Risk Factors of Anaemia Among 10-12 Years Old School Children

B.P.Sudha

Assistant Professor, Department of Nutrition and Dietetics, The Standard Fireworks Rajaratnam College for Women, Sivakasi- 626 123 Tamil Nadu, India

ABSTRACT *Nutritional Anaemia is a recognized public health problem throughout the world. According to WHO, anaemia is estimated to affect more than 2 billion people worldwide. The data from NFHS - 2 in India have suggested prevalence of iron deficiency anaemia of 56 per cent in all school age children and NFHS-3 (2005-06) shows that 79 per cent of children suffer from anaemia. So the study was undertaken to estimate the prevalence of anaemia among school children and also determine the various factors associated with anaemia in this population. The study was conducted in Maya Pandeeswari Middle School, Melmangalam, Theni district. A total of 150 children in the age group of 10 to 12 years were selected for the study. A questionnaire was formulated to elicit the information on socio economic background, food consumption pattern and hygienic practices followed by the respondents. Anthropometric measurements such as height, weight, BMI were calculated. BMI was classified using Agarwal, K.N., (2001) percentiles. Bio chemical parameter like Haemoglobin was estimated for all the subject (Cyanmethaemoglobin). Majority of the respondents were under weight and were affected by anaemia in moderate condition. The prevalence of anaemia was higher among the respondents who were having the habit of consuming tea/coffee, skipping meals and the respondents who belonged to low socio economic status. The study concluded that, Nutritional anaemia is a silent epidemic that prevails among school age children. Inadequate intake of iron rich foods, habit of skipping meals, poor hygienic practices are the major factors that contribute to nutritional anaemia among school children.*

INTRODUCTION:

Nutritional Anaemia is a recognized public health problem throughout the world (Gomber et al., 2003). According to WHO, anaemia is estimated to affect more than 2 billion people worldwide (Kriviene and Regeliene, 2006). In that at least 3,600 million people have iron deficiency and 2000 million out of these suffer from iron deficiency anaemia.

Global data based by World Health Organization on child growth and malnutrition and National Family Health Survey - 2 in India have suggested prevalence of iron deficiency anaemia of 56 per cent in all school age children (Gandhi, 2009).The data from NFHS-3 (2005-06) shows that 79 per cent of children suffer from anaemia.

NIN, (2000) studies based on rural population in India revealed that 75 to 76 per cent of children aged 1-6 years, 56-68 per cent of children aged 6-15 years and 42 to 64 per cent of adults above 15 years of age suffer from varying degree of iron deficiency anaemia. So anaemia is affecting people from all walks of life. So the study was undertaken to estimate the prevalence of anaemia among school children and also to determinate the various factors associated with anaemia in this population.

METHOD OF STUDY:

The study was conducted in Maya Pandeeswari Middle School which is located in Melmangalam, Theni district was chosen as a study area and totally one hundred and fifty children in the age group of 10 to 12 years were selected for the study. A questionnaire was formulated to elicit the information on socio economic background of the respondents. The food consumption pattern and hygienic practices followed by the respondents were also collected by using questionnaire.

Body size and growth were assessed through height and weight measurement. From the height and weight measurement, the BMI (Body Mass Index) was calculated. Body Mass Index was defined as the ratio of body weight to body height squared expressed as kg^{-1}/m^2. It is used to assess underweight, overweight and obesity. The formula for BMI is;

BMI= Weight (Kg) / Height^2 in (m).

BMI was classified using Agarwal, K.N., (2001) percentiles. Children with 95th percentile of BMI were taken as cut-off-point. Children with BMI more than this cut-off-point with respect to age and sex were considered as obese, between 95% to 85% were considered over weight and less than 75% was considered as child with under nutrition (Shah et al ., 2008).

95th percentile of BMI for Boys and Girls:

SEX	YEARS		
	10	11	12
Boys	22.1	23.4	23.8
Girls	23.2	24.5	25.7

Bio chemical parameter like Haemoglobin was estimated for the subject by using standard Cyanmethaemoglobin method (Cook, 2005). The level of anaemia was given below.

WHO Classification of Anaemia:

Haemoglobin Level(g/dl)	Anaemia
≥ 12	Normal

10 - 11.9	Mild
7 - 9.9	Moderate
< 7	Severe

SUMMARY OF THE STUDY:

Personal Particulars:
The sex wise distribution of the respondents showed that equal number (50 per cent) of the children both male and female formed the study sample. The result showed that, equal respondents from both male and female and majority of the respondents were in the age group of 11 years. It is understood from the occupational status of the parents of the respondents, most of the parents of the respondents were engaged as daily wage workers. The annual family income of the respondents clear that, majority of the respondent's family annual incomes was in low economic status group.

Anthropometric Assessment:
Table: 1
Mean Values of Anthropometric Measurements of the Respondents

Anthropometric factors	Respondents			
	Male	Female	t- Value	Level of Significance
Height (cm) Weight (Kg) BMI (kgm⁻²)	136 ± 7.9 28.47 ± 6.2 15.02 ± 2.4	135 ± 8.7 27.5 ± 6.4 14.9 ± 2.7	0.995 0.916 0.068	0.35 (NS) 0.361 (NS) 0.946 (NS)

All values are mean± SD; NS- Non-Significant.

