

Prevalence of anaemia among adolescents in rural area of North Karnataka

Deepti Shettar^{1*}, Bhavana Hiremath², Basavaraj Yamakanamardi³ and Raveendra D. Totad⁴

¹Department of Community Medicine, KLE JGMMMC, Hubballi-580028, KLE Academy of Higher Education and Research, Karnataka, India, ²Department of Community Medicine, SDM College of Medical Sciences & Hospital, Manjushree Nagar, Sattur, Dharwad-580009 Karnataka, India,

³Department of Pathology, SDM College of Medical Sciences & Hospital, Manjushree Nagar, Sattur, Dharwad-580009 Karnataka, India and ⁴Department of Microbiology, Al Ameen Medical College & Hospital, Athani Road, Vijayapur-586108, Karnataka, India

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Abstract: *Background:* Worldwide there are more than 1.2 billion adolescents, more than half of all adolescents live in Asia. Anemia is one of the most common health conditions contributing to morbidity among adolescents. Hence, this study was undertaken to know the prevalence of anemia among adolescents. *Objective:* To assess the prevalence of anaemia among adolescent boys and girls in rural area. *Methods:* A community based, cross sectional study was conducted among 600 adolescents in rural area of Dharwad. Data was collected using semi-structured questionnaire consisting of demographic details. Hemoglobin estimation was done by Sahli's method. Data was analyzed using SPSS v21.0. *Results:* Among the total 600 adolescents, 60.66% were found to be anemic of whom 14.8% had mild, 43.7% moderate and 2.2% had severe anemia. Hemoglobin level was significantly different among boys and girls ($p < 0.0001$). *Conclusion:* Prevalence of anaemia was higher among adolescent girls than boys. Factors such as age of the participants, sex, marital status, father's education, mother's education, father's occupation and socio-economic status were significantly associated with anemia in adolescents.

Keywords: Anaemia, Adolescents, Gender, Marital Status, Parent's Education.

Introduction

Adolescence term is defined as including those aged between 10 and 19 years [1-2]. During this period physical, psychological and social maturity takes place. This is a vulnerable period for development of nutritional anemia [3]. Anemia According to census of India 2011, there are 253 million adolescents contributing to 20.9% of population which contributes to one-fifth of the total population [4].

Adolescent girls and boys constitute more vulnerable group especially in developing countries where boys are expected to join men at work at early age to earn their living and girls to join household activities. Also, traditionally girls are married at an early age and hence are exposed to higher risk reproductive morbidity and mortality [5-6].

According to DLHS-4 of 2012-13, prevalence of anaemia in boys (10-19yrs) was 50.3% and in girls (10-19yrs) was 62.0%. In Karnataka, prevalence of anaemia in boys (10-19yrs) was 48.1% and in girls (10-19yrs) was 60.1% [7]. There is increased requirement of iron in both adolescent boys and girls, from preadolescent level of 0.7-0.9 mg Fe/day to as much as 2.2 mg Fe/day. In females this increase in requirement is due to expansion of blood volume, increase in lean body mass and the onset of menstruation. Whereas in boys iron needs are highest in males during peak pubertal development because of greater increase in blood volume, muscle mass and myoglobin [8]. Among girls, if anaemia persists into adulthood then, can increase the risk of negative reproductive outcomes such

as miscarriage, stillbirth, premature birth, low birth weight babies, perinatal mortality and maternal mortality [9]. Among boys’ anaemia can predispose to infections, and decreases physical capacity due to fatigue. National iron plus initiative was launched to combat anemia among pregnant and lactating women, adolescent girls and boys as well as under five children [10]. Hence, this study was done to assess the prevalence of anaemia among adolescent boys and girls in rural area of North Karnataka.

Material and Methods

Community based cross sectional study was conducted among adolescents between 10 to 19 years of age. The study was conducted over a period of one year, from December 2015 to November 2016 in rural field practice area of department of community Medicine, Shri Dharmasthala Manjunatheshwara College of medical Sciences and Hospital, Dharwad. Sample size was calculated using the formula $4pq/l^2$ (p = prevalence, q = 100 – p, l = allowable error i.e.10% of p). In a study done in Darjeeling, West Bengal [11] pallor (anemia) was seen in 40% of adolescents. So, taking 40% prevalence of anemia the sample size was 600. Study participants were selected by simple random technique. House to house survey was done. A semi-structured questionnaire was used to collect the data which consisted of socio-demographic details and hemoglobin estimation. Hemoglobin estimation was done by Sahli’s method after taking informed consent from parent/guardian in case of less than 18 years old participants. Ethical committee approval was obtained from institutional ethical committee.

