

A STUDY OF PREVALENCE OF ANAEMIA AND SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH ANAEMIA AMONG ADOLESCENT GIRLS IN RURAL AREA OF KATIHAR, BIHAR

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ABSTRACT

BACKGROUND

According to WHO, an adolescent is defined as an individual between 10-19 years of age. Adolescence is a period of rapid growth, weight gain and blood volume expansion. The overall iron requirement of the body is increased during this period. During adolescent period, the risk of iron deficiency anaemia among boys and girls appears to be more due to growth spurt. Anaemia in adolescents is a major public health problem in India.

OBJECTIVE

1. To estimate the prevalence of iron deficiency anaemia among adolescent girls. 2. To study the sociodemographic factors associated with anaemia among adolescent girls.

METHODOLOGY

A community based cross sectional study was conducted at Hajipur village, a rural field practice area of Katihar Medical College, Katihar, Bihar, among adolescent girls during the study period between January 2011 to December 2011. Haemoglobin estimation was done by Sahli's haemoglobinometer.

RESULTS

Total sample size of this study was 202, and prevalence of anaemia was 75.74%. The number of severe, moderate and mild anaemic girls were 11 (5.44%), 65 (32.18%) and 77 (38.12%) respectively. Percentage of anaemia was high in adolescent girls who belong to joint family as compared to nuclear family. Mean BMI of girls who are anaemic was 17.74 as compared to BMI of 18.17 among non-anaemic girls. The prevalence of anaemia is maximum among adolescent girls with illiterate mothers (85.71%) and the least was found in high school educated mothers (37.5%).

CONCLUSION

High prevalence of anaemia was found in this study. Adequate food consumption and regular intake of iron and vitamin C rich foods, deworming, food fortification, supplementary feeding and nutrition education of parents can prevent nutritional anaemia.

KEYWORDS

Anaemia, Adolescent Girl, Sociodemographic Factors.

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INTRODUCTION

According to the World Health Organization, an adolescent is defined as an individual between 10-19 years of age. South-East Asia Region accounts for about 350 million adolescents comprising about 22% of the total population.^[1] Anaemia is widely prevalent in India and affects both sexes of all age groups. Adolescent girls constitute the vulnerable group and in a family with limited resources female child is more likely to be neglected.^[2] Adolescent girls are vulnerable to iron deficiency anaemia due to accelerated increase in requirement for iron, poor dietary intake of iron, and worm infestation as

well as the social norm of early marriage and adolescent pregnancy.^[3] The added burden of menstrual blood loss, normal or abnormal, precipitates the crisis too often. The low iron stores in these young women of reproductive age makes them susceptible to iron deficiency anaemia during pregnancy.^[4] Anaemia in adolescent girls may lead to attributes such as high maternal mortality ratio, high incidence of low birth weight babies and high perinatal mortality in future.^[5]

Anaemia is a global public health problem affecting both the developing and developed countries with major consequences for human health as well as the social and economic development.^[6] The objective of the present study was to estimate the prevalence of iron deficiency anaemia among adolescent girls and to study the sociodemographic factors associated with anaemia among adolescent girls in our study area. The result of this particular study will be useful in prevention and management of anaemia in adolescent girls and also useful in planning for future health programmes in this geographic area.

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METHODOLOGY

A community based cross sectional study was conducted at Hajipur village, a rural field practice area of Katihar Medical College, Katihar, Bihar, during the study period of January 2011 to December 2011. Initially, a pilot study was conducted among a small number (70) of adolescent girls in Hajipur village to have a rough estimate of the prevalence of anaemia. The prevalence was found to be 50 percent in this study. On the basis of this prevalence of anaemia among adolescent girls, the sample size of the present study was calculated by adopting the following formula:

$$n = \frac{Z^2 \alpha / 2 \times PQ}{\Sigma^2}$$

Where, P= prevalence rate of the disease (here, P= 50% = 0.50).

Q= 1- P (Complement of P) [Here, Q=1.0-0.50= 0.50].

α =level of significance (type I error).

Z α / 2= 1.96 ≈ 2 (at α= 0.05)^[7]

Z²α / 2= 4

Σ= Allowable Error 20% of P = 0.10; Σ²= 0.0100

Then, n = $\frac{4 \times 0.50 \times 0.50}{0.0100} = 100$

Here, degree of confidence is 95% allowing design effect 2,
n = 100 x 2=200

Hence, the required study sample size was 200.

Houses that are having at least one adolescent girl or more were numbered serially. Then the houses, where survey was to be undertaken, were selected by systematic random sampling technique. Adolescent pregnant mothers were not included in this study. And in this present study the total number of sample size was 202 adolescent girls. The reason for taking two extra girls was that, in the last house which was selected by systematic random sampling technique there were three adolescent girls, and so all three girls were selected for the study. Detailed information was collected on a predesigned and pretested proforma, about sociodemographic characteristics and contributory factors in relation to anaemia, by oral questionnaire method and supplemented by general physical examination. Socioeconomic status was measured by according to modified B. G. Prasad classification.^[8] Due to feasibility and cost effectiveness, haemoglobin estimation was done by Sahli's haemoglobinometer. Haemoglobin estimation was done at rural primary health center, Department of Community Medicine, Katihar Medical College, Katihar. The subjects were

categorised as per WHO standards for anaemia into mild, moderate and severe categories.

