

IMPACT OF NUTRITION EDUCATION ON THE HEALTH STATUS OF SCHOOL GOING GIRLS

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ABSTRACT

Childhood nutrition should be a balance between the high energy and nutrient content required for growth and development and establishing a healthy diet with weight control, in association with regular physical exercise. The balance between these two aspects changes from the very high fat content of infancy to the low-fat, high-fibre diet of adulthood. The diet for a child should be focused on natural, fresh sources of energy and nutrients. Drastic dieting must be avoided. A positive attitude to healthy eating should be encouraged from an early stage. Sixty girls of age group 7-9 Years belonging to low Socio economic group in Yamunanagar district of State Haryana were divided equally into control (C) and experimental (E) group. The experimental group comprised of 30 girls and they along with their mothers were imparted nutrition counseling twice a month for a period of four months. Assessment of nutritional status was done before and after imparting nutrition counseling. The mean height of subjects in C and E group was 116.1cm and 117.1 cm in the beginning of the study and 116.2cm and 117.9 cm at the end. The average weight of subjects in both the groups was 20.1 kg in the beginning which significantly increased to 21.7 kg in E group after nutrition counseling. However, all the indices were lower than the standard parameters. Thus it can be inferred that nutrition counseling should be imparted for a longer duration and should be included in school curriculum.

Key words—Nutrition counseling, Nutritional status, height, weight

Introduction

Indian infants begin life with a disadvantage due to poor intrauterine growth; at birth one third of Indian infants are underweight and wasted and 20 per cent are stunted. Maternal factors associated with low birth weight (LBW) such as low maternal height and low pre-pregnancy weight cannot be modified during pregnancy. In India, weight for age has been the most widely used indicator for assessment of nutritional status, detection of undernutrition and monitoring the improvement following interventions in children. The question whether in Indian children with high stunting rates due to past chronic undernutrition, BMI for age is a more appropriate indicator for assessment of current undernutrition and improvement following interventions is often debated among nutrition scientists in the country. While there is global acceptance that body mass index (BMI) should be used for assessment of obesity/adiposity in children¹⁹, there has not been a similar consensus regarding use of BMI for assessment of under nutrition in children. To develop to their optimal potential, it is vital that children are provided with nutritionally sound diets. Diet and exercise patterns during childhood and adolescence may spell the difference between health and risk of disease in later years. Different stages of the life cycle dictate differing nutrient needs. Dietary habits, which affect food preferences, energy consumption and nutrient intakes, are generally developed in early childhood. The home and school environments play a major role in determining a child's attitude and the consumption of individual foods. Growing children being exposed to periodic food fads and slimming trends, tend to skip meals and develop irregular eating

habits. One of the most frequently missed meal is breakfast. Studies show that breakfast plays an important role in providing needed energy and nutrients after an overnight fast and can aid in concentration and performance at school. Snacks generally form an integral part of meal patterns for both children and teenagers. Younger children cannot eat large quantities at one sitting and often get hungry long before the next regular mealtime. Mid-morning and mid-afternoon snacks can help to meet energy needs throughout the day. Fast-growing and active children often have substantial energy and nutrition needs and the teaching of food and nutrition in the school curricula will enable children to have the knowledge to make informed choices about the foods in their regular meals and snacks.

Nutrition plays a vital role as inadequate nutrition during childhood may lead to malnutrition, growth retardation, reduced work capacity and poor mental and social development (Awasthi and Kumar,1999) . Incidence of anemia in developing countries is high and its prevalence is mostly attributed to iron deficiency and other nutritional deficiencies indicating more prevalence among the low income group. Imparting nutrition education to mothers helps to improve the dietary status of the family as mothers concept about balanced diet and how to provide it, can be changed with the improvement in nutrition knowledge of mothers ,nutritional status of children also improves .Nutrition education also needs to be included in school curriculum as children are better able to retain nutrition knowledge gained at school level ,when it is reinforced by favorable conditions in the home (Variyam *et al.*,1999).**Keeping this in view ,the present study was conducted to see the impact of nutrition counseling on the anthropometric measurements of school going girls.** Normally, the energy requirements of children tend to parallel with their growth rate, and individuals meet their energy needs by means of their appetite with adequate precision. As a result, majority of them maintain energy balance, and a varied food intake provides sufficient nutrients to ensure optimal growth and development. Stress and emotional upsets however can seriously affect the energy balance in children, resulting in the consumption of too little or too much food. Mild or severe infections, nervousness, dental or skin problems (acne) can result in alterations of appetite, and those on marginal diets are the most vulnerable. Emotional stress is often associated with food faddism and slimming trends, both of which can lead to eating disorders such as anorexia nervosa. On the other hand, the prevalence of overweight and obesity in children and adolescents is now a major nutritional problem and the condition is likely to persist into adulthood. Developing children are particularly concerned about their body image and excessive weight can have profound effects on their emotional well being as well as on their physical health. The cause of obesity is multifactorial and socio-economic, biochemical, genetic, and psychological factors all closely interact. Lack of activity plays an important role in the development, progression and perpetuation of obesity during childhood.

