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Research Paper

Nutritional Status of the Anaemic School Going Adolescents in A Rural Area of Tamilnadu, India

Food Science

KEYWORDS : Adolescent, Nutritional Status.

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ABSTRACT

Adolescent (10 to 19 years) is a crucial period of life with many changes. Relatively few studies are available on nutritional status of adolescents, particularly data on adolescent boys and girls in rural areas. Methodology: A total of 250 students who were studying from 6th to 12th standard in the age group of 10 to 18 years old, both boys and girls residing in the hostel were initially screened for the blood haemoglobin level by Cyanmethaemoglobin method and identified the anaemic adolescents and categorized anaemia as per the WHO (2011) classification. Out of 250, 220 adolescents were anaemic. All those 220 anaemic adolescents were further assessed for nutritional status by recording height, weight and computed Body Mass Index. Results: All the anaemic adolescents belonged to a monthly income of less than Rs.3000. In general girls recorded better BMI than boys. When compared to WHO (2007) growth standards of BMI for age z score (BAZ) 53.9 percent of boys and 75 percent of girls belonged to normal category. The percentage of severe under nutrition was less among girls than boys. The prevalence of anaemia was 88 percent. Among the anaemic adolescents moderate anaemia was found to be 69.1 percent, mild anaemia 27.3 percent, and severe anaemia 3.6 percent. Conclusion: The prevalence of anaemia is alarming hence an effective intervention is required to control and prevent further health consequences of adolescents

INTRODUCTION

Adolescents are the future generation of any country. According to WHO adolescent period covers 10 to 19 years of age. This is the transitional period from childhood to adulthood. During this formative year the maximum amount of physical, physiological and behavioral changes take place. The increased physical, physiological changes demand special nutritional needs. Inadequate intake of nutrients not only affects their growth but also their livelihood as an adult[1].

WHO report (2007)[2] shows that more than 2 billion population in the world is anaemic. India is one of the countries that have the highest prevalence of anaemia, even though it is common in all age groups. Nearly 58 percent of pregnant women, 56 percent of adolescent girls and 30percent of adolescent boys and a maximum of 80 percent of below 2 years of age children in India are anaemic[3].

As compared to studies on pregnant women and under five, relatively few studies are available on nutritional status of adolescents, particularly data on adolescent boys and girls in rural areas are scarce, and therefore the present study was aimed to assess the magnitude of anemia among the selected adolescents and their nutritional status.

MATERIALS AND METHODS

The study was carried out in a rural higher secondary school of Utheramerur Taluk, in Kancheepuram district of Tamil Nadu, India. All the available residential adolescents both boys and girls numbering 250 in the age group of 10 to 18 years studying from 6th to 12th standard, were initially screened for the blood haemoglobin level by gold standard cyanmethaemoglobin method, 0.20 micro liters of capillary blood was drawn by the finger prick method and incubated for 3 minutes and immediately analyzed for haemoglobin concentration using semi autoanalyser .The results of the study were used to identify the anaemic adolescents and also for categorization of anaemia as per the WHO (2011) classification[4].

The results of the haemoglobin estimation revealed that, out of 250, 220 adolescents were anaemic. All those 220 anaemic adolescents were selected for the further assessment of nutritional status by recording height using a stature meter to the nearest 0.1 cm accuracy, weight using digital weighing balance up to 100gm of accuracy and computation ofBody Mass Index (BMI). Anthro Plus software[5,6] and SPSS package version 16.0 was used for analysis. A predesigned questionnaire was administered to record the socio-demographic details from the parents of the adolescents by interview schedule. Consent of the ethical committee was taken prior to the conduct of the study. All the participants were given an informed consent before the beginning of the study.

RESULTS AND DISCUSSION

Table 1 presents age wise distribution of the anaemic adolescents

Out of 220 anemic adolescents, 128 were boys and the rest of 92 were girls. This might be due to the fact that the total number of girls staying in the hostel was less compared to that of boys.

In this study group more number of boys (45%) and girls (50%) were in the age group of 13-15 years, also the least prevalence was recorded among the 16-18 years old adolescents. This might be due to the fact that the number of 16-18 years age group adolescents residing in the hostel were less compared to other age groups.

The socio-demographic background of the adolescents was studied in terms of family size, type, education, occupation of their parents, monthly income of the family. The results are presented in Table 2.

The study revealed that the majority (74%) of the families of the adolescent comprised of 4-6 members system. This is found to be similar to the average Indian household size of 5.4 (http:/India.reports.in)[8]. The maximum percentage (92%) belonged to nuclear family set up. This observation is in accordance with the report that more than 80 percent of families in India are nuclear type[9].

The monthly income of the family showed that the majority (67%) of the selected adolescents belonged to a socioeconomic class V with the income of less than Rs.773 followed by 29 percent belonging to class IV, while a few (4%) belonged to class III. The school is run by a charity and provides all facilities regarding education to economically weaker section of the society.