Subjects having haemoglobin level between 10–11.9 g/dL were considered to be suffering from mild anaemia, 7–9.9 g/dL from moderate anaemia and below 7 g/dL from severe anaemia.^[9] The study was approved by Institutional Ethical Committee. Data thus collected were compiled in Microsoft Excel worksheet 2007 and analysed. Associations were inferred by Chi-square test. P value <0.05 was considered significant.

RESULTS

In the present study, the total sample size was 202 and out of these 153 (75.74%) were found anaemic, the remaining being non-anaemic.

Haemoglobin (g/dL)	No. of Adolescent Girls (%)	Mean Haemoglobin (g/dL)	Standard Deviation (±SD)
Severe Anaemia	11 (05.44%)	6.71	±0.098
Moderate Anaemia	65 (32.18%)	8.32	±0.538
Mild Anaemia	77 (38.12%)	10.66	±0.391
Normal	49 (24.26%)	12.34	±0.142

Table 1: Distribution of Anaemic Subjects According to their Haemoglobin Level

It is evident from the Table 1 that out of 202 adolescent girls, the number of severe, moderate and mild anaemic girls are 11 (5.44%), 65 (32.18%) and 77 (38.12%) respectively. The mean haemoglobin was found 6.718 g/dL, 8.32 g/dL and 10.66 g/dL in severe anaemic, moderate anaemic and mild anaemic girls respectively.

Family Type	Total	Anaemic (%)	Non-Anaemic	X ² =5.0963 df- 1 p <0.05
Joint	68	58 (85.2%)	10	
Nuclear	134	95 (70.8%)	39	

Table 2: Distribution of Anaemic Subjects according to their Family Type

Table 2 shows that the prevalence of anaemia was 85.2% in adolescent girls who belong to joint family as compared to nuclear families where the prevalence of anaemia was 70.8%. And this finding was significant with reference to anaemia (p <0.05).

Adolescent Girls	Mean BMI (±SD)	±SE of BMI	Mean Height (±SD)	±SE of Height	Mean Weight (±SD)	±SE of Weight
Anaemic	17.74 (SD±1.199)	±0.0972	138.92 (SD±9.312)	±0.7532	34.47 (SD±5.677)	±0.4593
Non-Anaemic	18.17 (SD±1.310)	±0.1873	139.44 (SD±10.13)	±1.4434	35.68 (SD±6.780)	±0.9685

Table 3: Comparison of Anthropometric Measurement in Anaemic Subjects and Non-Anaemic Subjects

Observation of Table 3 shows that mean BMI, mean height (in cm) and mean weight (in kg) of anaemic adolescent girls are 17.74 (SD±1.199), 138.92 (SD±9.312) and 34.47 (SD±5.677) respectively.

Mother Education	Total No. of Girls	Anaemic (%)	Non-Anaemic	χ ² -17.651 df-4 p<0.05
Illiterate	84	72 (85.71%)	12	
Just Literate	48	37 (77.08%)	11	
Primary School (Class 1 to 5)	49	35 (71.42%)	14	
Middle School (Class 6 to 8)	13	6 (46.15%)	7	
High School (Class 9-12)	08	3 (37.5%)	5	
Total	202	153	49	

Table 4: Distribution of Anaemic Subjects according to their Mother's Education

It is seen from Table 4 that the prevalence of anaemia in adolescent girls was maximum in illiterate mothers (85.71%), and the least was found in high school educated mothers (37.5%). In the present study, graduate and postgraduate mothers were not found. And the finding was significant with reference to anaemia ($p < 0.05$).

Girls' Education	Total No. of Girls	Anaemic (%)	Non-Anaemic	$\chi^2-10.32$ df-3 $p < 0.05$
Illiterate	85	74 (87.05%)	11	
Primary School (Class 1 to 5)	54	37 (68.5%)	17	
Middle School (Class 6 to 8)	40	27 (67.5%)	13	
High School (Class 9 to 12)	23	15 (65.2%)	8	
Total	202	153	49	

Table 5: Distribution of Anaemic Subjects According to their Education

It appears from Table 5 that the percentage of anaemia was higher in illiterate girls (87.5%) and least percentage of anaemia was seen in high school going girls (65.2%). Just literate, graduate and above educated girls were not found in this study. And the relation was found statistically significant between girls' education and anaemia. ($\chi^2-10.32$, df-3, $p < 0.05$).

