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Research Paper

Impact of low cost supplementary food on nutritional status of pre-school children

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ABSTRACT : A random sample of 100 pre-school children was selected from village Pansalwa of Beldour Block of Khagaria district of Bihar and was equally divided into two categories *viz.,* Control and Experimental. An interview schedule was used for data collection. 'Zea-fort Laddoo' was developed and used for nutrition intervention programme for continuous 180 days. Experimental children exhibited highly significant weight increments at 5 per cent level of significance, the t-value for 1 to 3 and 4 to 6 years old children were obtained as 23.19 and 25.96, respectively. A highly significant improvement was obtained in height (t-value=31.18 and 27.74 at 5% level) and mid upper arm circumference (t-value=31.18 and 27.74 at 5% level) of experimental children for both the age groups. According to Gomez classification, prevalence of malnutrition was reduced by 4 per cent in case of experimental children whereas the same was remained constant in case of control children. On the basis of MUAC value, prevalence of severe malnutrition (4%) completely disappeared in case of experimental children as a result of supplementation, whereas it (10%) remained as such in case of control children. A highly significant change was observed in shifting of moderate malnutrition to normal category (36%) in case of experimental children in comparison with control children (8%).

KEY WORDS : Supplementary food, Nutritional status, Pre-school children

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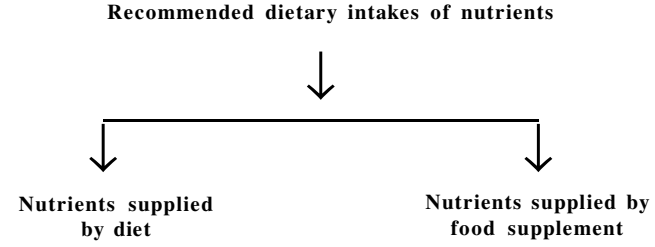
Diet is a vital determinant of health and nutritional status of people. Nutritional status during the most vulnerable and growing period of childhood lays foundation for good health in later years. Nutrition plays a vital role as inadequate nutrition during childhood may lead to malnutrition, growth retardation, reduced work capacity and poor mental and social development (Awasthi and Kumar, 1999).

Malnutrition is one of the major public health problems in most of the developing countries, including India. Nearly two out of three pre-school children in India are malnourished (Shrilakshmi, 2000). Assessment of nutritional status of community is one of the first steps in the formulation of any public health strategy to combat malnutrition.

Surveys carried out in different parts of India have shown that the primary bottleneck in the diets of pre-school children is calories and not protein. Though the protein intake is relatively adequate, some of it is used for energy, leading to conditioned protein deficiency. The subsequent systematic study of the habitual diets of these children indicated an average energy deficit of 300 Kcal/day.

The following figure illustrates the basic concept of food supplementation:



Nutritional anthropometry is measurement of human body at various ages and levels of nutritional status. Relatively speaking, weight, height and arm circumference have come to be considered the most sensitive parameters for assessing nutritional status of under fives.

A feeding trial conducted at Rajendra Agriculture University, Pusa, Samastipur (Bihar) on pre-school children for six months showed remarkable increase in anthropometric measurements *i.e.* height, body weight and arm circumferences of children fed with quality protein maize as compared to children fed with normal maize (Singh and Jha, 2001).

Keeping in view that supplementation with low cost maize based product will enhance the nutritional status of pre-school children. The present investigation was planned to be carried out with the following objective:

– To study the impact of supplementary feeding by assessment of nutritional status of pre-school children before and after nutrition intervention programme.

■ RESEARCH METHODS

The study was conducted in a largest maize producer village named Pansalwa of Beldour block of Khagria district of Bihar, which was purposively selected for smooth running of feeding trial. A random sample of 100 pre-school children was obtained and was equally divided into two categories *viz.,* Control (C) and Experimental (E). A pre-tested, structured and precoded interview schedule was designed for data collection. Mothers/caretakers of the children were interviewed for the purpose.

