



Original Research Article

A STUDY OF ANAEMIA AND ITS ASSOCIATED RISK FACTORS AMONG ADOLESCENT GIRLS IN URBAN AREA OF KATIHAR, BIHAR

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ABSTRACT

Background: According to the World Health Organization (WHO), adolescence is defined as the period between ages 10 and 19 for all individuals, encompassing both married and unmarried groups. Worldwide, there are roughly 1.2 billion adolescents, representing one-fifth of the global population, with numbers steadily increasing. During this phase, adolescents may attain up to 35% of their adult body weight and experience a height increase ranging from 11% to 18% of their eventual adult height. Adolescence is marked by a rapid increase in blood volume, leading to significantly higher iron requirements. During this period, boys and girls are at a greater risk of iron deficiency anemia due to accelerated growth. Adolescent girls, in particular, require additional iron to support menstruation alongside growth and development. Iron deficiency anemia can hinder cognitive and behavioral growth, negatively affecting academic performance. The objective of the present study was to estimate the prevalence of anaemia and its associated risk among adolescent girl in urban area of Katihar.

Material and Methods: It is a community based cross-sectional observational study and this study was undertaken among adolescent girls (10-19 years) in Sharifganj of Katihar district, Bihar. The sample size of the present study was 315. Data was collected by using a predesigned and pretested proforma, about socio-demographic characteristics, and other contributory risk factors in relation to anaemia, by oral questionnaire method.

Results: The overall prevalence of anaemia among the adolescent girls was found to be 168 (53.33%). Out of 168 adolescent girls the number of severe, moderate and mild anaemic girls were 13 (7.75%), 59 (35.11%) and 96 (57.14%) respectively. The prevalence of anaemia was found to be 117 (56.52%) and 49 (54.44%) in the underweight and normal BMI respectively.

Conclusion: A high prevalence of anaemia was found in this study. Adolescent girls are particularly vulnerable to anaemia, and as they grow older, this health challenge often persists, negatively affecting the well-being of women. This continued health issue raises the risk of maternal and neonatal complications, as well as child mortality.

Keywords: Adolescent, Anaemia, Urban Area, Risk factor.

INTRODUCTION

According to the World Health Organization (WHO), adolescence spans the ages of 10 to 19 for both males and females, including both married and unmarried individuals. Globally, there are

approximately 1.2 billion adolescents, making up one-fifth of the world's population—a number that continues to rise.^[1] During adolescence, individuals can achieve up to 35% of their adult weight and gain 11% to 18% of their adult height.^[2] In India, adolescents represent over 21.4% of the population,

highlighting the need for focused attention on this age group. Adolescents often experience significant developmental changes that bring about various challenges and unique needs, as they navigate diverse situations and address different issues at each stage of growth.^[3] Adolescence is marked by a rapid increase in blood volume, leading to significantly higher iron requirements. During this period, boys and girls are at a greater risk of iron deficiency anaemia due to accelerated growth. Adolescent girls, in particular, require additional iron to support menstruation alongside growth and development. Iron deficiency anaemia can hinder cognitive and behavioral growth, negatively affecting academic performance.^[4] Adolescent age group are spectators of intense rise in the necessity of iron because of issues like increase in blood volume, growth in lean body mass and muscle form. It has been detected that anaemia in girls has enormous influence on their ability to do physical work and their reproductive functioning.^[5] Anaemia is highly prevalent in India, impacting individuals across all ages and genders. Adolescent girls in developing countries, however, are particularly vulnerable. In lower-income households, girls often receive less attention, increasing their risk. The rapid growth during adolescence intensifies the body's need for iron, and in many developing regions, the high likelihood of infectious and parasitic diseases further heightens iron requirements.^[6,7] Anaemia is now acknowledged as one of the most prevalent and persistent nutritional challenges worldwide. For every case of iron deficiency anaemia, it's estimated that 2.5 times as many individuals experience iron deficiency, making anaemia only the visible aspect of a broader issue. Iron deficiency can weaken cellular responses, compromise immune function, and heighten vulnerability to infections. Additionally, it impairs maximal physical performance, which has significant economic implications for a country.^[8] This study has been intentionally conducted to gather firsthand information on the health issues faced by adolescent girls in the urban areas of Katihar, Bihar.

MATERIALS AND METHODS

Study Design: It is a community based cross-sectional study and this study was undertaken among adolescent girls (10-19 years) in Sharifganj of Katihar district, Bihar.

Study Area: The study was conducted at Sharifganj in Katihar district, Bihar, which is the urban field practice area (Sharifganj UHTC) under the department of Community Medicine, Bihar.

Sampling Unit: All adolescent girls aged 10-19-year-old who is residents of Sharifganj.

