Original Research Article

A study of anemia prevalence and its socio-demographic characteristics among adolescent girls in Jabalpur District (Madhya Pradesh)

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Abstract

Background – the current research was planned to appraise the prevalence of anemia and its socio-demographic characteristics among adolescent girls in 10-19 years of age group in Jabalpur District (Madhya Pradesh). **Method –** this was a community based cross sectional study conducted among 200 adolescent girls who willing to participate. The age group was 10 to 19 years grouped into two parts, 10- 14 years and 15 to 19 years of age group. As per questionnaire dietary history was taken. As per the Hemoglobin Color Scale (HCS), the assessments of anemia status were carried out. Descriptive statistics and inferential statistics chi square and T test were used for the inferential statistics. P<0.05 was considered statistically significant. **Result-** the prevalence of anemia among the adolescent girls in the age group 10-14 years was 56.4% were as 46% in the age group 15-19 years. Anemia was found highly significant (p<0.05) in relation to education, parents occupation, socioeconomic status BMI etc. in addition to this it is strongly associated with birth order, amount and days of menstrual blood flow (p<0.05). **Conclusion-** In adolescent girl's anemia is highly prevalent. Logistic regression reveals that low education, low nutritional intake, occupation, heavy blood flow during menses etc are strongly associated with anemia in 10-19 years of girl's age group.

Keywords- Anemia, Adolescent girl, Socio-economic status.

Introduction

One of the major health challenges to global development in this country is the rapid rice of nutritional disorder 'Anemia' in adolescent population[1]. The whole world is the house of 1.2 billion individuals aged between 10-19 years[2]. In India, an adolescent constituent about 25% of the total population. This group of population forms an important physiological group which nutritional needs demands special attention[3].

Adolescence is a significant period of human growth and maturation, when a unique change occurs along with huge adult patterns are established[4]. The high prevalence of anemia in adolescent girls has been attributed to rapid growth, increased demand of nutrients including high iron[5]. In India due to a family with limited resources, the female child is more likely to be neglected. The female child is deprived of good food, education, health etc. she is utilized as an extra working hand to carry out the household chores[6]. Increased nutritional need at this stage related to fact that adolescent child gain upto 50% of their adult skeletal mass during this period[7]. Iron requirement is very high at adolescent girls stage, because the increased requirements of iron for blood volume expansion is associated with the adolescent growth spurt and the onset of menstruation[8].

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Most of the population of adolescent girls suffers from iron deficiency anemia, due to heavy demand of increased growth and high loss of menstrual blood.NFHS 4 evaluated anemia in approximately 53% women at the age group 15 49 years in India. The prevalence of anemia in women aged 15-49 years in MP is estimated to be 52.5%. Across sectional study in Bhopal by Kakkar documented 58.4% prevalence of anemia among adolescent school girls recently[9]. The iron deficiency anemia not only affects the current health status of girls but also has serious effects in feature pregnancy. The overall effect of this it puts the women at several times greater risk of delivering low birth weight and high risk of perinatal mortality. This leads towards the high contribution to increased infant mortality rate and 30%maternal deaths[10].The prevalence of anemia is disproportionately high in developing countries, mainly due to poverty which leads to inadequate diet, certain diseases mainly due to poor hygiene early pregnancy/lactation and poor access of health services[11]. If the iron status can be ensured during adolescence then the control of anemia in pregnant women may be more easily achieved[10,11].Some of the programs for anemia control have been targeted adolescent girls and health care of adolescent girls all over the world has not been given priority[12]. The PCD/OMNI/USAID consultation concluded that "iron supplementation" resulted in significant improvement in school measurement of verbal and other measurable skills among the primary school children and adolescent[13].In MP National Family Health Survey (NFHS-3) reveals the prevalence of anemia to be 52-88% in adolescent girls, 82.6% in children, 57.9% in pregnant women and 24% in adult men[14]. As compared to the vast amount of work which had to be done on anemia in pregnant mother and adolescent girls, there were

comparatively few published. Research on the prevalence of anemia and its socio-demographic correlation among the adolescent girls. In addition to this for the better control and management the available information is needed to be updated time to time. The current study is therefore planned according to prevalence to assess the socio-demographic correlations among the adolescent girls within 10-19 years of age group in Jabalpur city (MP). Our study also aimed to create awareness regarding anemia and importance of iron rich food among the family members of serve group.

