International Journal of Research in Social Sciences
Vol. 6 Issue 9, Month 2016,
ISSN: 2249-2496 Impact Factor: 6.278
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

A CROSS-SECTIONAL STUDY ON SOCIO DEMOGRPHIC CORRELATES OF NUTRITIONAL ANEMIA AMONG RURAL ADOLESCENT GIRLS OF BHILWARA DISTRICT, RAJASTHAN

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ABSTRACT

Anemia is the most widespread nutrition problem in the world and has predominance in developing countries like India, particularly in children, adolescent girls and women. In developing countries it serves as a primary cause for 40% of maternal death either directly or indirectly. World Health report of 2002 identified anemia as one among the top 10 risks for infant mortality, maternal mortality and preterm birth. During adolescence anemia is more prevalent in both sexes due to growth spurt especially in girls where they are exposed to risk of onset of menarche. This stresses the need to investigate the factors associated with the prevalence of anemia. The main objective of this study was to estimate the prevalence of anemia and its socio demographic correlates among rural adolescent girls (10-19 year) of Bhilwara district of Rajasthan. A cross sectional survey was executed among 420 adolescent girls in the age group of 10-19 year of age. Socio demographic variables like age, religion, caste, family type , family size, parental occupation and education and socioeconomic status were studied. Heamoglobin was determined. The result of the study reveals that prevalence of anemia as per the World Health Organization (WHO) recommended cutoff value of hemoglobin, among these adolescent girls was 79.52% with different grades of severity. Significant association of anemia

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was found to be with religion, type of family, mother education and socioeconomic status. There is a need to improve their haemoglobin status through dietary modification along with preventive supplementation and nutrition education. The study 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 nutrition education.

Key Words: Adolescent Girls, Anemia, Socio-Demographic Characteristics, Education.

Introduction

Anemia is a major public health problem worldwide and is often ignored in both developed and developing countries. Preschool children, pregnant women and adolescent constitute vulnerable group of anemia (WHO, 2009). Adolescent is defined by WHO as period of life spanning the age between 10-19 years which is a period where both physical as well as psychological changes occur. During childhood, nutritional needs of boys slightly differ from that of girls. But difference in the nutritional needs widen after the onset of puberty. Iron requirement peek during adolescent due to rapid growth and increase in blood volume. There are about 1.2 billion adolescent in the world, which is equal to $1/5^{th}$ of the world's population and their number are increasing. Out of these, 5 million adolescent are living in developing countries. India's population has reached the one billion mark, out of which 21% are adolescent (Mathur, 2008).

Though this vulnerable period has been focused by existing programs it has to be constantly enhanced to offset the added burden like menstrual loss which precipitates the crises often. In developing countries parasitic infection and other infectious disease are more common which peek the requirement of iron in the body (Barbin et al. 2001). The nutritional anemia in adolescent girls attributes to the high maternal mortality rate, the high incidence of low birth weight babies, high prenatal mortality and the consequent high fertility rates. This phase of life is also important due to ever increasing evidence that the control of anemia in pregnant women can be more easily achieved if a satisfactory iron status can be ensured during adolescent (WHO,1999). About 43% of adolescent deaths are related to pregnancy. Pregnancy during adolescent deprives the girls from achieving their full growth according to their genetic potential

(Pathak et al., 2003). As compared to vast amount of work which has been done in pregnant women and young children, there are relatively few published studies on the prevalence of anemia among adolescent girls. The data on the prevalence of anemia among the rural adolescent is scarce, particularly in a rural community setup. Meaningful program cannot be implemented without sufficient data.

Though this study has been planned to highlight the burden of anemia among adolescent girls and study the socio demographic correlates of anemia among adolescent girls of rural area of Bhilwara district. It will also helpful in drawing recommendation and rendering suggestion to evaluate and enhance the existing Anemia Control Program.

