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Nutrient intake by preschool children and their impact on clinical health status

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Abstract
The period of life from two to six years of age is called early childhood years and also the preschool years. This is an important period in the life of an individual (Hurlock 1981). The nutrition of preschool children is of considerable importance not only because of concern over their nutrition in formative stage of life but is widely perceived to have a substantial and persistent impact on their physical and mental development and their health status and productivity during adult period/age. Adequate nutrition during infancy and early childhood is essential to ensure the growth, health, and development of children to their full potential. Poor nutrition increases the risk of illness, and is responsible, directly or indirectly, for the deaths that occur in children less than 5 years of age. The study was conducted in samastipur district of Bihar. For this purpose sixty respondents were purposively selected. The result of the study showed that the energy intake by preschool children 1264.85 but the RDA energy required is 1350 Kcal and protein intake has been 39.64 as compared to RDA of 20 g per day. The value for fat, iron and calcium has been observed to be 36.29 g, 18. 15 mg and 561.42 mg respectively as compared to RDA for fat (25g), iron (13 mg) and calcium (600 mg). 8.33 per cent of the children were suffering from bleeding gum followed by 5 per cent of children from angular stomatitis and 3.33 percent each from cheilosis, dry scaly dermatitis and pain and sensation in the arm and leg. Nutritional status of preschool children were positive and significant at 1 per cent of energy (0.691**), protein (r=0.641**), CHO(r=0.605**), fat (r= 0.386**), Cal(r=206), Iron(r=0.580**). Anthropometric indicators of height of protein (r=0.272*), CHO (r= 0.303*) and calcium (r=0.221*) with height. Energy (r=0.446**), CHO (r= 0.399**), and cal (r=0.002**) intake with weight was positive and whereas protein (0.295*) and iron (r= 0.308*) intake. Energy (r=0.300*) and fat (r= 0.338*) intake with MUAC was positive and significant at 5 per cent.

Keywords: preschool, Nutrient intake, Clinical status

Introduction
Preschool children constitute the most vulnerable segment of any community. Their nutritional status is a sensitive indicator of child health. Growth during childhood is widely used to assess adequate health, nutrition and development of children. it is well documented that chronic under nutrition is associated with serious health impairment later in life which reduce the quality of life. Children are the future of society and thus constant health status monitoring is necessary to ensure a healthy future of the society. As per UNICEF reports, 167 million preschool children are underweight in the world of which half belongs to South-Asia.

Malnutrition continues to be a critical public health problem in developing country like India. It is a silent emergency. One third of the children with malnutrition in the world are living in India .The consequences of malnutrition can be serious in childhood. Under-nutrition is responsible for 35% of disease burden of under-five year old children
(Black *et al.*, 2008). It contributes to about 3.5 million deaths in children within the age group (Black *et al*., 2008). As per UNICEF (2017) [3], nearly half of all deaths in children under5 are attributable to under nutrition. This translates into the unnecessary loss of about 3 million young lives a year. Globally 22.9 per cent or just one in four children under age 5 had stunted growth.

NFHS-4(2015-2016) found that 31.5% of the children under age five were underweight. The World Bank estimates that India is one of the highest ranking countries in the world for the number of children suffering from malnutrition. Nutritional assessment in under-five children can be carried out using anthropometric indicators which include stunting, wasting and underweight. In nutritional anthropometry, a child's index is compared with an internationally accepted reference population and children who fall below the recommended cut-offs are classified as malnourished. A malnourished child is one who has failed to attain

the expected values for any of the nutritional indicators (e.g length-for-age, weight-for-height or weight-for-age) as compared with a healthy child of the same sex and age in the reference population (WHO Multi-growth Reference Study group, 2006). Low weight-for-height relative to a child of same sex and age in a reference population is referred to as wasting. Wasting is normally used as an indicator of current nutritional status.

Healthy eating habits in children are crucial in preventing under nutrition, growth retardation, and acute child nutritional problems. Nutritional status indicators like wasting, stunting, low birth weights, breast feed availability and vitamin A deficiency are also still high in India compared to the USA and China. Child malnutrition reflects a number of intermediary processes such as household access to food, access to health services and caring practices, as well as the educational status of mother. Symptoms of malnutrition are not only seen in family with low-income group but it is also seen in family where mothers are working and children are nurtured in cretch or any maid or dais. It is necessary that the dietary guidelines for preschool children should include an adequate proper balance diet which must include fruits and vegetables. Child care is mostly the responsibility of mothers. Therefore, the mother's knowledge about child care influences the nature and quality of care that is given to the children.