Statistical analysis: Data was first entered into Microsoft Excel 2010 and analyzed using SPSS v21.0. Descriptive statistics were applied. Chi square test and univariate logistic regression were done to know the association of anaemia with socio-demographic variables. Unpaired t-test was done to know the difference in hemoglobin levels among boys and girls.

Results

Total of 600 adolescents participated in the study among whom 342(57%) were boys and 258 (43%) girls. Among these 47.7% were early adolescents and 52.3% were late adolescents.

Most of the participants were attending school (82%), 6.7% were school drop outs and staying at home, 4% farmers, 1.5% laborers, 1.3% mechanic and 0.7% involved in business. Around 6.2% of the study participants were married and 3.8% of them were housewives. As much as 5.8% of girls were pregnant at the time of study.

Table-1: Distribution of study participants according to socio-demographic characteristics			
Characteristic	Number	Percent	
Age -	10 -13	217	36.2
	14 -16	238	39.7
	17 -19	145	24.1
Gender –	Boys	342	57
	Girls	258	43
Religion –	Hindu	489	81.5
	Muslim	99	16.5
	Christian	12	2.0
Education -	Illiterate	18	3.0
	Primary	231	38.5
	High school	297	49.5
	PUC	54	9.0
Education of father	Illiterate	174	29.0
	Primary	204	34.0
	High school	96	16.0
	PUC	79	13.2
	Graduate	47	7.8
Education of mother	Illiterate	204	34.0
	Primary	225	37.5
	High school	140	23.3
	PUC	31	5.2
Occupation of father	Unemployed	44	0.7
	Farmer	325	54.2
	Business	72	12.0
	Daily wager	118	19.7
	Others	81	13.5
Occupation of mother	House wife	276	46.0
	Farmer	207	34.5
	Daily wager	101	16.8
	Others	16	2.6
Socio-economic status	Class II	39	6.5
	Class III	113	18.8
	Class IV	276	46.0
	Class V	172	28.7

Of the total 600 adolescents, 364 (60.66%) were found to be anaemic of whom 89 (14.8%) had mild, 262 (43.7%) moderate and 13 (2.2%) had severe anaemia. The age and gender distribution as per their anaemic status is given in table 2. It

was found that the prevalence of mild anaemia was higher among boys as compared to girls whereas moderate and severe anemia was more among girls.

Table-2: Age and gender distribution of study participants according to their anemic status (n=600)

Variables	Non anemic	Mild anemia	Moderate anemia	Severe anemia
Early adolescents (10-14 years)				
Male	115	17	51	02
Female	40	01	58	02
Total	155	18	109	04
Late adolescents (15-19 years)				
Male	44	55	58	01
Female	37	16	95	08
Total	81	71	153	09

Univariate logistic regression showed that, age (p=<0.0001), gender (p=<0.0001), marital status in girls (p=0.030), father’s education’ mother’s education, father’s occupation and socio-

economic status were significantly associated with development of anaemia among adolescents (Table 3).

Table-3: Univariate logistic regression for association of anemia and socio-demographic characteristics

Variable	Total number in group	Anemia (n=364)	P value	OR
Age group				
Early adolescents	286	131	<0.0001	0.33 (0.221-0.502)
Late adolescents	314	233		1
Gender				
Male	342	184	<0.0001	0.46(0.303-0.703)
Female	258	180		1
Marital status				
Married	37	36	0.030	9.65(1.245-74.794)
Unmarried	563	328		1
Family type				
Nuclear	341	187	0.512	1.17(0.726-1.899)
Joint	123	91	0.728	1.11(0.600-2.076)
Three generation	136	86	-	1
Father’s education				
Illiterate	174	139	0.015	3.25(1.255-8.429)
Primary	204	119	0.347	1.49(0.648-3.445)
High school	96	44	0.377	1.47(0.623-3.493)
PUC	79	48	0.001	4.25(1.76-10.266)
Graduate	47	14	-	1

