

A Study to Assess the Prevalence of Anemia Among Women of Reproductive Age in Selected Areas of Kanpur, Uttar Pradesh

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ABSTRACT

Background:

Anemia is one of the most common nutritional disorders worldwide and remains a major public health challenge in India. Women of reproductive age are particularly vulnerable due to menstrual blood loss, pregnancy, and inadequate dietary intake. Urban areas of Kanpur, including peri-urban communities, show a high prevalence of anemia due to poor nutrition, socioeconomic inequality, and limited awareness regarding preventive practices.

Objectives:

1. To assess the prevalence of anemia among women of reproductive age in selected areas of Kanpur.
2. To identify factors associated with anemia such as dietary habits, socioeconomic status, and menstrual history.
3. To assess the level of knowledge regarding anemia prevention.

Methodology:

A quantitative cross-sectional study was conducted among 200 women aged 15–49 years residing in selected urban areas of Kanpur. Participants were selected using simple random sampling. Hemoglobin

levels were assessed using Sahli's hemoglobinometer method, and structured questionnaires were used to collect data on demographic characteristics and risk factors.

Results(Summary):

Previous studies conducted in urban Kanpur reported that **78.7% of pregnant women were found to be anemic**, highlighting the high burden of anemia in this region.

Conclusion:

Anemia remains a major public health problem in Kanpur. Strengthening nutritional education, iron supplementation programs, and regular screening are essential to reduce the prevalence.

Keywords:

Anemia, hemoglobin, reproductive age women, Kanpur, nutritional deficiency

INTRODUCTION

Anemia is defined as a condition in which the number of red blood cells or hemoglobin concentration is lower than normal, reducing the capacity of blood to carry oxygen to body tissues. Iron deficiency is the most common cause of anemia globally and affects individuals of all age groups, particularly women and children.

Anemia is a major public health concern in India due to widespread nutritional deficiencies, poor dietary intake, parasitic infections, and inadequate health awareness. Women of reproductive age are particularly vulnerable to anemia because of repeated pregnancies, menstrual blood loss, and inadequate intake of iron-rich foods.

Studies conducted across India have shown that anemia prevalence varies widely among different groups. Research among adolescent girls has reported prevalence rates ranging from **21% to 96%**, indicating significant regional variation.

In northern India, anemia remains highly prevalent. A systematic review reported that the pooled prevalence of anemia among pregnant women in India was approximately **72%**, reflecting the seriousness of the problem.

Kanpur, one of the largest industrial cities in Uttar Pradesh, has a diverse population with varying socioeconomic conditions. Many families depend on daily wage labor, leading to poor dietary diversity and increased nutritional deficiencies. A cross-sectional study conducted in urban Kanpur reported that **163 out of 207 pregnant women were anemic**, giving a prevalence rate of **78.7%**, indicating a serious public health concern.

Anemia leads to reduced physical work capacity, impaired cognitive development, decreased immunity, and increased maternal and infant mortality. Therefore, assessing anemia prevalence and identifying associated factors are essential steps toward improving community health.

NEED FOR THE STUDY

Anemia continues to be one of the most common health problems among women in India. Despite the implementation of national programs such as iron and folic acid supplementation, the prevalence of anemia remains high.

In Kanpur, rapid urbanization and changing lifestyles have affected dietary patterns. Many women lack awareness regarding iron-rich foods and preventive practices. Early identification of anemia and associated risk factors is essential for preventing complications.

The present study is conducted to:

- Identify the prevalence of anemia
- Assess contributing risk factors
- Improve awareness regarding prevention
- Provide baseline data for health programs

Such research is important for developing effective public health strategies in urban communities.

STATEMENT OF THE PROBLEM

"A quantitative study to assess the prevalence of anemia among women of reproductive age in selected areas of Kanpur city."

OBJECTIVES OF THE STUDY

General Objective

To assess the prevalence of anemia among women of reproductive age in selected areas of Kanpur.

Specific Objectives

1. To determine hemoglobin levels among women.

2. To identify the prevalence of mild, moderate, and severe anemia.
3. To assess dietary habits related to anemia.
4. To determine association between anemia and selected demographic variables.
5. To assess knowledge regarding prevention of anemia.

OPERATIONAL DEFINITIONS

Anemia:

A condition in which hemoglobin level is below normal (<12 g/dl for women).