Methodology

The present cross sectional study was carried out among rural adolescent girls (10- 19 years) in Bhilwara district from august 2014 to December 2014. Sample size was calculated for prevalence of anemia among adolescent girl, using the standard statistical formula: $n = (Z\alpha/2)^2 p (1 – p)/d^2$.The estimated prevalence of anemia among adolescent girls as per National Family Health Suyvey-3 data is 56%. At 95% confidence level we used the prevalence of 56% anemia among adolescent girls and margin of error at 5%.This gave a required sample size of 378. A 10% safety margin is added to allow for a maximum estimated non- response, giving a sample size of 420. Bhilwara district is divided into 12 Panchayat samiti. Out of 12 panchayat samiti, one (Suwana Panchayat samiti) was selected for the study. There are 167 Anganwadi centers (AWCs) in Suwana panchayat samiti. Out of 167 AWCs, 21 were selected randomly. Twenty registered adolescent girls from each AWC were selected and invited to participate in the study. A total of 420 adolescent girls were selected.

Detailed information was collected on a predesigned and pretested proforma about the socio-demographic characteristics in relation to anemia. Social-economic status was assessed using Pareek scale for rural area (Sharankumar et al.2013). Heamoglobin estimation was done by Hemo-cue Hb 301 system Kit(Van Schenck et al.1986). Anemia was assessed by WHO criteria of anemia. The statistical analysis was carried out using SPSS 16.0 for windows.

Results

Among 420 rural adolescent girls 334 were found to be anemic with prevalence of 79.52%. the prevalence of mild, moderate and severe anemia among adolescent girls was 55.69%, 37.13% and 07.18 % respectively. Various socio demographic factors which were found to be significantly associated with anemia in adolescent girls have been tabulated in table 1 and 2.

Prevalence of anemia among Hindu girls was highest 91.52 % as compare to Muslims girls (31.94) and this was statistically significant $p<0.05$. Prevalence of anemia was 87.59%among adolescent girls in SC as against 81.36% in OBC and 72.16% in General caste (Table-1). Prevalence of anemia was also found to be significantly higher ($p<0.01$)in those adolescent girls having illiterate (87.68%) and just literate mother (78.5 %)as compare to better literate mothers

Prevalence of anemia was found to be significantly higher (90.62%) in those adolescent girls whose father was working as laborer than those of agriculturers (70.50%).

Prevalence of anemia was significantly higher among adolescent girls belonging to joint family (88.79%) than those belonging to nuclear family (72.84%). A significantly high ($p <0.01$) prevalence of anemia was found in adolescent girls belonging to families having family size >8 members(90.45%), than 86.21% and 41.10% in those girls belonging to families having family size 5-7 members and less than 4 members respectively(Table-2).

Prevalence of anemia was significantly associated with socio economic status ($p< 0.01$). As anemia was higher in socio economic class IV and class V and significantly reduced with rise in socio economic status being minimum in class II (Table-2).

Table-1 Socio-demographic characteristics of anemia among rural adolescent girls

Particular	**Normal**		**Anemic**		**Total**		**χ^2**	**df**	**p value**
	N	**%**	**N**	**%**	**N**	**%**			
Age (years)									
14-16	50	21.37	184	78.63	234	55.71	0.2578	1	0.6116
17 – 19	36	19.35	150	80.64	186	44.28			p<.01 NS

