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# RESEARCH HIGHLIGHTS



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## EVALUATION OF HEALTH ORIENTED EDUCATION PROGRAMME : ANAEMIC ADOLESCENTS

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### Introduction

Adolescence both in terms of age spanning between 10 to 19 years and in terms of phase of life marked by special activities, which include physical growth and development (WHO, 2003). Adolescent population is expected to reach 1.13 billion by the year 2025. Nutritional adequacy is one of the key determinants of the quality of human resources. At this stage adolescents require large amount of nutrients to support their growth. Sub-optimum intake will affect the growth rate which will lead to poor health status in their later life.

These wrong food habits lead to malnutrition and deficiency of iron, vitamin and iodine. Life styles of the adolescents influence their intake of nutrients and affect their food habits as well as their physiological requirements of nutrients. Adolescent nutritional problems are common throughout the world (Frank, 2003). Home managers lack adequate food and make poor food choice. The problems of malnutrition in developing countries encompasses a spectrum of deficiency of which the most devastating is under nutrition and deficiency of one or more of the three

micro nutrients like iron, vitamin and iodine. These nutritional problems are associated with health hazards.

About one in every five persons in the developing world is chronically under nourished, while 192 million children suffer from protein energy malnutrition and over 200 million experience micronutrient deficiencies (Latham, 2004). Together they contribute to a great deal of morbidity, ill health, growth retardation, reduction in physical and developmental activity among adolescents.

Three billion people are affected by micronutrient deficiencies world wide; the most prevalent of which is iron deficiency. Approximately 250 million adolescents in the world are affected by anaemia. International Centre for Research on Women Studies had documented that 55 per cent Indian adolescents are anaemic. In 1961, the prevalence of anaemia in Tamil Nadu, India was as high as 97.9 per cent and it declined to about 81 per cent in 1989 and to about 61.7 per cent in 1993 and further declined to about 51.7 per cent in 2007. About 50 per cent of the adolescent girls in Coimbatore district, Tamil Nadu were anaemic (Vijayaraghavan, 2007).

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Iron deficiency anaemia consistently and linearly reduced maximum aerobic capacity and physical endurance. It is associated with poor mental and motor development. Five to seven per cent of adolescents had vitamin A deficiency in the selected geographic area. Fifty three per cent adolescents were deficient in iron and nine per cent had goitre (Kapil and Bhavana, 2002).

School children in India are most often fast generation learners and can be trained to be "change agents" of the community to increase their nutritional status and combat nutritional deficiency diseases in the community. School programmes will have greater impact and be sustained longer if they are tied to community activities, programmes and other private and non-governmental organizations.

It is high time to shift the attention towards the promotion of health and nutritional status as these adolescents who form a major per cent of total population. Lack of awareness and knowledge could be the causes for the dismal performance in international arena. In view of these aspects the present study was undertaken with the following objectives. To

- assess the dietary nutrient consumption and compare with recommended allowances
- evaluate the nutrition knowledge, attitude and dietary practices of anaemic adolescents and
- formulate strategies to impart nutrition education and eradicate the existing food fads and fallacies.

## Materials and methods

### Selection of subjects

A total of 3166 adolescents, constituting 1823 (57.5%) boys and 1343 (42.5%) girls were selected as a cluster in the age group of 10 to 18 years, from the class of 6<sup>th</sup> to 12<sup>th</sup> standards studying in three government schools in Coimbatore city. Three pronged approach comprising of anthropometry, dietary and biochemical analysis formed the basis for assessing the nutritional status of the selected adolescents.

Blood haemoglobin levels for all the selected 1331 underweight adolescents were estimated using the cyanmethemoglobin method. A group of 295 underweight, moderate and mild anaemic adolescents (boys 566, girls 413) who had less than 5<sup>th</sup> centile of body mass index were selected for the study.

