Prevalence of Anemia among Adolescent Girls in Rural Population of Rajnandgaon, Chhattisgharh, India

Authors
Dr Vineeta Gupta[1], Dr Pravin S. Chavhan[2], Dr S. P. Singh[3], Mr Laxmikant Umate[4]
[1]Associate Professor, Department of Community Medicine, Raipur institute of medical sciences (RIMS)
[2]Associate Professor, Department of Pathology, Raipur institute of medical sciences (RIMS)
[3]Head And Professor, Department of Pathology, Raipur institute of medical sciences (RIMS)
[4]Biastaistician, Department of Community Medicine, Raipur institute of medical sciences (RIMS)
Correspondence Author
Dr Vineeta Gupta
Department of Community Medicine, College building, Third Floor, Raipur institute of medical sciences (RIMS) Raipur
Email: *drvieeitaomar@gamil.com, Mobile No: +91-9793125599*

ABSTRACT
Introduction: *The prevalence of under nutrition and anemia among adolescent girls is alarmingly high in India. Adolescent girls are at a greater risk of reproductive morbidity and mortality. To reduce the burden of anemia in adolescent population Government of India started WIFS scheme for all adolescents girls. This study was planned to assess anemia among adolescent girls of rural areas where WIFS scheme is running. Also to determine the role of sociodemographic variables on its prevalence.*
Materials and Method: *Present study was carried out in two higher secondary schools, in rural Rajnandgaon, Chhattisgharh. A total of 232 adolescent girls studying in standards 9th - 12thwere included in the study.*
A predesigned and pretested schedule was used to collect the information regarding socio-demographic characteristics and other variables. Hemoglobin estimation was done by cyanmethemoglobin method. Statistical analysis was done by mean, standard deviation and chi square test.
Results: *The mean haemoglobin level among adolescent girls was 10.91+1.32g/dl. The prevalence was found as 76.29%. A higher prevalence was noted in 14 - 16 years age group girls as compare to 17 - 19 years girls. The prevalence of anemia was found significantly higher in girls of illiterate or primary educated mothers, of housewives, and those having lowere socioeconomic background.*
Conclusion: *Though currently running programme for health and welfare of adolescent girls has the potential to break intergenerational cycle of malnutrition and deprivation, a further wide - scale approach is needed to address the other causes of anemia as well.*
Keywords: *Anaemia, Adolescent, Girls, Rural Population, Rajnandgaon.*

Introduction

Adolescence is a period of transition from childhood to adulthood. It is characterised by rapid physical, biological and hormonal changes resulting in psycho-social, behavioural and sexual maturation. Adolescence is a period of rapid growth: up to 45 per cent of skeletal growth and 15 to 25 per cent of adult height is achieved

during adolescence. The physical and physiological changes, that occur in adolescence places a great demand on the nutritional requirements and make them more vulnerable to nutritional deficiencies.[1] Adolescent girls constitute a vulnerable group, particularly in developing countries, where they are traditionally married at an early age and exposed to a greater risk of reproductive morbidity and mortality. [2]

Anemia during adolescence affects the growth and development of girls, diminishes their concentration in daily tasks, limits their learning ability, increases their vulnerability to dropping out of school, causes loss of appetite resulting in reduced food intake and irregular menstrual cycles, and reduces physical fitness and future work productivity. Moreover, anemia during adolescence influences women's entire life cycle since anemic girls will have lower pre pregnancy iron stores. As pregnancy is too short a period to build the iron stores required to meet the needs of the growing fetus, women who enter pregnancy anemic are at an increased risk of giving birth to children with a low birth weight (below 2,500 grams), delivering pre-term newborns, and/or dying while giving birth. Additionally, children born to anemic women are more likely to die before the age of one year and be sick, undernourished and anemic, thus perpetuating the intergenerational cycle of maternal and child under nutrition. [1]

According to 2011 census data there are 253 million adolescent in the age group of 10 - 19 years, which comprise little more than one fifth of India's total population.[3] A recent report from UNICEF says that an estimated 56 per cent of adolescent girls in India are anemic, and this amounts to an average 64 million girls at any point in time. Besides inadequate iron consumption, other major causes of anemia are high menstrual blood loss, malaria, and hookworm infestation. [4] Also there are few indirect socioeconomic factors such as illiteracy, poverty, and rural residence that affect anemia. [5]

To reduce the prevalence and severity of anemia in adolescent population (10-19 years) and to combat the gravity of problem, Government of India started distribution of WIFS (Weekly Iron - Folic acid Supplementation) scheme for all adolescents girls under Rajiv Gandhi Scheme for Empowerment of Adolescent Girls also known as SABLA in 2011, and for all adolescents under Rashtriya Kishor Swasthya Karyakram in 2014, all over India.