Religion									
Hindu	28	8.48	302	91.52	330	78.57	139.23	2	<.00001 p<.01
Muslim	49	68.06	23	31.94	72	17.44			
Sikh	6	54.55	5	45.45	11	2.62			
Christian	3	42.86	4	57.14	7	1.67			
Caste									
ST	20	29.41	48	70.59	68	16.2	12.279	2	0.006485 p<0.01
SC	17	12.41	120	87.59	102	24.29			
OBC	22	18.64	96	81.36	153	36.43			
GEN	27	27.84	70	72.16	97	23.1			
Education of father									
Illiterate	18	20.93	68	79.07	86	20.93	14.7678	5	0.6775 p<0.01 NS
Can read and write only	18	26.47	50	73.53	68	16.43			
Primary	11	10.28	96	89.72	107	25.85			
Secondary	18	23.68	58	76.32	76	18.36			
Higher secondary	8	16.67	40	83.33	48	11.6			
Graduate	11	37.93	18	62.07	29	7			
Education of mother									
Illiterate	25	12.32	178	87.68	243	59.12	39.252	3	<0.00001 p<0.01
Can read and write only	20	21.5	73	78.5	93	22.63			
Primary	20	22.73	68	77.27	48	11.67			
Secondary	17	62.96	10	37.04	27	6.6			
Higher secondary	0	0	0	0	0	0			
Graduate	0	0	0	0	0	0			
Education of subjects									
School going	44	19.13	186	80.87	230	54.76	3.5749	2	0.1674 p<.01
School dropout	30	19.61	123	80.39	153	36.43			

Illiterate	12	32.43	25	25	37	8.81			NS

Table -2 Socio-demographic characteristics of anemia among rural adolescent girls

Particular	**Normal**		**Anemic**		**Total**		χ^2	**Df**	**p value**
	N	**%**	**N**	**%**	**N**	**%**			
Occupation									
Labour	12	9.38	116	90.62	128	30.48			
Cast occupation	6	14.29	36	85.71	42	10	40.7332	5	p<0.01
Business	6	13.95	37	86.05	43	10.24			
Independent profession	6	13.33	39	86.67	45	10.75			
Cultivation	36	29.51	86	70.5	122	29.05			
Service	20	50	20	50	40	9.52			
Family type									
Nuclear	66	27.16	177	72.84	243	57.86	15.8251	1	0.0007
Joint	20	11.3	157	88.7	177	42.14			p<0.01
Family size									
Small (upto 4 members)	43	58.9	30	41.1	73	17.38			
Medium (5-8 members)	32	13.8	200	86.21	232	55.24	80.9731	2	<.00001
Large (>8 members)	11	9.56	104	90.43	115	27.38			p<0.01
Marital status of subject									
Married	20	16.4	102	83.6	122	29.05			
Unmarried	63	21.5	250	78.49	293	69.76	6.234	2	0.4427
Widow	3	60	2	40	5	1.2			p<0.01 NS
Divorce	0	0	0	0	0	0			

Food habits									
Vegetarian	40	11.33	313	88.67	353	84.05	113.643	1	<.0001
Non-vegetarian	46	68.66	21	31.34	67	15.95			p<0.01
Socioeconomic status									
I	Nil	Nil	Nil	Nil	Nil	Nil			
II	9	69.23	4	30.77	13	3.1			
III	20	29.41	48	70.59	68	19.19	26.207	3	<0.00001
IV	42	18.42	186	81.58	228	54.29			p<0.01
V	15	13.51	96	86.49	111	26.43			

Discussion

Anemia in adolescent has gained importance in last two decades. But still there is a question of increase in the prevalence of anemia that emphasize on the investigation of factors associated with anemia. Though there are various factors that contribute to the prevalence of anemia, the current study has helped narrow down the major contributors such as literacy status of mother, occupation, diet, age, socioeconomic status and menstrual discharge.

In the present study, it was found that out of 420 girls, 334 (79.52%) were suffering from various degrees of anemia and that 86 (20.48%) were non anemic. Findings of the study are almost in the accordance with Premlatha et al.(2012) (78.75%) and Kotecha et al.(2009) (74.7%) . However Sachan et al. (2012), Biradar et al.(2012) and Singh et al.(2008) reported a lower prevalence of 43.4%, 57.9%, 59.95, 56% and 68.8% respectively. Mishra et al.(2012), Bharti et al.(2009), Gupta et al.(2008), Toteja et al. (2006) and Verma et al.(2004) reported a higher prevalence of 96.8%, 99.9%, 81.81%, 90% and 81.8% respectively. Several studies have reported prevalence of anemia between 5.6 to 75% in different part of the world (Basu et al.2005; Choudhary et al.2008; Yearul et al.2010 and Atto et al. 2012).