As far as the educational status of the parents was concerned almost equal percent (27% fathers and 21% mothers) of the par-

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ents had studied up to high school, while 15 percent of fathers and 26 percent of mothers of the selected adolescent were illiterate.

The literacy rate in India was 74 percent[10] and the Tamilnadu literacy rate was 86.8 percent for males and 73.9 percent for females, whereas in Kancheepuram district the rural male literacy level is 84.18 percent and female literacy level is 68.96 percent.

The major occupation of the parents was found to be hired labour (father-53 percent; mother-57 percent) followed by agricultural labour works. Very few percentages of parents were engaged in small petty shop business, mason, tailor, cleaner etc.

The mean weight (kg), height (cm) and haemoglobin (g/dl) level of the anemic adolescents are presented in Table 3.

The mean weight of the boys ranged from 28.00 kg to 46.78kg whereas for girls it was 28.97kg to 41.54kg and the mean height of the boys was 138.50cm to 163.8cm and for girls the mean height ranged from 136.60cm to 148.92cm. However the height of both boys and girls were lesser than the mean height of the WHO (2007)[11] growth standards. The mean BMI of both boys and girls ranged from 14.58 to 17.13 and 15.42 to 18.60 respectively. In general girls recorded better BMI than boys, however it was also found to be lesser than the mean BMI of WHO (2007). The mean haemoglobin (g/dl) level of boys and girls extended from 9.78g/dl to 10.58g/dl and from 9.33g/dl to 9.99g/dl respectively. It was also observed that as the age increased the haemoglobin level also increased, this might be due to the reason that the majority of the adolescents belonged to the under privileged category when they got admission in the hostel. However they received six eggs in a week and their lunch was served with meat on all Sundays, which might be the reason for a slight increase in the haemoglobin level in the older age group.

Grouping of the anaemic adolescents, according to BMI for age z score (BAZ) of WHO (2007)[10] classification is presented in Table 4.

When compared with WHO (2007) growth standards of BAZ, the normal, moderate and severe under nutrition category of boys ranged from46. 6 to 61.7, 21.3 to 34.5 and 17 to 18.9 percent respectively, while in girls it was 71.7 to 86.6, 6.7 to 21.7 and 6.4 to 6.7 percent respectively. It was also revealed that a majority (53.9% boys and 75% girls) of the boys and girls belonged to normal category. It was also observed that younger the age higher the percentage of normal category especially in boys (10-12 years 62%) but among the girls higher percentage (86%) of normal category was found to be in 16-18 years. In the current study the overall percentage of normal category was 62.7percent, which is lower than the study result of Tiwari et.al[12], this might be due to the poor socioeconomic background of rural adolescents.

Grouping of anaemic adolescents according to degrees of anemia by WHO (2011)[4] is presented in Table 5.

The mild, moderate and severe anaemia dappled from 19.1 to 69.6, 30.4 to 76.6 and 1.7 to 4.3 percent respectively in boys and 6.5 to 20, 11 to 35 and 6.5 to 6.7 percent respectively in girls. The maximum of 61.7 and 79.4 percent of the boys and girls belonged to the moderate degree of anaemia, followed by mild anaemia (boys 35.9%, girls 15.2%), while severe anaemia was only a few (2.3% among boys and 5.4%among girls) percent among the boys and girls. However the severe anaemia was slightly greater among the girls than the boys, this is the common scenario in India. In the present study the prevalence of severe anaemia was 3.6 percent which is slightly higher than the findings of Rajaratnam et.al[13], conducted a study among 13 to 19 years old adolescents in a rural area of Tamilnadu and reported a prevalence of only 2.1 percent severe anaemia. However, when the findings of Mehta[14] among adolescent girls in urban slums of Bombay showed that 4.8 percent prevalence of severe anaemia.

CONCLUSION

In the present study, the overall mean height and BMI for age, of both boys and girls were lesser than the WHO (2007)[11] mean value. The prevalence of anaemia is alarming. Hence an effective intervention is required to control and prevent further health consequences of adolescents.

Table 1
Age Distribution of the Selected Anemic Adolescents

N=220

Age group (Years)	Boys (n=128)		Girls (n=92)		Total (n=220)	
	No.	Percent	No.	Percent	No.	Percent
10-12	47	37	31	34	78	36
13-15	58	45	46	50	104	47
16-18	23	18	15	16	38	17
Total	128	100	92	100	220	100

