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SCREEN OUT ANAEMIA AMONG ADOLESCENT BOYS AS WELL!

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ABSTRACT

Background: Adolescence – a period of transition between childhood and adulthood is a significant period of human growth and maturation. Adolescents represent about a fifth of India's population. Many studies in recent times have highlighted the high prevalence of anaemia among adolescent girls in India; however, there is limited published literature on prevalence of anaemia among adolescent boys.

Aims: To find out the prevalence of anaemia among adolescent (10-19 years) boys and girls in the urban slum of Meerut and to study socio-demographic and other determinants in relation to anaemia.

Material and Methods: A Community based cross sectional study was conducted in urban slum, Multan nagar, catchment area of UHTC, Department of Community Medicine, Subharti Medical College, Meerut. A total of 406 (216 females and 190 males) adolescents were included in this study. Haemoglobin estimation was done using Direct Cyanmethaemoglobin method. Statistical analysis were done using Microsoft excel 2007 and Epi info version 3.5.3.

Results: The prevalence of anaemia among adolescent males and females was found to be 31.6% and 52.8% respectively. Statistical significant association (p< 0.05) of anaemia among boys were found with type of family, socio-economic status, educational status, academic performance, hand washing before eating main meal, daily frequency of main meals, daily consumption of lemon/sour fruits and BMI.

Conclusions: A high prevalence of anaemia was found among adolescent males and females. So there is the need for routine iron supplementation even among adolescent boys.

Keywords: Adolescent boys, anaemia, urban, slum, cyanmethaemoglobin

INTRODUCTION

Adolescence – a period of transition between childhood and adulthood is a significant period of human growth and maturation. The term "adolescence" has been defined by WHO as those including between 10 to 19 years.[1] The health of adolescents attracted global attention in the past decade beginning with the International Year of Youth in 1985 and the World Health Assembly in 1989, when discussions were focused on the health of youth. Though the issues like sexually transmitted diseases, reproductive health, etc have been given due importance, limited work has been done on their nutritional status especially anaemia among

adolescent boys. There are 1.2 billion adolescents in the world, 85% of them live in developing countries.[2] The adolescent population constitutes about 18 to 25% of the total population of the South East Asia Region.[3] Adolescents represent about a fifth of India's population.[4]

During this period, more than 20% of the total growth in stature and 50% of adult bone mass are achieved[5] and iron requirement increases dramatically in both adolescent boys and girls, from preadolescent level of 0.7-0.9 mg Fe/day to as much as 2.2 mg Fe/day. This increase in iron requirement is the result of expansion of total blood volume, increase in lean body mass and the onset of menstruation in adolescent females.[6] Iron needs are highest in males during peak pubertal development because of a greater increase in blood volume, muscle mass and myoglobin.[7]

Globally, according to WHO, a total of 1.62 billion people are anaemic.[8] Every 9 out of 10 persons affected by anaemia live in developing world.[9] WHO also estimates the benefits of anaemia correction and suggests that timely treatment can restore personal health and raise national productivity levels by as much as 20%.[10]

Available literature from India confirms that anaemia is common among adolescent girls but there is a paucity of information on status of anaemia among adolescent boys and most of the studies are based on school – going population and are not from community. So the community based study was planned to highlight the problem of anaemia in adolescent males and females and to study socio-demographic factors and other determinants related to anaemia.

MATERIAL AND METHODS

Study population: Adolescents aged 10 to 19 years residing in the registered families in urban slum, Multan nagar, catchment area of urban health and training centre, department of Community Medicine, Subharti Medical College, Meerut were included for the study.

Study period: The period of study was from September 2010 to September 2011 which was used for data collection, compilation and presentation of findings.

Sample size: Since prevalence (p) of anaemia in adolescents (both males and females taken together) was not known, a prevalence of 50% was taken[11] to calculate the sample size with 95%

confidence interval and absolute precision of 5%. So minimum required sample size was 384 and adding 10% for incomplete responses to it, the total sample size came out to be 422. Finally, analysis was done on 406 adolescents (190 males and 216 females).

Selection of study participants: From the 2112 registered families, 422 families were selected randomly by lottery method and if there were more than one adolescent in the selected family, one adolescent was randomly selected from each family.

Data collection: Initially, a pilot testing was done on 50 adolescents in the study area to assess the validity of research tool. A pre designed semi structured schedule was used to elicit the necessary information from participants.

Hemoglobin estimation: For hemoglobin estimation, Direct cyanmethaemoglobin method was used using Photochem-Micro digital 5 calorimeter.

Ethical approval: First approval from the institutional ethical committee was obtained. Informed written consent was obtained from each participant after explaining about the study.

Statistical analysis: Data was analyzed using Microsoft excel 2007 and Epi info version 3.5.3 software. Proportions were calculated and Chi square test was used as a test for significance. A p value of less than 0.05 was considered significant.

