Original Research Article

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Study of prevalence of anaemia and its socio demographic co-relates among adolescent girls of Bhopal city

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ABSTRACT

Background: The present study was planned to assess the prevalence of anemia and study its socio-demographic correlates among adolescents' girls of 10-19 years in Bhopal city (M.P).

Methods: The study was conducted as a community based cross-sectional study on 640 adolescent girls residing in selected ward and willing to participate in the study. Detailed history as mentioned in questionnaire was obtained. Assessment of the anemia status was carried out using Hemoglobin Color Scale (HCS). Descriptive statistics and inferential statistics chi square test were used for the inferential statistics. P<0.05 was considered statistically significant. **Results:** Prevalence of anemia among adolescent girls was 72.8%. Anemia was found to be highly significantly associated with education and occupation of parent's, socio economic status and BMI (p<0.05). Also, anemia was significantly associated with birth order, amount and days of menstrual blood flow (p<0.05)

Conclusions: Anemia is highly prevalent in adolescent girls. Evidence suggests that there is need to emphasize on corrective measures for anemia in adolescent girls of 10-19 years before they enter adolescence so as to compensate the additional requirement for growth and development during puberty and combat the extra losses during menstruation.

Keywords: Anemia, Adolescent girls, Risk factors, Socioeconomic status

INTRODUCTION

Anemia, a global public health problem is the most common deficiency disorder among other micronutrients deficiencies and considered as a manifestation and not a disease: it affects not only just the health but also the education, economy and productivity of the affected country. Anemia can be observed in individuals of all age group but is commonly observed in adolescent girls. The higher prevalence of anemia in adolescent girls has been attributed to rapid growth, increased demand of iron. Also, in a family with limited resources, the female child is more likely to be neglected. She is deprived of good food and education, and is utilized as an extra working hand to carry out the household chores. The added burden of

menstrual blood loss, normal or abnormal precipitates the crises too often.³

NFHS 4 estimates anemia in approximately 53% women aged 15-49 years in India whereas the prevalence of anaemia in women aged 15-49 years in Madhya Pradesh is estimated to be 52.5%.⁴ A cross sectional study in Bhopal by Kakkar documented 58.4% prevalence of anaemia among adolescent school girls.⁵ Anemia not only affects the current health status of girls but also has deleterious effects in future pregnancy that puts the women at three times greater risk of delivering low birth weight and nine times higher risk of perinatal mortality, thus contributing significantly for increased infant mortality rate and 30% maternal deaths.⁶

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As compared to the vast amount of work which had been done on anemia in pregnant mothers and young children, there were relatively few published studies on the prevalence of anemia and its socio-demographic correlates among adolescent girls. Also, the available information is needed to be updated from time to time for its better control and management. The present study was therefore planned to assess the prevalence of anemia and study its socio-demographic correlates among adolescents' girls of 10-19 years in Bhopal city (M.P). Our study also aimed to create awareness regarding anemia and iron rich food among family members of survey group.

METHODS

The present study was conducted as a community based cross-sectional study on adolescent girl during the study period of 18 months i.e. 1st June 2018 to 20th November 2019. Sample size was estimated by taking the prevalence of anemia according to NFHS-4[4] which was 52.5% in M.P. The formula used for sample size calculation was n=4pq/L2 (where p= proportion of anemia; q=1-p; L= relative precision (10% of P). Using this formula sample size of 314 was derived, however, to make the study more precise double of the sample size was taken for study ie.640. All the girls aged 10-19 years residing in selected ward and willing to participate in the study were include whereas girls not available for interview on account of absence or door locked, girls suffering from chronic and systemic disease, girls with behavioral problem and not willing to participate in the study were excluded from the study. The study was conducted at ward number 63 of Bhopal city which was selected using simple random sampling. Enlisting of all the houses in selected ward was done and desired study participants were selected by systemic random sampling till the required sample was achieved.

After obtaining ethical clearance from Institutional Ethics Committee, written consent and assent was obtained from the parents and adolescent girls respectively. A detailed history was gathered which included socio demographic details, history of any chronic illness, socio-demographic characters, menstrual history and presenting complaints. Quantitative survey of diet pattern by 24hrs recall was carried out to assess the estimated calorie and iron intake. In this the quantity of food consumed by the respondents in terms of household measures (cup, spoons, ladles, serving spoons, katories, plates etc) was recorded. These were later converted into metric weight and the nutritive value was calculated using food consumption table (Nutritive Value of Indian Foods, Gopalan, 2004).[7] The subjects were examined clinically to find out other signs of deficiency. Anthropometric measurements such as height and weight were obtained. Assessment of the anemia status was carried out by hemoglobin estimation which was done by the Hemoglobin Color Scale (HCS), an ingenious and validated strip method. Hemoglobin color scale kit comprises of a small card with six shades of red representing values of Hb levels at 4, 6, 8, 10, 12, and 14gm/dl respectively. A drop of blood, collected by finger prick with sterile, disposable lancet supplied, after cleaning the finger with spirit swab, was placed on test strip provided and waited for 30 seconds. Then the color of the blood spot was matched against one of the hues on the scale and severity was graded as per WHO standard.

