



PREVALENCE AND CLINICAL PROFILE OF ANEMIA IN FEMALES AGED 10–15 YEARS AT INDEX MEDICAL COLLEGE

Paediatrics

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ABSTRACT

Background: Anemia is a major public health problem in adolescent girls, particularly in developing countries, due to rapid growth, menstrual blood loss, and poor nutritional intake. **Objective:** To assess the prevalence of anemia in females aged 10–15 years and describe their clinical profile and associated factors. **Methods:** A cross-sectional study was conducted at Index Medical College Hospital from January 2023 to March 2025. A total of 150 girls aged 10–15 years attending outpatient or inpatient services were evaluated. Hemoglobin was measured using standard methods and iron profile and B12 levels were also checked, and anemia was classified as per WHO criteria. Clinical examination and dietary history were recorded. **Results:** Among 150 adolescent girls studied, 88 (58.7%) were found to be anemic. The mean hemoglobin level in anemic girls was 9.8 ± 1.4 g/dL. Mild anemia was present in 40%, moderate in 52%, and severe in 8% of anemic girls. Common symptoms included fatigue (74%), pallor (69%), and reduced concentration (42%). Menstrual irregularities were noted in 28% of anemic girls. Nutritional deficiency was the most common etiology. **Conclusion:** Anemia is highly prevalent among adolescent girls, with most cases attributable to nutritional deficiencies. Early screening and dietary interventions are crucial to reduce morbidity in this vulnerable population.

KEYWORDS

Anemia, Adolescent girls, Iron deficiency, Nutritional anemia, Menstrual irregularities, Public health, School health programs

INTRODUCTION

Anemia is defined as a reduction in the oxygen-carrying capacity of blood, usually due to low hemoglobin concentration. It is one of the most common nutritional disorders globally and a major public health challenge, particularly among adolescent girls. According to the World Health Organization (WHO), adolescence is a critical period of growth and development characterized by rapid physical, cognitive, and psychosocial changes, which increase nutritional needs. For girls, the onset of menstruation further exacerbates iron loss, making them more vulnerable to iron deficiency anemia.

In India, the prevalence of anemia among adolescent girls remains unacceptably high. National Family Health Survey (NFHS-5) data indicate that nearly 59% of girls aged 15–19 years are anemic, underscoring the magnitude of the problem. The burden of anemia in adolescent girls has far-reaching consequences. It can impair physical growth, reduce cognitive performance, lower school attendance and academic achievement, and predispose them to complications during future pregnancies, including low birth weight and increased maternal mortality.

Iron deficiency anemia, the most common type, results from inadequate dietary intake of iron, poor absorption, parasitic infections, and increased requirements during periods of rapid growth and menstrual blood loss. Socioeconomic constraints, cultural dietary patterns, and lack of awareness about iron-rich foods and supplementation further contribute to the problem.

Although several national programs such as the Weekly Iron and Folic Acid Supplementation (WIFS) scheme and school health initiatives aim to address adolescent anemia, their reach and effectiveness remain limited, especially in underserved areas. Early identification and appropriate management of anemia in this population are crucial to break the intergenerational cycle of malnutrition and poor health.

This study was conducted to determine the prevalence of anemia among adolescent girls aged 10–15 years attending Index Medical College and to describe their clinical profile, severity of anemia, and associated factors. The findings are intended to inform targeted interventions for improving adolescent health and reducing the burden of anemia in this vulnerable age group.

METHODS

Study Design And Setting

A cross-sectional observational study was conducted at Index Medical College Hospital from January 2023 to March 2025.

Study Population

Girls aged 10–15 years attending outpatient or inpatient services were

included after obtaining consent.

Inclusion Criteria

- Females aged 10–15 years
- Willing to participate and provide consent

Exclusion Criteria

- Known chronic diseases or hemoglobinopathies
- Recent blood transfusion

Data Collection

Demographic details, menstrual history, dietary intake, and symptoms were recorded. Clinical examination included assessment for pallor, koilonychia, and signs of malnutrition. Hemoglobin was estimated, and anemia was classified as mild (10–11.9 g/dL), moderate (7–9.9 g/dL), or severe (<7 g/dL) per WHO guidelines.

RESULTS

Out of 150 girls enrolled, 88 (58.7%) were anemic. The mean hemoglobin level among anemic girls was 9.8 ± 1.4 g/dL.

