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Assessment of nutritional status of rural adolescent girls (13-15 years)

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A total number of 300 adolescent girls were surveyed. They were divided into two groups ie control (150) and experimental (150). The information regarding socio-economic status, anthropometric measurements and haemoglobin content was collected. The selected subjects were personally interviewed for knowledge, aptitude and practice with the help of questionnaire. Food and nutrient intake of sub sample (70) was collected. The IEC programme was conducted to the experimental group. The nutrition knowledge was imparted through messages, charts, posters, talk and demonstration, etc. After imparting the IEC programme, the haemoglobin content, food and nutrient intake, knowledge aptitude and practice was assessed. The impact of IEC programme was evaluated by appropriate statistical methods. The results indicated that there was a significant increase in the haemoglobin content and nutrient intake of experimental group after IEC programme. Similarly the improvement in the existing knowledge, aptitude and practice was observed. Hence, it was concluded that, respondents require approach regarding nutrition education.

Key Words : Adolescent girls, Haemoglobin food, Nutrient intake

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INTRODUCTION

Adolescence is a period of transition between childhood and adulthood that demands extra nutrients and energy-rich food for rapid growth spurt in both linear and body cell mass and reproductive maturation. Inadequate diet and unfavourable environmental condition in developing nations may adversely affect the growth and nutrition of adolescents.

Dietary knowledge and access to resources are critical to improve health and nutrition in a sustainable way. Adolescence is the time to learn and adopt healthy habits to avoid many health and nutritional problems later in life (Srihari *et al*.,2007). Adolescents have more easy access to health and nutrition information through schools, recreational activities and mass media than they have later in their lives (Gragnolati *et al*., 2005). Many Indian studies have pointed out that iron requirement increase during adolescence, especially in developing countries because of infections, diseases and parasitic infestations that cause iron loss and because of low bioavailability of iron from diets. Girls in low income communities have typically been reported to have Hb (haemoglobin) levels less than 10g/Land low iron status negatively affects their body functions (Brabin and Beabin 1992 and Kanani and Poojara, 2000).

The main reasons for iron deficiency anaemia (IDA)

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have been determined to be inadequate intake of iron, low bioavailability (1-6 %) of dietary iron from plant foods (Narasinga *et al.*,1983) due to inhibitory factors, low levels of absorption enhancers in the diet, repeated pregnancies, increased needs during growth and development among children and adolescents, parasitic infestations and chronic blood loss. Poverty compounds these factors through inadequate access to dietary diversity, safe water, knowledge and awareness about proper feeding practices (FAO/ILSI, 1997).

Lack of knowledge of the dietary requirements and the nutritive value of different foods is the main contributory cause for the widespread occurrence of malnutrition in developing countries. Nutrition education, which is practical and adopted to suit the socio-economic conditions, food habits and local food resources, can tackle the problem to a great extent. Adolescent are one of the most important groups of any society but nutritionally vulnerable for iron deficiency because of double demand of growth and activity. Nutrition education might be of the important strategies to combat iron deficiency anaemia in adolescent girls, stressing the importance of haemopoitic nutrients and consumption of green leafy vegetables which are excellent source of iron and micronutrients. So there is need to promote nutrition education on anaemia and its prevalence, causes and consequences.

METHODOLOGY

A total number of 300 adolescent girls were surveyed. They were divided into two groups *i.e.* control (150) and experimental (150). The information regarding socio-economic status, anthropometric measurements and haemoglobin content was collected. The selected subjects were personally interviewed for knowledge, aptitude and practice with the help of questionnaire. Food and nutrient intake of sub sample (70) was collected. Intake of nutrient was computed using the values given in the nutritive value of Indian foods (Gopalan *et al.*,2001). The IEC programme was conducted to the experimental group. The nutrition knowledge was imparted through messages, charts, posters, talk and demonstrations. After imparting the IEC programme, the haemoglobin content, food and nutrient intake, knowledge, aptitude and practice was assessed. The impact of IEC programme was evaluated by appropriate statistical methods.

OBSERVATIONS AND ASSESSMENT

The data regarding general information of selected adolescent girls is shown in Table 1. Family type, income of the family, food habits and meal pattern are the various parameters studied. Majority of the adolescent girls were belonging to the nuclear families (68 %) whereas (18 %) were belonging to joint families followed by extended families (14%). Maximum number of families were having income Rs.> 5000 -10,000 (44.33 %) followed by Rs. >10,000-15,000 (29.33 %) and 18.66 per cent families were having income less than Rs. 5000 .Only 7.66 per cent of the families were found to have the income more than Rs.15,000. Uddin *et al.* (2012) have reported that the high prevalence of malnourished adolescents is due the low socio-economic status of their parents.

