Original Research Article

Prevalence of Anaemia among Adolescent Girls: A Cross-Sectional Study

Deepika Anand[1], R.K. Anuradha[2]

[1]Research Scholar, Department of Home Science, Sri Venkateswara University, Tirupati
[2]Professor, Department of Home Science, Sri Venkateswara University, Tirupati

Corresponding Author: Deepika Anand

ABSTRACT

Background: Adolescents are vulnerable to anaemia particularly in developing countries because of increased iron requirements related to their rapid growth spurt. Substantial changes such as dietary habits, life style pattern, behavioural changes are likely to influence the haemoglobin profile of adolescents.
Objectives: The objective of the study was to assess the anthropometric and haemoglobin (Hb) profile of adolescent girls and to study the correlation between haemoglobin profile and Body Mass Index (BMI).
Methods and Materials: In the present study, a total number of 1300 adolescent girls from the age group of 13-17 years were randomly selected for the study from 10 different schools of Puttaparthi Mandal, Anantapur District. A pre-designed and pre-tested questionnaire was used to collect the data regarding anthropometric and haemoglobin profile of the selected subjects. The data analysis was carried out using the Statistical Package for Social Sciences (SPSS) Software.
Results: In the present study, about 31 per cent of the subjects were suffering from mild anaemia, followed by 6 per cent (moderate anaemia) and 3 per cent (severe anaemia). A highly significant ($p<0.01$), positive correlation of haemoglobin with BMI strata was observed among the subjects with severe thinness and overweight category.
Conclusions: Anaemia during adolescence severely impairs the physiological and cognitive development. There is an urgent need for improving overall nutritional status of adolescent girls employing a multisectorial community-based approach, especially for girls.

Keywords: Anaemia, haemoglobin, adolescent girls, Body Mass Index

INTRODUCTION

Anaemia is a global nutritional problem affecting both developing and developed countries, with major consequences on human health as well as social and economic development. Nutritional anaemia can be defined as the condition that results from the inability of the erythropoietic tissue to maintain a normal haemoglobin concentration due to inadequate supply of dietary essentials leading to reduction in circulating haemoglobin. Major causes of anaemia are dietary deficiency, heavy menstrual blood loss, parasitic infections, acute and chronic infections, poor absorption, haemoglobinopathies and chronic inflammatory diseases.

Globally, anaemia affects 1.62 billion people with about 69.4 million adolescents, 56 million pregnant women, and 468 million non-pregnant women are estimated to be anaemic (UNICEF, 2016). Africa and Asia account for more than 85 per cent of the absolute anaemia burden in high-risk groups and India is the worst hit, where more than half proportion of adolescent girls were estimated to suffer

from nutritional anaemia. Nearly one in every four adolescent girls aged 15-19 years in the developing world is anaemic. About 30 per cent of adolescent girls in South Asia are worst hit by getting married at the age between 15-19 years, which further aggravates future complications. (UNICEF, 2016).

Adolescents are vulnerable to anaemia particularly in developing countries because of increased iron requirements related to rapid growth. In a family with limited resources, the female child is more likely to be neglected. Among adolescent girls, menstruation increases the risk of iron-deficiency anaemia throughout their adolescence and child bearing age. In fact anaemia during adolescence limits growth and delays onset off menarche which may lead to cephalopelvic disproportion. Anaemia during adolescence severely impairs the physiological and cognitive development, which further declines the work performance and even contributes to adverse outcomes in pregnancy.

During adolescence inadequate nutrition, attributes to increased maternal mortality rate, high incidence of low birth weight babies, enhanced perinatal mortality and consequent low fertility rates (Kaur *et al*., 2006).Several studies across the country have revealed that the prevalence of anaemia is higher among adolescents from rural areas in comparison with the urban areas, which is primarily due to ignorance, low socio-economic status and poor dietary habits (Tatala and Svanberg, 1998).