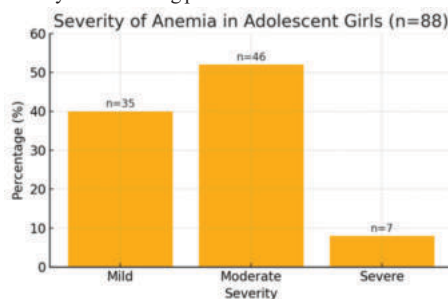
Severity Of Anemia

- Mild:** 35 (40%)
- Moderate:** 46 (52%)
- Severe:** 7 (8%)

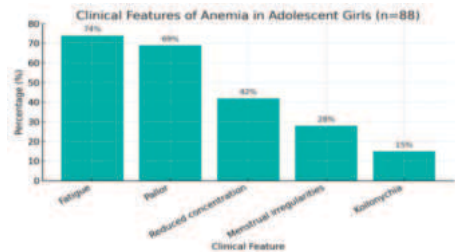
Clinical Features

- Fatigue:** 74%
- Pallor:** 69%
- Reduced Concentration:** 42%
- Menstrual Irregularities:** 28%
- Koilonychia:** 15%

Nutritional deficiency was identified as the most common cause, with iron-deficiency anemia being predominant.



Graph 1: Severity of Anemia in Study Participants



Graph 2: Common Clinical Features of Anemia

Table 1: Etiologies Of Anemia In Adolescent Girls (n=88)

Etiology	Number of girls (n)	Percentage (%)
Iron deficiency	62	70.5%
Folate deficiency	8	9.1%
Vitamin B12 deficiency	4	4.5%
Mixed nutritional deficiencies	6	6.8%
Chronic blood loss (menorrhagia)	5	5.7%
Other (infections, chronic disease)	3	3.4%

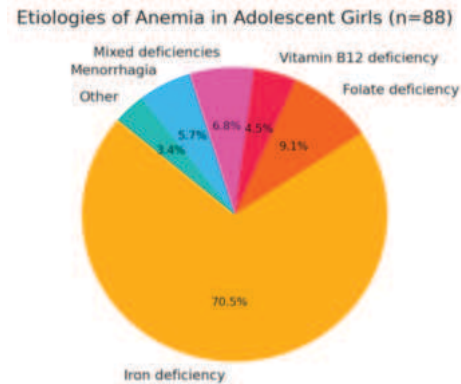
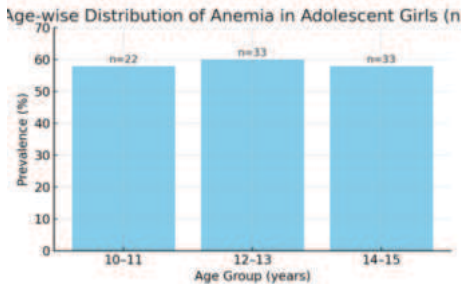


Table 2: Age-wise Distribution Of Anemia

Age Group (years)	Total Girls (n)	Anemic (n)	Prevalence (%)
10–11	38	22	57.9%
12–13	55	33	60.0%
14–15	57	33	57.9%
Total	150	88	58.7%



DISCUSSION

This study demonstrates a high prevalence of anemia among adolescent girls, consistent with national surveys. The predominance of mild to moderate anemia highlights the importance of early identification. Fatigue and pallor were the most common presenting features. Nutritional deficiencies, particularly iron deficiency, remain the major etiology.

Public health measures such as iron supplementation, dietary education, and menstrual hygiene awareness are essential to address this issue.

This study highlights that anemia continues to be a significant public health problem among adolescent girls aged 10–15 years, with a prevalence of 58.7% in our study population. These findings are consistent with NFHS-5 data, which report that over 59% of adolescent girls in India are anemic. The high prevalence reflects the combined impact of nutritional inadequacy, poor dietary habits, and increased iron demands during puberty.

Moderate anemia (52%) was the most common severity in our cohort, emphasizing that many girls may not appear severely ill but still face functional impairments such as fatigue, poor concentration, and academic underperformance. Clinical features like pallor, fatigue, and reduced concentration were highly prevalent, echoing findings from other Indian studies (Toteja et al., 2006).

The observation that 28% of affected girls had menstrual irregularities points to the need for targeted menstrual health education and support. Early menarche, heavy bleeding, and lack of awareness regarding iron-rich diets and supplementation may contribute significantly to iron loss in this age group.

Iron deficiency remains the predominant cause of anemia in this study. This suggests that community-based strategies such as weekly iron-folic acid supplementation (WIFS), deworming, dietary education, and regular screening in schools could be highly effective.

Importantly, this study also underscores that even in urban tertiary care settings like Index Medical College, anemia remains underdiagnosed unless actively screened. The findings strongly support the inclusion of hemoglobin testing in routine pediatric and adolescent checkups.

Limitations of the study include its single-center nature and lack of detailed dietary and socioeconomic analysis. However, the robust sample size and prospective data collection over two years strengthen the reliability of our findings.

Future studies could explore the impact of interventions like school-based nutrition programs and awareness drives on anemia prevalence. Qualitative studies to assess the knowledge, attitudes, and practices of adolescent girls toward menstruation and nutrition may further aid in program development.

CONCLUSION

Anemia affects a significant proportion of adolescent girls, adversely impacting their health and development. Routine screening, nutritional interventions, and health education programs should be emphasized to reduce its burden.

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