Sample Size: The sample size of the present study was calculated by adopting the following formula.

$$n = \frac{Z_{\alpha}^2 \times P \times Q}{L^2}$$

Z_{α} = Standard normal deviate at a confidence level 95%

p= prevalence, q= 100 – p; L = allowable error 15% of p.

So at 95% confidence level $Z_{\alpha} = 1.96$

Where, P= prevalence rate of the disease (Here P= 35.1% according to a study which was conducted in Urban area of Nagpur.^[9])

Then $n = \frac{1.96 \times 1.96 \times 35.1 \times 64.9}{5.27 \times 5.27} = 315$, so total 315 adolescent girls was taken for the study.

Study Period: September 2021 to February 2022.

Inclusion Criteria

- Adolescent girls aged 10 – 19 years residing in the study area for a minimum period of 6 months.^[10]
- Adolescent girls who are willing to cooperate in the study.

Exclusion Criteria

- Adolescent girls who are under the treatment of anaemia.
- Those girls who did not consent for the study.
- Adolescent pregnant mothers.
- Adolescent girls who are terminally ill.

The selection of study participants was done by systematic random sampling technique. Detailed information was collected on a predesigned and pretested proforma, about socio-demographic characteristics, and other contributory risk factors in relation to anaemia, by oral questionnaire method. Socioeconomic status was assessed based on the modified B. G. Prasad classification. All anthropometric measurements were conducted following standardized techniques. Weight was measured by adult weighing scale after standardization. Weight was recorded in kilogram to the nearest 100 gram. Height of the study participants was recorded by using stadiometer in centimetre. Body Mass Index (BMI) was calculated using the formula: BMI = weight (kg) / height (m)². Based on the calculated BMI, subjects were categorized according to the WHO global classification. Haemoglobin estimation was done by Sahli's haemoglobinometer. For interpretation of anaemia it was classified as mild if the haemoglobin level was 11.0 -11.4 gm/dl for those aged 10 to 11 years, and 11.0 – 11.9 gm/dl for those aged 12-19 years. Anaemia was classified as moderate when the haemoglobin level was 8.0 – 10.9 gm/dl and severe if the haemoglobin level was <8gm/dl.^[11, 19]

Data was collected and recorded in MS Excel, and presented using tables, bar charts, and pie charts where appropriate. Quantitative data were represented by mean and standard deviation, while qualitative data were expressed in percentages. Differences between proportions were analyzed using the Chi-square test, with significance difference at a p-value of < 0.05.

RESULTS

The overall prevalence of anaemia among the adolescent girls was found to be 168 (53.33%). The mean haemoglobin in anaemic and non-anaemic girls was 10.53 ± 1.72 gm/dl and 12.22 ± 0.67 gm/dl respectively. Out of 168 adolescent girls the number of severe, moderate and mild anaemic girls were 13 (7.75%), 59 (35.11%) and 96 (57.14%) respectively. The maximum number of girls i.e. 120 (38.1%) belonged to the age group of 10-13 years and the minimum number of girls belonged to the age group of 17-19 years i.e. 85 (27%). The prevalence of anaemia was found to be minimum in the age group of 10-13 years and maximum in the age group 17-19 years (61.17%) and the relation between age group and anaemia was found to be statistically significant. [Table 1]

The prevalence of severe anaemia was found to be maximum in the age group of 17-19. And the relation was found to be statistically significant with anaemia. (p value < 0.05). [Table 2]

The prevalence of anaemia was found to be 117 (56.52%) and 49 (54.44%) in the underweight and normal BMI respectively. And it shows a significant association with anaemia. (p value < 0.05). [Table 3] The prevalence of anaemia was found to be 63 (44.36%) and 105 (60.69%) in the middle and upper middle and Lower and lower middle socio economic class respectively. And it shows a significant association with anaemia. (p value < 0.05). [Table 4] The prevalence of anaemia was found to be 105 (53.84 %), 43 (56.57%) and 20 (45.45%) in the illiterate mother, mother educated up to 8th class and 9 & above class respectively. And it shows a non-significant association with anaemia. (p value > 0.05). [Table 5]

Table 1: Distribution Anaemia According to Age Groups

Age group (in years)	No. of Anaemic (%)	Non-Anaemic (%)	Total no. of girls (%)
10-13	52 (43.33)	68 (56.67)	120 (38.1)
14-16	64 (58.18)	46 (41.82)	110 (34.9)
17-19	52 (61.17)	33 (38.83)	85 (27)

X² value-7.96, dF-2, p value < 0.05

Table 2: Severity of Anaemia According to Age Group

Age group (in Years)	Mild (%)	Moderate (%)	Severe (%)	Total no. of Anaemic
10-13	39 (75)	12 (23.07)	1 (1.93)	52
14-16	30 (46.88)	29 (45.31)	5 (7.81)	64
17-19	27 (51.92)	18 (34.62)	7 (13.46)	52

