Original Research Article

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Prevalence of anemia in adolescent girls and its association with certain demographic variables: our experience from rural Telangana

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ABSTRACT

Background: Adolescents constitute over 21.4% of the population in India and adolescent girls constitute about 10 percent of the Indian population. This age group needs special attention because of the turmoil of adolescence which they face due to the different stages of development that they undergo, different circumstances that they come across, their different needs and diverse problems. The objectives of the study were to determine the prevalence of anaemia in the study population and to assess the socio-demographic risk factors associated with the anaemia.

Methods: Community based cross sectional study conducted in adolescent girls aged 10 to 19 years, permanently residing in the rural field practice area of Department of Community Medicine, Kamineni Institute of Medical Sciences, Narketpally during September 2010 to September 2012.

Results: Majority of families belong to upper lower socio-economic status (57.7%) according to BG Prasad's classification. Age-wise prevalence of anaemia shows that prevalence of anaemia was highest (69%) in 18 to 19 years age group and least (37.5%) in the age group of 16 to 17 years. Majority of subjects with anaemia were having mild anaemia (80.2%) followed by moderate anaemia (19.2%) and severe anaemia (0.6%) respectively. Highest prevalence (68.1%) was found in joint or extended and least prevalence (56.1%) was found in nuclear families. Highest prevalence (75.0%) in subjects belonging to large family and least (54.5%) with small family.

Conclusions: Prevalence of anaemia was 59% with majority of study subjects having mild to moderate anaemia. Prevalence of anaemia in these girls had a significant association with socioeconomic status of the family.

Keywords: Prevalence, Anemia, Adolescent girls, Demography

INTRODUCTION

Adolescents constitute over 21.4% of the population in India and adolescent girls constitute about 10 percent of the Indian population. This age group needs special attention because of the turmoil of adolescence which they face due to the different stages of development that they undergo, different circumstances that they come across, their different needs and diverse problems.

Menarche further calls for special attention because of the physical and emotional problems associated with it. Though the menstrual cycle is a normal monthly function of a healthy female body, the main concern is delayed menstruation, irregular cycles pertaining to hormonal fluctuations and pain during menses. Unfortunately, the assessment of the nutritional status of adolescent girls has been the least explored area of research, particularly in rural India.²

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Adolescents remain a largely neglected, difficult-to-measure, and hard-to-reach population, in which the needs of adolescent girls in particular are often ignored. Adolescence is a particularly unique period in life because it is a time of intense physical, psychosocial, and cognitive development. Caloric and protein requirements are maximal. Increased physical activity, combined with poor eating habits and other considerations, e.g. menstruation and pregnancy, contribute to accentuating the potential risk for adolescents of poor nutrition.³

The present study is based on the hypothesis that the adolescent girls in rural India have high prevalence of anaemia and they do face all socio-demographic and cultural problems of society, which leads to high prevalence of anaemia.

Objectives

The objectives of the study were to determine the prevalence of anaemia in the study population and to assess the socio-demographic risk factors associated with the anaemia.

METHODS

Study design was community based cross sectional study. Study period of this study was during September 2010 to September 2012 (for a period of two years).

Study population

The adolescent girls aged 10-19 years, permanently residing in the rural field practice area of Department of Community Medicine, Kamineni Institute of Medical Sciences, Narketpally.

Inclusion criteria

Adolescent girls of the age group 10 to 19 yrs, adolescent girls who were residing in the residential area for a minimum period of 6 months, adolescent girls who were willing for their blood testing were included.

Exclusion criteria

Adolescent girls who were terminally ill, adolescent girls who did not give consent, taking prevalence (p) =65%, allowable error (d) =10% of P and q=1-p. Sample size was estimated to be 216.

Data collection methodology

Institutional Ethical Committee clearance was obtained prior to initiation of the study.

To collect data about study population house to house survey was done with all required instruments. Subjects were interviewed in their home and necessary procedures were followed to collect the data. Informed consent was obtained from all the subjects.

Predesigned questionnaire was used to collect information from study population by personal face to face interview during the house to house visit. The questionnaire included socio-demographic variables (age, education, occupation, type of family, family size and socioeconomic status). Information was collected about their dietary habits and about menstrual and personal history. General physical examination was done to assess build and nourishment, conjunctival pallor and any other finding which was followed by systemic examination of subjects.

Weight

The weight was recorded using a standard weighing scale (Krups weighing scale, New Delhi, India) that was kept on a firm horizontal surface. Weight was recorded to the nearest 100 gm. It was checked daily at the beginning by a known weight. The girls were asked to stand on the weighing machine without footwear and the weight was recorded to the nearest to 100 grams.

