Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.5368

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (6):** 97-103 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Impact of Nutrition Education and Communication on Dietary Intake and Hemoglobin Level of Rural Adolescent Schoolgirls (age 13-16yrs)

Geetha K.*, Savita Hulamani and Shivaleela H. B.

University of agricultural sciences, AICRP-Home Science (Foods and Nutrition), GKVK, Bengaluru-65

*Corresponding Author E-mail: aicrpnutrition@gmail.com

Received: 2.08.2017 | Revised: 6.09.2017 | Accepted: 10.09.2017

ABSTRACT

Adolescence girls are more vulnerable to the effects of malnutrition, stunting, anemia etc, because of frequent erratic eating pattern, lack of nutritional knowledge and poor dietary habits. The present study is carried out to know the Impact of nutrition education and communication on dietary intake and Hemoglobin level of rural adolescent school girls (age 13-16yrs). Totally 965 adolescent school girls in the age group 13-16 years were selected and screened for their hemoglobin status of which 363 were found to be anemic based on their Hb content (<12g/dl). The subjects were further grouped into two groups' control (150) and experimental (150). Preliminary baseline information was collected from the subjects using pretested questionnaire and interviewing the adolescent girls. Diet survey for Ten percent of the subjects (control 35 and experiment 35) was carried out by 24 hr recall method using standardized cups and vessels for three consecutive days, both pre and post period of the study. Nutrition education was imparted only to the experimental group on various aspects of food namely food groups, nutritious balanced diet, deficiency disorder , sources of nutrients from foods ,RDA and RDI for adolescents girls, health, hygiene and sanitation utilizing locally available foods in daily diet, governmental and nongovernmental programmes aimed at adolescent girls. The present study revealed that IEC intervention could bring about a positive change in the overall well being of the rural adolescent girls. Hence, continued IEC will definitely have a positive effect on the health nutritional status who are future mothers and who are responsible for health of their family members.

Key words: *Rural adolescent school girls, IEC programme, Food intake, Diet survey*

INTRODUCTION

The word adolescent is derived from Latin word "adolescence" which means, "to grow" or "become mature". Almost one –fifth of the world's population is adolescent girls and 84 percent lives in developing countries[13].

A statistically significant increase in height (from 2.5 to 3.5 cm) and weight (1 to 1.5 kg) indicates some improvement in overall growth and development of adolescent girls over the past two decades.

Cite this article: Geetha, K., Hulamani, S., and Shivaleela, H.B., Impact of Nutrition Education and communication on dietary intake and Hemoglobin Level of Rural Adolescent Schoolgirls (age 13-16yrs), *Int. J. Pure App. Biosci.* **5(6):** 97-103 (2017). doi: http://dx.doi.org/10.18782/2320-7051.5368

Socio-economic and demographic factors still have an impact on adolescent growth and nutrition, as stunting decreased with increase in per capita income and land holding. Adolescent girls were thinner than adolescent boys. More than one-third of the girls were chronically energy-deficient and underweight. Adolescence is a vulnerable period in human lifecycle when nutritional requirements increase due to the adolescent growth spurt. This period is characterized by rapid increase in height, weight and hormonal changes resulting in sexual maturation[4]. Most girls begin a rapid growth spurt between the ages of 13 and 19 years. Nearly every organ in the body grows faster during this period, which lasts about 3 years. Adolescence, one of the nutritional stress periods of life with profound growth, comes with increased demands for energy, protein, minerals and vitamins[3]. In India, poor nutrition, early bearing and reproductive health complications compound the difficulties of physical development in adolescent girls[7].Adolescence girls are more vulnerable to the effects of malnutrition, stunting, anemia etc, because of frequent erratic eating pattern, lack of nutritional knowledge and poor dietary habits[2,11]. As a result of growth impaired and there may be an important public health problem in world[5,12]. According to Nurullal Alam *et al*[9] prelevance of adolescent statuary is 32% in India. According to NNMB, report[14],70 per cent and WHO reports 56 to 90 per cent of the Indian adolescent girls are anemic.

Nutritional education is an effective gauge to improve healthy dietary habits and food choice[13]. Increased physical activity combined with poor eating habits and the onset of menstruation constributes to accentuating the potential risk for adolescent's poor nutrition. In India, reproductive health of adolescent girls is very poor and they suffer from nutritional deficiency[10]. Thus, the present objectives of this study was to improve the nutritional status through Information, Education and Communication (IEC) intervention raising nutritional awareness among rural adolescent school girls.

