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Original Research

Health Issues and Contributing Factors Among Rural Adolescent Girls: A Hospital-Based Cross-Sectional Analysis

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ABSTRACT:
Background: Adolescence is a critical period marked by rapid physical, psychological, and social development. In rural India, adolescent girls are often exposed to a multitude of health risks, with malnutrition being one of the most prevalent and overlooked. **Aim:**To study the prevalence of malnutrition and the socio-demographic factors affecting the health of adolescent girls attending pediatric outpatient and inpatient departments in a rural tertiary care setting. **Material and Methods:**A hospital-based cross-sectional study was conducted among 250 adolescent girls aged 10–17 years. Data on age, nutritional status, socio-economic status, mother's occupation, family type, and dietary preferences were collected. Chi-square tests were applied to determine associations between nutritional status and socio-demographic variables. **Results:**Malnutrition was observed in a significant portion of the study population. Underweight status was significantly associated with lower socio-economic class, nuclear family setup, and vegetarian dietary preferences ($p < 0.001$). Girls with working mothers and those consuming mixed diets demonstrated better nutritional profiles. **Conclusion:**The study reveals a high prevalence of undernutrition among adolescent girls in rural areas, influenced by multiple socio-demographic determinants. Strengthening nutrition awareness programs and promoting balanced diets are essential to improve adolescent health outcomes.
Keywords: Adolescent girls, malnutrition, rural health, socio-demographic factors, undernutrition

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INTRODUCTION

Adolescence is a critical stage of life marked by rapid physical, emotional, and cognitive development. For adolescent girls, this period also coincides with the onset of menstruation and increased nutritional demands, making them particularly vulnerable to malnutrition and associated health problems. According to the World Health Organization (WHO), adolescent health remains a globally neglected priority, especially in developing regions like rural India, where access to education, healthcare, and nutrition remains inadequate [1].

Malnutrition in adolescent girls is a silent epidemic, often going unnoticed until it results in severe health outcomes such as anemia, stunted growth, delayed puberty, and reproductive complications later in life [2,3]. The National Family Health Survey-5 (NFHS-5) reports that a significant proportion of Indian adolescent girls suffer from undernutrition and iron deficiency anemia, with rural areas bearing a disproportionately high burden [4]. These problems are further compounded by socio-cultural norms that favor boys, early marriages, poor menstrual hygiene, and dietary taboos [5].

Hospital-based studies provide a unique opportunity to explore the real-time burden of adolescent health problems. Pediatric outpatient departments (OPDs) and inpatient wards often reflect the tip of the iceberg in rural health crises, capturing the subset of adolescents who seek care. These settings allow

clinicians to assess the magnitude of malnutrition and its comorbidities and help identify the factors—both biological and socio-environmental—that contribute to the health status of adolescent girls [6].

Several studies have emphasized that malnutrition among adolescent girls is strongly associated with poverty, parental illiteracy, low BMI, high workload, and irregular eating habits [7,8]. The intergenerational cycle of malnutrition often begins in adolescence, where an undernourished girl is more likely to become an undernourished mother, thereby perpetuating the cycle in her offspring [9].

Given the high prevalence and long-term implications of malnutrition in adolescent girls, early detection and intervention at hospital entry points such as pediatric OPDs and wards is crucial. This study aims to explore the nutritional status of adolescent girls presenting to these settings and understand the broader social and clinical factors influencing their health in rural populations.

MATERIAL AND METHODS

This hospital-based **cross-sectional study** was conducted in the **Department of Pediatrics** at a tertiary care centre, focusing on adolescent girls from rural backgrounds. The study aimed to evaluate the nutritional status and associated health problems among girls aged 10–19 years who presented to the **pediatric outpatient department (OPD)** or were admitted to the pediatric ward during the study period.

Study Population:A total of **250 adolescent girls** aged between **10 to 19 years**, residing in rural areas and attending the pediatric OPD or admitted to the pediatric ward, were enrolled in the study.

Inclusion Criteria

- Adolescent girls aged 10–19 years
- Residing in rural areas
- Presenting to the pediatric OPD or ward
- Provided informed consent (from guardian if minor)

Exclusion Criteria

- Adolescents with known chronic illnesses or congenital anomalies
- Those on long-term medications affecting nutrition
- Refusal to consent for participation

Study Duration

The study was carried out over a **one-year period**.

Sampling Technique

A **convenience sampling method** was used to recruit eligible adolescent girls who met the inclusion criteria.

Data Collection Procedure

Data was collected using a **pre-tested structured questionnaire** which included:

- Demographic details (age, socioeconomic status, school status)
- Dietary history and meal patterns
- Menstrual history (for post-menarcheal girls)
- Anthropometric measurements: weight, height, BMI (Body Mass Index)
- Clinical examination for signs of nutritional deficiencies
- Hemoglobin estimation using Sahli's or automated method (depending on lab availability)

Assessment Criteria

- **Undernutrition** was assessed based on **BMI-for-age Z scores** using WHO growth reference charts.
- **Anemia** was categorized based on WHO hemoglobin cut-offs (mild: 11–11.9 g/dL, moderate: 8–10.9 g/dL, severe: <8 g/dL).
- **Stunting** was assessed using height-for-age percentiles.

Ethical Considerations

- Ethical clearance was obtained from the **Institutional Ethical Committee**.
- Written informed consent was taken from all participants or their guardians.

Statistical Analysis:

Data was entered and analyzed using **Microsoft Excel and SPSS (version XX)**.

- Descriptive statistics were used to present means, proportions, and percentages.
- Chi-square test was applied to find associations between nutritional status and socio-demographic variables.
- A p-value of <0.05 was considered statistically significant.