Anthropometry measurements like height, weight and mid upper arm circumference (MUAC) of children were recorded twice, *i.e.* at 0 and 180th days of nutrition intervention programme to assess the impact of supplementary feeding. The WHO (1983) recommended the use of height and weight data obtained by the United States National Centre for Health Statistics (NCHS) as international reference which has been used in the present study. Gomez classification Gomez *et al.*, 1956) was used to assess the degree of malnutrition among children before and after feeding trial.

In view of objectives of the study mean, standard deviation and t-test were used for statistical analysis of the data (Gupta, 1995 a and b).

■ RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation have been discussed under following heads:

Impact of supplementary feeding on nutritional status of pre-school children :

Mean increments in the weight, height and MUAC of children have been presented in Table 1 to 3.

Mean weight of children :

Table 1 clearly reveals that as a result of the

Table 1: Mean increments in the weight (kg) of children

Children	Age (years)	N	Initial	Final	Increments	t-Value
Control	1-3	29	10.35 ±1.59	10.49± 1.54	0.14± 0.017	8.3*
	4-6	21	15.21±1.46	15.24± 1.44	0.03± 0.015	2.14*
Experimental	1-3	33	10.90± 2.08	11.42± 2.07	0.52±2.07	23.19*
	4-6	17	15.78± 0.87	16.31± 0.91	0.53± 0.02	25.96*

± S.D. * indicate significance of value at P=0.05, respectively

Table 2 : Mean increments in the height (cm) of children

Children	Age (years)	N	Initial	Final	Increments	t-Value
Control	1-3	29	80.78± 7.62	81.21± 7.58	0.43± 0.04	10.83*
	4-6	21	101.52± 5.75	101.91± 5.69	0.39± 0.043	9.00*
Experimental	1-3	33	83.48± 9.58	85.50± 9.58	2.02± 0.064	31.18*
	4-6	17	103.76± 3.04	105.84± 3.13	2.08± 0.074	27.74*

± S.D. * indicate significance of value at P= 0.05, respectively

Table 3: Mean increments in the MUAC (cm) of children

Children	Age-group (years)	N	Initial	Final	Increments	t-Value
Control	1-3	29	13.41±0.57	13.45±0.64	0.04±0.02	1.71 ^{NS}
	4-6	21	13.42±1.24	13.53±1.216	0.11±0.02	5.16*
Experimental	1-3	33	13.06	13.88±0.62	0.82±0.03	26.73*
	4-6	17	14.35±0.48	15.12±0.55	0.77±0.55	13.88*

± *S.D.* * indicate significance of value at P= 0.05, respectively N.S.- Non-significant.

supplementation, the weight of experimental children of each age-group (1 to 3 and 4 to 6 years) exhibited remarkable increments that were statistically significant at 5 per cent level.

Mean height of children :

It is obvious from Table 2 that experimental children (1 to 3 and 4 to 6 years age group) exhibited significantly greater height increments (2.02 and 2.08 cm) than their counterparts in control (0.43 and 0.39cm) group at 5 per cent level of significance.

Mean MUAC of the children :

The findings of Table 3 reveal that experimental children exhibited significantly greater MUAC increments (t value= 26.73 and 13.88) for 1 to 3 and 4 to 6 years experimental children at 5 per cent level of significance than their counterparts in control group.

Prevalence of malnutrition :

Prevalence of malnutrition among children according to Gomez classification has been presented in Table 4 and Fig. 1 to 4. Further, prevalence of malnutrition based on MUAC value of children has been presented in Table 5 and Fig. 5 to 8.

