

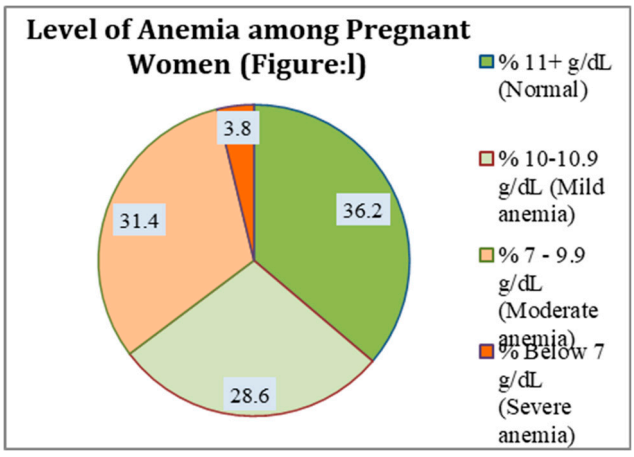

Figure 1. Level of Anemia among Pregnant Women. The pie chart represents the distribution of anemia severity among pregnant women based on hemoglobin levels: Normal (≥11 g/dL), Mild anemia (10–10.9 g/dL), Moderate anemia (7–9.9 g/dL), and Severe anemia (<7 g/dL).

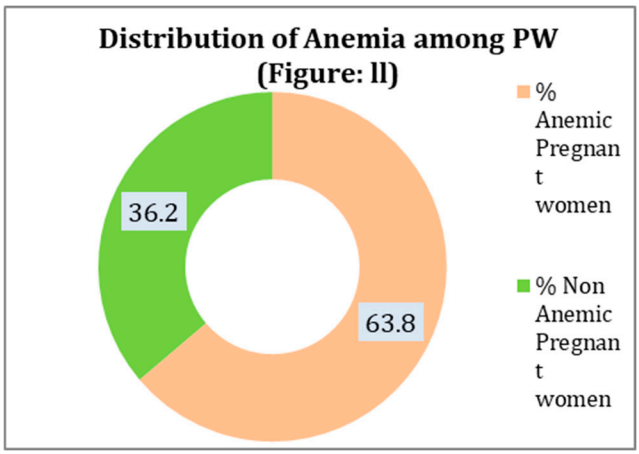

Figure 2. Distribution of Anemia among Pregnant Women (PW). The donut chart shows the overall proportion of anemic (63.8%) and non-anemic (36.2%) pregnant women in the study population.

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Table 1.

The socio-demographic characteristics of expectant mothers (n = 210)			
Variables	**Anemic PW - 134 (%)**	**Non Anemic PW - 76 (%)**	**Total - 210(%)**
Women's age group who are pregnant			
≤ 20	9 (6.7)	3 (3.9)	12 (5.7)
Age 21-25	46 (34.3)	31 (40.8)	77 (36.7)
Age 26 -30	56 (41.8)	33 (43.4)	89 (42.4)
Age 31 -35	19 (14.2)	7 (9.2)	26 (12.4)
Age >35	4 (3.0)	2 (2.6)	6 (2.9)
Monthly household income			
Low	84 (62.7)	10 (13.2)	94 (44.8)
Medium	39 (29.1)	38 (50.0)	77 (36.7)
High	11 (8.2)	28 (36.8)	39 (18.6)
Pregnant women's educational attainment			
No formal Education	23 (17.2)	7 (9.2)	30 (14.3)
Primary & Middle (1-8)	67 (50.0)	28 (36.8)	95 (45.2)
Secondary & Higher Secondary (9-12)	37 (27.6)	26 (34.2)	63 (30.0)
UG & PG	7 (5.2)	15 (19.7)	22 (10.5)
Religion of Pregnant women			
Hindu & Other	68 (50.7)	45 (59.2)	113 (53.8)
Muslim	66 (49.3)	31 (40.8)	97 (46.2)
Category of Religion			
General	60 (44.8)	33 (43.4)	93 (44.3)
OBC	53 (39.6)	34 (44.7)	87 (41.4)
SC	21 (15.7)	9 (11.8)	30 (14.3)
Basic Amenities Are Available (Electricity, clean drinking water, sanitary amenities, television, air conditioning, laptop or computer, and automobile transportation)			
Low	40 (29.9)	19 (25.0)	59 (28.1)
Medium	76 (56.7)	20 (26.3)	96 (45.7)
Normal	18 (13.4)	37 (48.7)	55 (26.2)
Entertainment Activities (Watch TV, Go to the Movies, and Read the News)			
Low	73 (54.5)	11 (14.5)	84 (40.0)
Moderate	34 (25.4)	21 (27.6)	55 (26.2)
High	27 (20.1)	44 (57.9)	71 (33.8)
Size of the family			
3-5	16 (11.9)	17 (22.4)	33 (15.7)
More than 5	118 (88.1)	59 (77.6)	177 (84.3)

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Table 2.