Statistical analysis

The collected information was compiled, tabulated and analyzed for results using statistical package for social sciences (SPSS) Version 20 statistical software. Descriptive statistics and inferential statistics –chi square test was used for the inferential statistics. P value less than 0.05 was considered statistically significant.

RESULTS

In present study, 640 adolescent girls of 10-19 years of age were enrolled with mean age of 14.7 ± 2.7 years.

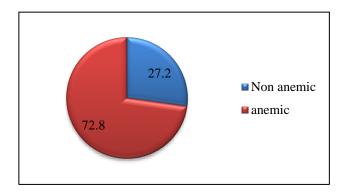


Figure 1: Distribution of study subjects as per hemoglobin concentration.

Overall, out of 640 girls 466 (72.8%) were anemic. 174 (27.2%) were non anemic. The mean hemoglobin was 9.95 gm/dl with SD of 1.77. Amongst the 466 anemic girls, 47.9% suffered from mild anemia 43.3% from moderate anemia and 8.8% from severe anemia.

Our study observed that as the age increases, the prevalence of anemia decreases. In present study, a statistically significant association of anemia with lower age, lower educational status of mother and father, father or mother engaged in unskilled work and upper lower socioeconomic class was observed (p<0.05).

Anemia in adolescent girls was significantly found to be more amongst those girls with birth order 5 or more (89.2%). Similarly, anemia was significantly associated with low BMI, heavy menstrual blood flow (p=0.004) and higher number of days of blood flow (p=0.027). However, no such association was observed with other risk factors (p>0.05).

Table 1: Association of anemia with sociodemographic variables.

Sociodemographic variables		Anemic (n=466)		Non anemic (n=174)		
		n	%	n	%	P value
Age	10-13	180	77.9	51	22.1	_
	14-16	152	72.4	58	27.6	0.048
	17-19	134	67.3	65	32.7	
Religion	Hindu	430	73	159	27	0.91
	Muslim	32	71.1	13	28.9	
	Others	04	66.7	02	33.3	
	Primary	415	76.3	129	23.7	
Father's education	Intermediate	35	51.5	33	48.5	0.001
	Graduate	16	57.1	12	42.9	
	Primary	286	78.6	78	21.4	
Mother's education	Intermediate	165	65.7	86	34.3	0.001
	Graduate	15	60	10	40	
Father's occupation	Unemployed	07	77.7	02	22.3	
	Unskilled	235	81.2	54	18.8	
	Semi-skilled	71	71	29	29	0.001
	Skilled	56	70.8	23	29.2	
	Shop owner	80	60.2	53	39.8	
	Semi professional	08	57.1	06	42.9	
	Professional	09	56.25	07	43.75	
	Unemployed	213	77.2	63	22.8	
	Unskilled	188	75.8	60	24.2	
Mother's occupation	Semi-skilled	37	50.7	36	49.3	
	Skilled	14	63.6	08	36.4	0.001
	Shop owner	12	75	04	25	
	Semi professional	01	50	01	50	
	Professional	01	33.3	02	66.7	
Socioeconomic status	Lower	11	73.3	04	26.7	0.001
	Upper lower	307	78.7	82	21.3	
	Lower middle	113	65	61	35	
	Upper middle	35	60.3	23	39.7	
	Upper	04	50	04	50	
Type of family	Nuclear	392	74.8	132	25.2	
	Joint	61	64.2	34	35.8	0.053
	Three generation	13	61.9	08	38.1	

Table 2: Association of anemia with risk factors.

Risk factors		Anemic (n=466)		Non anemic (n=174)		Davolaro
		n	%	n	%	P value
	1-2	281	70.4	118	29.6	0.04
Birth order	3-4	152	74.5	52	25.5	
	≥5	33	89.2	04	10.8	
Menarche	No	154	76.6	47	23.4	0.14
Wienarche	Yes	312	71.1	127	28.9	
Diet	Vegetarian	163	73.1	60	26.9	0.91
Diet	Mixed	303	72.7	114	27.3	
	<18.5	242	82.9	50	17.1	0.001
BMI	18.5-24.99	191	65.9	99	34.1	
	≥25	33	56.9	25	43.1	

Continued.

