Effect of socio-demographic characteristics on the prevalence of anemia among school going adolescent girls in Lucknow district, India

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Abstract

Anemia is a serious public health concern in most developing countries and the prevalence of anemia is quite high among adolescent girls. A cross-sectional descriptive study was carried out among school going adolescent girls in urban as well as rural schools of the Lucknow district, Uttar Pradesh, India from October 2008 to September 2009 with the objectives of studying the prevalence of anemia and the various socio-demographic characteristics in relation to anemia. Multistage random sampling was used to select the requisite number of girls. A total of 847 school going adolescent girls between 10-19 years of age were interviewed. Information regarding their socio-demographic characteristics was collected and the girls were also examined for presence or absence of pallor for anemia. Statistical analyses were done using percentage, Chi-square test, and odds ratio. The prevalence of anemia was found to be 55.6% and 57.9% in urban and rural school going adolescent girls respectively and significant association of anemia was observed with religion, caste and socio-economic status (p value<0.05). There is need to develop strategies for intensive adult education, nutrition education and dietary supplementation including anemia prophylaxis.

Keywords: Adolescent girls, Anemia, Socio-economic status, Lucknow district, India.

Introduction

Adolescence has been defined by the World Health Organization as the period of life spanning the ages between 10-19 years.[1] Protein energy malnutrition and iron deficiencies are major health concerns in adolescent girls. The common causes include inadequate intake of dietary iron, infectious diseases, deficiencies of micronutrients such as folate, vitamin B12, inherited conditions such as thalassemia and environmental pollutants such as lead.[2] Adolescent girls need extra iron for menstruation in addition to growth and development. Iron deficiency anemia impairs cognitive and behavioral development resulting in reduced school performance.[3] Further, low iron stores throughout childhood may contribute to a delayed menarche and impaired immune response.[4] Anemia in adolescent girls in future attributes to high maternal mortality rate, high incidence of low birth weight babies and high perinatal mortality.[5] In India, anemia is the second most common cause of maternal deaths, accounting for 20% of total maternal deaths.[6] National Nutritional Anemia Prophylaxis Programme (NNAPP) was initiated in 1970 during fourth five-year plan with the aim to reduce the

Practice points

- Anemia is widely prevalent in India and the prevalence of anemia is quite high among adolescent girls.

- The prevalence of anemia in the Lucknow district was 56.3% among school going adolescent girls.

- A significant association of anemia was found with religion and caste.

- Prevalence of anemia was found maximum (64.0%) in adolescent girls who belonged to SES-IV.

- The study provides an indication to implement intensive health education programs and to strengthen anemia prophylaxis programs for adolescent girls.

prevalence of anemia to 25 %.[6] The present study focuses on the prevalence of anemia and its relationship with various socio-demographic factors among school going adolescent girls in the Lucknow district, India.

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Material and methods

The present cross-sectional study was carried out among school going adolescent girls in the Lucknow district, India from October 2008 to September 2009. An optimum sample size of 847 (593 urban and 254 rural) school going adolescent girls aged 10-19 years was obtained by an estimated prevalence of 50% anemia in adolescent girls with a precision of 5% at 95% confidence limit with a design effect of two. Multi-stage random sampling technique was used to select the requisite number of eligible girls.

Lucknow district is divided into urban and rural areas. The urban area is spread equally on both sides of Gomti River known as Cis Gomti and Trans Gomti. According to Nagar Nigam Lucknow, urban area is divided into six zones. From Cis Gomti two zones were randomly selected and similarly from Trans Gomti two zones were randomly selected. From each zone, one senior secondary school was selected randomly from the listed senior secondary schools. Similarly two blocks were selected randomly from eight blocks of the rural Lucknow. From each block, one senior secondary school was randomly selected from listed senior secondary schools. Finally, a total of six senior secondary schools, four schools from urban area and two schools from rural area were selected. Students from classes VI to XII of age group 10-19 years were selected. Students within the class were selected through systematic random sampling. In some schools of rural area, the numbers of students in the classes were not enough; therefore all the students of the class were invited to participate in the study as systematic random sampling was not possible. From the six schools, 593 adolescent girls from urban schools and 254 adolescent girls from rural schools were selected for the study.