Table 2
Socio Demographic Characteristics of the Anaemic Adolescents

N=220

Variables	Details		No.	Percent
Size of the Family	Up to ≤3		47	21
	4 to 6		163	74
	>6 Members		10	05
	Total		**220**	**100**
Type of the Family	Nuclear		203	92
	Joint		17	08
	Total		**220**	**100**
Monthly Income of the Family (Rs.)*	SES Class I	5156 and above	Nil	Nil
	SES Class II	2278 – 5155	Nil	Nil
	SES Class III	1547 – 2577	08	04
	SES ClassIV	773 – 1546	65	29
	SES ClassV	< 773	147	67
	Total		**220**	**100**
Educational Level of the Fathers	Illiterate		32	15
	Primary School		38	18
	Middle School		62	30
	High School		56	27
	Higher Secondary School		21	10
	Total		**209**‡	**100**
Educational Level of the Mothers	Illiterate		56	26
	Primary School		49	22
	Middle School		61	28
	High School		46	21
	Higher Secondary School		07	03
	Total		**219**††	**100**
Occupational Details of the Fathers	Hired Labour		110	53
	Agricultural Labour		67	32
	Business (small petty shop)		06	03
	Skilled Workers (mason, tailor)		19	09
	Others(cleaner, waterman& clerk)		07	03
	Total		**209**	**100**
Occupational Details of the Mothers	Unemployed/housewives		53	24
	Hired Labour		124	57
	Agricultural Labour		40	18
	Business/Skilled Workers		02	01
	Total		**219**	**100**

*Dudala & Arlappa, (2013)[7]. †-fathers 209 were alive, ††-mothers 219 were alive

Table 3
The Mean Weight (kg), Height (cm) and Haemoglobin (g/dl) level of the Anaemic Adolescents
N=220

Parameter	Ages (year)					
	10-12 yrs		Age 13-15 yrs		Age 16-18 yrs	
	Mean SD		Mean SD		Mean SD	
	Boys (n=47)	Girls (n=31)	Boys (n=58)	Girls (n=46)	Boys (n=23)	Girls (n=15)
Weight (kg)	28.00 ± 3.42	28.97 ± 5.48	36.65 ± 7.18	38.71 ± 6.45	46.78 ± 5.35	41.54 ± 7.43
Height (cm)	138.50 ± 5.97	136.60 ± 8.12	151.89 ± 8.06	148.38 ± 6.69	163.38 ± 6.43	148.92 ± 6.38
WHO (2007)*	146.05 ± 5.28	147.71 ± 5.34	165.42 ± 5.08	160.32 ± 1.83	175.36 ± 1.06	162.92 ± 0.19
BMI	14.58 ± 1.36	15.42 ± 1.84	15.74 ± 1.91	17.55 ± 2.46	17.13 ± 1.61	18.60 ± 2.24
WHO (2007)*	17.25 ± 0.50	17.61 ± 0.65	19.38 ± 0.68	19.85 ± 0.58	21.15 ± 0.35	21.03 ± 0.16
Hb (g/dl)	9.78 ± 1.67	9.33 ± 0.98	10.13 ± 1.21	9.76 ± 1.15	10.58 ± 0.74	9.99 ± 1.08

N, n=Number. * Mean Weight, Height reported by WHO (2007)[11].

Table 4
Degrees of Nutritional Status according to WHO (2007) BMI for Age z Score

WHO Classification		10-12 (n=80)		13-15 (n=101)		16-18 (n=39)		Total (220)		Total(sex Combined) (n=220)
		Boys (n=47)	Girls (n=31)	Boys (n=58)	Girls (n=46)	Boys (n=23)	Girls (n=15)	Boys (n=128)	Girls (n=92)	
Severe UN* (< -3SD)	n	8	2	11	3	4	1	23	6	29
	%	17	6.4	18.9	06.5	17.4	06.7	18	06.5	13.2
Moderate UN* (<-2SD to >-3SD)	n	10	6	20	10	6	1	36	17	53
	%	21.3	19.4	34.5	21.7	26.1	06.7	28.1	18.5	24.1
Normal (- 2SD to +1SD)	n	29	23	27	33	13	13	69	69	138
	%	61.7	74.2	46.6	71.7	56.5	86.6	53.9	75	62.7

N, n=Number, UN-Under Nutrition.

N, n=Number, UN-Under Nutrition.

Table.5
Grouping of Anaemic Adolescents according to Degrees of Anemia, WHO (2007)
N=220

Degrees Anaemia		Age (years)								Total (sex Combined) (n=220)
		10-12 (n=80)		13-15 (n=101)		16-18 (n=39)		Total (n=220)		
		Boys (n=47)	Girls (n=31)	Boys (n=58)	Girls (n=46)	Boys (n=23)	Girls (n=15)	Boys (n=128)	Girls (n=92)	
Mild	n	09	02	21	09	16	05	46	14	60
	%	19.1	06.5	36.2	19.6	69.6	20	35.9	15.2	27.3
Moderate	n	36	27	36	35	07	11	79	73	152
	%	76.6	87.0	62.1	76.1	30.4	73.3	61.7	79.4	69.1
Severe	n	02	02	01	02	0	01	03	05	08
	%	04.3	06.5	01.7	04.3	0	06.7	02.3	05.4	03.6

N, n=Number, Mild <11yrs: 11-11.4g/dl, for 12-14yrs and >15yrs girls: 11-11.9g/dl, for boys >15yrs: 11-12.9g/dl, Moderate 8-10.9g/dl, Severe <8g/dl, Normal: >12 g/dl for Girls, >13 g/dl for Boys.

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