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IMPACT OF NUTRITION EDUCATION PROGRAM ON THE NUTRITIONAL STATUS OF CHILDREN IN EAST KHASI HILLS, MEGHALAYA

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ABSTRACT

A study to determine the risk factors and intervening factors prevalent that predispose children (1-3 years) of age, residing in East Khasi Hills, Meghalaya to protein energy malnutrition was done. An interview schedule was used to elicit information regarding the demographic profile, socio-economic status, and dietary habits. Dietary intake of 100 protein energy malnourished children was assessed using a 3-day dietary method. A greater percentage of the malnourished and normal children belong to the age group of 2-2.5 years and have more than three siblings. Boys were more malnourished compared to girls. There is a high degree of the positive correlation between weight and intake of energy, protein, fat, calcium and vitamin, significant at 1 % level of significance, whereas there was a negative correlation between weight and iron intake which is not significant.There is a significant correlation between height of the malnourished children and intake of energy, protein and carbohydrate. A comprehensive nutrition education program was formulated and conducted in order to improve knowledge and awareness of the mothers of the malnourished children. There was an improvement in the knowledge and awareness of the parents after the nutrition program and this was statistically significant at 1 percent level of significance.

Keywords: Malnutrition, East Khasi Hills, Meghalaya, Nutrition Education Program

INTRODUCTION

Malnutrition is estimated to contribute to more than one third of all child deaths, although it is rarely listed as the direct cause. Lack of access to highly nutritious foods, especially in the present context of rising food prices, is a common cause of malnutrition. Poor feeding practices, such as inadequate breastfeeding, offering the wrong foods, and not ensuring that the child gets enough nutritious food, contribute to malnutrition. Infection – particularly frequent or persistent diarrhoea, pneumonia, measles and malaria – also undermines a child's nutritional status (WHO, 2014). Malnutrition varies widely across regions, states, age, gender and social groups with children under 5 being the worst hit.

Engel (1999), states that rate of malnutrition in India were much more higher than those in sub-Saharan countries, 53 percent of children under 4 years are moderately or severely malnourished. In terms of number, 60 million children are malnourished in India. Protein energy malnutrition is widely prevalent in East Khasi Hills, Meghalaya. In Meghalaya, The target for providing supplementary nutrition is 6, 17,947 while the achievement is 4, 91,005. In terms of nutritional status of children (0-6 years), Children with Grade I Malnutrition is 49311, Grade II Malnutrition is 15283, Grade III & IV Malnutrition is 229 and Normal 123676 in number. Thus 34.38 percent of the children are malnourished in the state of Meghalaya (ICDS, 2010).

Maternal malnutrition, geographic and seasonal distribution of food, poverty, large family size, unhygienic living conditions, lack of maternal knowledge, education, skills and time are some of the influencing factors affecting malnutrition. Thus there is an urgency to educate the mothers regarding the risk factors, environmental factors, importance of hygiene and sanitation and incorrect dietary habits that predisposes a child to protein energy malnutrition.

MATERIALS AND METHODS

GEOGRAPHICAL LOCATION

East Khasi Hills is one of the 11 (eleven) districts of the State of Meghalaya. The district occupies an area of 2748 Sq Km. And it lies between 25°07" & 25°41" N Lat. And 91°21" & 92°09" E Long bounded by Ri-Bhoi District on the north, Karbi Anglong District on the north east, Jaintia Hills district on the east, Bangladesh on the south and West Khasi Hills district on the west.

DESIGN OF THE STUDY

The present study was designed to determine the

risk factors and intervening factors prevalent that predispose children (1-3 years) of age to protein energy malnutrition and to assess the dietary intake of 100 protein energy malnourished children of East Khasi Hills, Meghalaya. 500 children of the age group (1-3 years) were randomly selected to study the risk factors prevalent that predispose a child to protein energy malnutrition. An interview schedule was used to elicit information on demographic profile and nutritional pattern.

ETHICAL CLEARANCE

The study protocol was reviewed by the delegated Independent Ethics Committee, Women's Christian College, Chennai and was approved for the conduct of the study. Concern for the interests of the subjects over the interests of research study was obtained by a written informed consent. Each potential subject was adequately informed of the aims, methods and anticipated benefits. The research study was appropriately scrutinized by qualified and experienced supervisor.