There are studies describing the status of anemia among adolescents prior to the initiation of program. But no study was undertaken in this region to determine the impact of WIFS on prevalence of anemia among adolescents. So, this study was planned to assess anemia among adolescent girls of rural areas where WIFS scheme is running. Also to determine the sociodemographic variables contributing anemia in adolescent girls.

Materials and Method

Present study was a school based study, carried out in teaching institute of, Rajnandgaon, Chhattisgharh mainly concentrating on rural population. The study was conducted after ethical approval by local ethical committee of our teaching institute. This study was conducted in two higher secondary schools, selected randomly in the catchment area of Rural Health Training Centre of the institute. Permission for conducting the study and suggestion for suitable date was sought from the school administration about 15 days prior to the study. Parents / guardians of the girls were informed of the date, time and nature of study by the school managements. All the adolescent girls studying in standards 9th - 12th, who were present on the days of visit and were given consent to hemoglobin estimation were included in the study. The girls ≥20 years, and those suffering from any chronic disease were not included in the study. A total of 232 girls were interviewed and were investigated for their Hemoglobin concentration.

A predesigned and pretested schedule was used to collect the information about the participants. Information regarding socio-demographic

characteristics and other relevant variables were collected. Hemoglobin estimation was done by cyanmethemoglobin method.

Socio-demographic status was estimated by modified B. G. Prasad's classification. For interprettation of anemia, cut off point for Hemoglobin concentration was taken as <12 gm/dl. The severity of anemia was graded as mild (10 to <12gm /dl), moderate (7 to <10 gm /dl) and severe (<7 gm /dl). [6]

Data obtained was tabulated in MS excel sheet. Statistical analysis was done by mean, standard deviation and chi square test.

Results:

A total of 232 adolescent girls were included in the study. Among them, 59.91% were 14 - 16 years of age, and 40.09% belonged to 17 - 19 years age group. Among mothers of the adolescent girls, 11.21% of mothers were illiterate, 59.48% have completed primary education, and 24.57% have studied up to secondary level education. Only 4.74% of mothers did higher secondary or graduation. Among fathers of the girls, 16.38% were unemployed or unskilled worker, 39.22% were skilled workers, 20. 26% were service holders and 24.14% were having their own business. Educational status wise 40.09% of them have had primary education, 36.64% have studied up to secondary education, 18.97% have gone up to higher secondary level or higher, and 4.31% of them were illiterate. As per modified Prasad's classification and taking consumer price index of April 2015 into consideration, 39.66% of the families belonged to lower socio-economic group and 60.34% of the families belonged to middle socio-economic group. In our study, 60.78% of the girls were belonged to nuclear families, and 39.22% were having joint families.

In the present study, the mean haemoglobin level among adolescent girls was calculated as 10.91+1.32g/dl. The prevalence of anemia among adolescent girls was found as 76.29%. Out of 232anemic girls, 118 girls were suffering from mild degree of anemia and 58 girls were having moderate degree of anemia. Only one girl was found severely anemic. (Table no 1)

Prevalence of anemia was found higher in 14 - 16 years age group girls as compare to 17 - 19 years girls. Also a larger fraction of anemic girls of 14 - 16 years age group were recorded a higher degree of anemia, than their older counterparts. (Table no. 2). The difference was statistically significant. ($\chi 2$ = 7.8236, $p <0.05$).

A higher burden of anemia in younger adolescent girls was also noticed by analysing their age specific mean hemoglobin levels, as shown in table no. 3.The mean Hb level of 14- 16 years adolescent girls was calculated as 10.83 gm % and of 17 - 19 years as 10.94 gm%.

Table 4 shows the correlation of anemia among adolescent girls with different socio-demographic variables. A high prevalence of anemia was found in girls whose mother were illiterate or only primary educated than the girls of mothers with better educational status. Statistically the difference was significant ($p= <0.05$).

A statistically significant difference was also noticed between the prevalence of anemia among girls of working mothers and of housewives. Adolescent girls of working mothers had shown better hemoglobin level in present study. (Table 4) However no significant association was observed between anemia among adolescent girls and their father's educational or occupational status. Likewise type of family (Nuclear or Joint) had not shown any significant association with anemia in present study subjects (Table 4).

Socio- economic status of the study subjects was found very significantly ($p = < 0.001$) associated with the prevalence of anemia . Larger number of adolescent girls belonging to lower socioeconomic status were found anemic as compared to upper socioeconomic status in current study. The difference found was highly significant statistically ($p = < 0.001$) (Table 4).