MATERIALS AND METHODS

Selection of school: This study was a community based cross sectional study and was carried out over a period of six months. List of schools in Bengaluru north and Doddaballapur taluk of Bengaluru rural district, Karnataka, India, were collected from the concerned block education officer, of which nine schools were selected based on their total number of students, convenience and co-operation of the school authorities to carry out the study. After selection of schools, consent forms from the parents school authorities and the adolescent girls where for willing to participate in the IEC programme was obtained.

Selection of subjects: Totally 965 adolescent school girls in the age group 13-16 years were selected and screened for their hemoglobin status of which 363 were found to be anemic based on their Hb content (<12g/dl). The subjects were further grouped into two groups' control (150) and experimental (150).

Data collection: Preliminary baseline information was collected from the subjects using pretested questionnaire and interviewing the adolescent girls.

Diet survey : Diet survey for Ten percent of the subjects (control 35 and experiment 35) was carried out by 24 hr recall method using standardized cups and vessels for three consecutive days, both pre and post period of the study. Nutrition education was imparted only to the experimental group on various aspects of food namely food groups, nutritious balanced diet, nutritional deficiency disorder , sources of nutrients from foods, RDA and RDI for adolescents girls, health hygiene and sanitation utilizing locally available foods in daily diet, governmental and nongovernmental programmes aimed at adolescent girls. IEC a tool for nutrition education was carried out for the control group through personal and group discussion, using various audio visual aids such as charts leaflets, posters visual presentations, lecture cum demonstration then distribution seeds and seedlings to encourage nutritional garden in their back yard. For the effective retention of the information by the

subjects various competitions such as debuts, quiz and skits were organized.

RESULTS AND DISCUSSION

Table1and 2 represented the anemic status of the subjects under study where 63 percent of the subjects were found to be mildly anemia with Hb level (11.0-11.9g/dl) followed by 34.3percent with moderate anemia (8-10.9g/dl) and 2.7 percent were severely anemia (<8g/dl). The mean Hb level of the subjects under study was 10.9g/dl±1.03.

Table 1: Classification of subject according to Hemoglobin level

Anemic status	Number	Percentage (%)
Mild (11.0-11.9g/dl)	189	63
Moderate (8.0-10.9g/dl)	103	34.30
Severe (<8g/dl)	8	2.7
Total	**300**	**100**

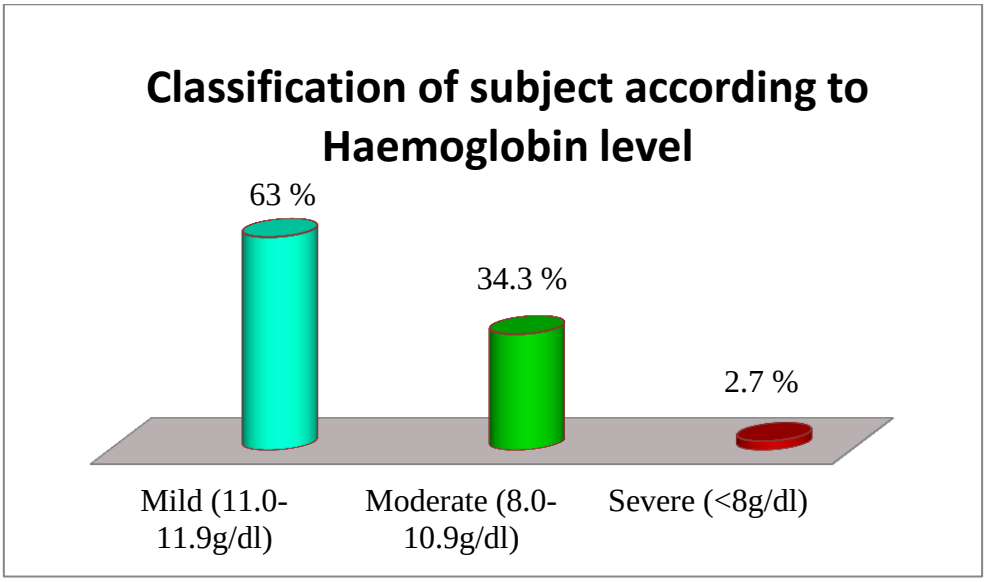

Fig. 1: Classification of subject according to Hemoglobin level

Table 2: Impact of IEC on Hemoglobin status of adolescent girls

Period	Experimental	Control
Pre	10.90±1.10	10.92±0.95
Post	11.60±0.25	10.33±0.91
't' value	6.9E-13	0.0E-26