X² value-712.85, dF-4, p value < 0.05

Table 3: Prevalence of Anaemia According to Body Mass Index (BMI)

BMI of Adolescent Girls	Anaemic (%)	Non-Anaemic (%)	Total no. of girls
Underweight (<18.5)	117 (56.52)	90 (43.48)	207
Normal (>18.5-24.9)	49 (54.44)	41 (45.56)	90
Overweight (>25.0)	2 (11.11)	16 (88.89)	18

X²- 13.78, df-2 p value <0.05

Table 4: Prevalence of Anaemia According to Socio-Economic Status

Socio-Economic Class	Anaemic (%)	Non-Anaemic (%)	Total no. of girls
Upper middle and middle	63(44.36)	79 (55.64)	142
Lower middle and Lower	105 (60.69)	68 (39.31)	173

X²- 7.71, df-1 p value <0.05

Table 5: Prevalence of Anaemia According to Mother Education

Mother Education	Anaemic (%)	Non-Anaemic (%)	Total no. of girls
Illiterate	105 (53.84)	90 (46.16)	195
1 to 8th class	43 (56.57)	33 (43.43)	76
9 and above class	20 (45.45)	24 (54.55)	44

X²- 1.44, df-2 p value >0.05

DISCUSSION

Anaemia is a global burden and the nutritional deficiency anaemia is more prevalent mainly in the developing nations. Anaemia deficiency in the young people has negative consequences for survival, growth and development of the children later in life. To combat such kind of problems, the Government of India started the Adolescent Girls Anaemia Control Programme with technical support

from UNICEF. A cross-sectional community based observational study was conducted at Sharifganj in Katihar district which is the urban field practice area under the department of Community Medicine of Katihar Medical College, Katihar, Bihar

The overall prevalence of anaemia was found to be 53.33% (168 girls). The prevalence of anaemia among adolescent girls was found to be similar to observations reported by KambleBD,^[12] and Kumari R,^[13] with rates of 59% and 50%, respectively.

It can be observed that in this present study the prevalence of severe, moderate and mild anaemia among adolescent girls was found to be 13 (7.75%), 59 (35.11%) and 96 (57.14%) respectively. A similar finding was reported by Chandrakumari AS et al., that prevalence of severe, moderate, and mild anaemia among adolescent girls at rates of 10.48%, 33.87%, and 55.64%, respectively.^[14]

The prevalence of anaemia was found to be maximum in the age group of 17-19 and the minimum in the age group of 10-13. In a study conducted by Chandrakumari AS et al. in Tamil Nadu, it was observed that the prevalence of anemia increased with age.^[14]

In the current study, it was observed that anaemia severity also increased with age, with higher severity noted in the 17–19-year age group compared to the 10–13-year age group.

The prevalence of anaemia was found to be 117 (56.52%) and 49 (54.44%) in the underweight and normal BMI respectively. And it shows a significant association with anaemia. (p value < 0.05). In a study by Rani GS et al, it was observed that almost 97.4% with BMI of (<2SD) had a high percentage of anaemia as compared to others.^[15] A study conducted by Yadav J,^[16] observed that adolescent girls with a normal BMI was less anaemic than those with a low BMI.

The table above shows that the prevalence of anaemia rises with lower socio-economic status. Study carried out on adolescent health in urban slums of Surat it was found out that the prevalence of anaemia in female adolescents were 70.2% in lower socioeconomic class as compared to those belonging to higher socioeconomic class of having prevalence of anaemia around 29.8%.^[17]

The prevalence of anaemia was found to be maximum in those adolescent girls whose mother was illiterate 105 (53.84%). A study conducted by Dr. Gupta V et al. it was seen that the presence of anaemia was high in girls whose mother were illiterate or just had primary education as compared to girls whose mother had better education and it was seen that the statistically the difference was significant (p<0.05).^[18]

CONCLUSION

This study found a high prevalence of anaemia, with adolescent girls being especially susceptible. As these girls grow older, anaemia often remains a persistent health issue, impacting women's overall well-being and increasing the risks of maternal and neonatal complications, along with increased child mortality. In this study anaemia in girls is strongly associated with mother educational and socio-economic factors. Women with higher education levels often have greater awareness and access to nutritional resources, promoting dietary practices

that reduce anaemia risk. On the other hand, women from lower socio-economic backgrounds may encounter restricted access to healthcare and nutritious food options, heightening their susceptibility to anaemia. Tackling these educational and socio-economic inequalities is crucial to lowering anaemia rates and enhancing the overall health and well-being of women and their families.

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