RESULTS

Table 1 shows the distribution of adolescent girls according to age. The majority of participants were between the ages of 13 and 15, with the highest number (23.2%) in the 14-year age group, followed by 20.0% in the 13-year group. Only 4.8% were aged 10 and 4.0% were aged 17, indicating lower attendance of very young and older adolescents in the pediatric OPD and ward.

Table 2 presents the association between nutritional status and socio-economic status (SES). Underweight adolescents were most prevalent in the upper lower and lower middle classes, with 62 and 35 participants respectively. Overweight and obese girls were found exclusively in the lower middle class. Normal nutritional status was more common in the upper middle and upper lower classes. The association between SES and nutritional status was statistically significant ($p < 0.001$).

Table 3 combines the associations of nutritional status with mother's occupation, family type, and diet. A

higher number of normally nourished girls had working mothers (102) and lived in nuclear families (130). Underweight status was more frequent among girls from nuclear families and those with homemaker mothers. Overweight and obesity were relatively more common among girls consuming mixed diets. All associations were found to be statistically significant, indicating strong relationships between these socio-demographic factors and nutritional outcomes.

Figure 1 illustrates the overall nutritional status of the study participants. Out of 250 adolescent girls, 62% were normally nourished while 38% were malnourished. The graphical representation clearly highlights that although the majority maintained normal nutrition, a significant proportion still suffers from malnutrition, underscoring the need for targeted interventions.

Table 1: Distribution of the participants in terms of age (n = 250)

Age (years)	N	%
10	12	4.8
11	40	16.0
12	36	14.4
13	50	20.0
14	58	23.2
15	30	12.0
16	14	5.6
17	10	4.0

Table 2: Association of nutritional status and SES among adolescent girls (n = 250)

Nutritional Status	Upper Class	Upper Middle	Lower Middle	Upper Lower	Lower
Underweight	6	24	35	62	9
Normal	0	22	8	24	4
Overweight & Obese	0	0	26	0	0

Chi-square test: Test value = 138.902 (df=8), p value < 0.001

Table 3: Association of Nutritional Status with Mother's Occupation, Family Type, and Diet (n = 250)

Nutritional Status	Mother Working	Homemaker	Joint Family	Nuclear Family	Mixed Diet	Vegetarian Diet
Normal	102	40	12	130	122	20
Underweight	38	21	3	62	50	10
Overweight & Obese	14	15	6	23	18	2

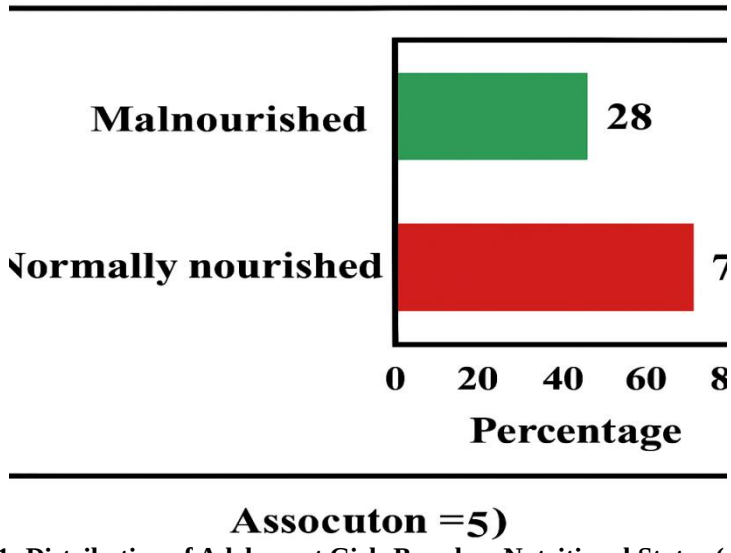

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Figure 1: Distribution of Adolescent Girls Based on Nutritional Status (n = 250)

DISCUSSION

This study highlights the significant burden of malnutrition among adolescent girls in rural areas, a demographic often overlooked despite being nutritionally vulnerable. Among the 250 girls assessed, a considerable proportion were found to be undernourished, particularly those belonging to lower socio-economic strata and those from nuclear

families. This finding aligns with previous literature where malnutrition in adolescent girls was strongly associated with poverty, poor dietary diversity, and lack of nutritional education [11].

The current data also showed that adolescent girls with working mothers had better nutritional outcomes compared to those with homemaker mothers. This could be attributed to improved household income and awareness about health practices among working women, as noted in previous studies [12]. Family structure also played a key role, where girls from nuclear families had higher undernutrition rates. Joint families often offer more structured meal patterns and shared responsibilities, which might contribute to better nutritional intake [13].

Dietary preferences emerged as a crucial determinant, with those consuming mixed diets exhibiting significantly better nutritional status than vegetarians. This may reflect the inclusion of animal protein and a wider range of micronutrients in mixed diets, which are known to positively impact adolescent growth and development [14]. The prevalence of overweight and obesity, although relatively low, was confined to specific socio-economic groups and reflects the dual burden of malnutrition in transitional rural communities.

The results are consistent with findings from national surveys such as NFHS-5, where rural adolescent girls were reported to have higher rates of anemia and undernutrition compared to urban counterparts. Programs like POSHAN Abhiyaan have aimed to address these gaps but often fall short in reaching adolescent girls who are not enrolled in school [15].

CONCLUSION

This hospital-based study demonstrates that malnutrition continues to be a significant health issue among rural adolescent girls, influenced by socio-economic status, maternal occupation, family structure, and dietary habits. Targeted, community-based interventions focusing on nutrition education, school retention, and support for families are necessary to improve adolescent health outcomes. Emphasis should also be placed on integrating adolescent girls more effectively into national nutrition programs.

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