Surveys of young people have found that the majority is largely inactive and health professionals and governments are now encouraging higher levels of physical activity among children and adolescents. Physical inactivity does not only have a prime role in the development of overweight and obesity, but also on the development of chronic diseases such as heart disease, certain cancers, diabetes, hypertension, bowel problems and osteoporosis in later life. In addition, physical activity is related to improvements in body flexibility, balance, agility and co-ordination and strengthening of bones. The current recommendation is for children to try to be physically active for at least 60 minutes daily.

MATERIALS AND METHODS

For the study sixty girls of 7-9 years belonging to low socio economic group were selected randomly from two Government Schools of Yamunanagar district .They were divided into Experimental (E) and control (C) Group Comprising of 30 girls each .Girls in Experimental Group along with their mothers were imparted nutrition counseling twice a month for a period of four

months through lecture cum – discussion method with the use of charts ,posters and demonstrations .Interview –cum-questionnaire method was used for collecting background information of the subjects. Anthropometric measurements like height ,weight, Mid upper Arm Circumference (MUAC) and Triceps Skin Fold Thickness (TSFT) of the school girls were recorded before and after nutrition counseling using the techniques given by Jelliffe(1966) .Data was analyzed statistically .Mean and standard error were calculated for each variable .Comparison of anthropometric parameters of subjects in E and C group was done . Monitoring of growth by serial measurements of anthropometric parameters particularly height and weight are routinely used to assess the nutritional status of a child. At the community level, it is used to identify children who might benefit from a nutrition or medical intervention. These assessments are usually made using the NCHS data as a reference standard upto 10 years of age. There is however no agreement on the parameters to be used for the assessment of growth and development in adolescence as there exists a wide variation amongst different populations in time of onset of puberty. These anthropometric parameters are therefore compared with a cross-sectional study conducted by the ICMR in the seventies as well as with the growth of affluent children of India and the NCHS standard

RESULTS AND DISCUSSION

The anthropometric parameters of school girls is presented in Table 1

Height -The mean height of the respondents in C and E Group before counseling was 116.1cm and 117.1 cm and after nutrition education it increased to 116.2cm and 117.9 cm respectively. The difference in average height of the subjects in E group before and after Nutrition Counseling (NC) was statistically non –significant .It is evident from Table II that the height of the respondents was 92.64 percent of NCHS standards in E Group before counseling that increased to 93.27 percent after counseling for 4 months. These findings were supported by Sangha *et al.* (1999) who reported that mean height was 90 percent of NCHS standards in primary school children in Ludhiana.

Table III indicates that before counseling 16.7 percent girls were in normal category in E group ,which increased to 20 percent after nutrition counseling while there was no change in C group .Also an increase in percentage of respondents having mild malnutrition was observed in E group after Counseling. However percentage of respondents decreased in moderate and severe malnutrition category in E group after Nutrition education .The impact of Nutrition education was evident as more respondents in E group shifted to normal and mild malnourished category with none of the respondents in severely malnourished category .Dutta and Kumar (1997) also reported similar findings that in Uttar Pradesh ,20 Percent primary school children were normal and remaining were suffering from different grades of malnutrition.

Weight: Table IV shows that before imparting nutrition education the mean weight of the respondents in C and E group was same i.e. 20.1 kg and after counseling the weight of the girls in E group significantly ($P<0.05$) increased to 21.7 kg while in C group no significant change was observed .Both the groups were having less weight as compared to NCHS and ICMR standards. Weight of respondents in E group was 80.3 percent of NCHS standards before counseling which increased to 86.7 percent after imparting nutrition education.

Table V shows the distribution of respondents according to Gomez Classification of weight for age . Before counseling, 16.7 Percent and 23.3 percent school girls in C and E group, respectively were in normal category which significantly increased to 33.3 percent in E group after counseling, while no significant change was observed in C group. After imparting nutrition education, the percentage of respondents in mild malnutrition category increased whereas and in moderate malnutrition category decreased. Similar to present findings 25 percent girls of Kumaon

hill were normal (Awasthi and Kumar, 1999) rest were suffering from different grades of malnutrition.