Table 1 : Prevalence of anemia among adolescent girls (N = 232)

Hb level	No. of girls	%
10 -11.9gm/dl	118	50.86
7 - 9.9gm/dl	58	25
<7gm /dl	1	0.43
Total no. of anemic girls	177	76.29

Table 2 : wise distribution of anemia among adolescent girls

Age	10 -11.9gm/dl	7 - 9.9gm/dl	<7gm/dl
14 - 16 (n= 139)	71 (51.08%)	40 (28.78)	1 (0.72%)
17 - 19 (n=93)	47 (50.54%)	18 (19.36%)	0 (0.00%)
Total (N=232)	118 (66.67%)	58(25%)	1(0.43%)

Table 3 : Age specific mean hemoglobin levels of adolescent girls

Age (years)	No. of girls	Mean Hb	S.D.
14	42	10.77gm/dl	1.227
15	47	10.87gm/dl	1.262
16	50	10.83gm/dl	1.298
17	46	10.93gm/dl	1.385
18	34	11gm/dl	1.253
19	13	10.88gm/dl	1.303

Table 4: Sociodemographic variables - in relation to anemia among adolescent girls

Sociodemographic correlates	No.of girls	anemic girls		X2((Chi-Square)	p value
		No.	%		
Age					
14 - 16	139	112	80.57%	3.5159	0.0608
17 - 19	93	65	69.89%		
Mother's education					
Illiterate	26	19	73.08%	6.4249	0.0403
Primary	138	113	81.88%		
Secondary	57	39	68.42%		
HS or higher	11	6	54.55%		
Mother's occupation					
Working	42	24	57.14%	10.3985	0.0013
Housewife	190	153	80.53%		
Father's education					
Illiterate	10	7	70%	5.4743	0.0648
Primary	93	77	82.79%		
Secondary	85	65	76.47%		
HS or higher	44	28	63.64%		
Father's occupation					
Unskilled worker /unemployed	38	28	73.68%	1.566	0.6671
Skilled worker	91	71	78.02%		
Service	47	38	80.85%		
Own business	56	40	71.43%		
Type of family					
Nuclear	141	113	80.14%	2.944	0.0862
Joint	91	64	70.33%		
Socioeconomic status					
I	0	0		27.3773	< 0.001
II	13	5	38.46%		
III	48	28	58.33%		
IV	79	71	89.87%		
V	92	73	79.35%		

Discussions

Anemia during adolescence influence women's entire life cycle. It also has negative consequences for survival, growth, development of their children later in life. The Government of India has made the adolescent health as a part of RCH package since 1997.

Later to combat the problem, Government of India started Adolescent Girls anemia Control Program with technical support from UNICEF. The main interventions of this program were later continued under the heads of SABLA and WIFS scheme under Rashtriya Kishor Swasthya Katyakram (RKSK). In the base line survey for the program by UNICEF, 65- 99% of adolescent girls were found anemic, at various states of country. [1]

In this study the prevalence of anemia among adolescent girls was observed as 76.29%, which is very close to the observations taken by Rati et al[7] and Patnaik et al[8], who found the prevalence as 80% and 78.8% in their studies in rural areas of Karnataka and Odisha respectively. Though Kaur et al [9] observed anemia prevalencerate as 59.8% in rural Wardha (Maharashtra). Whereas a very high prevalence of anemia (90.1%) was noted by Kulkarni et al [10] in adolescent girls of a urban slum in Nagpur.

In the current study the mean hemoglobin level of adolescent girl was calculated as 10.91gm/dl . In a review article by Bharati et al [11], where they analyzed the data collected during District Level Health Survey (2002 - 2004), the mean hemoglobin level of adolescent girls of Chhattisgarh was quoted as 8.3gm/dL.7 This survey was done before the commencement of Adolescent Girls anemia Control Program and reflects pre-program status of anemia in adolescent girls. This difference shows an increase in mean hemoglobin level among the girls after implementation of the program.

In the present study 66.67 % of anemic girls had mild anemia and only one (0.43%) had severe anemia. Almost similar results were observed in studies done by Kulkarni et al in 2012 [10] and Patnaik et al in 2013 [8], where severe anemia was found in 1.5% and 0.00% girls respectively. This

reflects a better hemoglobin level among study population than the prevalence noted in District Level Health Survey (2002 - 2004) [11], where prevalence of mild moderate and severe anemia was noted as 19.3%, 60.3% and 10.1% respectively. The increase in hemoglobin level results in shift in the prevalence of severe and moderate anemia towards mild one. This increase can be seen by comparing age specific hemoglobin level of girls in current study with DLHS (2002-2004) 11 data. In present study age specific hemoglobin levels for 14 - 19 year girls ranges from 10.77gm/dl to 11 gm/dl while in DLHS (2002 – 2004) [11] data it ranges from 9.79gm/dl to 9.87gm/dl.