Material & Methods

The study has been conducted in rular areas of Belkara block of Jabalpur district (MP). Current research was accomplished as a community based cross sectional study on adolescent girls at the age group of 10-19 years. The study duration was 12 months.

Sample size

The **s**ample size was taken based on total population of PHC Belkhera approximately 23% is the adolescent population. The sex ratio in PHC Belkhera is 927:1000. After taking the prevalence of anemia as 60% the sample size was estimated by using the formula,

$$N = \frac{4pq}{LxL}$$

P = (Positive character)

Q = 1-P

In this case P = Prevalence

Q = 100-P

L = Allowable error

Using this formula sample size of 200 was derived; by systemic random sampling all the subjects were selected, till the required sample was getting achieved.

Inclusion Criteria

All the adolescent girls within the age group 10-19 years in selected wards and willing to participate were included in the study.

Exclusion Criterion

Girls who were not available for interview on account of absence or door locked, girls who are suffering from chronic and systemic diseases, girls with behavioral problem and girls who were not willing to participate in the present study were excluded.After obtaining ethical clearance from Intuitional ethics committee, written consent and assent was obtained from the girls and the parents respectively. A detailed history was collected which includes socio-demographic details, history regarding chronic illness, sociodemographic characters, menstrual history and any complains etc. regarding the diet pattern, 24hrs recall was estimates by quantitative survey to assess the estimated calorie and iron intake. The quantity of food consumed by the respondents was recorded in terms of household measurements (like spoon, cup, plate, katories etc). After that these were converted into metric height. The nutritive value was measured by using food consumption table. The all subjects were examined clinically to find out other signs of deficiency.

Statistical Analysis

The information collected was compiled, tabulated and analyzed for results. Descriptive statistics and inferential statistics- chi square test and T test were used for the inferential statistics. P value P<0.01 was considered statistically significant.

Result

In the current study 200 adolescent girls within the age group 10-19 years were enrolled within two groups, one is 10-14 years of age and second is 15-19 years of age group.

Assessment of Anaemia

Certain clinical signs, such as pallor of skin, conjunctival pallor, nail bed pallor, oral mucosa pallor, palmer crease pallor, spoon shaped nail bed blanching with or without oedema are taken as the features of an anaemic patient which was followed by Hb (g/dl) estimination.

Anaemia

Cut off level of Hg (g/dl) for anaemia in adolescent girls was taken as12g/dl

Table-1: Distribution of Anaemia in adolescent girls according to its Severity

Severity	Hb Range (gm%)
Mild	10-12
Moderate	7-10
Severe	<7

Table -2: Age wise Distribution of Anaemia in Adolescent Girls

Age Group (Years)	Anaemia -nt		Anaemia +nt		Total	
	No	%	No	%	No	%
10-14	54	(43.5)	70	(56.4)	124	(62)
15-19	41	(54)	35	(46)	76	(38)
Total	95		105		200	

Chi square test= 2.043, df=1,P=.153

In the present study population out of 200 girls 62% were in the age group of 10-14 and 38% were in 15-18 years of age group. As shown in table-2 the prevalence of anaemia in age group 10-14 years was 56.4% as compared to 46% in age group 15-19 years. However this difference in prevalence of anaemia in relation to age of adolescent girls was not found to be statistically significant (p=.153).