This study was conducted to assess the prevalence of anaemia among adolescent girls and to study epidemiological correlates of nutritional anaemia among the subjects.

MATERIAL AND METHODS

Across-sectional study was carried out in 10 different schools of Puttaparthi Mandal, Anantapur District. A total number of 1300 adolescent girls from the age group of 13-17 years were randomly selected for the study. The participants and parents were informed about the study and written consent was obtained from the parents and guardians of the participants. A pre-designed and pre-tested questionnaire was used to collect the data regarding anthropometric and haemoglobin profile. The selected adolescent girls were assessed for their haemoglobin profile using Sahli's Haemoglobinometer.

The data analysis was carried out using the Statistical Package for Social Sciences (SPSS) Software. The relationship between haemoglobin profile (Hb) and BMI was examined by calculating Pearson's Correlation Coefficient and Regression Analysis.

RESULTS

In the present study of 1300 adolescent girls, 301 (23.2 per cent) belonged to 13 years, 260 (20 per cent) belonged to 14 years, 220 (17per cent) belonged to 15 years, 249 (19 per cent) belonged to 16 years and 270 (20.8 per cent) belonged to 17 years of age. Table 1 represents age wise distribution of the subjects.

Table 1.Age-wise distribution of the subjects

SNO.	Age	N	%
1.	13 years	301	23.2
2.	14 years	260	20
3.	15 years	220	17
4.	16 years	249	19
5.	17 years	270	20.8
Total		1300	100

Among 13 and 14 years age group, the mean weight was found to be lower, when compared with ICMR standards. Table 2 shows mean weight, height and BMI of the subjects according to their age. The mean BMI among 16 and 17 years age group was found to be higher than normal when compared with other age groups

TABLE 2. MEAN WEIGHT AND HEIGHT OF THE SUBJECTS ACCORDING TO THEIR AGE

MEASUREMENTS	AGE OF THE SUBJECTS					*p* value
	13 YEARS (N=271)	14YEARS (N=263)	15 YEARS (N=251)	16 YEARS (N=255)	17 YEARS (N=260)	
	MEAN ± SD*	MEAN ± SD*	MEAN ± SD*	MEAN ± SD*	MEAN ± SD*	
WEIGHT (kg)	31.2±3.25	35.4 ± 2.8	40.5 ± 1.9	49.8 ± 1.34	58.5 ± 4.73	0.000*
HEIGHT (cm)	132.2 ± 2.88	139.8 ± 2.76	142.5 ± 3.7	146.9 ± 3.45	149.2 ± 4.53	0.000*
BODY MASS INDEX (BMI) [kg/m²]	17.9 ± 1.36	18.2 ± 1.33	20.0 ± 1.16	23.18 ± 1.61	26.44 ± 2.36	0.000*
Values are mean ± SD of number of subjects under each group. *Significant at p <0.01 level.						

As per WHO criteria for diagnosis and classification of anaemia (table 3), 781 (60 per cent) subjects were found to be normal (figure 1), 402 (31 per cent) subjects were suffering from mild anaemia, 78 (6 per cent) subjects fell under moderate anaemia category and 39 (3 per cent) subjects were suffering from severe anaemia.

Among all the age groups, severe anaemia (6.3 per cent) and moderate anaemia (13.3 per cent) were found to be highest among 13 years age group. Majority of the subjects (37.6 per cent) from 14 years age group fell under mild anaemia category.