Table 3: Mean food intake of control and experimental group before intervention

Food groups	RDA, ICMR 2010	Control group		Experimental group	
		Actual intake	% Deficit/excess	Actual intake	% Deficit/excess
Cereals (gm)	300	339.4	+13.1	359.8	+19.9
Pulses(gm)	60	34.7	-42.2	41.0	-6.3
Green leafy vegetables (gm)	100	40.0	-60.0	44.5	-18.5
Other vegetables (gm)	100	57.2	-42.8	57.8	-14.1
Roots and tubers(gm)	100	39.9	-60.1	44.0	-18.7
Fruits(gm)	100	83.1	-16.9	89.6	-3.5
Milk and milk products (ml)	500	150.4	-69.9	168.7	-110.4
Fats and oils (gm)	25	20.0	-20.0	20.7	-1.4
Sugar and jaggary (gm)	30	22.8	-24.0	24.8	-1.7

Table 4: Mean food intake of control and experimental group after intervention

Food groups	RDA, ICMR 2010	Control group		Experimental group	
		Actual intake	% Deficit/excess	Actual intake	% Deficit/excess
Cereals (gm)	300	270.9	-9.7	384.2	28.1
Pulses(gm)	60	32.7	-45.5	41.8	-30.3
Green leafy vegetables (gm)	100	34.7	-65.3	51.9	-48.1
Other vegetables (gm)	100	98.6	-1.4	62.2	-37.8
Roots and tubers(gm)	100	40.9	-59.1	47.1	-52.9
Fruits(gm)	100	99.7	-0.3	103.7	3.7
Milk and milk products (ml)	500	53.6	-89.3	152.1	-69.6
Fats and oils (gm)	25	19.0	-24.0	31.0	24.0
Sugar and jaggary (gm)	30	22.4	-25.3	25.2	-16.0

Table 5: Mean Food intake of control and experimental group of adolescent school girls N=35

Food Groups	Control group		Experimental group	
	Pre	Post	Pre	Post
Cereals (gm)	339.4	270.9	359.8	384.2
Pulses (gm)	34.7	32.9	41.0	41.8
Green leafy vegetable (gm)	40.0	34.7	44.5	51.9
Other vegetable (gm)	57.2	98.6	57.8	62.2
Roots and Tuber (gm)	39.9	40.9	44.0	47.1
Nuts and oils (gm)	15.9	21.9	20.0	22.1
Condiments (gm)	12.4	14.8	13.9	12.5
Fruits (gm)	83.1	99.7	89.6	103.7
Fish (gm)	0.0	0.0	0.0	1.9
Meat and poultry (gm)	20.9	69.0	21.5	34.0
Milk and Milk products (ml)	150.4	53.6	168.7	152.1
Sugars (gm)	22.8	19.0	24.8	31.0
Fats and oils (gm)	20.0	22.4	20.7	25.2
'r' value	0.91		0.99	
't' value	0.42 NS		1.86 NS	

The mean food intake of control and experimental group before intervention programme is as presented in **table 3**. The mean intake of all the food groups except for cereals was found to be deficit in both the groups before the intervention. The intake of milk and milk products was nearly 70 percent deficit in control and 66 percent in experimental group. The intake of vegetable was almost 50 per cent deficit in both the groups.

The mean food intake after the intervention period is as depicted in **table 4.** The intake of all the food groups was found to below RDA in control group where as in experimental group the intake of cereal , fruits, sugars, fat and oils was meeting the RDA and the intake of remaining foods continued to be lower than the RDA. Similar observation has been reported by Sujata.K and Kousalya .S[15] and Kamalaja *et.al*[6]. There was a decrease in the mean intake of most of the foods in the control group from pre to post intervention period was presented in **table 5**. But in the experimental group except for milk intake, the intake of all the foods was found to be slightly increased from pre to post. However, statistically' test indicated non-significant in the intake of foods from pre to post intervention period in both the groups. There was a association between IEC and in the mean intake of foods from pre to post period As indicated by 'r' value in both groups.