Objective

1. To assess the nutrient intake by preschool children and their impact on clinical health status.

Methodology

The research methodology is one of the important pillars of the research work. Since the research on impact on pre-school children's health was done in Dr. Rajendra Prasad Central Agricultural University, Bihar, hence Pusa block of Samastipur districts was selected purposively for this study. Four schools were selected for the present study:(1) Home Science Nursery Laboratory School and (2) Rajendra Shishu Sadan School and Private School (3) Shanti Niketan Steping School (4) Green Hood Public School. Sixty children from 3 to 6 years old had been selected for the study from different schools. Information of preschool children for the study, age and sex of the children have been recorded**.**

Age: The age of the respondents were measured in terms of their chronological age. It refers to the number of completed years as reported by the respondents at the time of interview. Age of the respondents was noted from the register of the schools is where they studied.

Sex: According to the sex, children were classified as male and female and classified as follows.

Result and discussion

Nutrient intake of preschool children

The data on nutrient intake required for the growth and development of the body of preschool children has been gathered and presented in Table 1 for the nutrient intake, the observed value has been compared with Recommended Daily Allowance and illustrated through table 1.

Table 1: Nutrient intake of preschool children

Particulars	Observed value (N=60)*	RDA
Energy (K.cal)	1264.85±227.65	1350
Protein (g)	39.64±8.17	20
Fat (g)	36.29±8.62	25
Iron (mg)	18.15±5.48	13
Calcium (mg)	561.42±160.03	600

*The value is mean ± SD of sixty subjects.

Total energy provided through nutrients has been observed to be 1264.85, but the RDA for energy requirement is 1350 Kcal. Hence there had been a gap of 85.15 Kcal. The observed value for protein intake has been 39.64 as compared to RDA of 20 g per day. The value for fat, iron and calcium has been observed to be 36.29 g, 18. 15 mg and 561.42 mg respectively as compared to RDA for fat (25g), iron (13 mg) and calcium (600 mg).

Clinical status of preschool children

The clinical symptoms of preschool children which have been observed in present condition have been presented in Table 2and illustrated in fig 1.

In this table, the symptom of children suffering from different types of vitamin deficiency disease has been mentioned. It is clear from the Table that 8.33 per cent of the children were suffering from bleeding gum followed by 5 per cent of children from angular stomatitis and 3.33 percent each from cheilosis, dry scaly dermatitis and pain and sensation in the arm and leg.

Table 2: Clinical symptoms of the preschool children

Particulars	Subjects (N= 60)	
Diseases	Frequency	Percentage
Angular stomatitis	3	5
Cheilosis	2	3.33
Dry scaly dermatitis	2	3.33
Bleeding gum	5	8.33
Pain & sensation in the arm and leg	2	3.33

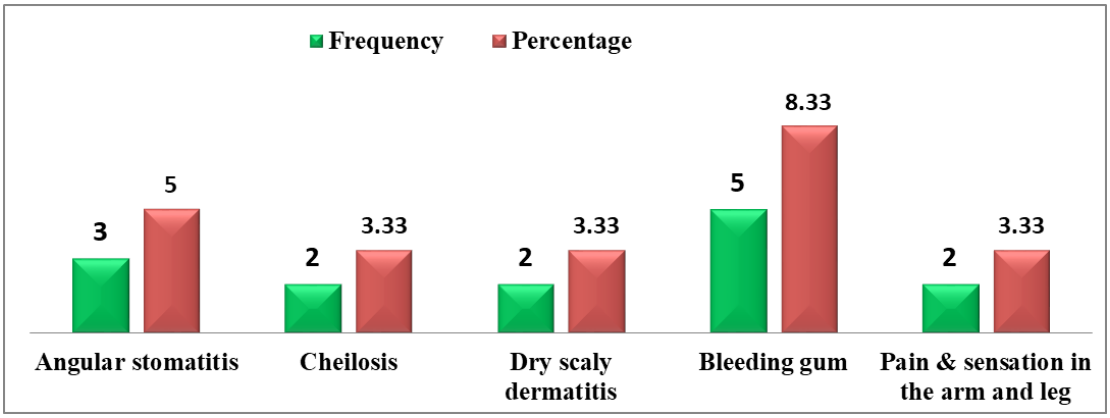

Fig 1: Clinical symptoms of the preschool children

Table 3: Comparison between clinical status of male and female

Particulars	Subjects (N= 60)			
	Boy (N=30)		Girl (N= 30)	
Disease	Frequency	Percentage	Frequency	Percentage
Angular stomatitis	1	3.33	2	6.67
Cheilosis	1	3.33	1	3.33
Dry scaly dermatitis	1	3.33	1	3.33
Bleeding gum	3	10	2	6.67
Pain & sensation in the arm and leg	-	-	2	6.67

Table 3 depicts that the prevalence of clinical deficiency symptoms were very less amongst both boys and girls except cheilosis, bleeding gum and pain and sensation in the arm and leg and angular stomatitis. The case was more among girls in respect of angular stomatitis (6.67 %) and pain & sensation in arm a leg (6.67%) as compared to boys where the case of angular stomatitis and pain and sensation was among 3.33 per cent and 0 per cent male children. But the case of bleeding gums was more among male children (10%) as compared to female children (6.67%).