Obstetrics features of ANC participants at UPHC Meerut City town, March–June 2025 (N=210)			
Variables	**Anemic PW - 134 (%)**	**Non Anemic PW - 76 (%)**	**Total - 210(%)**
Gestational Age of Pregnant women			
First Trimester	3 (2.2)	5 (6.6)	8 (3.8)
Second trimester (13-26 weeks)	36 (26.9)	33 (43.4)	69 (32.9)
Third trimester (27+ weeks)	95 (70.9)	38 (50.0)	133 (63.3)
For this pregnancy, begin your first ANC visit			
Before 12 weeks	5 (3.7)	7 (9.2)	12 (5.7)
12–20 weeks	129 (96.3)	68 (89.5)	197 (93.8)
21–28 weeks	0 (0.0)	1 (1.3)	1 (0.5)
Women in Pregnancy Gravida			
1	25 (18.7)	19 (25.0)	44 (21.0)
2	54 (40.3)	34 (44.7)	88 (41.9)
3	42 (31.3)	16 (21.1)	58 (27.6)
4	13 (9.7)	7 (9.2)	20 (9.5)
The parity of pregnant women			
0	45 (33.6)	27 (35.5)	72 (34.3)
1	53 (39.6)	33 (43.4)	86 (41.0)
2	27 (20.1)	12 (15.8)	39 (18.6)
3	9 (6.7)	4 (5.3)	13 (6.2)
Birth Gap from the previous to the present			
Primigravida	31 (23.1)	27 (35.5)	58 (27.6)
<2	72 (53.7)	28 (36.8)	100 (47.6)
>2	31 (23.1)	21 (27.6)	52 (24.8)
Live Children in the Present			
0	30 (22.4)	28 (36.8)	58 (27.6)
1	60 (44.8)	30 (39.5)	90 (42.9)
2	37 (27.6)	15 (19.7)	52 (24.8)
3	7 (5.2)	3 (3.9)	10 (4.8)

Table 3.

Dietary Habit ,Anemia and its awareness			
Variables	**Anemic PW - 134 (%)**	**Non Anemic PW - 76 (%)**	**Total - 210(%)**
Daily diet include :- Fruits, Vegetables, Dairy products, Protein (meat, fish, eggs),Junk Food (Noodles, bread, pasta)			
Low	87 (64.9)	10 (13.2)	97 (46.2)
Medium	41 (30.6)	37 (48.7)	78 (37.1)
Normal	6 (4.5)	29 (38.2)	35 (16.7)
Do you face financial constraints in purchasing nutritious food?			

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Yes	104 (77.6)	43 (56.6)	147 (70.0)
No	30 (22.4)	33 (43.4)	63 (30.0)
Consume foods high in iron, such as meat, beans, and green leafy vegetables			
Daily	5 (3.7)	9 (11.8)	14 (6.7)
2-3 times/week	9 (6.7)	12 (15.8)	21 (10.0)
Rarely	120 (89.6)	55 (72.4)	175 (83.3)
Do you know how important it is to eat a balanced diet when pregnant?			
Yes	116 (86.6)	69 (90.8)	185 (88.1)
No	18 (13.4)	7 (9.2)	25 (11.9)
How is your Iron/FA intake?			
Daily	36 (26.9)	19 (25.0)	55 (26.2)
Once in a week	16 (11.9)	13 (17.1)	29 (13.8)
Sometime	82 (61.2)	44 (57.9)	126 (60.0)
Do you follow a special diet during pregnancy			
Yes	19 (14.2)	60 (78.9)	79 (37.6)
No	115 (85.8)	16 (21.1)	131 (62.4)
Knowledge of Anemia and Its Sources			
High	29 (21.6)	35 (46.1)	64 (30.5)
Moderate	58 (43.3)	18 (23.7)	76 (36.2)
Low	47 (35.1)	23 (30.3)	70 (33.3)

Table 4.

