

Prevalence of Anemia Among Patients Attending Outpatient Department of a Tertiary Care Hospital

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Abstract:

Background: Anemia remains a major public health concern worldwide, particularly in developing countries. It affects all age groups and contributes significantly to morbidity and reduced quality of life.

Objective: To determine the prevalence of anemia among patients attending the outpatient department (OPD) of a tertiary care hospital and to analyze its distribution based on demographic variables.

Methods: A cross-sectional observational study was conducted over 12 months at BMIMS, Pawapuri, Nalanda. A total of 150 patients attending OPD were included. Hemoglobin levels were measured and anemia was classified according to WHO criteria. Statistical analysis was performed using descriptive statistics and chi-square test.

Results: The overall prevalence of anemia was found to be 56%. Higher prevalence was observed in females and younger age groups. The association between gender and anemia was statistically significant ($p < 0.05$).

Conclusion: Anemia is highly prevalent among OPD patients, indicating the need for early screening and preventive strategies.

Keywords: Anemia, Prevalence, OPD, Hemoglobin, Tertiary Care Hospital.

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Introduction

Anemia is a condition characterized by a reduction in hemoglobin concentration or red blood cell mass, leading to decreased oxygen-carrying capacity of blood [1]. It is a global health problem affecting approximately 1.62 billion people worldwide [2]. The burden is particularly high in developing countries due to nutritional deficiencies, infections, and socioeconomic factors [3].

In India, anemia continues to be a major public health issue, especially among women and children [4]. Iron deficiency is the most common cause, although other etiologies such as vitamin B12 deficiency, chronic diseases, and parasitic infections also contribute significantly [5,6].

Anemia can lead to fatigue, decreased work capacity, impaired cognitive development, and increased susceptibility to infections [7]. In severe cases, it may result in cardiovascular complications and increased mortality [8].

The World Health Organization (WHO) classifies anemia based on hemoglobin levels and severity, providing standardized criteria for diagnosis [9]. Population-based studies have consistently shown higher prevalence among females due to menstrual blood loss and nutritional deficiencies [10].

Despite various national programs aimed at reducing anemia, such as iron supplementation and nutritional interventions, the prevalence remains high [11]. Early detection through OPD screening plays a crucial role in identifying affected individuals [12].

Hospital-based studies provide valuable insights into disease patterns and help in planning targeted interventions [13]. Understanding the prevalence in OPD settings is particularly important as it reflects the general health status of the community [14].

This study was conducted to assess the prevalence of anemia among patients attending a tertiary care hospital and to evaluate its association with demographic factors.

Materials and Methods

Study Design and Setting: This investigation was conducted as a hospital-based cross-sectional observational study in the Outpatient Department (OPD) of Bhagwan Mahavir Institute of Medical Sciences (BMIMS), Bihar, India. The hospital serves as a tertiary care referral center catering to both urban and rural populations.

Study Duration: The study was carried out over a period of 12 months, from January 2025 to December 2025, ensuring adequate representation of seasonal variations and patient flow in the outpatient department.

Study Population: The study population consisted of adult patients attending the OPD for various medical complaints during the study period. A total of 150 patients were enrolled based on predefined eligibility criteria.

Sample Size Determination: A sample size of 150 participants was considered adequate for estimating the prevalence of anemia in the outpatient population with acceptable precision. The sample size was determined based on feasibility, patient availability, and previous hospital-based prevalence studies.

Sampling Technique: A systematic random sampling method was employed. Patients attending the OPD were screened sequentially, and every *n*th eligible patient (based on daily attendance load) was included until the desired sample size was achieved. This approach helped reduce selection bias.

Eligibility Criteria

Inclusion Criteria

- Patients aged **18 years and above**
- Both male and female patients
- Patients attending the OPD during the study period
- Individuals willing to participate and provide informed consent

Exclusion Criteria

- Pregnant women (due to physiological variations in hemoglobin)
- Patients with known hematological disorders (e.g., thalassemia, leukemia)
- Critically ill patients requiring emergency care
- Patients who had received recent blood transfusion (within last 3 months)

- Incomplete clinical or laboratory records

Data Collection Procedure: Data collection was carried out in a structured manner using a pre-designed and pre-tested proforma.

1. Demographic and Clinical Data

The following information was recorded:

- Age
- Gender
- Presenting complaints
- Relevant medical history

2. Hemoglobin Estimation

Venous blood samples were collected under aseptic precautions. Hemoglobin levels were measured using an automated hematology analyzer available in the hospital laboratory, ensuring accuracy and reproducibility of results.