Height

The subjects were made to stand without foot wear with the feet parallel and with heels, buttocks, shoulders, and occiput touching the wall, hands hanging by the sides. The head was held comfortably upright with the top the head making firm contact with the scale and marking was done with pencil on the wall. The height was measured with measuring tape and recorded.

Haemoglobin

Haemoglobin levels were estimated using Sahli's acid hematin method. After explaining the whole procedure in detail to the subject, pulp of the finger of study subject was pricked under aseptic precautions after cleaning with spirit swab and a drop of blood was allowed to form without squeezing the finger. Blood sample was taken for haemoglobin estimation by pipette followed by preparation of peripheral blood smear on slide for typing of anaemia.

For typing of anemia, a thin peripheral blood smear was prepared on a glass slide, stained with Leishman's stain and examined under high power of microscope. Slide was examined for size and colour density of the RBC's. Expert opinion of pathologist was sought while examining the slides.

Data analysis

Data was entered and analyzed using statistical package for social sciences (SPSS) version 19.0 The results are expressed as proportions. Univariate analysis was done using chi-square test to study the relationship between different variables. Variables were analyzed to find out the association of the correlates with the risk factors, namely, age, fathers and mother's occupation and education, socio-economic status, family size and family type and their significance were estimated in terms of odd's ratio (OR) and its 95% confidence interval. A p value less than 0.05 was considered significant.

RESULTS

Table 1 describes the study subjects according to socioeconomic status, family size and type of family. Majority of families belong to upper lower socio-economic status (57.7%) according to BG Prasad's classification. Most of the families (48.7%) had medium (5 to 7) family size. Most of the families were nuclear family (76.0%).

Table 1: Distribution of study subjects according to socio-demographic characteristics (n=300).

Socio-demographic characteristics	N	Percentage (%)
Socio economic status*		
Upper class	6	2.0
Upper middle	38	12.7
Lower middle	37	12.3
Upper lower	173	57.7
Lower	46	15.3
Family size	·	
Small (1-4)	110	36.7
Medium (5-6)	146	48.7
Large (≥7)	44	14.7
Family type		
Nuclear family	228	76.0
Joint or extended	72	24.0

^{*}B.G. Prasad's socio-economic classification for the month of July 2009.

Table 2: Age-wise distribution of prevalence of anaemia.

Age	Anaer	nia		Prevalence	
(in years)	Yes	No	Total	(%)	
10-11	34	22	56	60.7	
12-13	55	29	84	65.5	
14-15	56	43	99	56.6	
16-17	12	20	32	37.5	
18-19	20	9	29	69.0	
Total	177	123	300	59.0	

P>0.05 not significant; Chi-Sq. value =0.059.

Table 2 depicts the prevalence of anemia. Prevalence of anaemia in our study was found to be 59%. Age-wise prevalence of anaemia shows that prevalence of Anaemia was highest (69%) in 18 to 19 years age group and least (37.5%) in the age group of 16 to 17 years. The difference in prevalence of anaemia between different adolescent age group was not found to be statistically significant.

Table 3: Distribution of anaemia according to severity among adolescent girls (n=177).

Grading of anaemia	No. of subjects	Percentage (%)
Mild (10.1-11.9 gm%)	142	80.2
Moderate (7.1-10 gm%)	34	19.2
Severe (≤7 gm%)	1	0.6
Total	177	100

Table 3 shows that majority of subjects with anaemia were having mild anemia (80.2%) followed by moderate anaemia (19.2%) and severe anaemia (0.6%) respectively.

Table 4: Prevalence of anaemia according to type of family.

Type of	Anae	mia	- Total	Prevalence
family	Yes	No	Total	(%)
Nuclear	128	100	228	56.1
Joint or extended	49	23	72	68.1
Total	177	123	300	59.0

P>0.05 not significant; Chi-Square value=0.07.

Table 4 shows prevalence of anaemia according to type of family. Distribution of prevalence of anaemia according to type of family shows that highest prevalence (68.1%) was found in joint or extended and least prevalence (56.1%) was found in nuclear families.

Table 5: Prevalence of anaemia according to socioeconomic status.*

Socio-	Anaer	nia		Prevalence (%)
economic status	Yes	No	Total	
Lower	34	12	46	73.9
Upper lower	106	67	173	61.3
Lower middle	20	17	37	54.1
Upper middle	16	22	38	42.1
Upper class	1	5	6	16.7
Total	177	123	300	59.0

*B.G. Prasad's socio-economic classification for the month of July 2009. P<0.05 significant, Chi-Square value=0.008; Chi-square for Linear trend 12.76598; p=0.00035 highly significant.

