



## A STUDY ON PREVALENCE OF ANAEMIA AMONG ADOLESCENT GIRLS IN BOKO DEVELOPMENTAL BLOCK IN ASSAM

### Community Medicine

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### ABSTRACT

**Background:** There is lack of data regarding prevalence of anaemia in adolescent girls in north eastern region of India. Hence, this study was conducted to evaluate the prevalence and factors associated with presentation of anaemia in adolescent girls.

**Material and Methods:** This cross-sectional study was conducted from 1<sup>st</sup> February 2016 to 30<sup>th</sup> April 2016 involving 200 unmarried adolescent girls in the age group of 10-19 years in Boko Bongaon block in Assam. Eating habits and blood hemoglobin levels were estimated.

**Results:** Anaemia was present in 31% (n=62) adolescent girls - mild 48.39% (n=30), moderate 45.16% (n=28) and severe 6.45% (n=4). There was significant association of presence of anaemia with age (p=0.0244), type of diet (p=0.0026), consumption of citrus fruits (p=0.0357), frequency of intake of green leafy vegetable (p<0.0001) and iron folic acid supplementation (p<0.0001).

**Conclusion:** The prevalence of anaemia in adolescent girls in Boko Bongaon block is 31% and is associated with factors like age, type of diet, consumption of citrus fruits, green leafy vegetables, iron folic acid supplements.

### KEYWORDS

hemoglobin, citrus fruit, iron folic acid

#### Introduction:

Anaemia is a decrease in red blood cell mass, which impairs the body's ability for gas exchange of oxygen and carbon dioxide.<sup>1</sup> According to World Health Organization criteria, anemia is defined as a blood hemoglobin concentration of <13g/dl in adult males, and a hemoglobin concentration of <12g/dl in adult females.<sup>2</sup> Anaemia is a global problem with enhanced burden in developing countries like India. About 29% of the women of reproductive age group are victims of anemia.<sup>3</sup> Adolescent girls are at more risk of developing anemia due to physiological, nutritional, psychological & social factors.<sup>4</sup> The high incidence of anemia in adolescent girls has been attributed to increase in iron requirements for growth, menstrual cycle, low consumption of iron containing foods, dislike for iron rich foods like green leafy vegetables, and consumption of inhibitors of iron absorption such as phytates or tannins.<sup>5</sup> According to National Family Health Survey 3, the prevalence of anemia in Indian women of reproductive age group is estimated to be 55.8%.<sup>6</sup> There is scarcity of data regarding the prevalence of anemia in north eastern region of India. This study was conducted to assess the prevalence of anemia in adolescent girls and factors associated with it in Boko developmental block in Assam.

#### Materials & Methods:

This cross-sectional study was carried out in Boko Bongaon block in Kamrup district, Assam which is a field practice area for Department of Preventive & Social Medicine, Gauhati Medical College, Guwahati. Data were collected between 1<sup>st</sup> February 2016 to 30<sup>th</sup> April 2016 in adolescent girls (10-19 years) around the villages of Boko Bongaon block. Married adolescent girls or those having chronic or serious illness were excluded. The sample size was calculated by assuming prevalence of anaemia in Indian women of reproductive age group as 55.8%<sup>6</sup> & assuming absolute error at 7%. By using the formula of  $4pq/n^2$  where p is the percent prevalence, q is 100-percent prevalence & n is absolute error in percentage, the sample size obtained was 200. From the total of 140 villages in the block, 15% i.e. 20 villages were selected randomly. From each village, data of 10 adolescent girls was collected. First household in each selected village was taken randomly following which house to house visits were made to obtain the required sample. If the required sample was not obtained in each village then the adjacent village was taken to get the desired sample. Interview was taken according to their convenience.

Pre-designed & pretested schedule containing both open & closed ended questions regarding lifestyle habits was used. HemoCue® portable hemoglobin photometer was used to estimate hemoglobin. The girls with hemoglobin concentration <12gm/dl were considered as

anemic, which was graded as mild (10-12 gm/dl), moderate (7-10 gm/dl) and severe (<7 mg/dl).<sup>2</sup>

#### Statistical analysis:

Prism GraphPad software for windows, version 7.03 was used for analysis. Descriptive statistics were assessed. Association with factors was evaluated by Chi square test. The p-value of <0.05 was considered as significant.

#### Results:

Among the 200 adolescent girls in study, anaemia was found to be present in 31% (n=62). Among the anaemic girls, the severity of anaemia was mild in 48.39% (n=30), moderate in 45.16% (n=28) and severe in 6.45% (n=4).

Association of anaemia with various factors has been described in Table 1.