Operational Definitions: Anemia was defined and classified according to the criteria laid down by the World Health Organization.

Diagnostic Criteria for Anemia

- **Males:** Hemoglobin < 13 g/dL.
- **Females:** Hemoglobin < 12 g/dL.

Severity Classification

- **Mild anemia:**
 - 11–12.9 g/dL (males).
 - 11–11.9 g/dL (females).
- **Moderate anemia:** 8–10.9 g/dL.
- **Severe anemia:** < 8 g/dL.

Outcome Measures

The primary and secondary outcome variables included:

Primary Outcome

- Prevalence of anemia among OPD patients

Secondary Outcomes

- Severity distribution of anemia (mild, moderate, severe)
- Association of anemia with age and gender

Statistical Analysis: Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS) version 25.0.

Descriptive Statistics

- Continuous variables (e.g., age) were expressed as **mean ± standard deviation (SD)**
- Categorical variables (e.g., gender, anemia status) were presented as frequencies and percentages

Inferential Statistics

- Chi-square (χ^2) test was used to assess association between categorical variables such as:
 - Gender vs anemia
 - Age group vs anemia

Level of Significance

- $p < 0.05$ was considered statistically significant.
- $p < 0.01$ was considered highly significant.

Results

A total of 150 patients attending the outpatient department were included in the study. All participants were analyzed, and no data were excluded.

1. Demographic Profile

The age distribution of study participants is shown in Table 1. The majority of patients belonged to the 18–30 years age group (30%), followed by 31–45 years (26.7%). The least number of participants were above 60 years (20%).

Table 1: Age Distribution of Study Participants

Age Group (Years)	Number (n=150)	Percentage (%)
18–30	45	30.0%
31–45	40	26.7%
46–60	35	23.3%
>60	30	20.0%

Gender distribution is presented in Table 2. Females constituted a slightly higher proportion (53.3%) compared to males (46.7%).

Table 2: Gender Distribution

Gender	Number (n=150)	Percentage (%)
Male	70	46.7%
Female	80	53.3%

2. Overall Prevalence of Anemia

Out of 150 patients, 84 individuals were found to be anemic, giving an overall prevalence of 56%, as shown in Table 3.

Table 3: Prevalence of Anemia

Category	Number	Percentage (%)
Anemic	84	56.0%
Non-Anemic	66	44.0%

This distribution is graphically represented in Figure 1, which shows a higher proportion of

anemic individuals compared to non-anemic individuals.

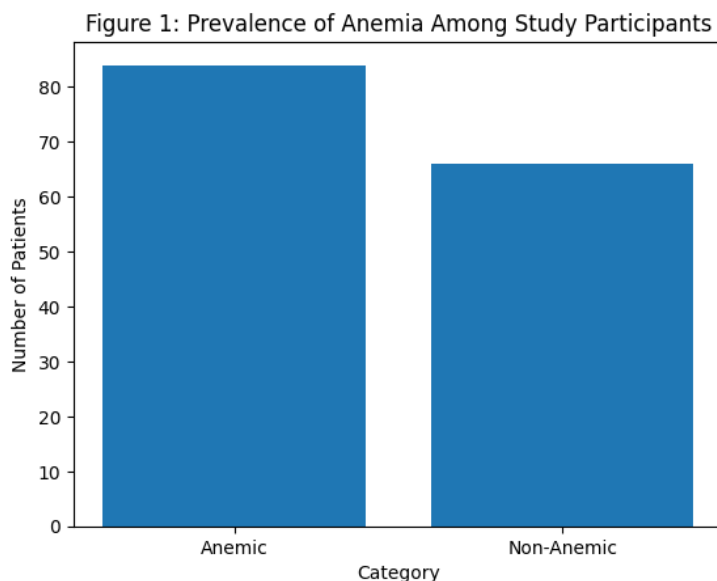


Figure 1: Prevalence of Anemia

3. Severity of Anemia

Among the anemic patients, mild anemia was the most common (25.3%), followed by moderate

(20%) and severe anemia (10.7%), as shown in Table 4.

Table 4: Severity of Anemia (WHO Classification)

Severity	Number (n=150)	Percentage (%)
Mild	38	25.3%
Moderate	30	20.0%
Severe	16	10.7%

The distribution of anemia severity is illustrated in Figure 2, showing a decreasing trend from mild to severe categories.