The mean nutrient intake by the control and experimental group before intervention is as presented in **table 6**. The mean intakes of fat, calcium, thiamine, vitamin 'c' were meeting the RDA. However, the intake of the visible fat was below RDA. The intake of invisible fat from other foods would have contributed to the excess intake of fat. The intake of calcium was also on the positive side because; ragi rich in calcium was a staple food for the subjects, which has contributed to calcium. Similarly, vitamin 'c' was adequate due to the intake of adequate fruits especially tomato, guava as they are locally grown consumed in the study area. A similar finding on the nutrient intake by the adolescent girls has been reported by Kamalaja *et.al*[6], Aazam doust Mohammad *et al*[1]. The post intervention nutrient intake is as presented in **table 7** except for the intake of thiamine fat, vitamin "C", calcium, iron and folic acid continued to be below RDA in both the groups. However, the intake of energy and protein was found to be adequate in addition to calcium, vitamin 'c' and thiamine in the experimental group.

The impact of intervention and without intervention on the intake of nutrients was presented in **table 8**.The results indicated that the lack of awareness, knowledge and practice on dietary habits and health has definitely had negative effect on their nutrient intake. Though not significant IEC intervention was found to bring about positive changes in the dietary intake of nutrients but still the changes was found to be non significant as indicated by 't'. Tarvinder Jeet kaur *et. al.*[16], and Kamalaja *et. al.*[6] have reported similar findings.

Table 6: Mean nutrient intake of control and experimental group before intervention

Nutrients	RDA, ICMR 2010	Control group		Experimental group	
		Actual intake	% Deficit/excess	Actual Intake	% Deficit/excess
Energy(k.cal)	2330	2180	-6.4	2366	+1.5
Protein (g)	51.9	49.8	-0.1	54.9	+5.8
Fat(g)	40.0	41.3	0.1	45.1	+12.8
Iron(mg)	27.0	16.8	-0.4	18.4	-31.9
Calcium(mg)	800	995.9	8.4	1092.3	+36.5
Beta Carotente(µg)	4800	3403	-60.0	3711	-22.7
Thiamine(mg)	1.2	1.6	0.0	1.7	+41.7
Riboflavin (mg)	1.4	1.0	0.0	1.1	-21.4
Niacin(mg)	14	10.1	-0.2	11.1	-20.7
Vitamin 'c'(mg)	40	53.0	0.6	58.0	+45
Folic acid(mg)	150	118.2	-1.4	131.0	-61.3

Table 7: Mean nutrient intake of control and experimental group after intervention

Nutrients	RDA, ICMR 2010	Control group		Experimental group	
		Actual intake	% Deficit/excess	Actual Intake	% Deficit/excess
Energy(k.cal)	2330	1880	-19.31	2527	+8.45
Protein (g)	51.9	42.7	-17.73	57.6	+10.98
Fat(g)	40.0	47.5	+18.75	51.7	+29.25
Iron(mg)	27.0	17.2	-36.30	20.0	-25.93
Calcium(mg)	800	812.5	+1.56	1153.3	+44.16
Beta Carotente (µg)	4800	3540.5	-26.24	4430	-7.71
Thiamine(mg)	1.2	1.6	+33.33	1.9	+58.33
Riboflavin (mg)	1.4	1.0	-28.57	1.2	-14.29
Niacin(mg)	14	9.8	-30.00	11.9	-15.00
Vitamin 'c'(mg)	40	57.6	+44.00	67.3	+68.25
Folic acid(mg)	150	116.2	-22.53	143.4	-4.40

Table 8: Impact of IEC on Nutrient intake of control and experimental group

Nutrients	Control group (N=35)		Experimental group (N=35)	
	Pre (Mean)	Post(Mean)	Pre (Mean)	Post(Mean)
CHO (gm)	335.8	288.7	360.7	389.0
Protein (gm)	49.8	42.7	54.9	57.6
Fat (gm)	41.4	47.5	45.1	51.7
Total minerals (gm)	10.1	9.4	11.0	11.8
Crude fibre (gm)	10.0	10.1	10.9	11.7
Energy (kcal)	2181.0	1880.0	2366.0	2527.0
Calcium (mg)	995.5	812.5	1092.3	1153.3
Phosphors (mg)	1227.7	1204.4	1341.9	1428.4
Iron (mg)	16.8	17.2	18.4	20.0
Vitamin C (mg)	53.0	57.6	58.0	67.3
Beta-carotene **(µg)**	3403.2	3540.5	3711.8	4430.0
Ratinol **(µg)**	1701.6	1770.3	1855.9	2149.0
Thiamine (mg)	1.6	1.6	1.7	1.9
Riboflavin (mg)	1.0	1.0	1.1	1.2
Niacin (mg)	10.1	9.8	11.1	11.9
Folic acid (mg)	118.2	116.2	131.4	143.4
'r' value	**0.99**		**0.99**	
't' value	**0.89NS**		**1.85 NS**	