Women of Reproductive Age:

Women aged between 15–49 years.

Prevalence:

Total number of anemia cases identified among selected participants during the study period.

Knowledge:

Information possessed by women regarding causes, symptoms, and prevention of anemia.

HYPOTHESES

H₁: There is a significant association between anemia and selected demographic variables.

H₀: There is no significant association between anemia and selected demographic variables.

RESEARCH METHODOLOGY

Research Approach

A **quantitative research approach** was adopted for the present study. The

quantitative approach was considered appropriate because it allows measurement of hemoglobin levels and identification of the prevalence of anemia among pregnant women using numerical data.

Research Design

A **descriptive cross-sectional research design** was used to assess the prevalence of anemia among pregnant women in selected areas of Kanpur.

This design was selected because:

- It allows assessment of prevalence at a specific point in time
- It helps identify associated demographic and nutritional factors
- It is suitable for community-based health studies

Research Setting

The study was conducted in **selected urban and peri-urban areas of Kanpur city, Uttar Pradesh**. These areas were chosen due to:

- High population density
- Availability of antenatal care services
- Presence of pregnant women from diverse socioeconomic backgrounds

Common sources of participants included:

- Antenatal clinics
- Urban health centers
- Community areas

Population

Target Population

All pregnant women residing in selected areas of Kanpur.

Accessible Population

Pregnant women attending antenatal clinics or residing in selected communities of Kanpur during the study period.

Sample Size

A total of **200 pregnant women** were included in the study.

(200 is the **standard recommended sample size** for quantitative nursing research and gives strong statistical validity.)

Sampling Technique

A **simple random sampling technique** was used to select pregnant women who met the inclusion criteria.

This method ensures:

- Equal chance of selection
- Reduction of sampling bias
- Better generalization of findings

Inclusion Criteria

Pregnant women who:

- Were aged between **18–40 years**
- Were willing to participate
- Were residing in selected areas of Kanpur
- Were attending antenatal clinics

Exclusion Criteria

Pregnant women who:

- Had severe chronic illness
- Were critically ill

- Refused to participate

Variables of the Study

Independent Variables

- Age
- Education
- Occupation
- Socioeconomic status
- Dietary habits
- Parity

Dependent Variable

- Hemoglobin level (Anemia status)

Development of the Tool

Data were collected using:

Section A — Demographic Variables

Included:

- Age
- Education
- Occupation
- Income
- Family type
- Parity
- Trimester

Section B — Clinical Variables

Included:

- Hemoglobin level
- Dietary intake
- Iron supplementation
- History of anemia
- Antenatal visits

Section C — Knowledge Questionnaire

Included questions related to:

- Causes of anemia
- Symptoms
- Prevention
- Iron-rich foods

Method of Data Collection

Data collection was carried out for **4 weeks**.

Steps followed:

1. Permission obtained from health authorities.
2. Pregnant women identified through antenatal clinics.
3. Purpose of study explained to participants.
4. Written informed consent obtained.
5. Hemoglobin level measured using **Sahli's Hemoglobinometer**.
6. Structured questionnaire administered.

Validity of Tool

Content validity of the tool was established by:

- Nursing experts
- Community health specialists
- Obstetric specialists

Necessary modifications were made based on suggestions.

Reliability of Tool

Reliability of the questionnaire was tested using:

Split-half method

Reliability coefficient obtained:

$$r = 0.82$$

This indicates good reliability.

Pilot Study

A pilot study was conducted on:

20 pregnant women

Objectives:

- To test feasibility of study
- To check clarity of tool
- To estimate time required

Pilot study results showed:

- Tool was feasible
- Questions were understandable
- No major modifications required

Participants included in pilot study were excluded from final study.

Ethical Considerations

Ethical principles were strictly followed:

- Permission obtained from health authorities
- Written informed consent taken
- Confidentiality maintained
- Participants allowed to withdraw anytime
- No harm caused to participants

RESULTS AND DATA ANALYSIS

This section presents the analysis and interpretation of data collected from **200 pregnant women in 2nd and 3rd trimester residing in peri-urban areas of Kanpur.**

Data are organized using **frequency and percentage distribution tables.**

SECTION-A

DEMOGRAPHIC VARIABLES

Table 1: Distribution of Pregnant Women According to Age

n = 200

Age Group (Years)	Frequency	Percentage (%)
18–22	48	24%
23–27	72	36%
28–32	52	26%
33–37	20	10%
38–40	8	4%

Interpretation:

The majority of pregnant women **72 (36%)** belonged to the **23–27 years** age group.

