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RESEARCH ARTICLE

IMPACT OF NUTRITION EDUCATION ON KNOWLEDGE LEVEL AND HAEMOGLOBIN STATUS AMONG ADOLESCENT GIRLS

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ABSTRACT

Background: Adolescence is a key phase of human development. The rapid biological and psychosocial changes that take place during the second decade affect every aspect of adolescents' lives. Thus growth spurts, menarche, poor diet and no added iron supplementation puts them into the high-risk category of iron deficiency anemia. Nutrition knowledge and nutrition education is considered a long term approach to combat iron deficiency and anaemia.

Objective: Hence an effort made to assess the impact of nutrition education on knowledge level and heamoglobin status among the adolescent girls.

Methods: A group of 138 adolescent girls in the age group of 13-16 years studying in 8th, 9th and 10th standard with mild to moderate anaemic status was selected from a Government school. A lecture for 45 minutes was delivered using visual aids followed by discussion and reassessment of knowledge after the nutrition education class. Such classes were conducted thrice a week for 3 months. To assess the nutrition knowledge level of respondents, a schedule of 50 questions was developed and the tool was administered thrice during the study period initial (before education), soon after the nutrition education and three months later. And the respondent's heamoglobin level was assessed before and after the education intervention programme.

Results: Education intervention showed a significant increase in the mean scores on knowledge level from 14.79 before the intervention to 31.38 immediately after the intervention. The improvement in the knowledge level among the respondents after education intervention was found to be significant as there was a shift in the knowledge level of respondents from inadequate (94 %) to moderate (52%) and adequate (25%) levels after the education intervention programme. There was a shift in the heamoglobin level from moderate to mild range among the respondents. Education intervention was found to be an effective method in improving the knowledge level among the respondents, which in turn helped in improving the heamoglobin status.

Conclusion: Focused nutritional education intervention, correcting dietary habits in this group results in dietary changes and practices that ultimately improve the iron status.

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INTRODUCTION

Adolescence marks the developmental transition from childhood to adulthood, a time when many important social, economic, biological, and demographic events set the stage for adult life. Adolescent girls (age 10-19 years) are at high risk of iron deficiency and anaemia due to increased iron demands during puberty, menstrual losses and poor dietary intake, high rate of infection and worm infestation as well as the social norm of early marriage and adolescent pregnancy.

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Nutrition knowledge and nutrition education is considered a long term approach to combat iron deficiency and anaemia.

Nutrition education is equally important as that of any education as it helps to build up good nutritional status, firstly the school children, the future youth and thus the educated community, thereby increasing the work output and on the whole benefits the national economy. Nutrition education programmes will need to pay special attention to address the issue of iron deficiency within different population groups with varying dietary habits, socio-economic situations and nutritional and health status. It is important to incorporate nutrition and health education into the curriculum of primary education which considers priority nutrition issues affecting

Table 1. Mean scores on knowledge level of respondents(n=138)

Assessment	score		Paired 't' Test
	Mean	SD	
Pre test	14.79	5.0	
Post test	31.38	8.8	27.80**
Difference	16.59	7.0	
Post test	31.38	8.8	
After 3 months of post test	28.02	8.8	17.92**
Difference	3.36	2.2	

** Significant at 1% level

Table 2. Knowledge level of the respondents (n=138)

Knowledge Level	Respondents					
	Pre test		Post test		After 3 months of post test	
	N	%	N	%	N	%
Inadequate (< 25 score)	130	94.2	33	23.9	47	34.1
Moderate (26-37.5 score)	8	5.8	71	51.4	70	50.8
Adequate (> 37.5 score)	0	0.0	34	24.6	21	15.2
Total	138	100.0	138	100.0	138	100.0
$\chi 2$ Value	-		Pre to post test (139.48*)		Post test to After 3 months (5.72^{NS})	

* Significant at 5% Level, NS: Non-significant, $\chi 2$ (0.05, 2 df) = 5.991

children and their families in the country. It is also coherent with the national health and nutrition policy (Food and Agriculture Organization, 2013a). There is dearth of information about the impact of school-based health nutrition education on nutritional anemia among school children. Hence an effort made to assess the impact of nutrition education on knowledge level and heamoglobin status among the adolescent girls.