**Table 1: Association of anaemia with various factors**

Chi square test, WIFS – Weekly Iron Folic acid Supplementation

Variables	Anaemia present (%)	Anaemia absent (%)	Total (%)	Chi-square statistic, df
Age group (in years)	12 (21.82) 30 (42.86) 20 (26.66)	43 (78.18) 40 (57.14) 55 (73.33)	55 (27.5) 70 (35) 75 (37.5)	7.427, 2 p=0.0244
Type of diet	11 (64.70) 51 (26.70)	6 (35.29) 132 (73.29)	17 (8.5) 183 (91.5)	9.036, 1 p=0.0026
Tea consumption within half hour of food	21 (23.86) 41 (36.60)	67 (76.13) 71 (63.39)	88 (44) 112 (56)	3.169, 1 p=0.075
Citrus fruits	29 (24.78) 33 (39.76)	88 (75.21) 50 (60.24)	117 (58.5) 83 (41.5)	4.413, 1 p=0.0357

Frequency of intake of green leafy vegetables	15 (45.45) 26 (22.22) 4 (14.81)	18 (54.55) 91 (77.78) 23 (85.19)	33 (16.5) 117 (58.5) 27 (13.5)	30,546, 3 p<0.0001
Once a week	17 (73.91)	6 (26.09)	23 (11.5)	
Twice or more / week				
Daily				
Rarely				
WIFS Receivers	43 (24.43) 19 (79.16)	133 (75.57) 5 (20.83)	176 (88) 24 (12)	27.077, 1 p<0.0001
Non-receivers				
Menstrual problems	5 (18.52) 57 (38%)	22 (81.48) 93 (62%)	27 (15.25) 150 (84.75)	3.008, 1 p=0.0829
Yes				
No				
<b>Total</b>	<b>62 (31%)</b>	<b>138 (69%)</b>	<b>200 (100%)</b>	

**Discussion**

In the present study, the prevalence of anaemia among adolescent girls in the study area was found to be 31%. The factors associated with presence of anaemia were age, type of diet, consumption of citrus fruits, intake of green leafy vegetable and iron folic acid supplementation. The prevalence of anaemia was higher in age group of 14-16 years, and those consuming vegetarian diet and with low consumption of citrus fruits, green leafy vegetables and iron folic acid supplementation.

The prevalence of anaemia in adolescent girls and associated factors reported by various studies has been summarized in Table 2.

**Table 2: Prevalence of anaemia in adolescent girls and associated factors reported by different studies**

Author, year	Age group (years)	Study Area	Sample size	Prevalence of anaemia	Associated factors	Ref. no.
Rajaratnam et al, 2000	13-19	K.V. Kuppam block and Gudiyatham block, Vellore District, Tamil Nadu	316	44.8%	Education of girls and their mothers	7
Rawat et al, 2001	10-18	Daurula, Meerut, Uttar Pradesh	504	34.5%	Type of family, socioeconomic status, father's occupation, mother's education, family size	8
Choudhary et al, 2006	11-18	Vellore, Tamil Nadu	100	29%	Low socioeconomic status, religion, low consumption of meat	9
Toteja et al, 2006	11-18	16 Districts of 11 States, India	4337	90.1%		10
Bulliyy et al, 2007	11-19	3 Districts from Orissa	1937	96.5%	Pre-menarche, community, education level of girls, parents income, body mass index, mid upper arm circumference	11
Chaudhary et al, 2008	10-19	Urban Health and Training Center in Bapunagar, Nagpur, India	176	35.1%	Socioeconomic status	12
Ramzi et al, 2011	10-19	Kavar Urban Area, Southern Iran	363	5.8%		13

Biradar et al, 2012	10-19	Vantamuri, Belgaum Karnataka	840	41.1%	Lower socioeconomic groups	14
Işık Balcı et al, 2012	12-16	Denizli, Turkey	672	8.3%		4
Gupta et al, 2013	10-19	Jhaukhel (Bhaktapur), Nepal	204	35.3%		15

As observed from Table 2, the prevalence of anaemia in adolescent girls has a wide range in India. Toteja et al<sup>10</sup> and Bulliyy et al<sup>11</sup> are studies with larger sample size and have reported the highest prevalence of >90%, while studies conducted in comparatively smaller sample size have reported a prevalence of <45%, and are in accordance with findings of the current study.

The severity of anaemia in different studies is mentioned in Table 3.

**Table 3: Severity of anaemia reported by different studies**

Author, year	Mild anaemia (%)	Moderate anaemia (%)	Severe anaemia (%)	Ref. no.
Current study	48.39	45.16	6.45	
Rajaratnam et al, 2000	36.5	6.3	2.1	7
Rawat et al, 2001	19	14.1	1.4	8
Choudhary et al, 2006	27	2	-	9
Toteja et al, 2006	32.1	50.9	7.1	10
Bulliyy et al, 2007	45.2	46.9	4.4	11
Chaudhary et al, 2008	69.2	30.8	-	12
Ramzi et al, 2011	85.7	14.29	-	13
Biradar et al, 2012	34.6	6.3	0.2	14

The current study has noted higher prevalence of severe anaemia compared to other studies.

The Weekly Iron Folic acid Supplementation (WIFS) programme under National Health Mission by Government of India has been introduced with the objective of reducing the prevalence and severity of anaemia among the adolescent population. In the present study, the prevalence of anaemia was lower among the adolescents receiving WIFS and is an indicator of the achievements of the programme. However, a considerable proportion of adolescents (12%) have not yet received WIFS and should be covered under the programme.

The study had certain limitations. Socioeconomic status was not evaluated. Causes of anemia were not investigated. Adolescent girls should be recommended to consume non-vegetarian diet, citrus fruits, green leafy vegetables and iron folic acid supplements.

**Conclusion:**

The prevalence of anaemia in adolescent girls in Boko Bongaon block is 31% and is associated with factors like age, type of diet, consumption of citrus fruits, green leafy vegetables, iron folic acid supplements.

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