Prashant and Shaw (2014) study results are

Table 1: Socio-economic information of the adolescent girls

Particulars		Number	Per cent
Family type	Nuclear	204	68.00
	Joint	54	18.00
	Extended	42	14.00
Income of the family	Rs.< 5000	56	18.66
	Rs.>5,000-10,000	133	44.33
	Rs.>10,000-15,000	88	29.33
	Rs. >15,000	23	7.66
Food habit	Vegetarian	257	85.66
	Non-vegetarian	43	14.33
Meal pattern/day	2 time	55	18.33
	3 time	245	81.66

conformity. It was found that large proportion (54% to 58%) of adolescents were malnourished.

Majority of the selected adolescent girls were vegetarian (85.66%) and (14.33%) were non-vegetarian. Similarly, Kaur (2009) reported 92 per cent of subjects were vegetarian and only 8 per cent were non-vegetarian. Three meal pattern was followed by highest per cent of families (81.66 %). Whereas two meal pattern was followed by 18.33 per cent families.

The values for mean anthropometric measurement of selected adolescent girls are given in Table 2. The result showed that the mean values of height and weight of the selected adolescent girls ranged from 135 -179 cm and 23-64 kg with the mean values of 149.66 cm and 39.77 kg, respectively. Further it is indicated from the table that BMI of adolescent girls ranged from 11.9 to 26.99 with the mean of 17.72. The mean value of mid upper arm circumference was 20.72 cm with the range of 15 to 34 cm. Weight of the adolescent girls were somewhat similar to those of height which fell below the NCHS standard values (Kumar *et al.*, 2006).

The mean values of hemoglobin content of adolescent girls of control and experimental group before and after IEC programme are given in Table 3. The mean values of hemoglobin content of control and experimental group before and after IEC were 9.31 and 9.50 g/dl and 9.32 and 10.21 g/dl, respectively. The increase in the haemoglobin (0.01 g/dl) was noticed at the end of experimental period in the control group which was not statistically significant. On the other hand, increase in the values of haemoglobin content (0.71 g/dl) of experimental group after implementation of IEC programme was statistically significant. Hence, it can be concluded from the results that IEC programme had positive effect in increasing the haemoglobin level of adolescent girls of experimental group.

Evaluation of knowledge of adolescent girls regarding food and nutrition is given in Table 4. From the table it was observed that after imparting IEC programme, the scores of nutrition knowledge improved when it was compared with the scores before imparting the IEC programme. The difference was statistically significant. Hence, it was concluded that, respondents require approach regarding nutrition education.

Table 2: Anthropometric measurements of the adolescent girls

Particulars	Height (cm)	Weight (kg)	BMI	MUAC (cm)
Range	135-179	23-64	11.9-26.99	15-34
Mean ±SD	149.66 ±5.87	39.77 ±6.35	17.72 ±2.45	20.72 ±2.59

Table 3 : Mean hemoglobin content of the adolescent girls before and after IEC programme

Particulars	Hemoglobin (g/dl)			
	Control group (150)		Experimental group (150)	
	Pre	Post	Pre	Post
Range	8.16-10.67	8.01-10.8	7.53-10.67	8.41-11.29
Mean ±SD	9.31 ±0.87	9.32 ±0.88	9.50 ±0.87	10.21±0.71
t value	0.13^{NS}		3.75**	

** indicate significance of value at P=0.01 NS= Non-significant

Table 4 : Evaluation of knowledge of adolescent girls regarding food and nutrition

Particulars	Control group (150)		Experimental group (150)	
	Pre	Post	Pre	Post
Mean ±SD	24.60 ±28.73	24.62±17.6	25.26 ±32.46	90.33 ± 4.7
t value	NS		6.27**	

NS=Non-significant ** indicate significance of value at P=0.01

Table 5 : Evaluation of aptitude of adolescent girls regarding food and nutrition

Particulars	Control group (150)		Experimental group (150)	
	Pre	Post	Pre	Post
Mean ±SD	10.36 ±12.41	40.03 ± 11.98	20 ± 7.51	84.53 ±3.68
t value	3.27**		11.37**	

** indicate significance of value at P=0.01

Evaluation of aptitude of adolescent girls regarding food and nutrition is presented in Table 5. The aptitude of experimental group regarding various messages was improved after imparting nutrition education. The significant increase in the aptitude scores of experimental group was observed whereas increase in the aptitude scores of control group was not significant statistically. Hence, it can be concluded that imparting nutrition education helped the experimental group in enhancing the aptitude level of the subjects than the control group.