MATERIALS AND METHODS

Purposive random sampling method was adopted for the selection of the study population. All the students in the age group of 13-16 years studying in 8^{th}, 9^{th} and 10^{th} standard, Government High school, Uttarahalli, Bangalore Urban District, Karnataka, India were screened for anaemic status. Nutrition education intervention programme was given to a group of 138 children with mild to moderate anaemic status. The respondents of education intervention group further divided in to 2 groups with 69 respondents in each group, to make more effective way to reach the respondents for the education intervention as the number was more. A lecture for 45 minutes was delivered using visual aids followed by discussion and reassessment of knowledge after the nutrition education class. Such classes were conducted thrice a week for 3 months. The visual aids like video clippings, power point presentations, flash cards, posters, exhibition, quiz competition and display of raw foods were the part of nutrition education. A study material was also formulated to assist the study group.
To assess the nutrition knowledge level of respondents, a schedule of 50 questions including multiple choice and true or false questions regarding basic nutrition and about iron, its functions, food sources, iron deficiency anaemia, consequences of anaemia and preventive measures for the same was developed. The tool was administered thrice during the study period initial (before education), soon after the nutrition education and three months later. The respondents knowledge level on adherence to basic nutrition, adolescent nutrition and importance of iron was further classified as low, medium and high based on mean +1/2 SD. Haemoglobin estimation was carried out as a part of biochemical assessment before and after the intervention programme. Random venous blood samples (2 ml) were drawn using disposable syringes (No.22) with the assistance of a qualified laboratory technician. Haemoglobin levels of respondents were estimated by cyanmethaemoglobin method. Permission for conducting experimental study was obtained from the school authorities prior to commencement. An informed consent was obtained from all the parents of the respondents for participating in the study. Ethical clearance was obtained from Institutional Human Ethical Committee (IHEC), Department of Food and Nutrition, Research Centre (NEEC BU004Ph.D/Project/2013-14), Smt.VHD Central Institute of Home Science, affiliated to Bangalore University, Bangalore for conducting human trails.

Statistical analyses

The data classified, tabulated and expressed as percentage, mean $\pm$SD. The results were analysed statistically using Anova, Freidman's two way analysis of variance, correlation and 't' test determine whether there is any significant change in the parameters of the respondents before and after the study.

RESULTS AND DISCUSSION

Three months nutrition education to adolescent girls was planned and the results of the study are presented. The impact of nutrition education on the knowledge level of the respondents is presented in Table 1 and Fig.1. The mean score of the respondents before education intervention was 14.79, whereas the score was found to be 31.38 immediately after the intervention, the increment was found to be highly significant ($P<0.01$). Nutrition education showed a significant increase in the knowledge scores of experimental group, whereas control group also showed slight an increase in knowledge scores, which was not significant. There was a significant enhancement in the mean scores in the post test compared to pre test with a nutrition education thrice a week with duration of 45 minutes, effective use of audiovisual aids on different nutrition topics had a substantial impact on the improvement in the knowledge level. The retention of knowledge level was tested after 3 months of education intervention and the results revealed that the mean score of the respondents was 28.02. Paired 't' Test revealed that the difference in the mean scores of the respondents between immediately after the education intervention and 3 months later was found to be highly

significant. This could be because they were constantly teaching and revising in classes, since the nutrition for their own health, ideas about dietary practices were strongly imprinted in their mind and concepts were very strong and they were confident. The respondents were classified based on the scores obtained before, immediately after the education and one month later. The classification was made as low, medium and high based on mean ±1/2 SD. The results of the same are presented in Table 2.

%) decreased to 5.8 % after the education intervention. The increase in the haemoglobin among the respondents of education intervention group may be due to improvement in nutrition knowledge and thereby healthy dietary practices might led to improve heamoglobin level among education intervention group. This may be even due to educational intervention, which might encouraged the consumption of green leafy vegetables and other protective foods in their dietaries.