Information about the subjects pertaining to demographic profile, dietary pattern, life style pattern, food and nutrient intake and medical history, knowledge on nutrition was recorded using a pre tested interview schedule. The mean nutrient intake of these subjects was assessed by a 24 hour dietary recall survey for three consecutive days. This formed the basis for formulating the intervention programme. All the 979 moderate and mild anaemic adolescents were selected as sub sample for health oriented education programme (HOEP).

### **Development of Health Oriented Education Programme (HOEP)**

An educational tool namely HOEP was developed by the researcher. HOEP materials such as posters, charts, rotating charts, hand outs and power point presentations were developed and were used to create awareness regarding good health, ways and means of combating nutritional deficiencies and sound eating habits. These included poster on food pyramid for healthy adolescents, leaflets providing messages of anaemia and underweight, charts highlighting consequences of anaemia, underweight, protein energy malnutrition, niacin deficiency, thiamine deficiency, vitamin A deficiency and calcium deficiency. Software showing importance and consequences of underweight, anaemia and healthy life style were also developed.

The HOEP also emphasized on basic nutrition concepts and demonstrated low cost nutritious recipes. Lectures and discussions were held for the sub sample. Interactive session was held during the Parents-Teachers Meeting. Special care was taken to pass on the message to the concerned parents through the prepared visual aids. Teachers were also trained for this interpersonal communication. Life style education was imparted to them and they acted as "Agent Communicators" during the intervention period.

Medical, dental and eye camps were organized in three schools as an incentive to the school children. Individual attention and care was taken to check the selected

underweight anaemic adolescents and medical advice was given by the doctors.

Using the audio visual aids prepared HOEP was imparted in the groups in their respective class room in every 15 days for a period of two months during their leisure time without disturbing their regular class hours. Lecturing was minimized and other methods that bring out creative interaction were adopted to make learning continuous. Participatory approach, instructional approach and child to child approach were followed while teaching.

### **Assessment of Impact of HOEP on KAP scores**

Multiple choice questions were prepared to find the pre and post knowledge, attitude and practices of the selected adolescents. Scores were allotted for each question and the impact was assessed. Scoring was done on the following basis. Scores of one, half and zero were awarded respectively to each correct, partially correct and wrong answer. Gain in scores and per cent improvement was calculated using the following equation.

$$\text{Gain in scores} = \text{Scores of post test} - \text{Scores of pre test}$$

Per centage of improvement

$$= \frac{\text{Gain in scores}}{\text{Pre test scores}} \times 100$$

### **Results and discussion**

#### **Background information of the selected subjects**

The dietary practices and health status of the individual is closely linked with the

demographic factors like age, sex, size of the family, literacy and income of the family. Fifty per cent of the boys and 32 per cent of the girls were in nuclear family system. Parents of 83 per cent adolescents were literate. Occupational status of the parents of the selected adolescents revealed that 54 per cent of them were employed in private sector, 34 per cent were coolies and employed on daily wages and 11 per cent of the mothers were

home makers. According to HUDCO classification (2002) 41 and 21 per cent of the boys and girls respectively belonged to low income family (Rs. 2100- 4500), whereas 18 per cent boys and 16 per cent girls come from middle income family (Rs. 4510-7500).

### Body Mass Index

Distribution of the selected adolescents based on Body Mass Index is furnished in Table 1.

**Table 1. BMI wise distribution of the selected adolescents based on per centile**

BMI classification (NHANES I,2004)	Boys (N=1823)						Girls (N=1343)					
	Age (years)											
	10-12		13-15		16-18		10-12		13-15		16-18	
	N	%	N	%	N	%	N	%	N	%	N	%
<5 <sup>th</sup> centile (Underweight)	211	7	484	15	124	4	176	6	256	8	80	3
5 <sup>th</sup> to15 <sup>th</sup> centile (Risk of Underweight)	71	2	194	6	43	1	87	3	121	4	53	2
15 <sup>th</sup> to85 <sup>th</sup> centile (Normal)	153	5	302	10	176	6	126	4	281	9	120	4
85 <sup>th</sup> to95 <sup>th</sup> centile (Overweight)	17	1	18	1	13	0.04	8	0.25	17	1	5	0.15
>95 <sup>th</sup> centile (Obesity)	4	0.12	11	0.3	2	0.06	4	0.12	8	0.25	1	0.03

It can be inferred that out of 1331 underweight adolescents, 15 per cent boys and eight per cent girls were in the age group of 13 to 15 years. The present study is on par with the study of Ravi (2002) which shows high prevalence of under weight (36.5%) among Chennai adolescents with BMI less than 5<sup>th</sup> per centile which was significantly

influenced by size of family, education, occupation of parents and family income.