Factors associated with Prevalence of Anemia among pregnant women					
Variables	**Anemic PW - 134 (%)**	**Non Anemic PW - 76 (%)**	**Total - 210(%)**	**Chi Square P-Value**	**Logistic Regression p-value**
Household monthly Income					
Low	84 (62.7)	10 (13.2)	94 (44.8)		
Medium	39 (29.1)	38 (50.0)	77 (36.7)	0.000*	0.003**
High	11 (8.2)	28 (36.8)	39 (18.6)		
Daily diet include :- Fruits, Vegetables, Dairy products, Protein (meat, fish, eggs),Junk Food (Noodles, bread, pasta)					
Low	87 (64.9)	10 (13.2)	97 (46.2)		
Medium	41 (30.6)	37 (48.7)	78 (37.1)	0.000*	<0.001**
Normal	6 (4.5)	29 (38.2)	35 (16.7)		
Knowledge of Anemia and Its Sources					
High	29 (21.6)	35 (46.1)	64 (30.5)		
Moderate	58 (43.3)	18 (23.7)	76 (36.2)	0.000*	0.187***
Low	47 (35.1)	23 (30.3)	70 (33.3)		
Pregnant women's educational attainment					
No formal Education	23 (17.2)	7 (9.2)	30 (14.3)		
Primary & Middle (1-8)	67 (50.0)	28 (36.8)	95 (45.2)	0.002*	0.116***
Secondary & Higher Secondary (9-12)	37 (27.6)	26 (34.2)	63 (30.0)		

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UG & PG	7 (5.2)	15 (19.7)	22 (10.5)

***** The result Chi-square is significant at p < .05, ** Logistic Regression p-value is significant at <.05 & *** p-value is not significant at <.05.

➢ **Interpretation of Key Findings:**

The present study examined the sociodemographic, obstetric, dietary, and awareness-related factors associated with anemia among 210 pregnant women attending antenatal care at UPHC Meerut City, India. A high prevalence of anemia was observed among pregnant women with various interrelated risk factors identified.

Sociodemographic analysis revealed that most anemic women were in the age group of 26-30 years (41.8%), with a majority (62.7%) from low-income households, compared to only 13.2% of non-anemic women in the same income group, indicating a significant association between lower socioeconomic status and anemia. Educational attainment was also strongly linked; 17.2% of anemic women had no formal education, and 50% had only primary or middle school education, while higher educational levels were more prevalent among non-anemic women. Religious and caste-wise distribution showed comparable representation; however, social determinants such as low income and education likely contributed indirectly to anemia prevalence. Access to basic amenities was limited among anemic women, with 29.9% lacking adequate utilities, and entertainment activities were also minimal, reflecting broader socio-environmental deprivation.

Obstetric characteristics further highlighted that the majority of women (63.3%) initiated their first ANC visit in the second trimester or later, with 70.9% of anemic women presenting in the third trimester, indicating delayed healthcare engagement. Higher gravidity and parity were also associated with anemia, with 31.3% of anemic women being in their third pregnancy and 27% already having two living children. Short birth intervals (<2 years) were more common among anemic women (53.7%), suggesting that closely spaced pregnancies may contribute to nutritional depletion and higher anemia risk.

Dietary habits demonstrated a clear relationship with anemia. A significant proportion of anemic women (64.9%) reported poor dietary quality, with insufficient intake of fruits, vegetables, dairy products, proteins, and over-reliance on junk food. Financial barriers were substantial, with 77.6% of anemic women reporting economic constraints in purchasing nutritious food. Consumption of iron-rich foods was notably low; 89.6% of anemic women rarely consumed such foods. Despite good awareness regarding the importance of a balanced diet (86.6%), practical implementation was poor, as reflected in low adherence to daily iron and folic acid supplementation (only 26.9% daily intake among anemic women). Moreover, a majority of non-anemic women (78.9%) reported following a special diet during pregnancy, while 85.8% of anemic women did not, indicating that proactive dietary management may have a protective effect. Knowledge of anemia and its sources was moderate to low in most anemic women, with only 21.6% demonstrating high knowledge.

Multivariate analysis confirmed that low household income (p=0.003) and poor dietary quality (p<0.001) were strong independent predictors of anemia. While lower knowledge levels and lower education were associated with anemia in univariate analysis, they did not remain significant in multivariate regression, indicating that socioeconomic status and dietary habits may have a more direct influence on anemia risk.