Table 5 shows prevalence of anaemia according to socioeconomic status. Prevalence of anaemia was higher in subjects belonging to socioeconomic class V (73.9%) followed by class IV (61.3%), class III (54.1%), class II (42.1%) and class I (16.7%) respectively. The difference between the groups was found to be statistically significant.

Table 6: Prevalence of anaemia according to family size.

Family	Anae	mia	Total	Prevalence
size	Yes	No	Total	(%)
Small (1-4)	60	50	110	54.5
Medium (5-6)	84	62	146	57.5
Large (>7)	33	11	44	75.0
Total	177	123	300	59.0

P>0.05 not significant; Chi-Square value=0.058.

Table 6 shows prevalence of anaemia according to family size. Distribution of prevalence of anaemia according to family size shows highest prevalence (75.0%) in subjects belonging to large family and least (54.5%) with small family.

DISCUSSION

Table 2 depicts prevalence of anemia. Prevalence of anaemia in our study was found to be 59%.

Age-wise prevalence of anaemia shows that prevalence of Anaemia was highest (69%) in 18 to 19 years age group and least (37.5%) in the age group of 16 to 17 years.

The difference in prevalence of anaemia between different adolescent age group was not found to be statistically significant.

Our study findings regarding prevalence of anaemia among adolescent girls was consistent with studies done by Kaur et al and Binay et al where they have observed prevalence of anaemia found to be 59.8% and 68.8% respectively.^{4,5}

However, Vitull et al, Meenal et al and Sharda et al have reported higher prevalence of anaemia with figures of 87%, 90.1% and 70.57% respectively.⁶⁻⁸

Rawat et al and Rajaratnam et al have observed low prevalence of anaemia with figures 34.5% and 40.7% respectively. 9,10

Age-wise distribution of anaemia in our study where in highest prevalence was found in age-group of 18 to 19 years and lowest prevalence in 16 to 17 years was not consistent with the studies done by Sharda et al and Binay et al.^{5,8}

Sharda et al reported that highest prevalence of anaemia was found in 15 to 16 years.⁸ Binay et al reported maximum prevalence in the age group 11 to 12 years and least prevalence in the age group 14 to 16 years.⁵

Table 3 shows grades of anemia in our study. Majority of subjects with anaemia were having mild anemia (80.2%) followed by moderate anaemia (19.2%) and severe anaemia (0.6%) respectively. Our study findings are

comparable with Vitull et al and Sanjeev et al where prevalence of anaemia was found to be 67.1% and 69.2% respectively.^{6,11} However, Rawat et al, Kaur et al and Siddharam et al have reported low prevalence of mild anaemia with figures of 55.2%, 38.4% and 40.14% respectively.^{4,9,12}

A study by Siddharam et al on adolescent girls in rural area has found that mild anaemia, moderate anaemia and severe anaemia was seen in 40.14%, 54.92% and 4.92% of cases respectively.¹²

Another study by Sanjeev et al revealed that 69.2% of cases had mild anaemia and 30.8% of cases had moderate anemia and no subject had severe anaemia.¹¹

Vitull et al has found in their study in rural Punjab on adolescent girls that 67.1% had mild anaemia, 19.0% had moderate anaemia and 0.9% had severe anaemia among anemic subjects in 10 to 19 years age group.⁶

In a study by Rawat et al in rural Meerut the proportion of subjects with mild, moderate and severe anaemia were 55.2%, 40.8% and 4.0% respectively.⁹

Kaur et al in their study on adolescent girls of rural Wardha have found that the proportion of subjects with mild, moderate and severe anaemia were 38.4%, 20.8% and 0.6% respectively.⁴

Table 5 shows prevalence of anaemia according to family size in our study. Our study finding was consistent with study done by Kaur et al.⁴

Kaur et al in their study on adolescent girls of rural Wardha found that the prevalence of anaemia to be higher in grade V (73.4%) followed by grade IV (65.1%), in grade III (55.0%) and in grade I (41.7%). our study findings were comparable with this study respectively.⁴

CONCLUSION

In this study on adolescent girls of rural area, the prevalence of anaemia was 59% with majority of study subjects having mild to moderate anaemia. Prevalence of anaemia in these girls had a significant association with socioeconomic status of the family. Prevalence of anaemia in these girls had a significant association with small and medium size families.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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