Table 3. Impact of education intervention programme on heamoglobin status of the respondents

Haemoglobin status	Subjects							
	Education intervention (n=138)				Control (n=42)			
	Before		After		Before		After	
	N	%	N	%	N	%	N	%
Moderate (8-9.9 g/dl)	16	11.6	8	5.8	0	0.0	0	0.0
Mild (10-11.9 g/dl)	122	88.4	126	91.3	0	0.0	2	4.8
Normal (12&>12g/dl)	0	0.0	4	2.9	42	100.0	40	95.2
$\chi 2$ Test	6.73*				2.05 ^{NS}			

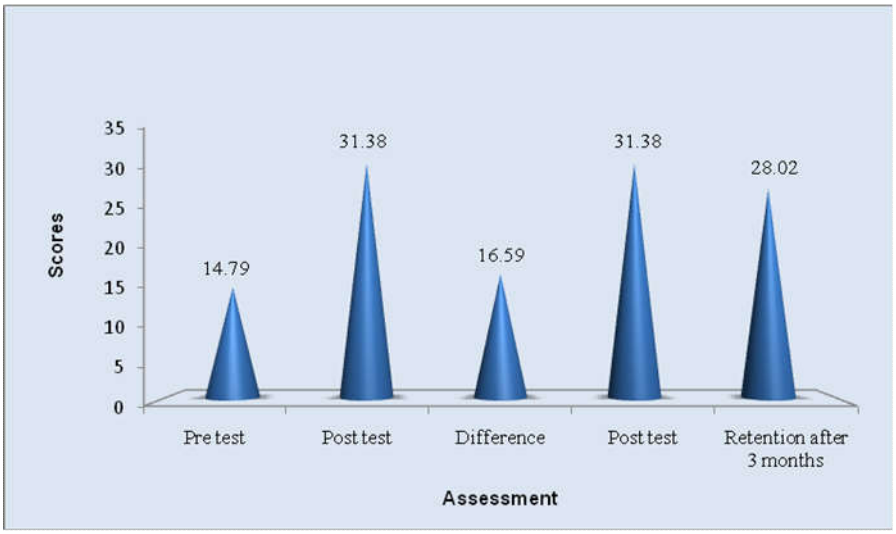

Fig. 1. Mean scores on knowledge level of respondents of nutrition education group

There was an enhancement of inadequate knowledge level in pre test to moderate knowledge level in post test. Before the education intervention programme majority of the respondents (94%) had inadequate knowledge level (< 25 score). Assessment of the knowledge immediately after the education programme revealed that there was a shift in the knowledge level of respondents from inadequate (94 %) to moderate (52%) and adequate (25%) levels. The improvement in the knowledge level among the respondents after education intervention was found to be significant (P<0.05). Three months later, the knowledge level was reassessed using the same questionnaire which revealed that, the retention of moderate level of knowledge was 50 percent among the respondents and the difference was found to be non significant reflecting that the retention of knowledge is quite satisfactory during follow up assessment. This could be due to repeated sessions of nutrition education at the time of intervention period. Impact of education intervention programme on haemoglobin status of the respondents is depicted in Table 3. The significant improvement in the haemoglobin levels was observed after the education intervention programme compared to the haemoglobin status before the intervention. There was a shift in the heamoglobin status from moderate to mild in the respondents of education intervention group. The number of respondents with moderate haemoglobin level (11.6

Nutrition education is an instructional method that promotes healthy behaviours by imparting information that individual can use to make informed decision about food, dietary habit and health (Moore, 2002). The students in the education intervention group reported more positive attitudes about food and eating when compared with the control group post-intervention, after nutrition education occurred twice a week after school conducted by a certified science teacher over the course of 8 weeks (Whiting, 2014). Knowledge regarding nutritious diet & disorders improved significantly after health education among college students (Patel, 2013). Nutrition education is an appropriate, effective and sustainable approach to combat iron deficiency anemia, who observed improvement knowledge score after imparting nutrition education (Jyotikumari and Dubey, 2016). There was a gain in KAP scores by one and a half time after the nutrition counseling [6].
This calls for educationists and policy makers to include nutrition education in the school and college curriculum for the improvement of health and nutritional status of the youth who are future leaders of the country.

Conclusion

Education intervention was found to be an effective method in improving the knowledge level among the respondents, which in turn helped in improving the heamoglobin status. The

retention of knowledge was quite satisfactory even after 3 months of completion of education intervention programme. Focused nutritional education intervention, correcting dietary habits in this group results in dietary changes and practises that ultimately improve the iron status. This helps the young girls on long term in improving their health and nutritional status as they are procreators in future.

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