Variable	Total number in group	Anemia (n=364)	P value	OR
Mother's education				
Illiterate	204	142	0.111	2.68(0.797-9.035)
Primary	225	144	0.051	3.15(0.997-9.956)
High school	140	70	0.04	3.24(1.057-9.97)
PUC	31	8	-	1
Father's occupation				
Unemployed	4	1	0.872	0.82(0.074-9.061)
Farmer	325	212	0	3.73(1.953-7.023)
Business	72	30	0.037	2.25(1.049-4.826)
Daily wager	118	101	0.002	4.63(1.798-11.948)
Others	81	20	-	1
Socio-economic status				
Class II	39	06	0.089	0.12(0.488-6.351)
Class III	113	37	<0.001	0.18(0.102-0.342)
Class IV	276	190	0.094	0.65(0.402-1.074)
Class V	172	131	-	1

Mean hemoglobin among adolescent girls was 10.37±1.45 and mean hemoglobin among boys was 11.48±1.25. The difference in the hemoglobin level was found to be statistically significant (Table 4).

	Number (n)	Mean	SD
Boys	342	11.484	1.254
Girls	258	10.371	1.450
t=10.059, p=<0.0001, dof=598			

Discussion

In the present study, 5.8% of girls were pregnant at the time of study. This was similar to finding in DLHS-4, in which 6.6% of total births were to women aged between 15 to 19 years in rural area [7]. On general examination it was observed that, 42.7% of adolescent boys and 69.8% of girls had pallor in our study. This was in contrast to a study done by Dey I et al [11] in West Bengal, pallor was present in 40% of the adolescents (30% girls and 46% boys). In our study a greater number of girls had pallor than boys as they are more prone for anaemia due to physiological reasons such as increased demand of iron due to menstrual blood loss.

In our study, 364 (60.66%) were found to be anaemic of whom 89 (14.8%) had mild, 262(43.7%) moderate and 13 (2.2%) had severe anaemia. This was in concurrence with a study done by Subramanian et al, [12] where 4.8% of adolescent girls had mild, 41.2% moderate and 25.7% had severe anemia. Also, 30.66% of girls and 30% of boys had anaemia in the present study which was similar to a study done by Chauhan S et. Al [13] in which 30.7% of boys had anemia, whereas 62.0% of girls had anaemia.

This study reflected a general trend of anaemia where, anemia was more among late adolescents compared to early adolescents. Among boys, there was decreasing trend of anaemia from early to late adolescence and among girls, prevalence of anaemia increased as the age increased. This could be due to blood loss during menstruation in late adolescent girls. Similarly, prevalence of anemia (52.24%) was high among the late adolescents, as compared to 47.34% among the early adolescents in a study by Chandrakumari, et.al [2] in Tamil Nadu (anemia new 4). Whereas Dharmalingam A et al [14] reported that 63.8% of early adolescents (10-13 years), 59.3% of middle adolescents (14-16 years) and 41% of late

adolescents (17-19 years) were found to be anaemic. Socio-economic status of study participants was significantly associated with development of anaemia in our study. Similar finding was observed in a study done in Gujarat by Vaishnav et al [15] in which 92.3% boys and 70.2% of girls belonging to class V socio-economic status were anaemic which was more compared to other adolescents belonging to class IV and above.

Conclusion

Prevalence of anaemia was higher among adolescent girls than boys. The prevalence of

mild and moderate anaemia was higher than severe anaemia among both adolescent girls and boys. Factors like age of the participants, sex, marital status, father's education, mother's education, father's occupation and socio-economic status were significantly associated with anaemia in adolescents.

Recommendations

Screening of adolescents for anemia at regular intervals is recommended so that it can be treated at the right time.

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*All correspondences to: Dr. Deepti Shettar, Assistant Professor, Department of Community Medicine, KLE JGMMMC, Hubballi-580028, KLE Academy of Higher Education and Research, Karnataka, India. E-mail: deepti.shettar@gmail.com