NUTRITIONAL ASSESSMENT

Anthropometric measurements were recorded, clinical examination was to assess the presence of symptoms of protein energy malnutrition in relation to general appearance, hair, eyes, ear, mouth, tongue, teeth, gums, skin, edema and abdomen.

NUTRITION EDUCATION PROGRAM

A nutrition education program was formulated and conducted for the mothers of the 100 protein energy malnourished children. A checklist consisting of 15 questions was used to ascertain information regarding the knowledge and awareness of nutrition of the mothers of the malnourished children before and after the nutrition education program. The impact of the nutrition education program for the mothers of these children in terms of knowledge and awareness was assessed using a checklist. Both group and individual diet counseling was given. Each session lasted for 2-3 hours and was done over a period of one week.

STATISTICAL ANALYSIS

SPSS version was used to conduct the statistical analyses. For all the statistical analysis a binomial variable was created for normal and malnorished children. Frequency tables and cross tabulations were generated. The statistical significance between the two groups was tested at the 0.05 and 0.01 level and the results were expressed as mean and standard deviation. Pearson chi square tests and 't' test were analysed.

RESULTS AND DISCUSSION

The present study was undertaken with the objective to study the risk factors and intervening factors that predispose a child to protein energy malnutrition and to impart nutrition education to the parents of the protein energy malnourished children. The data collected from the parents of the children in East Khasi Hills, Meghalaya was analyzed and is discussed.

GENERAL INFORMATION

Demographic profile is presented in table 1.

Table 1-Association of demographic variable of the children with occurrence of protein energy malnutrition

Particulars		Malnourished Children (N=165)	Normal Children (N=335)
		%	%
Age (in years)	1-1.5	22.4	28.4
	1.6-2	18.2	21
	2.1-2.5	30.9	28.7
	2.6-3	28.5	21.9
Gender	Female	44.2	51.7
	Male	55.7	49.5
Number of sibling	1	13.9	19.2
	2	32.1	28
	3	19.4	16.2
	>3	34.6	36.6
Birth order of the child	1	28.5	29.3
	2	27.9	23.1
	3	15.2	15
	>3	28.4	32.7
Type of Family	Joint family	18.2	24
	Nuclear family	70.3	69.5
	Single parent	11.5	6.9

Results indicate that most of the malnourished and the normal children belong to the age group of 2-2.5 years. The least percentage of malnourished children (18.2%) was in the age group of 1.6-2 years. Greater percentages of boys (55.7%) were malnourished compared to girls, whereas among normal children, a greater percentage of girls (51.7%) were normal. Results of the study indicate that 32.1 percent of the malnourished children and 28 percent of the normal children have only one sibling, 34.6 percent of the malnourished children and 36.6 percent of the normal children have more than 3 siblings. A study done by Swami et al., (2000) states that with increase in family size, the prevalence of malnutrition also significantly increased, and decreased with high literacy rate in parents. It is evident from table 1 that there is no significant association between number of siblings of the children and the occurrence of protein energy malnutrition. The number of children who were 3rd born was the least (15.2%). An almost equal number of children 28.5 percent and 29.3 percent were the 1st born child among the malnourished and normal children.

DIETARY PATTERN

Association of meal consumption by the

malnourished and normal children with occurrence of protein energy malnutrition is shown in table 2. From table 2 it is evident that majority of the malnourished and normal children were non vegetarians. Iron deficiency is common in populations where protein sources are of vegetable origin. More than half (55.2%) of the malnourished children, and 71.9 percent of the normal children consume four meals per day, however the quality of food consumed by the malnourished children was inadequate or too little. There is a significant association between the diet pattern and the frequency of meal consumption with the occurrence of protein energy malnutrition. The association is significant at 1 % level. A lack of adequate protein in the diet, depleted by food prejudices that forbid eating what is available, can adversely affect the health status of a population, i.e., cause protein-calorie malnutrition in children**,** maternal depletion, premature aging, and general malnutrition in women (Ogbeide, 1974).

Table 2-Association of diet pattern and meal consumption of the children with occurrence of protein energy malnutrition

Particulars		Malnourished children N=165	Normal children N=335	Chi-square value	Level of significance
		%	%		
Diet Pattern	Vegetarian	24.2	18	2.717	1%
	Non-Vegetarian	75.8	82		
Frequency of meal consumption	4 meals per day	55.2	71.9	16.293	1%
	3 meals per day	37.6	21		
	2 meals per day	6.1	6.3		
	Only one meals per day	1.2	0.9		

1% = Significant at the 0.01 level.