Table-3: Distribution of Anaemia in adolescent girls according to their Birth Order

Birth Order	Anaemia-nt		Anaemia +nt		Total	
	No	%	No	%	No	%
1	56	(63)	33	(37)	89	(44.5)
2	15	(41)	21	(59)	36	(18)
3	19	(35)	35	(65)	54	(27)
4+	7	(33)	14	(67)	21	(10.5)
Total	95		105		200	

Chi -square test= 17.796 , P<0.0001,OR=3.543

Table no 3 shows that prevalence of anaemia in adolescent girl's was found statistically significant (p<0.0056) amongst those girls with birth order 4 or more (67%), followed by 3rd order(65%), 2nd order(59%) and 1st order(37%) etc.i.e. these percentage indicates that, girls with higher birth order are either not getting proper nutritious food or they are not getting proper care as compare to other family members.

In addition to this low educational status, parents are engaged in unskilled work, low BMI, heavy menstrual blood flow (80%) during menses compared with girls with normal menses (47%). This difference was found to be statistically significant (P<0.02).

Table -4: **Association of anemia with sociodemographic variables**

N= number of subject

Sociodemographic variables		Anemic N=	%	Non anemic N=	%	P Value
Age	10-14	70	56.4	54	43.5	P<0.153
	15-19	35	46	41	54	
Religion	Hindu	91	53.5	79	46.5	P<0.643
	Muslim	10	43.5	13	56.5	
	Jain	4	57	3	43	
Father education	Illiterate	31	51	30	49	P<0.098
	Primary	28	53	25	47	
	High school	10	45	12	54.5	
	Intermediate	4	50	4	50	
mother education	Illiterate	42	68	20	32	P<0.003
	Primary	27	55	22	45	
	High school	15	44	19	56	
Father Occupation	Service	6	25	18	75	P<0.0056
	Business	15	37.5	25	62.5	
	Agricultural	43	57.5	32	42.7	
	Labourer	41	67.2	20	32.7	
mother Occupation	Housewife	60	59.5	41	40.5	P<0.05
	Working	45	45.5	54	54.5	
Socioeconomic status	Upper class	0	0	0	0	P<0.001
	Upper middle	0	0	0	0	
	Middle	7	25	21	75	
	Lower middle	11	33	23	67	
	Lower class	87	63	51	33	
Type of Family	Nuclear	46	42.2	63	57.7	P<0.001
	Joint	59	64.8	32	35.1	

Table -5: Association of Anemia with risk factors

Risk factors		Anemic N=	%	Non anemic N=	%	P Value
Birth order	1	33	37	56	63	P<0.0001
	2	21	59	15	41	
	3	35	65	19	35	
	4	14	67	7	33	
Menarche (years)	11	16	62	10	38	P<0.76
	12	48	52	45	48	
	13	33	48	30	52	
	14+	8	47	9	53	
Diet	Veg	59	59.5	40	46	P<0.05
	Mixed	46	54.5	55	54	
Duration of menses (days)	1-3 days	56	47	63	53	P<0.04
	3-5 days	49	60	32	40	
Amount of blood flow in menses	Normal	77	47	88	53	P<0.001
	Excessive	28	80	7	20	

Discussion

Nutritional deficiency anemia is a widely spread disease globally. Especially the prevalence is high in developing countries[14,15]. In India approximately 113 million adolescent girls are between the age group of 11-18 years. 52% women's in India were anemic according to NFHS-4[1,16,17]. In our study 200 subjects were included. The prevalence of anemia was found 56.4% in age group 10-14 years & 46% in 15019 years of age group. According to NFHS-3 prevalence of anemia in Madhya Pradesh reveals to be 52-88% in adolescent girls, 82% in children and 58% in pregnant women's[17].

WHO classified various countries with respect to public health significance of anemia based on prevalence of estimated blood Hb levels. More than 40% anemia prevalence was considered as severe public health significance[1,14,15,17].