In the present study the prevalence of anemia was found significantly higher in girls having lower socioeconomic background. Kaur et al [9] , Patnaik et al [8], and Rati et al [7] also quoted significantly higher prevalence of anemia in girls coming from lower socioeconomic status. DLHS (2002 – 2004) [11] data also reflects similar association.

Like present study Patnaik et al [8] observed a significant association of anemia among adolescent girls with the educational status of their mother, while Kulkarni et al [8] found it associated with mother's occupational status.

Age of the girls has not shown any significant relationship with the prevalence of anemia in this study. Similar findings were observed by Patnaik et al [8], Kaur et al [9] and Kulkarni et al. [10] However Rati et al7 found maximum prevalence of anemia at 14 years of age among the adolescent girls. As far as mean hemoglobin level is concerned an increased level is found in older age group in this study, while Bharati et al [11] quoted a decrease in hemoglobin level with increasing age in adolescent girls.

Conclusion

The prevalence of under nutrition and anemia among adolescent girls is alarmingly high in India. In researches conducted at various states of India, prevalence of anemia among adolescent girls was found as 60% - 90%. In our neighboring country Nepal, the prevalence of anemia (68.8%) among adolescent girls was lower than that of India.[12]

According to WHO / UNICEF the problem of anemia is very high magnitude in a community when prevalence rate exceeds 40%. [13] Even after a decade of implementation of Adolescent Girls Anemia Control Program (AGACP), and widespread coverage of SABLA and WIFS scheme since 2011, though severity of anemia is markedly reduced, the prevalence of anemia is still high among adolescent girls. There are many causes of anemia other than dietary insufficiency of iron, including low absorption of iron in body, overcooking of food, parasitic infection, heavy menstrual blood flow, and malaria. Though, currently running program for health and welfare of adolescent girls has the potential to empower them and to break intergenerational cycle of malnutrition and deprivation, a further wide - scale approach is needed to address the other causes of anemia as well. Only then we can curb this problem and ensure a healthy and vibrant future for the adolescents of today and tomorrow.

References

1. www.Unicef.in/uploads/publication/resour-cs/ pub_doc82.pdf
2. WHO, programming for adolescent health and development. Technical Report Series no. 886, 1999
3. www.nrhm.gov.in/nrhm-components/rmncha/adolescent-health-rksk-background.html
4. Raheena Beegum M. Prevalence of malnutrition among adolescent girls: A case study in Kalliyoor Panchayat, Thiruvanthapuram. Discussion Paper No.35. Thiruvanthapuram, India: Kerala Research Programme on Local Level Development Center for Development Studies, 2001
5. Rawat CMS, Garg SK, Singh JV, et al. Socio-demographic correlates of anemia among adolescent girls in rural area of district Meerut (U.P.). Indian Journal of Community Medicine 2001;26:173–175.
6. World Health Organization. Control of nutritional anemia with special reference to iron deficiency. Technical Report Series No. 580, 1975.
7. Rati SA, Jawadagi S. Prevalence of anemia among adolescent girls studying in selected schools. International Journal of Science and Research.2014; 3(8): 1237 - 1242.
8. Pattnaik S, Patnaik L, Kumar A, Sahu T. Prevalence of anemia among adolescent girls in a rural area of Odisha and its epidemiological correlates.Indian Journal of Maternal and Child Health. 2013;15 (1):1-11.
9. Kaur S, Deshmukh PR, Garg BS. Epidemiological correlates of nutritional anemia in adolescent girls of rural Wardha. Indian Journal of Community Medicine. 2006;31(4): 255-258.
10. Kulkarni MV, Durge PM, Kasturwar NB. Prevalence of anemia among adolescent girls in an urban slum. National Journal of Community Medicine. 2012;3(1):108-111.
11. Bharati P., Shome S., Chakrabarty S. et al. Burden of anemia and its socioeconomic determinants among adolescent girls in India. Food and Nutrition Bulletin, 2009; 30(3): 217 - 226.
12. Shah BK, Gupta P. Weekly vs daily iron and folic acid supplementation in adolescent nepalese girls. Arch Pediatr Adolesc Med. 2002; 156: 131-135.
13. Indicators for assessing iron deficiencies and its strategies for its prevention. Draft based on a WHO/ UNICEF consultation, World Health Organization, Geneva, 1996.