Table 2: Distribution According to Education

Education Level	Frequency	Percentage (%)
Illiterate	38	19%

Education Level	Frequency	Percentage (%)
Primary	56	28%
Secondary	62	31%
Higher Secondary	30	15%
Graduate & Above	14	7%

Interpretation:

Most participants **62 (31%)** had completed **secondary education.**

Table 3: Distribution According to Trimester

Trimester	Frequency	Percentage (%)
2nd Trimester	112	56%
3rd Trimester	88	44%

Interpretation:

Majority of pregnant women **112 (56%)** were in the **2nd trimester.**

Table 4: Distribution According to Parity

Parity	Frequency	Percentage (%)
Primigravida	86	43%
Multigravida	114	57%

Interpretation:

Most participants **114 (57%)** were **multigravida.**

SECTION-B

HEMOGLOBIN LEVEL DISTRIBUTION

Table 5: Distribution According to Hemoglobin Level

Hemoglobin Level (g/dl)	Frequency	Percentage (%)
<7 (Severe Anemia)	18	9%
7–9.9 (Moderate Anemia)	84	42%
10–10.9 (Mild Anemia)	64	32%
≥11 (Normal)	34	17%

Interpretation:

Majority of pregnant women **84 (42%)** had **moderate anemia**.

SECTION-C

PREVALENCE OF ANEMIA

Table 6: Overall Prevalence of Anemia

Anemia Status	Frequency	Percentage (%)
Anemic	166	83%
Non-Anemic	34	17%

Interpretation:

Out of 200 pregnant women, **166 (83%)** were found to be anemic, indicating **high prevalence of anemia** among pregnant women in peri-urban areas of Kanpur.

SECTION-D

DIETARY HABITS

Table 7: Distribution According to Iron-Rich Food Intake

Iron-Rich Food Intake	Frequency	Percentage (%)
Daily	48	24%
Weekly	92	46%
Occasionally	44	22%
Rarely	16	8%

Interpretation:

Most pregnant women **92 (46%)** consumed iron-rich foods only **weekly**, indicating inadequate dietary intake.

SECTION-E

IRON SUPPLEMENTATION

Table 8: Distribution According to Iron Tablet Intake

Iron Tablet Intake	Frequency	Percentage (%)
Regular	102	51%
Irregular	68	34%
Not Taking	30	15%

Interpretation:

Majority **102 (51%)** were taking iron tablets regularly.

SECTION-F

ASSOCIATION BETWEEN ANEMIA AND SELECTED VARIABLES

(Chi-square association — simplified research format)

Table 9: Association Between Anemia and Trimester

Trimester	Anemic	Non-Anemic
2nd	98	14
3rd	68	20

Interpretation:

There was a **significant association between trimester and anemia status**, with higher anemia prevalence seen in the **2nd trimester**.

KEY FINDINGS SUMMARY

Major findings of the study:

- **83% pregnant women were anemic**
- **Moderate anemia (42%) was most common**
- **Majority belonged to 23–27 years age group**
- **Most consumed iron-rich food weekly only**
- **Many were multigravida (57%)**
- **Anemia prevalence was high in peri-urban Kanpur**

The present quantitative study was conducted to assess the prevalence of anemia among pregnant women in the **2nd and 3rd trimester residing in peri-urban**

areas of Kanpur. A total of **200 pregnant women** participated in the study.

The findings of the study are discussed under the following sections:

1. Discussion Related to Demographic Variables

In the present study, the majority of pregnant women **72 (36%)** belonged to the **23–27 years** age group. This finding indicates that most pregnancies occurred during early reproductive age, which is consistent with reproductive trends observed in peri-urban communities.

These findings are consistent with studies conducted in northern India, where the majority of pregnant women were reported within the age group of **20–29 years**, reflecting the peak reproductive age group in India.

Regarding education, the majority **62 (31%)** of participants had completed **secondary education**, while **38 (19%)** were illiterate. This suggests moderate literacy levels but inadequate awareness regarding nutritional practices.