A reduction of 4 per cent in prevalence of malnutrition has been analyzed among experimental children (Table 4). Fig. 1 to 4 clearly highlight the impact of supplementary feeding

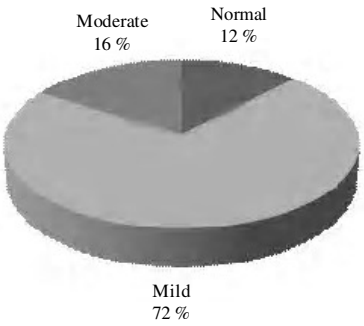


Fig. 1 : Prevelance of malnutrition among control children (at baseline)

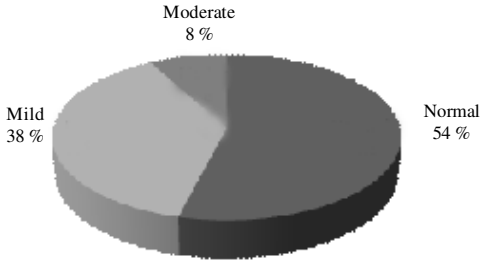


Fig. 3 : Prevelance of malnutrition among experimental children (at baseline)

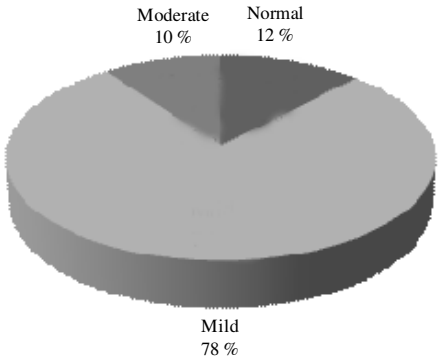


Fig. 2 : Prevelance of malnutrition among control children (after nutrition intervention)

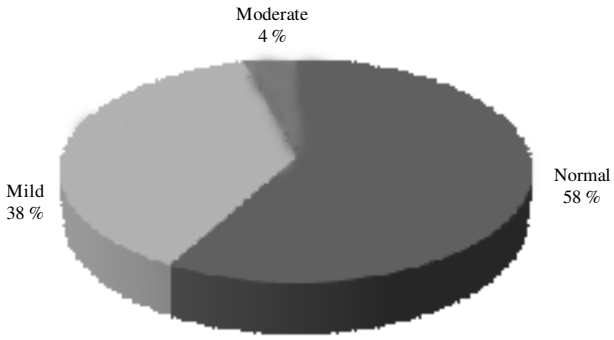


Fig. 4 : Prevelance of malnutrition among experimental children (after nutrition intervention)

Table 4 : Per cent prevalence of malnutrition among children (Gomez classification)

Grade of malnutrition	Control (n=50)		Experimental (n=50)	
Cut-off level as % of NCHS median	Initial %	Final %	Initial %	Final %
Normal >90%	12 (6)	12 (6)	54 (27)	58 (29)
Mild malnutrition 75-90%	72 (36)	78 (39)	38 (19)	38 (19)
Moderate malnutrition 60-75%	16 (8)	10 (5)	8 (4)	4 (2)
Severe malnutrition <60%	0 (0)	0 (0)	0 (0)	0 (0)

Figures in parentheses represent numbers.

on nutritional status of children.

Prevalence of malnutrition according to MUAC :

The findings presented in Table 5 indicate the shifting of nutritional grade from moderate malnutrition to normal category in both the groups, but shifting was far greater (36%) in case of experimental children than that of control children (8%) which is obvious from Fig. 5 to 8.

After a period of six months' supplementation, experimental children exhibited highly significant increments in height, weight and MUAC in comparison with control children. Shifting of nutritional grade from moderate malnutrition to normal category according to Gomez classification was assessed as 4 per cent in case of experimental children whereas percentage prevalence was remained constant at 88 in case of control children where shifting was observed from moderate to mild degree of malnutrition. On the basis of MUAC for age, prevalence of severe malnutrition (4%) among experimental children at baseline was completely disappeared as a result of supplementation, whereas prevalence of severe malnutrition (10%) among control children remained as such. A highly significant change was observed in shifting of moderate malnutrition to normal category (36%) in case of experimental children than that of control children, where a change of only 8 per cent was observed.