Detailed information was collected on a predesigned and pretested proforma about the socio-demographic characteristics in relation to anemia by orally and supplemented with clinical examination. Social class was calculated using modified Kuppuswamy scale[7] in urban area and Pareek scale[7] in rural area. The statistical analysis was carried out using SPSS 16.0. for Windows.

Results

Among the 847 school going adolescent girls, 477 were found to be anemic with a prevalence of 56.3% (Table 1). About 55.6% urban school girls and 57.9% rural school girls were anemic and this difference was statistically insignificant. The prevalence of anemia among Hindu and Muslim girls was 57.8% and 47.5% respectively and this was statistically significant (p<0.05) (Table 2). The prevalence of anemia among urban adolescent girls was 57.1% (odds ratio 4.166) and 49% in Hindu and Muslim girls respectively. Overall prevalence of anemia was highest among Scheduled Caste/Scheduled Tribe school going adolescent girls and was statistically significant (p<0.05).

Overall prevalence of anemia was highest (60.9%) among girls of birth order of three to four. Among urban adolescent girls it was higher (62.8%) in the girls with birth order of three to four while it was more prevalent (59.1%) in girls with birth order of one to two in rural schools. Prevalence of anemia among urban and rural adolescent girls was found more (56.3%) who lived in nuclear families. Among urban school going adolescent girls it was more (56.7%) in girls who lived in nuclear families; however it was found to be more (66.7%) (odds ratio 0.210) in rural adolescent girls who lived in joint families.

Overall prevalence of anemia was found higher (64.0%) in adolescent girls who belonged to socio-economic status (SES)-IV and it was statistically significant (p<0.05) (Table 3). Among urban adolescent girls, it was more prevalent (69.3%) (Odds ratio 0.112) in girls with SES-IV; however in rural school going adolescent girls it was more prevalent in girls with SES-III.

Discussion

The Government of India has made the adolescent health as a part of Reproductive and Child Health (RCH) Package since 1997. The anemia in this age group has been identified as an important health problem by DeMaeyer & Adiels-Tegman[8] followed by further reinforcement at the 1994 International Conference on Population and Development held at Cairo.[9]

The study revealed that the overall prevalence of anemia as 56.3% in school going adolescent girls in the Lucknow district. Findings of the present study are almost in accordance with Kapoor *et al.*[10] (60%), Singh *et al.*[11] (56%), Rana *et al.*[12] (60%) and Seshadri *et al.*[13] (63%). However, Chaturvedi *et al.*[14], Kotecha *et al.*[15] and Agarwal[16] reported a higher prevalence of 73.7%, 74.7% and 47.6% respectively. These differences in the prevalence of anemia may be due to difference in the study area and other associated factors.

Table 1: Prevalence of anemia among school going adolescent girls

Anemi	Urban	Rural	Total	*p*-value
	Adolescent girls (%)	Adolescent girls (%)	Adolescent girls (%)	
Present	330 (55.6%)	147 (57.9%)	477 (56.3%)	
Absent	263 (44.4%)	107 (42.1%)	370 (43.7%)	0.550
Total	593	254	847	

Table 2: Socio-demographic characteristics of anemia among school going adolescent girls