Table 3- Comparison of mean value of anthropometric measurement between malnourished and normal children

Variable	Children	Mean	Std. Deviation	"t" value	Level of Significance
Weight	Malnourished	8.00	1.504	11.973	1 %
	Normal	10.08	1.966		
Height	Malnourished	76.11	6.548	4.024	1 %
	Normal	79.15	8.534		
Head Circumference	Malnourished	46.25	1.988	2.702	1 %
	Normal	47.22	4.416		
Chest Circumference	Malnourished	47.51	3.982	3.059	1 %
	Normal	48.79	4.574		
Mid arm Circumference	Malnourished	13.20	.960	10.582	1 %
	Normal	14.37	1.246		
1%= Significant at the 0.01 level					

ANTHRPOMETRIC MEASUREMENTS

Table 3 presents the comparison of mean value of anthropometric measurement between malnourished children and normal children. The mean anthropometric measurements and results of the test of significance for the malnourished and normal children. Results indicate that there was a significant difference in the mean anthropometric measurements of the children in both groups. The difference was significant at 1 % level. The anthropometric measurement was lower for the malnourished children as compared to the normal children.

PEM is measured in terms of underweight (low weight for age), stunting (low height for age) and wasting (low weight for height).The prevalence of stunting among under five is 48% (moderate and severe) and wasting is 20% (moderate and severe) and with an underweight prevalence of 43% (moderate and severe), in the world (UNICEF, 2013).

CLINICAL EXAMINATION

Table 4 presents the percent distribution of malnourished and normal children according to presence of clinical symptoms of malnutrition

Table 4-Percent distribution of the children according to presence of clinical symptoms of malnutrition

Particulars		Malnourished children N=165	Normal children N=335
		%	%
General Appearance	Normal	9.1	91.3
	Undernourished	-	0.6
	Malnourished	90.9	7.2

Hair	Normal	11.5	84.1
	Dry and lusterless	68.9	12
	Dyspigmentation	37.6	4.5
	Thin and sparse	37	3.6
	Easily pluckable	1.2	-
Skin	Normal	73.3	97.3
	Dry and scaly	25.5	2.7
	Follicular hyperkertosis	1.2	0.3
	Phrynoderma	0.6	-
Nails	Normal	95.2	99.7
	Koilonychia	2.4	0.3
Edema	Absent	90.9	99.7
	Present	9.1	0.3
Abdomen	Normal	90.9	100
	Ascites	8.5	-
Eyes	Normal	21.2	81.7
	Pale conjunctiva	77.6	18
	Conjunctival xerosis	0.6	-
	Bitot spot	0.6	0.3
	Corneal Xerosis	-	-
	Keratomalacia	-	-
	Night blindness	-	-
Ear	Normal	65.5	92.8
	Infected	32.1	7.2
Mouth	Normal	89.1	99.7
	Angular stomatitis	10.3	0.3
	Angular scars	.6	-
Tongue	Normal	100	100
	Atrophic papillae	-	-
	Fissures	-	-
	Abnormally smooth	-	-
	Raw and red	-	-
	Normal	47.9	77.8
Teeth	Caries	50.9	22.2
	Mottled teeth	0.6	0.6
Gums	Normal	100	100
	Bleeding	-	-

Majority of the malnourished children had typical clinical signs of malnutrition, such as dry and lusterless hair accompanied with dyspigmentation and dry and scaly skin. A smaller percentage of malnourished children had koilonychia, phrynoderma, follicular hyperkertosis and ascites compared to the normal children. With regard to facial clinical signs, majority of the malnourished children had pale conjunctiva, infected ear, angular stomatitis and dental caries compared to normal children, however all the children in both groups had normal tongue and gum. Results of the tests of significance indicate that there was a significant difference between the clinical signs of the children in both groups; the difference was significant at 1 % level. In protein energy malnutrition hair is thin and sparse, lacks lusture, is dyspigmented, easily pluckable and flag signs appear.Skin changes in protein energy malnutrition may involve any part of the body, the more common sites being lower limbs, buttocks and perineum. The skin changes show characteristic areas of desquamation and pigmentation or depigmentation. Cracks appear as folds and ulcers may develop at anal region and over pressure points (Joshi, 2003).