Table 1 indicated that the respondents were not in normal height and weight and they were under weight based on the BMI values. The mean and height and weight of the present study was found to be more or less similar to the study conducted by (Medhi et al., 2006) among the school age children of tea garden worker of Assam.

Biochemical Assessment:
Based on the level of haemoglobin, higher percentages of the respondents were affected by iron deficiency anaemia in moderate condition. The mean value of haemoglobin is 9.86 ± 1.73 and 9.36±1.93 for male and female respectively.

Food Consumption pattern and Hygienic Practices:
Food consumption pattern of the people are deeply influenced by their culture, behavior and life style. Some habits are responsible for specific types of nutritional disorders reported in different population (Mohammad, 2006). So the healthy behaviors are crucial, especially in iron deficiency anaemia (Mwanri et al., 2001). The finding from the study showed that, most of the respondents were non-vegetarians and most of the respondents were skipping their breakfast. Breakfast is a brain's food; it enhances the cognition and academic performances. Missing breakfast has

adverse affect on cognition, particularly the speed of information retrieval in working memory and reduces the learning capacity of children. The finding also showed that the personal hygienic practices which followed by the respondents were poor, especially most of the respondents were practicing open field defecation and were not wearing foot wear while using toilet. It might be one of the reasons for anaemia caused by hook worm infestation.

Factors associated with anaemia:
Table: 2
Habit of Skipping Meals Vs Anaemia

Variables	Level of Anaemia					
	Normal	Mild	Moderate	Severe	Total	Chi Square
Habit of skipping meals	3 (17.6)	29 (65.9)	58 (71.6)	8 (100.0)	98 (65.3)	
Not skipping meals	14 (82.4)	15 (34.1)	23 (28.4)	-	52 (34.7)	* 29.8
Total	17 (100)	44 (100)	81 (100)	8 (100)	150 (100)	

*Percentage is given in parenthesis; *significant at 0.05 level*

It clearly showed that the respondents who skipped their meals were suffering from mild, moderate and severe anaemia and very few of them were normal. Many of the respondents were not having the habit of skipping meals were found to be normal but they also affected by mild to moderate level anaemia but not with severe anaemia. The chi square value indicates that there was an association between the habit of skipping meals and the level of anaemia of the respondents.

Table: 3
Habit of Drinking Tea/Coffee Vs Hb Level

Habit of drinking tea/coffee	Normal		Mild		Moderate		Severe	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Early morning/ evening	3	17.6	28	63.6	55	67.9	6	75.0
Before breakfast	1	5.9	6	13.7	11	13.6	1	12.5
After breakfast	-	-	6	13.7	10	12.3	1	12.5
Not taken	13	76.5	4	9.0	5	6.2	-	-
Total	17	100	44	100	81	100	8	100

The above Table 3 reveals the habit of drinking tea/coffee among the respondents and their Hb level. The result shows that, the respondents who did not drink tea/coffee were found mostly in normal condition than those consuming tea and coffee. The prevalence of mild, moderate and severe anaemia was higher among the respondents who were having the habit of consuming tea/coffee. Consump-

tion of tea and coffee may lead to anaemia due to the tannin content present in the drinks and interfere with the bioavailability of iron.

Verma et al.,(2006) in their study on factors influencing anaemia among girls of school going age (6-18 years) from the slum of Ahmedabad city indicated that the association observed between the habit of taking tea/coffee and anaemia is due to the interference of the dietary bioavailability of iron by the tannin content of tea/coffee.

The annual family income and the Hb level:
The annual family income and the Hb level of the respondents revealed that high prevalence rate of mild moderate and severe anaemia was noticed among the respondents who belonged to low socio economic status which is similar to the result of the study conducted by (Gandhi et al., 2009) among the children residing in Katora Talab Slum, Raipur.

Table: 4
Body Mass Index Vs Hb level

BMI	Hb level					Chi Square
	Normal	Mild	Moderate	Severe	Total	
Normal	10(58.8)	2(4.5)	1(1.2)	-	13(8.7)	
Underweight	6(35.3)	41(93.2)	79(97.6)	8(100)	134(89.3)	71.3*
Overweight	-	-	1(1.2)	-	-	
Obese	1(5.9)	1(2.3)	-	-	-	
Total	17(100)	44(100)	81(100)	8(100)	150(100)	

*Percentage is given in parenthesis; *significant at 0.05 level.*

As shown in Table 4, majority of the selected respondents were found to be underweight and were suffering from moderate level of anaemia. Most of the non-anaemic respondents were found to be normal based on their Body Mass Index. It reveals that when BMI is low, there is a change in Hb level. The chi square value 71.3 indicates that, there was a significant association between BMI and Hb level of the respondents which is similar to the finding of the study conducted by (Verma et al., 2006) among the girls of school going age.

Conclusion:
The study concluded that, Nutritional anaemia is a silent epidemic that prevails among school age children in the age group of 10 – 12 years. Inadequate intake of iron rich foods, regular habit of skipping meals, poor hygienic practices, lack of knowledge on anaemia are the major factors that contribute to nutritional anaemia among school children.

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