Collectively, these findings underscore the complex interplay between socioeconomic deprivation, poor dietary habits, delayed antenatal care initiation, high parity, short interpregnancy intervals, and inadequate nutritional management as key contributors to anemia among pregnant women in this setting. Interventions focusing on improving household income, enhancing dietary quality, promoting timely ANC engagement, encouraging adequate birth spacing, and strengthening nutritional education and supplementation adherence are crucial for the effective prevention and control of anemia during pregnancy.

Summary and Conclusion

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This study highlights a high burden of anemia among pregnant women attending antenatal care in Meerut City, with multifactorial determinants contributing to its prevalence. The findings demonstrate that low household income, poor dietary habits, financial constraints in purchasing nutritious food, delayed initiation of antenatal care, high parity, short birth intervals, and suboptimal adherence to iron and folic acid supplementation are significantly associated with anemia. While knowledge and awareness regarding the importance of a balanced diet were generally adequate, practical application in dietary behavior and supplementation compliance was limited among anemic women. Multivariate analysis identified low socioeconomic status and inadequate dietary intake as the most significant independent predictors of anemia.

The results emphasize the urgent need for comprehensive, multi-sectoral strategies that address the underlying social determinants of health, including poverty alleviation, nutritional education, dietary support programs, improved access to affordable nutritious foods, early and regular antenatal care, and effective counseling on adherence to iron and folic acid supplementation. Strengthening these interventions is essential for reducing the burden of anemia, improving maternal and fetal outcomes, and advancing maternal health goals.

5. Discussion

This study investigated the multifactorial determinants of anemia among pregnant women attending antenatal care services at UPHC Meerut City. The findings revealed a high prevalence of anemia, with significant associations observed across sociodemographic, obstetric, dietary, and behavioral domains.

Sociodemographic analysis indicated that anemia was disproportionately prevalent among women from lower-income households with limited educational attainment and restricted access to basic amenities. Financial constraints likely limit the ability to procure diverse, nutrient-rich foods, directly contributing to nutritional anemia. These findings are consistent with prior studies that have identified low socioeconomic status as a significant risk factor for maternal anemia.

Obstetric characteristics further influenced anemia risk. The majority of anemic women initiated antenatal care in the second or third trimester, delaying timely identification and management of anemia. Higher gravidity, increased parity, and short birth intervals were commonly observed among anemic women, suggesting cumulative nutritional depletion over successive pregnancies. These patterns underscore the need for family planning services and public health education promoting adequate birth spacing and early antenatal care enrollment.

Dietary practices were strongly associated with anemia status. Despite adequate general awareness of the importance of balanced nutrition during pregnancy, many anemic women reported poor dietary quality, characterized by insufficient intake of iron-rich foods and overconsumption of nutrient-poor options. Financial barriers, limited dietary diversity, and inconsistent adherence to iron and folic acid supplementation exacerbated their vulnerability. In contrast, non-anemic women more frequently adopted special pregnancy diets and adhered to supplementation regimens, demonstrating the protective effect of effective nutritional management.

Although knowledge about anemia and its dietary sources was statistically associated with anemia status in univariate analysis, it did not retain significance in multivariate regression. This suggests that knowledge alone may be insufficient to drive behavior change in the presence of socioeconomic and systemic barriers.

These findings highlight the complex interplay of social determinants, obstetric history, dietary habits, and health behaviors in the etiology of anemia during pregnancy. Comprehensive and integrated interventions are necessary to address these intersecting risk factors and reduce anemia prevalence effectively.

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6. Conclusion

Anemia remains highly prevalent among pregnant women in this urban setting, primarily driven by low socioeconomic status, poor dietary diversity, and suboptimal nutritional practices. Strengthening antenatal care services with a focus on poverty alleviation, nutritional counseling, early antenatal care initiation, and enhanced iron and folic acid supplementation adherence is critical to reducing anemia burden and improving maternal and neonatal health outcomes.The study highlights a high burden of anemia among pregnant women in Meerut City, with nutritional inadequacy and economic deprivation being the major contributing factors. These findings emphasize the urgent need for integrated antenatal interventions focusing on improving maternal nutrition, dietary counselling, and addressing underlying socioeconomic inequalities. Strengthening existing national programs such as Anemia Mukt Bharat with local-level nutritional surveillance and community-based education can play a pivotal role in reducing the anemia burden among pregnant women in urban India.

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T**ransparency statement:** The corresponding author (Dr. Prem Kumar) affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

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