NUTRIENT INTAKE OF THE CHILDREN

As growth during infancy is rapid, meeting the nutritional requirements is very important. Nutritional requirements for infants is based on the composition and intake of breast milk of well nourished population combined with the contributions from supplementary foods introduced around 4-5 months of age as mothers milk alone is inadequate after that. Table 5 shows the Mean values of the nutrient intake of protein energy malnourished children compared with Recommended Dietary Allowance.

Table 5-Mean values of the nutrient intake of malnourished children compared with Recommended Dietary Allowance

Nutrients	RDA	Mean	Std. Deviation	Std. Error Mean	't'	Level of significance
Energy (Kcal)	1240 (Kcal)	784.932	95.1507	9.5151	4.759	1 %
Protein (gm)	22 (gm)	18.5621	2.30322	.23032	1.485	NS
Fat (gm)	25 (gm)	7.9427	4.63457	.46346	3.662	1 %
Fiber	-	3.7515	4.08802	.40880	-	-
Carbohydrate	-	159.275	24.1758	2.4176	-	-
Calcium (gm)	400(gm)	142.742	85.3608	8.5361	2.999	1 %
Iron (mg)	12 (mg)	4.76134	13.78557	1.3785	.522	NS
Vitamin A (mg)	1600 (mg)	552.267	704.2117	70.4212	2.611	1 %
Vitamin C (mg)	40 (mg)	35.7952	44.54939	4.45494	.094	NS
Thiamine (mg)	0.6 (mg)	.85613	1.901014	.190101	.134	NS
1%= significance at 0.01 level, NS - Not Significant						

The mean nutrient intake of the children reads that the intake of all nutrients which includes proximate principal, vitamin, mineral and fiber was less when compared to the Recommended Dietary Allowance.

Results of the present study indicate that there is a significant difference between the mean energy, fat, calcium and vitamin A intake of the malnourished children compared with the Recommended Dietary Allowance. There is no significant difference between the mean intake of protein, iron, vitamin C and thiamine. The reason for this could be because most of the malnourished children are regular consumers of the food distributed at the ICDS centers, which are rich in proteins and includes pulses (soyabean, Bengal gram whole, horse gram), semolina and processed milk, malnourished children who belong to the low income group do benefit from the ICDS centers.

NUTRITION EDUCATION PROGRAM

The nutrition education sessions were designed so that common nutrition topics such as spreading awareness among the mothers of the malnourished children about protein energy malnutrition, importance of breastfeeding, immunization, importance of hygiene and sanitation, deficiency diseases and dietary modifications. Knowledge and awareness of the mothers before and after the nutrition education program is presented in table 6.

From Table 6 we observe that the mean score obtained by the parents of the malnourished and normal children before nutrition education was 5.11. The scores increased to 11.50 after the conduct of the nutrition education programme. There is a significant increase in the scores obtained after the conduct of the nutrition education programme. The difference in knowledge scores is statistically significant, indicating that the nutrition education program was effective. There was an improvement in the knowledge and awareness of the parents after the nutrition program and this was statistically significant at 1 percent level of significance. The similar kinds of results were got by Bhuvaneswari and Nazni, 2011.

Table 6-Comparison of mean pre-test and post-test value on knowledge and awareness of the mothers of the malnourished children

Variable	Mean	Std. Deviation	Std. Error Mean	't' value	Level of significance
Pre test	5.11	2.685	.269	25.832	1 %
Post test	11.50	2.452	.245		
1%= significance at 0.01 level					

CONCLUSION

Nutrition education is a key element to promoting lifelong healthy eating and exercise behaviors and should start from the early stages of life; it should also address the specific nutritional needs associated with pregnancy, including reinforcing breastfeeding. The role of education, especially girls' education, in improved health and nutrition status of children and birth-spacing is now clear, as is improving women's status. Increases in female status and education have been estimated to account for half of the reduction in child malnutrition rates during the past 25 years (Darnton-Hill 2006).Young children do not choose what they eat, but their parents decide and prepare these foods for them. As malnutrition is highly prevalent among the children of 1-3 years in East Khasi Hills, Meghalaya, it is necessary to educate the mothers of these children on the quantity and quality of food to be given and emphasize the importance of healthy eating and nutrition. it is necessary to extend this nutrition program to all the surrounding areas where the incidence of protein energy malnutrition is high.

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