This difference in the prevalence of anemia may be due to difference in the study area. WHO/UNICEF has suggested that the problem of anemia is a very high magnitude in a community when prevalence rate exceeds 40% (WHO, 2001).Considering that anemia development is a consequence occurred at a later stage of iron deficiency, the problem of iron

deficiency in these adolescent girls with a prevalence of 79.52% should be considered serious and call for an action

Thus, the result of various study which have been mentioned above, demonstrated that the prevalence of anemia in the study was high as in other part of the country. This indicated the importance of including adolescent in the risk group to improve their iron status and the need for planning intervention programs that would increase the heamoglobin levels among the adolescent girls through prophylaxis treatment, dietary modification and worm infestation control.

The study shows high prevalence of anemia in scheduled caste community, which could be due to lack of money, either due to poverty or more number of children in the family and lack of knowledge about child care practices. The prevalence of anemia was 88.23% among the adolescent girls in scheduled caste/scheduled tribes as against 72.16 percent in general caste which is comparable to the study by Singh et al. (2008) on adolescent girls in rural area of Meerut.

A significant association was found between the level of parental education and anemia, particularly the education of mothers is a significant factor for girls. In present study reveals that 87.68% anemic adolescent girls, mothers were illiterate. Singh (2008) also reported that prevalence of anemia was more (43.2%) in adolescent daughter of illiterate mothers as compared to education mothers.

Prevalence of anemia is related to parents occupation was found to be significant ($p<.001$) which may be because of availability of better quality food to the girls of agriculture and service class families.

In the present study, the prevalence of anemia was significantly higher (88.7%) among the adolescent girls belonging to joint families as compared to(72.84%)those from nuclear families($p<0.01$), which may be due to availability of quantitatively and qualitatively adequate food in nuclear families.

A higher prevalence of anemia (p<.01) in adolescent girls belonging to families having family size >8 members than those girls from families of family size <4 members. Which may be due to availability of adequate diet to all family members in small families. The current study concur the report of Rawat et.al(2001), Singh (2008) and Choudhary et.al(2008) which shows high prevalence in joint families.

Relationship of anemia with diet has been proven by various studies which delineated the preponderance of anemia on vegetarian. Present study reported that vegetarian adolescent girls (88.67%) were more anemic then non vegetarian (31.34%) which is corroborated with the findings of Kaur et.al (2008) and Premlatha et.al.(2012).

Reverse association was seen between socioeconomic status and prevalence of anemia in adolescent girls: lower the socioeconomic status higher the prevalence of anemia. In the present study, the prevalence of anemia was high among girls who belong to low socioeconomic groups (86.49%in class IV and 81.58% in class V) as compared to the girls who belonged to higher socio-economic groups(30.7%in class II). This was statistically significant, which is comparable with the study conducted by Singh.(2008) with maximum prevalence(47.65%) in class V and minimum(29.1%) in class I and II. Birader et al.(2014)reported that majority of the adolescent girls were anemic (43.1% in class IV and 100% in class V) who belonged to low socio-economic class.

These findings correlated with those of the study which were conducted among adolescent girls in Chandigarh, Nagpur, UP and Delhi, where it was revealed that anemia was high in lower socio-economic groups (Choudhary et al.,2008; Maliya et al., 2010; Mishar et al., 2012 and Verma et al., 2013). This may be because of better availability of high quality food for children with better socio-economic status.

A significant association of anemia with low socio-economic status suggested a need to develop strategies for intensive adult education and to improve the socio-economic status of the population through poverty alleviation programs.

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 majority of rural adolescent girls are suffering from anemia. Anemia has many critical health and nutritional implication in adolescent girls, which leads to poor pregnancy outcomes, impaired school performance, decreased work productivity and other adverse outcomes. Safe and effective public health intervention is needed to address iron deficiency anemia in adolescent girls. Significant associations of anemia with religion, caste and socio economic status suggest 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 nutrition education.

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