Risk factors		Anemic (n=466)		Non anemic (n=174)		P value
		n	%	n	%	r value
Regularity of menstrual cycle	Regular	244	71	100	29	0.90
	irregular	68	71.6	27	28.4	0.90
Intermenstrual interval (days)	<21	40	78.4	11	21.6	
	21-35	236	71.1	96	28.9	0.27
	>35	36	64.3	20	35.7	
Amount of blood flow	Scanty	49	61.3	31	38.7	0.004
	Moderate	232	71.4	93	28.6	
	Heavy	32	91.4	3	8.6	
Blood flow (days)	<3	36	72	14	28	0.03
	3-5	197	67.5	95	32.5	
	>5	80	81.6	18	18.4	

DISCUSSION

India is home to nearly 113 million adolescent girls between the ages of 11 and 18 years. An estimated 52% women in India were anemic according to NFHS-4.4 In the present study 640 study subjects were included. Prevalence of anemia in the present study was found out to be 72.8%. WHO classified countries with respect to public health significance of anemia based on prevalence estimated from blood hemoglobin levels. Anemia prevalence of more than 40% was considered as of severe public health significance.8 Further in our study mild, moderate and severe anemia was observed in 47.9%, 43.3% and 8.8% cases respectively. These findings were similar to findings of Verma et al in which the authors documented mild anemia in 55.2%, moderate anemia in 44.9% and severe anemia in 0.6% cases. In our study high prevalence of severe anemia was found due to the difference in the study setting and more girls in the lower socio-economic class.⁹ Also the high prevalence of moderate and severe anemia observed in present study could be attributed to higher proportion of underweight girls in the study.

However, Melwani et al documented anemia 57.65% adolescent girls, of which 34.7% girls had mild anaemia, 44.9% girls have moderate and 20.4% girls had severe anaemia. 10

In our study, anemia was more prevalent (77.9%) in the younger age group of 10-13 years as compared to 72.8% observed in the older age group and it was statistically significant (p=0.048). Similar findings were reported by Kakkar et al in which level of anemia was significantly higher (p< 0.05) in early adolescent (10-13years) age group as compared to 58.3% in middle (14-16 years) and 48.7% in late adolescent (17-19 years). Biradar et al however documented higher prevalence of anemia among the late adolescents i.e. 60%, whereas it was 38.9% among the early adolescents (p<0.05). Higher prevalence in younger age group in this study could be due to malnutritional status indicated by higher proportion of underweight girls in the study.

In present study, prevalence of anemia was seen to be significantly associated with parental education as well as

occupation i.e. low level of education and unemployment was associated with anemia (p<0.05). Similar results i.e. significant association between parental education and anemia in adolescent girls was found in studies conducted by Rawat et al and Chaudhary et al in both rural and urban setting respectively.3,12 Kulkarni et al documented that anemia was less prevalent in girls whose mother were engaged in Service or business as compared to the girls with mothers as housewives or laborers. 13 Mothers who were earning may be able to spend better on food and nutrition. However, Kuldeep et al found no significant association between parents occupation and anemia in adolescent girls.¹⁴ In present study, anemia was significantly observed in higher proportions of girls belonging to the Lower (73.3%) and Upper lower (78.7%) class of the Kuppuswamy scale (p<0.01). Our study findings were supported by findings of Kaur et al which the authors observed increased likelihood of anemia in girls of lower socio economic status. ⁶ Similarly Deshpande et al found that 43.3% in class I and 83.3% in class IV and V were anemic.15

Among various risk factors, our study observed statistically significant association of anemia with higher birth order, lower BMI, heavy menstrual flow and more number of days of bleeding (p<0.05). Similar findings were documented in a study by Sachan et al where overall prevalence of anemia was highest (60.9%) among girls of birth order three or four but the association was not significant. 16 This could be due to dilution of the household resources and also the poor attention given by the mothers. Pattnaik et al in their study in two villages of Odisha, found that 49% of the girls were below the 5th percentile and 51% of the girls were in the normal range of BMI i.e. 5th to 85th percentile for girls Anemia was found to be significantly higher in girls with under nutrition i.e less than 5th percentile of BMI for girls (p=0.024). This is similarly, Gupta A et al showed higher (60.9%) prevalence of anemia in underweight as compared to normal weight or overweight children although it was not found to be statistically significant. It was evident from our results that a significant proportion of apparently healthy children suffered from anemia.¹⁸ The rising trend of consuming snack and junk food which supply empty calories were also responsible for children being anemic. Adolescents belong

to vulnerable group and efforts should be done to provide adequate nutrition to them.

In our study anemia was more prevalent (91.4%) in girls who had heavy menstrual blood flow and, in those girls, (81.6%) whose period lasted for >5 days. while no association of anemia was seen in girls with the regularity of cycle or the intermenstrual duration. Similar results were seen in a study by Goel et al where significantly higher prevalence was seen in a group of females that had menstrual problems like mennoraghia, polymenorrhea and irregular menstrual cycle. ¹⁹ A significant association was found between anemia and excessive menstrual bleeding in a study done by Pattnaik (p< 0.001). ¹⁷

CONCLUSION

Based upon the findings of present study it could be concluded that anemia is highly prevalent in adolescent girls. Younger age group, low parental education and low socioeconomic status, malnutrition was significantly associated with anemia. Similarly, higher birth order, amount and days of menstrual blood flow predispose adolescent girls for anemia. Evidence suggests that there is need to emphasize on corrective measures for anemia in adolescent girls of 10-19 years before they enter adolescence so as to compensate the additional requirement for growth and development during puberty and combat the extra losses during menstruation.

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Institutional Ethics Committee

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