In our study we analyzed that about 54.4% mild, 42.8% moderate and 2.8% were severe anemia. Our finding are in accordance with Shweta Shrivastava et al and Anil Kumar et al who documented mild 48%, moderate 43% and severe 8.8% respectively[1,3]. In our research there was high prevalence of mild and moderate anemia was observed could be attributed to high proportion of underweight girls in the study. The adolescent stage is the period of rapid growth, requires sufficient intake of energy and other nutrients. This is the period of sexual maturation and to achieve the full potential for growth and physical work capacity. But due to low socioeconomic status, low education and lack of nutrition leads towards anemia.

In our research anemia is more prevalent (56.4%) in a 10-14 age group whereas 46% in an age group 15-19 years of adolescent girls. Our results are correlate with Abhilash S C et al and Amal Jamee et al that, anemia prevalence rate spreads a wide ranges from 21% to 61% among the age group of 10-14% years. High prevalence in younger age group in our study could be due to malnutritional status indicated that, there was high proportion of underweight adolescent girls in the study[15,16].As per the socioeconomical status in our study it has been observed that, the prevalence of anemia was highly significantly associated with parental education, their occupation and living status. The low education and unemployment was strongly associated with

anemia ($p<0.05$). As per the study of Shweta Shrivastava et al, Pattanaik S et al, Rawat CMS et al, reveals that very high prevalence of anemia in adolescent girls of illiterate or just literate mothers. Anemia was less prevalent in girls whose mother were engaged in business or service as compared to adolescent girls mother as labourer or became housewife[1,2,18]. This indicates that the earning mother might be able to spent better on food and look after better nutrition. In our study, there was strong association found in high proportion of adolescent girls in both age groups related to socioeconomic status. Belongs to lower class 69%, lower middle class was 17% and middle class was 14% ($p<0.0001$). There was no anemic population belongs to upper class which shows inverse association between socioeconomic status and prevalence of anemia. It might be because of better availability of high quality food with better socioeconomic status.In addition to this, there are various risk factors leading towards the anemia. Among the various risk factors in our study we analyzed that, there was statistically significant correlation of anemia ($p<0.005$) with higher birth order, BMI, very heavy menstrual blood flow etc. such finding are may be due to dilution of the household resources and poor attention giver by mothers. Our outcomes are in favor of Pattnaik et al and Anil Kumar et al that, 49% of the girls were below 5^{th} percentile and 51% were in normal BMI. The anemia was found to be significantly higher in girls with under nutrition i.e. less than 5^{th} percentile of girls BMI[2,3]. In addition to this all sociodemographic characteristics and risk factors, the forthcoming trend of consuming junk food, snacks, high fried food etc. which provides empty calories. These all factors are also responsible for anemia. The adolescent child belongs to 10-19 age group should get proper nutrition to prevent anemia. In our study anemia was more prevalent in girls with excessive menstrual bleeding ($p<0.05$) i.e. 80% as compared with normal bleeding (47%). Very high proportion was found in girls with blood dyscrasias[1,2,16,17]. Our study shows that 55.5% of adolescent girls not eating iron rich food and due to this reason the prevalence of anemia is high in them ($p<0.001$). These results are in accordance with other researchers that, the diet survey among the adolescent girls reveals a poor intake of green leafy vegetables, fruits, and iron rich food etc. were met only marginally folate requirements [1,2,3,17].

Conclusion

The 56.4% prevalence of anemia at the age group of 10-14 years and 46% in the age group 15-19 years of adolescent girls in the Jabalpur district (MP) is a public health concern. Based on our study findings it could be concluded that, low parental education, malnutrition, unemployment, low socioeconomical status families etc were strongly associated with anemia in this age group. In addition to this H/O excessive menstrual bleeding, high birth order, low menstrual hygiene leads towards the anemia. Evidences suggest that, it can be corrected by intensive nutrition education, awareness by health care providers. There is a need to emphasize on corrective measures for prevention of anemia in adolescent girls of 10-19 years of age group. Additional nutritional supplementation may compensate the requirement for growth and overall development during puberty and combat the extra loss during menses.

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