RESULTS

The prevalence of anaemia in adolescent males aged 10 to 19 years was found to be 31.6%, with 30% of the boys had mild anaemia. (Table-1)

Table 1: Distribution of prevalence of anaemia in adolescent males according to its severity (DeMeyer, 1989)[12] [n=60]

Severity (Hb g/dl)	Male adolescents	Prevalence (%)
Mild (>10 – cut-off)	57 (95.0)	30.0
Moderate (7 – 10)	02 (3.3)	1.1
Severe (< 7)	01 (1.7)	0.5
Total	60 (100.0)	31.6

In the present study, total 114 (52.8%) females were found to be anaemic, with 44.9% of the females had mild anaemia and 7.9% of the females had moderate to severe anaemia. (Table-2)

Table 2: Distribution of prevalence of anaemia in adolescent females according to its severity (De Maeyer., 1989)[12] [n=114]

Severity (Hbg/dl)	Female Adolescents	Prevalence (%)
Mild (>10–cut-off)	97 (85.1)	44.9
Moderate (7 – 10)	15 (13.2)	6.9
Severe (< 7)	02 (1.7)	1.0
Total	114 (100.0)	52.8

Table 3 and 4 shows the various socio-demographic determinants which were found to be statistically significant in both males and females and includes socio-economic status (the prevalence of anaemia decreased with increase in socio-economic status) and adolescents educational status (prevalence of anaemia was maximum in those who were illiterate/just literate and minimum in those who had completed intermediate class).

Table 3: Prevalence of anaemia in males according to socio-demographic determinants (n=190)

Socio-demographic determinants	Males (%)	Anaemic males	Prevalence (%)	χ^2, df, p- value
Type of family				4.99, 1, 0.02
Nuclear	159 (83.7)	56	35.22	
Joint	31 (16.3)	04	12.90	
Socio-economic Status				
Upper (I)/ Upper middle (II)	42 (22.1)	05	11.90	10.36, 2, 0.005
Lower middle (III)	79 (41.6)	27	34.18	
Upper lower (IV)/ Lower (V)	69 (36.3)	28	40.58	
Educational Status				
Illiterate/ Just literate	06 (3.2)	03	50.0	9.70, 4, 0.046
Primary	47 (24.7)	15	31.91	
Middle	80 (42.1)	32	40.0	
High school	43 (22.6)	09	20.93	
Intermediate	14 (7.4)	01	7.14	
Academic performance*				
Below average (≤ 40%)	13 (7.8)	06	46.15	8.95, 3, 0.03
Average (> 40 to 60%)	82 (49.1)	31	37.80	
Above average (> 60 to 80%)	65 (38.9)	12	18.46	
Topper (>80%)	07 (4.2)	01	14.29	

* 23 male adolescents had left school and were therefore excluded from analysis

Table 4: Prevalence of anaemia in females according to socio-demographic determinants (n=216)

Socio-demographic determinants	Females (%)	Anaemic females	Prevalence (%)	χ^2, df, p- value
Socio-economic Status				
Upper (I)/Upper middle (II)	32 (14.9)	07	21.90	15.09, 2, 0.001
Lower middle (III)	96 (44.4)	53	55.21	
Upper lower (IV)/Lower (V)	88 (40.7)	54	61.36	
Mother's working status*				
Housewife	177 (83.1)	90	50.85	4.94, 1, 0.03
Working	36 (16.9)	11	30.56	
Educational Status				
Illiterate/ Just literate	08 (3.8)	05	62.5	9.80, 4, 0.044
Primary	50 (23.1)	30	60.0	
Middle	84 (38.9)	48	57.14	
High school	42 (19.4)	22	52.38	
Intermediate	32 (14.8)	09	23.68	
Occupation				
Student	168 (77.8)	80	47.62	9.52, 2, 0.009
Employed	09 (4.1)	08	88.89	
Unemployed	39 (18.1)	26	66.67	

*Mother of 3 female adolescents had died and were therefore excluded from analysis

The determinants which were found to be statistically significant only in males include type of family (prevalence of anaemia was more (35.22%) in those belonging to nuclear families in comparison to 12.90% in joint families) & their academic performance.

The statistically significant determinants for anaemia among adolescent girls include their occupation (prevalence of anaemia was least among students and more among employed and unemployed female adolescents) and their mother's occupation (prevalence of anaemia was maximum (50.85%) among adolescent females whose mother's were housewife and 30.56% in those whose mother's were working)

The determinants which were not found to be statistically significant include age, religion, caste, father's education, father's occupation, mother's education and birth order.