Table 6 gives the information of evaluation of practice of adolescent girls regarding food and nutrition. The results indicated that significant increase in the scores of practice followed by experimental group. Pre and post evaluation scores of control group was not significant regarding practice followed. From the findings it was inferred that mean scores of experimental group regarding practice followed are more than that of control group when it was compared with initial scores.

Mean nutrient intake of adolescent girls of control group is depicted in Table 7. The nutrients such as energy, protein, fat, carbohydrate, minerals, crude fibre, calcium, iron and vitamin C were calculated. The mean values of intake of all the nutrients are not statistically significant

Table 6 : Evaluation of practice of adolescent girls regarding food and nutrition

	Control group (150)		Experimental group (150)	
	Pre	Post	Pre	Post
Mean ±SD	15.33 ±13.59	37.33 ±33.10	20.00 ±14.63	84.53± 12.92
t value	1.93^{NS}		10.90**	

NS= Non-significant ** indicate significance of value at P=0.01

Table 7: Nutrient intake of adolescents girl (Control group) (n=35)

Nutrient	Control group		
	Pre	Post	
	Mean ± SD	Mean ± SD	t value
Energy [Kcal]	1481.83 ±160.08	1560.3 ±174.34	1.96 ^{NS}
Protein [g]	44.14 ±2.22	46.94 ±8.91	1.80 ^{NS}
Fat [g]	47.25 ±13.04	56.43 ±24.03	2.01 ^{NS}
CHO [g]	216.31 ±28.03	242.45 ±73.35	1.97 ^{NS}
Minerals [g]	10.76 ±4.79	11.61 ±1.29	1.01 ^{NS}
Crude fibre [g]	10.81 ±3.06	12.12 ±2.54	1.95 ^{NS}
Calcium [mg]	762.77 ±241.15	803.81 ±194.67	0.78 ^{NS}
Iron [mg]	22.27 ±3.37	24.1 ±5.63	1.65 ^{NS}
Vitamin C [mg]	150.36 ±99.26	149.03 ±93.09	0.06 ^{NS}

NS=Non-significant

Table 8 : Nutrient intake of adolescents girl (Experimental group) (n=35)

Nutrient	Experimental group		
	Pre	Post	
	Mean ± SD	Mean ± SD	t -value
Energy [Kcal]	1536.0 5± 124.09	1779.74 ±148.4	7.45 **
Protein [g]	45.56 ±3.0	49.74 ±6.25	10.40 **
Fat [g]	48.02±5.93	53.39 ±6.81	3.52 **
CHO [g]	225.82 ± 28.62	261.22 ±29.21	5.12 **
Minerals [g]	9.64±1.25	12.51 ± 1.34	9.24 **
Crude fibre [g]	10.4±2.14	13.97 ±3.13	5.46 **
Calcium [mg]	705.10±205.17	880.99 ±186	3.76 **
Iron [mg]	22.01± 3.07	26.95 ±4.18	12.48 **
Vitamin C [mg]	164.46±1719.19	182.19 ±57.34	0.90^{NS}

NS=Non-significant ** indicate significance of value of at P=0.01

in control group.

Mean nutrient intake of adolescent girls of experimental group is given in Table 8. The nutrients such as energy, protein, fat, carbohydrate, minerals, crude fibre, calcium, iron and vitamin C were calculated.In conclusion, it can be said that the intake of all nutrients by the selected rural adolescent girls was less than Recommended Dietary Allowances. These findings correspond with results of Venkaiah *et al.* (2002) and Malhotra and Passi (2007) who also stated deficient nutrient intake by the adolescents. Varsha *et al.* (2008) also specified gross deficient intake of nutrients by their subjects. Shahin *et al*. (2015) result showed that the average energy consumption (kcal), protein and iron is very low in comparison to recommended dietary allowances (ICMR, 2010).

The mean values of pre and post evaluation of intake of nutrients were found statistically significant except vitamin C. The mean values of post intake of all the nutrients were increased than the pre values. Hence, it can be concluded that IEC programme had positive effect in the enhancement of nutrient intake of adolescent girls from experimental group. The results are in concurrence with the study by Saibaba *et al.* (2002) which revealed that use of educational aids through intervention have a positive effect on the nutritional knowledge of girls which may ultimately improve their nutritional status.

Conclusion:

The post exposure knowledge, aptitude and practice after imparting IEC programme was more than that of existing knowledge among the experimental group. Similarly IEC programme had positive effect in the enhancement of nutrient intake of adolescent girls from experimental group. Thus findings of the present study stress on imparting the nutrition knowledge and creating awareness regarding health and nutrition thereby achieving an improvement in the nutritional status of adolescent girls for better quality of life for next generation.

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