To conclude, statistical analyses of the data also support the findings of significant improvement in the nutritional status

Table 5 : Per cent prevalence of malnutrition among children

Sr.No.	Grade of malnutrition	Control (n=50)		Experimental (n=50)	
	MUAC (cms)	Initial %	Final %	Initial %	Final %
1.	Normal MUAC > 13.5	36 (18)	44 (22)	38 (19)	78 (39)
2.	Moderate malnutrition MUAC- 12.5-13.5	54 (27)	46 (23)	58 (29)	22 (11)
3.	Severe malnutrition MUAC <12.5	10 (5)	10 (5)	4 (2)	00 (00)

Figures in parentheses give numbers.

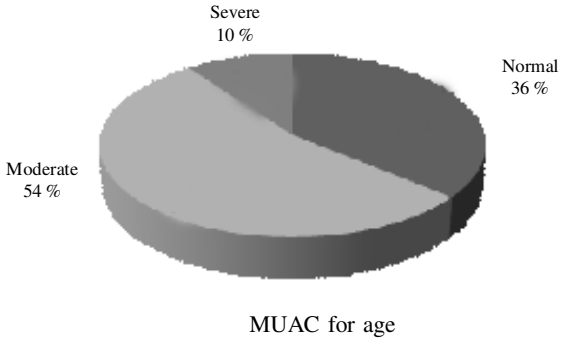


Fig. 5 : Prevelance of malnutrition among control children (at baseline)

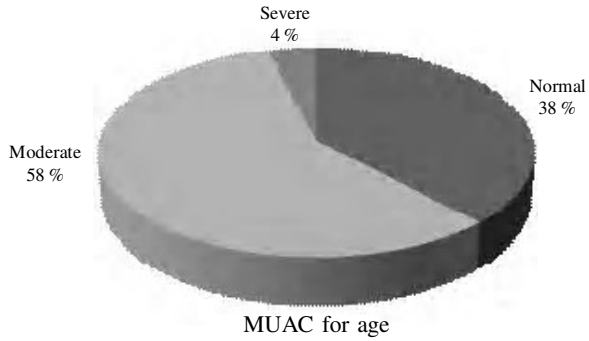


Fig. 7 : Prevelance of malnutrition among experimental children (at baseline)

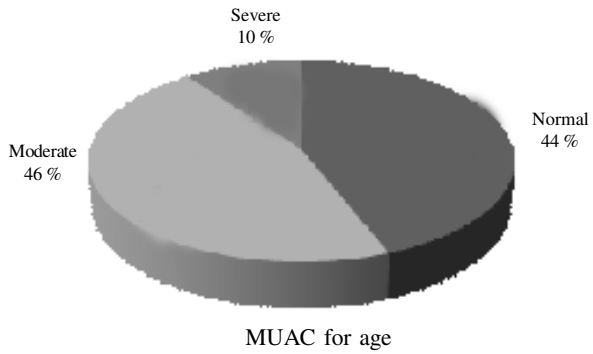


Fig. 6 : Prevelance of malnutrition among control children (after nutrition intervention)

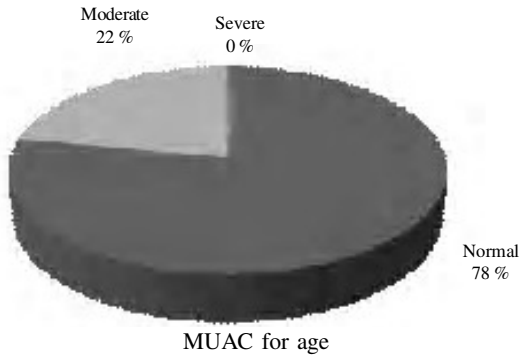


Fig. 8 : Prevelance of malnutrition among experimental children (after nutrition intervention)

of experimental pre-school children as a result of supplementation.

There is a great need of nutrition education for the development of low cost supplementary foods to the mothers of children so that they could be able to prevent their children to be malnourished as well as to overcome their children from severe to mild degree of malnutrition, if malnutrition be prevailing.

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