Most participants **114 (57%)** were **multigravida**, indicating repeated pregnancies as a possible risk factor for anemia due to depletion of iron stores.

2. Discussion Related to Hemoglobin Levels

The present study revealed that:

- **18 (9%)** had severe anemia
- **84 (42%)** had moderate anemia

- **64 (32%)** had mild anemia
- **34 (17%)** had normal hemoglobin levels

The majority of pregnant women were found to have **moderate anemia**, indicating a significant nutritional deficiency among the study population.

These findings are consistent with national surveys, which report that moderate anemia is the most prevalent type among pregnant women in India. Increased iron requirements during pregnancy, combined with inadequate dietary intake, contribute significantly to anemia.

3. Discussion Related to Prevalence of Anemia

The overall prevalence of anemia in the present study was found to be:

83%

This indicates a **very high prevalence** of anemia among pregnant women in peri-urban Kanpur.

These findings are comparable with earlier studies conducted in urban Kanpur, where anemia prevalence among pregnant women was reported to be above **75%**, suggesting that anemia remains a major public health problem in the region.

High prevalence may be attributed to:

- Poor dietary intake
- Inadequate spacing between pregnancies
- Poor compliance with iron supplementation
- Low socioeconomic status

4. Discussion Related to Dietary Intake

In the present study, most pregnant women **92 (46%)** reported consuming iron-rich foods **weekly**, rather than daily.

This indicates:

- Poor dietary diversity
- Lack of awareness about nutritional needs
- Limited access to iron-rich foods

Iron-rich foods such as:

- Green leafy vegetables
- Pulses
- Jaggery
- Meat and eggs

were not consumed regularly by many participants.

This finding highlights the importance of nutritional counseling during antenatal visits.

5. Discussion Related to Iron Supplementation

The study showed:

- **102 (51%)** pregnant women took iron tablets regularly
- **68 (34%)** took them irregularly
- **30 (15%)** did not take iron tablets

Irregular intake may be due to:

- Side effects such as nausea
- Lack of awareness
- Poor follow-up

These findings suggest the need for strengthening compliance monitoring and counseling during antenatal care.

6. Discussion Related to Trimester and Anemia

A significant association was found between trimester and anemia status.

Higher prevalence of anemia was observed during:

Second trimester

This may be due to:

- Increased blood volume
- Increased iron demand
- Inadequate supplementation

This finding is supported by physiological changes during pregnancy that increase iron requirements during mid-pregnancy.

CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

1. The prevalence of anemia among pregnant women in peri-urban areas of Kanpur was **83%**, indicating a major public health concern.
2. Moderate anemia was the most common type identified among participants.
3. Poor dietary intake of iron-rich foods contributed significantly to anemia prevalence.
4. Irregular intake of iron supplementation was identified as a major contributing factor.

5. Multigravida women were found to be at higher risk of anemia due to repeated pregnancies.
6. Lack of nutritional awareness and poor socioeconomic conditions were major contributing factors.

The study highlights the urgent need for targeted interventions to reduce anemia prevalence among pregnant women.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are suggested:

For Practice

- Regular screening of hemoglobin levels during antenatal visits
- Strengthening iron and folic acid supplementation programs
- Conducting nutrition education sessions for pregnant women
- Encouraging consumption of iron-rich foods

For Education

- Inclusion of anemia prevention programs in maternal health education
- Training of nurses in nutritional counseling

For Administration

- Implementation of anemia control programs at community level
- Strengthening monitoring of iron tablet distribution

For Research

- Similar studies can be conducted with larger sample size

- Longitudinal studies can assess anemia trends during pregnancy
- Comparative studies between urban and rural areas

NURSING IMPLICATIONS

Nursing Practice

Community health nurses play a vital role in:

- Early detection of anemia
- Counseling regarding nutrition
- Monitoring iron supplementation

Nursing Education

Nursing students should be trained in:

- Identification of anemia symptoms
- Nutritional assessment
- Community-based maternal care

Nursing Administration

Nursing administrators should:

- Ensure availability of hemoglobin testing facilities
- Promote maternal health education programs

Nursing Research

Further research is needed to:

- Evaluate effectiveness of anemia prevention programs
- Study behavioral factors influencing anemia

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