Religion	Urban		Rural		Total	
	Adolescent girls	Anemia Cases (%)	Adolescent girls	Anemia Cases (%)	Adolescent girls	Anemia Cases (%)
Hindu	489	279 (57.1%)	238	141 (59.2%)	727	420 (57.8%)
Muslim	104	51 (49.0%)	16	06 (37.5%)	120	57 (47.5%)
Total	593	330 (55.6%)	254	147 (57.9%)	847	477 (56.3%)
p value	0.135		0.088		0.036*	
Caste						
General	222	124(55.9%)	54	29 (53.7%)	276	153 (55.4%)
OBC	231	120 (51.9%)	114	61 (53.5%)	345	181 (52.5%)
SC/ST	140	86 (61.4%)	86	57 (66.3%)	226	143 (63.3%)
Total	593	330 (55.6%)	254	147 (57.9%)	847	477 (56.3%)
p value	0.204		0.152		0.037*	
Birth Order						
1-2	359	189 (52.6%)	154	91 (59.1%)	513	280 (54.6%)
3-4	180	113 (62.8%)	73	41 (56.2%)	253	154 (60.9%)
=5	54	28 (51.9%)	27	15 (55.6%)	81	43 (53.1%)
Total	593	330 (55.6%)	254	147 (57.9%)	847	477 (56.3%)
p value	0.069		0.887		0.212	
Family type						
Nuclear	501	284 (56.7%)	200	111 (55.5%)	701	395 (56.3%)
Joint	92	46 (50.0%)	54	36 (66.7%)	146	82 (56.2%)
Total	593	330 (55.6%)	254	147 (57.9%)	847	477 (56.3%)
p value	0.235		0.140		0.968	

Key: OBC: Other Backward Class, SC/ST: Scheduled Caste/Scheduled Tribe, *Significant

Table 3: Prevalence of anemia in adolescent girls according to socio-economic status (SES)

SES[†]	Urban		Rural		Total	
	Adolescent girls	Anemia Cases (%)	Adolescent girls	Anemia Cases (%)	Adolescent girls	Anemia Cases (%)
I	24	13 (54.2%)	-	-	24	13 (54.2%)
II	229	100 (43.7%)	10	5 (50%)	239	105 (43.9%)
III	190	113 (59.5%)	152	91(59.9%)	342	204 (59.6%)
IV	150	104 (69.3%)	92	51(55.4%)	242	155 (64.0%)
Total	593	330 (55.6%)	254	147 (57.9%)	847	477 (56.3%)
p value	0.000*		0.695		0.000*	

[†]None of the school going adolescent girls belonged to SES-V, *Significant

In this study, a significant association of anemia was found with religion and caste (p<0.03). The overall prevalence of anemia was greater among Hindu girls 57.1% than Muslim girls (49%) which could be due to the consumption of a vegetarian diet with low bioavailability of iron. It was similar to the findings of Kakkar *et al.*[6] There is a high

prevalence of anemia among girls belonging to scheduled castes (Table 2) which is comparable to the study conducted by Singh[17] with urban population of Meerut City, Uttar Pradesh, India. The reason for this could be due to lack of money, either due to poverty or greater number of children in the family and lack of knowledge about child care practices.

In the present study, the association of anemia with birth order is found to be insignificant while Rawat *et al.*[18] observed a significant association in their study. It is reported that in urban areas, anemia is comparatively less in birth order one or two than birth order 3-4 due to dilution of household resources and mother's attention, as the birth order in the family increases. In rural areas more girls are anemic when the birth order is one or two. This can be explained by the fact that older girls take care of their younger siblings, and in the process ignore their own health status.

A significant association between SES and the prevalence of anemia was also observed (p<0.000) which may be because of availability of high quality food with better SES and may be due to better awareness among parents about the nutritional requirement of girls during the adolescent period. Rawat *et al.*[4] and Chaudhary *et al.*[19] also reported a significant association between SES and prevalence of anemia. In the present study, no significant association was observed with birth order and type of family.

Conclusion

Anemia is a serious public health concern in most developing countries and the prevalence of anemia is quite high among adolescent girls. We identified that more than half of the school going adolescent girls are suffering from anemia. Anemia has many critical health and nutritional implications in adolescent girls, which leads to poor pregnancy outcome, impaired school performance, decreased work productivity and other adverse outcomes.[20] Safe and effective public health interventions are needed to address iron deficiency anemia in adolescent girls. A significant association of anemia with religion, caste and socio-economic status suggests a need to develop strategies for intensive adult education and to improve the socio-economic status of the population through poverty alleviation programs. The study provides an indication to initiate strengthening of anemia prophylaxis programs for adolescent girls including nutritional education. Health education may be useful for improving the health status of adolescent girls and this could be imparted in all the schools with the help of heath personnel, NGOs. The teachers of the

schools should be trained on health education and health promotion.

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