### Details on the haemoglobin levels of the selected underweight anaemic adolescents

Table 2 presents the classification of underweight anaemic adolescents according to WHO (1989).

**Table 2. Haemoglobin levels of the selected underweight anaemic adolescents**

Age(years)	Boys (N=819)						Girls(N=512)					
	7.1-10 g/dl (moderate anaemia)		10.1-11.9 g/dl (mild anaemia)		>13 g/dl (normal)		7.1-10 g/dl (moderate anaemia)		10.1-11.9 g/dl (mild anaemia)		>12g/dl (normal)	
	N	%	N	%	N	%	N	%	N	%	N	%
10-12	101	8	84	6	26	2	58	4	98	7	20	2
13-15	127	9	197	15	160	12	56	4	147	11	53	4
16-18	18	1	39	3	67	5	11	1	43	3	26	2

Normal haemoglobin level Boys  $\geq$  13g/dl: Girls  $\geq$  12g/dl (WHO, 1989).

Among the selected 1331 underweight adolescents, 24 per cent boys, 21 girls had 10.1 to 11.9g/dl blood haemoglobin level and they were classified as mild anaemic (WHO, 1989). The present study is in line with Devi and Nath (2003) which revealed that 45 per cent of the adolescents in urban and rural areas of Bangalore were mild anaemic with mean haemoglobin level of 10.75g /dl. The prevalence of anaemia in Nagai district of Tamil Nadu state was found to be 43 per cent among school children of both sexes.

Moderate anaemia was identified among 18 per cent boys and nine per cent girls. Rest of the underweight adolescents were non anaemic and had normal haemoglobin level  $\geq$ 12g /dl. The findings of Kapil and Bhavana (2002) showed that 53 per cent Indians had iron deficiency.

**Impact of HOEP on the selected sub sample  
Nutrition knowledge scores of the selected sub sample**

Table 3 depicts the nutritional knowledge scores of the selected sub sample.

**Table 3. Per cent of scores obtained for nutrition knowledge by the selected sub sample**

Knowledge	Boys (N=566 )				Girls (N=413)			
	Pre test	Post test	Increase	't 'value	Pre test	Post test	Increase	't 'value
Nutrients and related risk factors	28	46	17	14.04**	12	31	19	18.49**
Dietary factors	21	46	25	18.55**	12	23	11	10.73**
Life style factors	23	43	19	15.45**	12	33	21	22.23**
Dental and physical hygiene	16	40	24	19.25**	17	34	17	16.45**
Sanitation and hygiene	28	47	19	18.29**	9	31	22	22.63**

\*\*significant at one per cent level

A significant difference ( $p < 0.01$ ) was found in the scores of pre test and post test of nutrition knowledge and health practice (Table 3). The mean per cent pre test scores of the girls were less when compared with the pre test scores of the boys. After administration of HOEP, nutrition knowledge was increased and the gain in scores was noted. The maximum increase in scores 25 per cent was noted in dietary factor scores of the boys, whereas in the aspects of nutrients and related risk factors only 17 per cent gained scores. In the case of the selected girls, maximum gain in scores 22 per cent

was obtained for sanitation and personal hygiene. The gain in scores related to dietary factor was only 11 per cent. The improvement in nutrition knowledge, sanitation and hygiene was noted after HOEP which is significant at one per cent level. Similar findings proved that there was a significant improvement in nutrition education imparted to adolescent girls in urban Mumbai.

#### Changes in attitude of the selected sub sample

Changes in attitude of the selected sub sample is shown in Table 4.