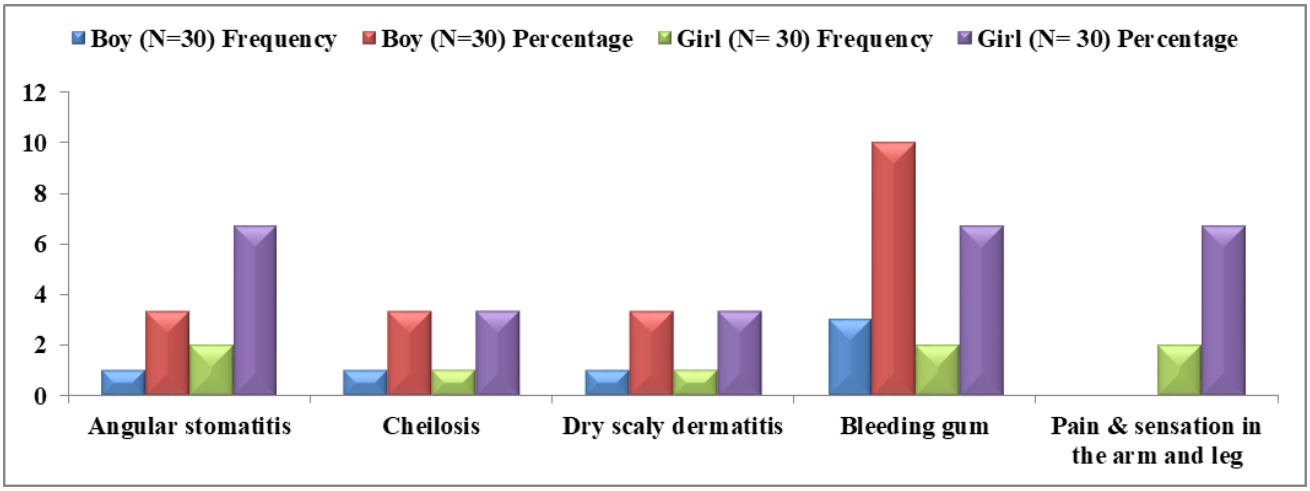

Fig 2: Comparison between clinical status of male and female children

Table 4: Correlation relation of intake of nutrients of preschool children with different indicators

	Indicators	Nutrient intake					
		Energy	Protein	CHO	Fat	cal	iron
1	Nutritional status of children	0.691**	0.641**	0.605**	0.386**	0.206	0.580**
2	Anthropometric indicators						
	Height	0.189	0.272*	0.303*	-0.093	0.221*	0.267
	Weight	0.446**	0.295*	0.399**	0.151	0.002**	0.308*
	MUAC	0.300*	0.110	0.119	0.338**	-0.098	0.098

* Significant at 5 % level of probability. **Significant at 1 % level of probability.

Table 4 revealed that correlation relation to energy, protein, CHO, fat, Cal and iron intake with nutritional status of preschool children were positive and significant at 1 per cent. The correlation relation of energy (0.691**), protein (r=0.641**), CHO(r=0.605**), fat (r= 0.386**), Cal(r=206), Iron(r=0.580**). The correlation relation of anthropometric indicators of height of protein (r=0.272*), CHO (r= 0.303*) and calcium (r=0.221*) with height was significant at 5 per cent. The correlation co-efficient of energy (r=0.446**), CHO (r= 0.399**), and cal (r=0.002**) intake with weight was positive and significant at 1 per cent whereas protein (0.295*) and iron (r= 0.308*) intake with weight was significant at 5 percent. The correlation co-efficient of energy (r=0.300*) and fat (r= 0.338*) intake with MUAC was positive and significant at 5 per cent.

Conclusion

In early childhood, adequate nutrition can ensure healthy growth, proper organ formation and function, a strong immune system, and neurological and cognitive development. Nutrition, has increasingly been recognized as a basic pillar for social and economic development. Adequate nutrition during infancy and early childhood is essential to ensure the growth, health, and reduce the risk of illness and development of children to their full potential. . It is necessary that the dietary guidelines for preschool children should include an adequate proper balance diet which must include fruits and vegetables, milk, multigrain food items that enhance their healthy life and less show their clinical symptoms like angular stomatitis, Cheilosis, dry scaly dermatitis and bleeding gum.

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