Socioeconomic Class	Total No. of Girls	Anaemic (%)	Non Anaemic	χ^2 16.662 df-4 $p < 0.05$
Class I	21	9 (42.85%)	12	
Class II	54	40 (74.07%)	14	
Class III	72	56 (77.7%)	16	
Class IV	37	32 (86.4%)	5	
Class V	18	16 (88.8%)	2	

Table 6: Distribution of Anaemic Subjects according to their Socioeconomic Status

It is clearly seen from Table 6 that the prevalence of anaemia is maximum in socioeconomic class V (88.8%) and minimum in socioeconomic class I (42.85%). And the relation was found statistically significant between socioeconomic status and anaemia ($p < 0.05$).

Socio-economic Class	Total No. of Girls	Total No. of Anaemic	Mild Anaemia (%)	Moderate Anaemia (%)	Severe Anaemia (%)
I	21	9	6 (28.6%)	3 (14.3%)	0
II	54	40	20 (37%)	19 (35.2%)	1 (1.9%)
III	72	56	35 (48.6%)	19 (26.4%)	2 (2.7%)
IV	37	32	11 (29.7%)	17 (45.9%)	4 (10.8%)
V	18	16	5 (27.7%)	7 (38.8%)	4 (22.2%)

Table 7: Distribution of Severity of Anaemia according to their Socioeconomic Status

From table 7, it can be observed that the percentage of severe anaemia was maximum (22.2%) in socioeconomic class 'V', and in the class 'I' there were no cases of severe anaemia. And the percentage of moderate anaemia was maximum (48.6%) in socioeconomic class 'IV' and maximum number 35 (48.6%) cases of mild anaemia were found in socioeconomic class III.

DISCUSSIONS

In the present study, the prevalence of anaemia among adolescent girls was 75.74%. Premalatha T et al, Devi S et al also found almost the similar prevalence of anaemia 78.75%, 73% respectively in their study.^[10,11] In other studies, Mallikarjuna M et al and Jawarkar AK et al reported lower prevalence of anaemia (56.3% and 55% respectively).^[12,13] However, a study by Chauhan AS et al reported higher prevalence of anaemia at 85.9% in adolescent girls.^[14] These differences in the prevalence of anaemia may be due to differences in the study area. Our study showed that the number of severe, moderate and mild anaemic girls are 11 (5.44%), 65 (32.18%) and 77 (38.12%) respectively. Thakur et al reported the prevalence of mild, moderate and severe anaemia among adolescent girls of hilly state was 42.3%, 38.9% and 3.2% respectively.^[15] In the present study, percentage of anaemia was higher (85.2%) in joint families than in nuclear families (70.8%). In another study, Agarwal AK also reported that anaemia was more in joint family.^[16] Our study showed that the mean BMI value of all selected adolescent girls were in Chronic Energy Deficiency (CED) grade I. Gupta N et al in a study of adolescent girls found that the mean BMI was 17.40 ± 2.78 kg/m² (CED-I).^[17] In another study, a significant association between mother's literacy and anaemia among adolescent girls was found, similar to our study.^[18] Our study shows that the percentage of anaemia was more in illiterate girls than in literate girls. Kulkarni MV et al. also documented similar results and prevalence of anaemia was found 83.7%, 87%, 92.3% and 93.1% in \geq graduate, Higher Secondary, Senior Secondary and primary & middle school educated girls respectively.^[5] This study shows that lower the socioeconomic status higher the prevalence of anaemia. Biradar SS et al in a study found that the prevalence of anaemia among the girls who belonged to class III was 4.1%, whereas it was 43.1% in girls of socioeconomic class IV and 100% in girls of socioeconomic class V.^[19]

CONCLUSION

In spite of the fact that anaemia is a preventable condition, it is highly prevalent among the adolescents all over India. More focus has been given to adolescent pregnancies and sexually transmitted diseases like HIV, but not much attention has been given towards nutrition. This study shows that the prevalence of anaemia is more in adolescent girls who belong to joint families. This could probably be due to both quality and quantity of food consumption which gets affected by number of members in the family. Educational status of mothers and adolescent girls has been found to have a significant association with anaemia. Low prevalence of anaemia in adolescent girls in more educated mothers and girls may be explained by their increased awareness regarding available health services leading to change in health seeking behaviour, personal hygiene and intake of adequate nutrition. The

socioeconomic status of girls has got a positive effect on anaemia. This may be because of better availability of high quality of food for their children due to their better socioeconomic status.

Strength

It is a population based cross sectional study and the strength of this study was that from this study it is possible to assess the burden of disease in this area. Bias was taken care of by random sampling. This study is expected to enhance the knowledge base and awareness regarding nutritional anaemia among study population and will also be useful in planning for future health programmes in this geographic area.

LIMITATIONS

In spite of our best efforts, it was difficult to convince all study subjects to participate in the study, for collection of samples was not welcomed in many cases. At times, elderly family members and/or female relatives were not present at their houses, and study subjects refused to cooperate in their absence. Repeated visits had to be made for such cases.

RECOMMENDATIONS

It was felt during the study that there is a need to improve female literacy, socioeconomic status of the masses through poverty alleviation programmes. Promotion of family planning measures too reduces the family size. Also important is nutritional education and personal hygiene in school curriculum.

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