Table 5: Prevalence of anaemia in males according to other determinants (n=190)

Determinants	Males (%)	Anaemic males	Prevalence (%)	χ^2, df, p- value
Hand washing before eating main meal				
Every time with soap & water	104 (54.7)	25	24.04	9.22, 3, 0.03
Sometimes with soap & water	27 (14.2)	08	29.63	
With water only	30 (15.8)	12	40.0	
Never	29 (15.3)	15	51.72	
History of malarial infection				
Yes	17 (8.9)	10	58.82	6.41, 1, 0.01
No	173 (91.1)	50	28.90	
Frequency of main meals (daily)				
Once	11 (5.8)	10	90.91	19.66, 2, 0.001
Twice	128 (67.4)	38	29.69	
Thrice	51 (26.8)	12	23.53	
Daily consumption of lemon/sour fruits				
Yes	43 (22.6)	06	13.95	7.99, 1, 0.005
No	147 (77.4)	54	36.73	
Body Mass index				
< 5th percentile	67 (35.3)	30	44.78	8.67, 1, 0.003
5-85th percentile	121 (63.7)	29	23.97	
>85th percentile*	02 (1.0)	01	50.00	

*Category of overweight males were excluded from the analysis for the calculation of χ^2 value

Table 6: Prevalence of anaemia in females according to other determinants (n=216)

Determinants	Females (%)	Anaemic females	Prevalence (%)	χ^2, df, p- value
Hand washing before eating main meals				
Every time with soap & water	97 (44.9)	39	40.21	11.35, 3, 0.01
Sometimes with soap & water	35 (16.2)	23	65.71	
With water only	54 (25.0)	33	61.11	
Never	30 (13.9)	19	63.33	
Nail Cutting				
Regular	140 (64.8)	65	46.43	6.44, 1, 0.01
Irregular	76 (35.2)	49	64.47	
History of malarial infection				
Yes	13 (6.0)	11	84.61	4.35, 1, 0.04
No	203 (94.0)	103	50.74	
Body Mass index				
< 5th percentile	76 (35.2)	47	61.84	3.86, 1, 0.049
5-85th percentile	138 (63.9)	66	47.83	
>85th percentile*	02 (0.9)	01	50.0	

*Category of overweight females were excluded from the analysis for the calculation of χ^2 value.

Table 5 and 6 shows the various other determinants which were found to be statistically significant in both males and females & includes practice of hand washing before eating main meals (the prevalence of anaemia was maximum in those who never washed their hands before eating main meal and minimum in those who always washed their hands every time with soap and water before eating main meal), history of malarial infection (prevalence of anaemia was more in those who had positive history of malarial infection) and BMI status of adolescents (prevalence of anaemia was more among those who had BMI less than 5th percentile).

The determinants which were found to be statistically significant only in males include daily frequency of main meals (anaemia was more prevalent among those who were having their main meals once daily (90.91%) than among those who were having their meals twice (29.69%) or thrice daily (23.53%) and daily consumption of lemon/sour fruits.

The statistically significant determinants for anaemia among adolescent girls include their habit of cutting nail (prevalence of anaemia was maximum (64.47%) in those who had irregular nail cutting habit in comparison to 46.43% in those who cut their nails regularly).

The determinants which were not found to be statistically significant include history of pica, type of diet, frequency of non-vegetarian diet, intake of junk food, post meal habit of consuming tea/coffee and pattern of menstruation.

DISCUSSION

The present study yielded relatively low prevalence (31.6%) of anaemia among adolescent boys when compared to studies conducted by Jain et al[13] in Urban Meerut, Hyder et al[14] in Bangladesh and Hettiarchi et al[15] in Sri Lanka who found prevalence of anaemia to be 42.8%, 69%, and 49.5% respectively. Basu et al[16], however, reported the prevalence of anaemia among school going adolescent boys of Chandigarh to be 7.7%. These differences may be due to difference in age groups studied, different study settings and difference in cut-off values for diagnosis of anaemia.

Adolescent boys who scored below average (≤ 40% marks) academic performance were more anaemic in comparison to toppers (80% marks). Abalkhail et al[17] also showed that anaemics scored lower rank significantly than non-anaemics.

Daily frequency of main meals influence anaemia to a large extent as it was very high (90.91%) among those boys who had their main meals once daily when compared to 23.53% in those who had their main meals thrice daily. ICRW[18] and Jain et al[13] also documented that anaemia to be significantly more in those who eat two or fewer meals in a day.

In this study, the prevalence of anaemia was significantly more (44.78%) among those adolescent boys who had their BMI less than 5th percentile as compared to those who had their BMI between 5th and 85th percentile. Other researchers[13,19,20] also documented similar findings.

In the present study, determinants which were found to be not significantly related with anaemia among adolescent boys include their age, religion, caste, father's education, father's occupation, mother's education, mother's working status, their occupation, birth order, habit of cutting nail, history of pica, type of diet, frequency of non-vegetarian diet, intake of junk food, post meal habit of consuming tea/coffee. Jain et al[13] also reported that age is not a significant correlate of anaemia.

CONCLUSIONS & RECOMMENDATIONS

The present study highlights the high prevalence of anaemia among adolescent boys in the urban slum population of Uttar Pradesh, thus indicating that the problem of anaemia was related to a wider population than the traditional groups of the adolescent, pregnant and lactating females and children. We suggest that there is a need for well planned, systematic and large-scale studies by using standardized methodologies to estimate the prevalence of anaemia as well as the causes of anaemia at the community level among males in all the age groups, with the representation of the different regions of India.

It is seen that anemia affects the overall nutritional status of adolescent males as well as females. So iron supplements have to be provided to the adolescent boys also as in our country, most of the National programmes related to supplementary nutrition are focusing

only on adolescent girls, but none of the programmes include adolescent boys.

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