Mid Upper Arm Circumference (MUAC) –Table VI shows that the mean MUAC of school girls in C and E group was 14.9cm and 15.3 cm before counseling and the corresponding values were 15.1cm and 15.8 cm after imparting nutrition education which were less than the Jelliffe (1966) standards of 18.43 cm .A significant ($p<0.05$) increase to 85.72 percent was noted after counseling. Similar findings were reported by Parvathi and Poorani (1991); Awasthi and Kumar (1999) .

Table 1 : Anthropometric profile of respondents

Parameters	Before counseling		After counseling		t-value
	Control (n = 30)	Experimental (n = 30)	Control (n = 30)	Experimental (n = 30)	
Height (cm)	116.1±3.78	117.1±3.91	116.2±3.93	117.9±3.83	1.63
Weight (kg)	20.1±2.23	20.1±1.90	20.6±2.14	21.7±2.37	2.3*
Mid upper arm circumference MUAC (cm)	14.9±1.83	15.3±1.06	15.1±2.17	15.8±2.06	1.83*
Triceps skin fold thickness (TSF) (mm)	6.35±0.83	6.24±0.72	6.51±0.71	6.57±1.18	1.56

Values are mean ± S.E

*Significant $P < 0.05$

Table II: Mean height of the respondents as compared with NCHS (1987) and ICMR (1990) standards

		Height (cm±S.E)	NCHS standards	%age	ICMR standards	age
Before counseling	Control	116.1±3.73	126.97	91.85	128.27	0.95
	Experimental	117.1±3.91		92.64		1.73
After counseling	Control	116.2±3.93		91.93		1.03
	Experimental	117.9±3.83		93.27		2.36

Table - III
Distribution of subjects according to Waterlow's classification of height for age

Height for age* Per cent NCHS standards	Before Counseling				After Counseling			
	Control (n = 30)		Experimental (n = 30)		Control (n = 30)		Experimental (n = 30)	
	n	%	n	%	n	%	n	%
Normal (>95%)	6	0.0	5	6.74	6	20.0	6	20.0
Mild malnutrition (Grade I) (90-95%)	14	6.7	16	3.3	15	50.0	19	63.3
Moderate malnutrition (Grade II) (85-90%)	9	0.0	7	3.3	8	26.7	5	16.7
Severe Malnutrition (Grade III) (<85%)	1	3.3	2	6.7	1	3.3	-	-

* Gibson (1990)

Table - IV
Mean weight of the respondents as compared with NCHS (1987) and ICMR (1990) standards

		Weight (cm±SE)	NCHS standards	%age	ICMR standards	age
Before counseling	Control	20.1±2.23		80.3		5.2
	Experimental	20.1±1.90		80.3		5.2
After counseling	Control	20.6±2.14	25.03	82.3	26.74	6.9
	Experimental	21.7±2.37		86.7		1.2

Table - V
Distribution of subjects according to Gomez classification of weight for age

Weight for age* Per cent NCHS standards	Before Counseling				After Counseling			
	Control (n = 30)		Experimental (n = 30)		Control (n = 30)		Experimental (n = 30)	
	n	%	n	%	n	%	n	%
Normal (>95%)	5	16.7	7	3.3	6	0	10	33.3
Mild malnutrition (Grade I) (75-90%)	16	53.3	17	6.7	5	0	18	60.0
Moderate malnutrition (Grade II) (60-75%)	8	26.7	6	0.0		0	2	6.7
Severe Malnutrition (Grade III) (<60%)	1	3.3	-	-	-		-	-

* **Gibson (1990)**

Table - VI
Mid upper arm circumference and tricep skinfold thickness as compared to Jelliffe (1966) standards

		Mean±SE	Jelliffe standards	Percentage
Mid-upper arm circumference (cm)				
Before Counseling	Control	14.9±1.83		80.80
	Experimental	15.3±1.06	18.43	83.01
After Counseling	Control	15.1±2.17		81.91
	Experimental	15.8±2.06		85.72
Triceps skin fold thickness (mm)				
Before Counseling	Control	6.35±0.83		63.94
	Experimental	6.24±0.72	9.93	62.83
After Counseling	Control	6.51±0.71		65.55
	Experimental	6.57±1.18		66.17

Triceps Skin Fold Thickness (TSFT) : The mean TSFT in C and E group was 6.35 mm and 6.24 mm before counseling and 6.51 mm and 6.57 mm after counseling, indicating no significant change in E group. It is evident from Table VI that the TSFT was 62.83 and 66.17 per cent of Jelliffe standards in E group before and after imparting nutrition education, respectively. Rao *et al.*, (1993) reported TSFT of 6.5 mm among primary school children in Maharashtra which was in accordance with the present study.