CONCLUSION

Adolescent girls often lack basic information on health, food and nutrition. It is more so among rural adolescents as they lack access to require information due to several reason such as lack of mass media like TV radio and newspaper, lack of information on government and non-government programmes available for health and well-being of adolescents. In addition to their poor purchasing capacity, poor access to nutritious food, false beliefs and taboos all add to the poor nutritional of the adolescent girls . However, effective communication and nutrition education can play a significant role to enhance their nutritional awareness and good health. The present study revealed that IEC intervention could bring about a positive change in the overall well being of the rural adolescent girls. Hence, continued IEC will definitely have a positive effect on the health nutritional status who are future mothers and who are responsible for health of their family members.

REFERENCES

1. Aazam Doustmohammadian1, Seyed Ali Keshavarz, Sorayya Doustmohammadian, Eelizabeth, B. M., Developmental psychology: a life span approach, 5th Edn Tata Mc Graw Hill (2000).
2. Gaikwad Surekha Ramrao, Impact of nutrition education on adolescent girls of Purna Maharashtra. Adv. *Appl. Sci. Res.*, **4(1):** 386-391 (2013).

3. Gopalan C, Sastri B.P and Balasubramanian S.C, Nutritive Value of Indian Foods. Hyderabad: *National Institute of Nutrition* (ICMR) (2001).
4. Gupta S. Adolescence- The Trouble Years in a Girl's Life. New Delhi: *Joyorsha Publishers.* (1990).
5. Kalhan, M., Vashisht, B.M., Kumar, V. and Sharma, S., "Nutritional status of adolescent girls of rural Haryana", *The Internet J of Epidemiology,* **8(1):** (2010).
6. Kamalaja T., Prashanti M, and Uma Maheshwari. K , Impact of food based strategies on nutrient intake of rural adolescent girls, *Indian joural of Nutrition*, **3(2)**: 135 (2016).
7. Manford A and Picciano M. Nutrition for teenage girls.*Nutrition*, **56:** 86 – 89 (2000).
8. Mitra Abtahi and Minoo Shahani, Nutritional status and dietary intake among adolescent girls *Journal of Paramedical Sc iences (JPS)* Supplement ISSN 2008-4978.**4:** (2013).
9. Nurul Alam, Swapan Kumar Roy, Tahmeed Ahmed, and A.M. Shamsir Ahmed Nutritional Status, Dietary Intake, and Relevant Knowledge of Adolescent Girls in Rural Bangladesh. *J Health PopulNutr*. **28(1):** 86–94 (2010).
10. Parimalavalli R., Sangeetha M. and Shanmugapriya VP, .Nutrition education on reproductive biology in post pubescent girls belonging to slum area. *Research Highlights*, **17(2):** 69-73 (2007).
11. Prashant K. and Chandan S., Nutritional status of adolescent girls from an urban slum area in South India. *Indian Journal of Paediatrics*, **76:** 501-504 (2009).
12. Pratibha Patanwar, and Kkn Sharma , Nutritional status of Kurmi adolescent girls of Raipur city Chhattisgarh, India. *International Journal of Scientific and Research Publications*, **3(11):** November (2013).
13. Raghunatha Rao, D., Vijayapushpam,T. G., Subba Rao, M., Antony, G. M., and Sarma, K. V. R. Dietary habits and effect of two different educational tools on nutrition knowledge of school going adolescent girls in Hyderabad, India. *European Journal of Clinical Nutrition* **61**: 1081–1085 (2007).
14. Studies on adolescent girls An Analytical Review *National Institute of Public Cooperation and Child Development* **5:** Siri Institutional Area, Hauz Khas, New Delhi-110016.
15. Sujatha K. and Kowsalya S. Socio economic and dietary assessment of anaemic adolescent girls (13-18yrs) in rural coimbatore. . *Int. j. adv. res.* **4(11):** 1628-1633 (2016).
16. Tarvinder Jeet Kaur, G.K. Kochar and Taru Agarwal, Impact of Nutrition Education on Nutrient Adequacy of Adolescent Girls, Stud, *Home Comm. Sci.*, **1(1):** 51-55 (2007).