TABLE 3. PREVALENCE OF ANAEMIA AMONG THE SUBJECTS

SNO	WHO CRITERIA Haemoglobin (gm/dl)	GRADING OF ANAEMIA	AGE OF THE RESPONDENTS										TOTAL	
			13 YEARS		14 YEARS		15 YEARS		16 YEARS		17 YEARS			
			N	%	N	%	N	%	N	%	N	%	N	%
1.	≤ 6.9 gm/dl	SEVERE ANEMIA	17	6.3	6	2.3	7	2.8	3	1.2	6	2.3	39	3
2.	7 – 9.9 gm/dl	MODERATE ANEMIA	36	13.3	21	8	9	3.6	7	2.7	5	2	78	6
3.	10 - 11.9 gm/dl	MILD ANEMIA	94	34.7	99	37.6	63	25.1	81	31.8	65	25	402	31
4.	>12 gm/dl	NORMAL	124	45.7	137	52.1	172	68.5	164	64.3	184	70.7	781	60
		Total	271	100	263	100	251	100	255	100	260	100	1300	100
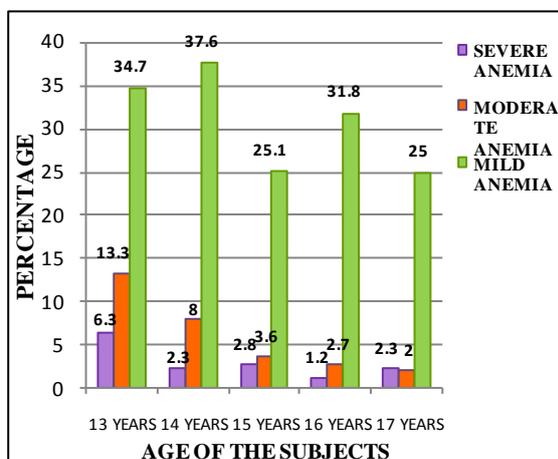
Fig 1: Prevalence of Anaemia among the Subjects

TABLE 4. CORRELATION OF HAEMOGLOBIN WITH BMI GRADES OF THE SUBJECTS (N=1300)

SNO	BMI FOR AGE (WHO z- score)	r	Significance (*p*)
1.	Severe Thinness	0.55	0.007**
2.	Thinness	0.96	0.042*
3.	Normal	0.87	0.026*
4.	Overweight	0.92	0.003**
5.	Obesity	0.19	0.013*

BMI : Body Mass Index;   r : Correlation Coefficient
**Significance at 1 % (p<0.01);   *Significance at 5 % (p<0.05)
NS : Not significant

Table 4 depicts the correlation of haemoglobin with different grades of BMI, with positive correlation among adolescent girls. A highly significant (*p*<0.01), positive correlation of haemoglobin with BMI strata was observed among the subjects with severe thinness and overweight category. A positive correlation can be observed more clearly through the scatter diagram (figure 2).
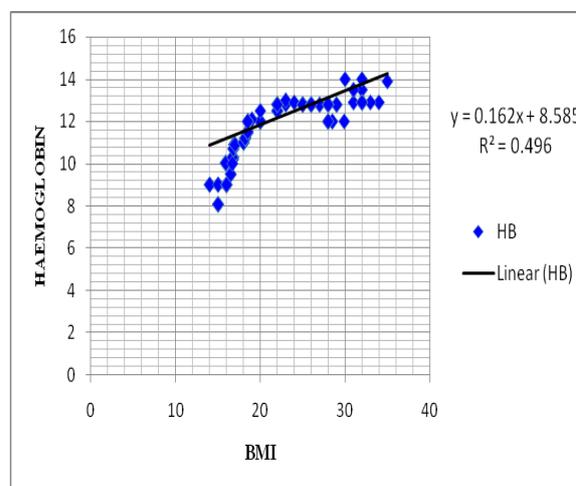

Fig 2: Correlation of BMI with Haemoglobin in subjects

DISCUSSION

In the present study, about 31 per cent of the subjects were suffering from mild anaemia, followed by moderate anaemia (6 per cent) and severe anaemia (3 per cent). Findings of the present study are in concurrence with the study conducted by Soman *et al*., (2017), which revealed that the prevalence rates of mild anaemia (57.4 per cent) was found to be highest among the subjects, followed by moderate malnutrition (4.2 per cent).