Conclusion:

The anthropometric measurements of school girls was below the standards in both the groups. However, a significant increase in weight and MUAC was observed in E group after nutrition counseling. This was due to increased food and nutrient intake and also due to adoption of desirable nutritional practices like use of sprouted grains and other nutritious foods like milk and pulses by subjects in E group. Thus nutrition counseling imparted to girls along with their mothers helped to improve the dietary status of school girls. With improvement in nutrition knowledge and

dietary practices, anthropometric profile of girls improved. Children have a high energy requirement because they are growing quickly and becoming more active. A diet which is low in fat and high in fibre will not provide enough energy for a young child but a family approach to a healthy diet is important at this stage because food preferences are often established very early in life. Ideally, children should restrict the number of times a day that they have foods and drinks containing sugar and then only have them at meal times. Young children should not be put on weight reduction diets, but a healthy family approach to food and regular physical activity are important in avoiding excessive weight gain and obesity.

The energy requirements of schoolchildren are still high because of growth and activity. Therefore, there should be a progression towards an adult-style healthy diet, but with continued emphasis on foods with a high energy and nutrient content. The progression should be gradual with an increase in fibre, reduction in fat and increase in starch content in the diet. An increasing number of children are overweight or obese. These children should not try to lose large amounts of weight but instead be encouraged to remain at a constant weight or increase weight slowly while their height increases. A healthy lifestyle for the whole family is very important for effective weight control, fitness and health of the child. Convergence of services under National Rural Health Mission and Integrated Child Development Services can improve access to both nutrition and health education and care in India and effective implementation of these programmes can bring about improvement both in the health and nutritional status of preschool children.

HANDOUT FOR IMPARTING NUTRITION EDUCATION

- **Enjoy your food**--Try to eat lots of different foods every day for variety and enjoyment. Share foods with family and friends.
- **Breakfast is a very important meal**--Your body needs energy after a long sleep so breakfast is important. Foods that are high in carbohydrates, such as bread, cereals and fruit, make good breakfast choices. Skipping meals, especially breakfast, can lead to out-of-control hunger, often resulting in helpless overeating. Skipping breakfast can also cause lack of concentration.
- **Eat a variety of foods**--A variety of different foods every day is the recipe for good health. You need different vitamins and minerals for good health and no one food can supply all of them. There are no "good" or "bad" foods so you don't need to miss out on foods you enjoy. Just make sure you get the right balance by eating a wide variety of foods. Balance your choices over time!
- **Base your food choices on carbohydrates**--These foods provide the needed energy, vitamins and minerals. Foods that are high in carbohydrates include pasta, breads, cereals, fruits and vegetables. Try to include some of these foods at every meal as around half of the calories in your diet should come from them.
- **Eat fruits and vegetables at each meal**--You can enjoy fruits and vegetables at meals and as tasty snacks. These foods provide vitamins, minerals and fibre. You should aim to get at least 5 servings of fruits and vegetables a day.
- **Take some fats**--Everyone needs some fat in the diet for good health. However, too much fat, especially saturated fat, can be bad for our health. Saturated fat is found in full fat dairy foods, pies, pastries, fatty meats and sausages. Balance your food choices-if you eat a high-fat meal at lunch, try to choose low-fat foods for dinner.
- **Choice of snacks**--Snacks help to provide energy and nutrients. Choose from a variety of snacks such as fruits, dairy, biscuits, cakes, crisps, nuts and chocolate. Make sure to vary your choices to keep the balance in your diet and don't snack but have proper meals.

- **Quench your thirst**--You need to drink plenty of liquids because half of your body is made up of water. At least 8 glasses of fluid per day are needed, more if it is very hot or you are exercising. Water and milk are great but variety is fun too.
- **Care for your teeth**---Care for your teeth by brushing them at least twice a day. Foods high in starch or sugars can play a role in tooth decay if they are eaten too frequently throughout the day so don't nibble or sip drinks all day.
- **Be physically active**--Being fit is important for healthy heart and strong bones so get active. Try to exercise every day and make sure its something you enjoy so you stick with it. Too many calories and not enough activity can result in weight gain. Moderate physical activity helps burn off those extra calories. You don't have to be an athlete to get on the move!

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