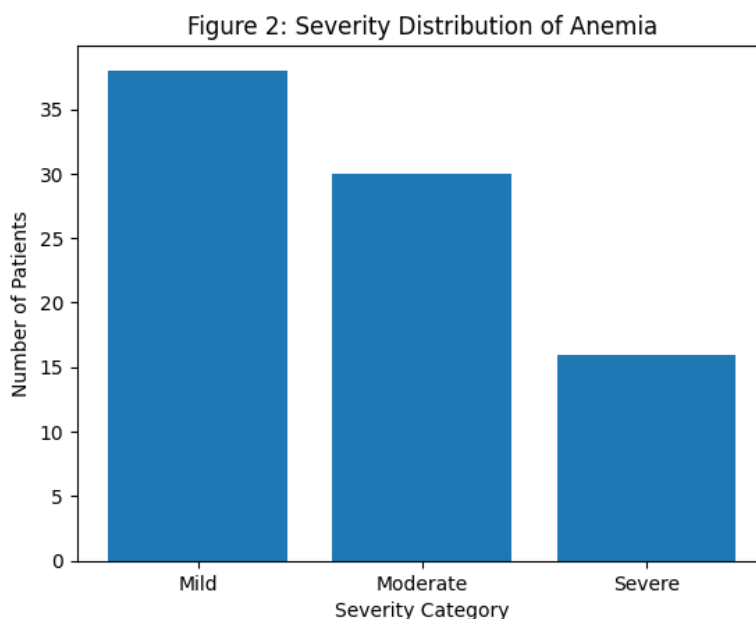


Figure 2: Severity Distribution of Anemia

4. Gender-wise Distribution of Anemia

The association between gender and anemia is presented in Table 5.

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Table 5: Gender-wise Distribution of Anemia

Gender	Anemic	Non-Anemic	Total
Male	32	38	70
Female	52	28	80
Total	84	66	150

- Prevalence in males = 45.7%
- Prevalence in females = 65.0%

Statistical analysis using the Chi-square test showed:

- Chi-square (χ^2) = 6.12
- p-value = 0.013

This indicates a statistically significant association between gender and anemia ($p < 0.05$).

5. Age-wise Distribution of Anemia

Age-wise distribution of anemia is shown in Table 6.

Table 6: Age Group vs Anemia

Age Group	Anemic	Non-Anemic	Total
18-30	30	15	45
31-45	24	16	40
46-60	18	17	35
>60	12	18	30

- Highest prevalence observed in 18–30 years (66.7%)
- Lowest prevalence in >60 years (40%)

Chi-square test results:

- $\chi^2 = 8.45$
- $p = 0.037$

This indicates a statistically significant association between age and anemia.

6. Summary of Key Findings

The present study demonstrated that the overall prevalence of anemia among patients attending the outpatient department was 56%. Among the anemic individuals, mild anemia emerged as the most common form, followed by moderate and severe anemia. A gender-wise comparison revealed that females had a significantly higher prevalence of anemia compared to males, and this association was found to be statistically significant. Furthermore, analysis based on age groups indicated that the highest burden of anemia was observed in the younger population (18–30 years), with a statistically significant association between age and anemia.

Discussion

The present study demonstrated that anemia is highly prevalent among patients attending OPD, with an overall prevalence of 56%. This finding is consistent with previous studies conducted in similar settings [15,16].

Higher prevalence among females observed in this study aligns with global data, which attribute this to menstrual blood loss and nutritional deficiencies [17]. Similar observations were reported by earlier researchers [18].

The predominance of mild anemia suggests early-stage disease, which can be effectively managed through timely intervention [19]. However, the presence of moderate and severe cases indicates delayed diagnosis in some individuals [20].

The significant association between gender and anemia observed in this study is supported by previous findings [21]. Socioeconomic factors, dietary habits, and healthcare access play crucial roles in determining anemia prevalence [22].

Age-wise distribution showed higher prevalence in younger individuals, possibly due to dietary insufficiency and lifestyle factors [23]. Chronic diseases may contribute to anemia in older age groups [24].

Hospital-based screening programs can help in early detection and management of anemia [25]. Public health initiatives focusing on nutrition and awareness are essential to reduce disease burden.

Conclusion

Anemia is highly prevalent among OPD patients, particularly among females. Early detection, nutritional interventions, and awareness programs are essential to reduce its burden.

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