Another study conducted by Jayant and Jayshree (2017), revealed that the overall prevalence of mild and moderate anaemia were found to be 73.3 per cent and 16.6 per cent, respectively, which is relatively higher when compared with the present study. A study revealed relatively higher prevalence rates of anaemia when compared with the present study, about 53.3 per cent of adolescent girls were suffering from nutritional anaemia.(Ali *et al*., 2016).

Kavthekar *et al*., (2016) conducted a study among the rural school going adolescent girls and revealed that the overall prevalence of mild, moderate and severe anaemia among subjects were found to be 23.4, 30 and 0.8 per cent, respectively. Another study conducted by Devi *et al*., (2015) revealed that the overall prevalence of anaemia was found to be 73 per cent among school going adolescent girls of Rohtak district, which is relatively higher when compared with the present study. About 54 per cent of the subjects were found with mild anaemia, followed by 18 per cent (moderate anaemia) and 1 per cent (severe anaemia).

In the present study, a highly significant ($p<0.01$), positive correlation of haemoglobin with BMI strata was observed among the subjects with severe thinness and overweight category. Findings of the present study are in concurrence with the study conducted by Kaur*et al*., (2015), which revealed positive correlation haemoglobin with BMI strata among subjects with severe thinness.

CONCLUSION

In this study, it is concluded that the overall prevalence of mild, moderate and severe anaemia among adolescent girls were found to be 31, 6 and 3 per cent, respectively. Anaemia during adolescence severely impairs the physiological and cognitive development, which further declines the work performance and even contributes to adverse outcomes in pregnancy. A highly significant ($p<0.01$), positive correlation of haemoglobin with BMI strata was observed among the subjects with severe thinness and overweight category.

Hence, there is an urgent necessity for improving overall nutritional status of adolescent girls by imparting nutrition education, hygiene and sanitation programme and supplementation programme, especially for girls.

REFERENCES

- Ali D., Fazili A., Shah R. J. and Rafiq M. M. A study on the prevalence of nutritional problems of school going adolescent girls of Kashmir Valley with special focus on anaemia. *Int. J. Cur. Res. Rev.* 8 (24), 2016, pp. 6-12.
- Devi S., Deswal V. and Verma R. Prevalence of anaemia among adolescent girls: A school based study. *Int. J. Basic and Applied Medical Sciences*. 2015; 5 (1): 95-98.
- Jayant V.U. and Jayshree J.U. Assessment of anaemia in adolescent girls. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017; 6(7): 3113-3117.
- Kaur M., Singh A., Bassi R. and Kaur H. Nutritional status and anaemia in medical students of SGRDIMSAR, Amritsar. *National Journal of Physiology*, *Pharmacy and Pharmacology*. 2015; 5(1):35-49.
- Kaur S., Deshmukh P.R. and Garg B.S. Epidemiological correlates of nutritional anaemia in adolescent girls of rural Wardha. *Indian J. Community Med.* 2006; 31: 255-258.

- Kavthekar S., Chougule A., Kurane A. and Kulkarni D. Association between skinfold thickness and neck circumference with anaemia in rural school going adolescent girls. *International Journal of Community Medicine and Public Health.* 2016; 3(8): 2197-2200.
- Soman S.K., Areekal B., Murali A.J. and Varghese R. G. Adolescent anaemia its prevalence and determinants: a cross-sectional study from South Kerala, India. *Int. J. Community Med. Public Health.* 2017; 4(8): 2750-2756.
- Tatala T.S., Svanberg U. Low dietary iron availability is a major cause of anaemia: a nutritional survey in Lindi District of Tanzania. *Am. J. Clinical Nutr.*1998; 68: 171.
- UNICEF (United Nations Children's Fund). Adolescents and youth. New York. USA. 2016. https://www.unicef.org/adolescence/

How to cite this article: Anand D, Anuradha RK. Prevalence of anaemia among adolescent girls: a cross-sectional study. Int J Health Sci Res. 2019; 9(2):27-31.

******