**Table 4. Changes in attitude of the selected sub sample**

Attitude	Boys (N=566 )				Girls (N=413)			
	Before HOEP		After HOEP		Before HOEP		After HOEP	
	N	%	N	%	N	%	N	%
Role of nutrition in the body	149	44	276	76	211	32	351	62
Misconception in relation to dietary factors	173	59	289	64	333	51	382	58
Life style factors	158	54	225	69	232	35	509	78
Maintaining sanitation hygiene while eating	143	48	245	73	331	50	428	65
Nutrition to combat several diseases	139	47	261	78	283	43	473	72

Prior to intervention programme, 51 per cent of boys and 32 per cent of girls had knowledge on role of nutrient in the body building but on post testing change in attitude was noticed among 76 per cent and 62 per cent of boys and girls respectively. Misconception about dietary factors was prevalent among the selected adolescents but after HOEP change in attitude was however seen in 64 per cent of boys and 58 per cent of girls.

After HOEP counselling the general attitude towards lifestyle factors was changed in 69 per cent and 78 per cent of boys and girls respectively. Whereas 73 per cent and 65 per cent had positive attitude in maintaining personal and sanitation hygiene while eating.

Before education 47 per cent of boys and 43 per cent of girls were not aware of nutrients that are responsible for nutritional

deficiency disorders. After counselling 78 per cent of boys and 72 per cent of girls believed that including nutritious balanced diet can help to overcome several deficiency diseases.

**Impact of education on practices by the selected sub sample**

Adoption of desirable practices by the selected sub sample is depicted in Table 5.

**Table 5. Adoption of desirable practices by the selected sub sample**

Practices	Boys (N=566 )				Girls (N=413)			
	Before HOEP		After HOEP		Before HOEP		After HOEP	
	N	%	N	%	N	%	N	%
Inclusion of nutritious food	176	60	235	80	225	34	454	69
Skipping meal and adherence to strict meal timing	72	24	63	21	204	31	159	24
Habit of taking junk foods	254	86	116	39	481	73	209	32
Combination of food groups	167	57	237	80	336	51	502	77
Personal hygiene	199	67	241	82	282	43	409	62

The selected 80 per cent and 77 per cent sub sample of boys and girls respectively consumed combination of food groups. After imparting the HOEP, skipping the meal and adherence to meal timing was changed from 24 per cent to 21 per cent in selected boys and 31 per cent to 24 per cent in selected girls.

HOEP also imparted the benefits of avoiding the junk foods and street foods but only 50 per cent of boys and girls practised

after intervention. Practices of personal and sanitation hygiene was also observed by 82 per cent and 62 per cent of boys and girls respectively. Research studies also showed that nutritional counselling imparted in non formal way showed positive out comes in adolescent school children.

**Distribution of the selected sub sample based on the KAP scores.**

Mean KAP scores obtained by the selected sub sample is shown in Table 6.

**Table 6. Impact of education on KAP**

Details	SA	Boys (N=566 )				Girls (N=413)			
		Pre test	Post test	Gain in scores	't' test	Pre test	Post test	Gain in scores	't' test
Knowledge	25	9.8	18.7	8.9	3.28**	6.36	13.4	7.04	4.32**
Attitude	25	11.69	19.25	7.1	2.23*	7.27	9.67	2.42	1.87NS
Practices	25	7.71	13.22	5.5	2.23*	6.50	10.67	4.17	2.09*

SA-Scores allotted, \*\* Significant at one per cent level, \* Significant at five per cent level, NS- Not significant

Table 6 shows that nutrition knowledge of the boys had scored more when compared with the girls which is significant at one per cent level. However changes in attitude of the selected boys alone found to be significant at five per cent level. There was a desirable practices on nutrition and health aspects and five per cent level of significance was noticed among the selected subjects.

### Conclusion

It can be concluded that nutrition counselling based on dietary modifications can be used as a basis for the prevention of underweight and anaemia and as a general strategy to overcome nutritional deficiency diseases among adolescents in forth coming years.

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