NATIONAL AGRICULTURAL TECHNOLOGY PROJECT

Proceedings of the Workshop on

Empowerment of Fisher Women

in Coastal Ecosystem of Andhra Pradesh, Karnataka, Kerala and Tamilnadu

ANGRAU Auditorium, Rajendranagar, Hyderabad

13th & 14th October 2003

Chapter 5

NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN

K. Dhanapal*, J.Lakshmi*, Vijaya Khader*, R.Sathiadhas**, H.Mohamad Kasim**, R.Narayanakumar**, N.S.Sudhakara*** and Femeena Hassan**

Abstract

In the surveyed 'south Indian states' , it was found that cereal intake per child was found to be 136 gm., and pulse intake was found to be 10gm. The consumption of vegetables and fruits was found to be low. Milk consumption was also very low. Fish consumption was found to be 35 gm. The intake of nutrients was also lower than the RDA.

Introduction

Activity increases markedly during the second year of life. Insufficient food will not only result in under nutrition in terms of inadequate weight gain but will hinder physical and mental growth. Healthy children with low blood levels of some vitamins particularly folate, vitamin C and riboflavin have been found to score poorly on tests of memory and non verbal abstract thinking. Hence there is a need to put increased emphases on the relation between nutrition and health in children.

Methodology

To elicit the information on the food consumption of preschool children in the selected villages, a detailed information on the food consumed, frequency and amount purchased for a period of one month was collected from the families.

24 hour recall method combined with one day weighment was employed to assess the nutritional status of preschool children (1-5years). The purpose of diet survey was explained thoroughly to the parents. Food items served in plate before eating were noted. The cooked ingredients were measured using measuring cups and were then converted to raw ingredients.

Standardization of cups for volume

Take a set of the diet survey cups and rank the edges of all cups to a particular level. Fill each of the cup with water and measure the water in each cup with measuring cylinder to know the volume of the cups.

Standardization of cups for weight

Take a set of 12 diet survey cups and rank the edges of all cups to a particulars level . Fill each of the cups in a uniform way with cooked rice and weigh. Deduct the weight of the empty vessel.

The mean intake in forms of raw equivalents from intake of cooked amounts were calculated using the formula (Thimmayyamma , 1986) given below.

* Acharya N.G.Ranga Agricultural University, Hyderabad – 500 0030
**Central Marine Fisheries Research Institute, Kochi – 682 014
***College of Fisheries, Mangalore – 575 002

$$\text{Individual intake of items in raw equivalents (gm/ml)} = \frac{\left[\text{total raw amounts of each Ingredient used in preparation}\right] \times \left[\text{Individual intake (cooked amount)}\right]}{\text{Total cooked amount of each preparation g/ml.}}$$

The nutritive values of foods consumed were calculated using the nutritive value of Indian foods (Gopalan et al., 1989).

Statistical analysis

The date generated has been utilized to meet the objectives of the study. Frequency distributions, Mean and Standard Deviations and tests of significance were utilized and the results are provided for each of the variables studied. Analysis variance, Chisquare test and multiple comparision 't' test procedures were utilized and the results are been provided in the chapters (Visveswara Rao, 1996)

Result and discussion

a. Food intake.

From the Table 1: given below it was observed that the mean intake of cereals by the preschool children in the surveyed southern Indian states was found to be 136 gm/ day., pulse intake was 9.8 gm, milk consumption was 66gm and poultry was 16.8 gm whereas Fish intake was found to be 34 gm. All the food items consumed are lower than the recommended dietary allowances . Only in Andhra Pradesh pre school children were with cereal intake of 198 gm/day. Children of other states were with cereal intake lower than 135gm/day. Milk intake is highest in Kerala children with dietary intake of 170 ml/day followed by Andhra Pradesh children with intake of 64.8 ml/day. Fish intake of 48.5gm/day in Tamilnadu and in Andhra Pradesh with 40.9 gm. Kerala and Karnataka are been with less intake

Table 1: Food intake of Preschool children (per Capita / day (gm))

No	State	Cereals	Pulses	Green Leafy Veg	Other. Vegetables	Fat & oil	Fruits	Sugar & Jaggery	Milk (ml)	Poultry	Fish
	A.P.	198.0 ±55.1	11.6 ±3.03	15.1 ±2.5	13.1 ±4.1	12.6 ±3.2	19.2 ±3.5	15.4 ±3.49	64.8 ±29.2	16.9 ±15.9	40.9 ±18.4
	Karnataka	132.6 ±19.5	6.49 ±4.26	2.94 ± 4.7	9.51 ±3.4	20.1 ±3.4	20.1 ±3.4	8.08 ±1.92	9.56 ±2.7	9.91 ±7.4	26.1 ±9.5
	Kerala	107.0 ±8.36	14.0 ±3.55	9.0 +3.1	9.0 ± 3.1	27.3 ±3.9	21.0 ± 3.9	13.0 ±1.5	170.0 ±37.8	35.0 ±5	23.5 ±8.5
	Tamilnadu	108.0 ±22.4	7.4 ±1.6	4.3 ±1.3	4. 3 ± 1.3	17.1 ±4.5	17.1 ±4.5	12.3 ±2.1	20.8 ±2.3	5.5 ±1.4	48.5 ±11.5
	Overall	136.25	9.87	7.8	11.52	20.9	8.29	12.17	66.29	16.82	34.8
	RDA	200	37	60	35	20	17	275	200	-	-

Note: Figures given are mean ± SD
RDA: Recommended Dietary Allowances, ICMR (1999)

b. Nutrient Intake

(i) Macronutrient intake

The data relating to the intake of macro nutrients are presented in the table 2

Table 2: Mean Macro Nutrient intakes of preschool children (per capita per day)

Sl.No	State	Energy(K.cal)	Protein(gm)	CHO(gm)	Fat(gm)	Total ranks	$\bar{\chi}$
1	Andhra Pradesh	753 (248)	22.2 (7.1)	129.0 (23)	16.5 (4.4)	12	3
2	Karnataka	632 (72)	12.4 (2.0)	127.4 (17.1)	8.1 (2.0)	16	4
3	Kerala	1497 (142)	53.0 (14.5)	238.0 (69)	37 (7.3)	4	1
4	Tamilnadu	1096 (143)	24.1 (3.1)	198.0 (28)	23.1(4.6)	8	2
5	**Overall Mean**	**995**	**27.9**	**173.1**	**21.2**		
6	**RDA**	**1240**	**30**	**-**	**25**		
7	**% adequacy of overall mean**	**80.24**	**93.00**	**92.57**	**84.80**		

Note: Figures with in the brackets indicate SD values
$\bar{\chi}$ = Mean of the relative ranks

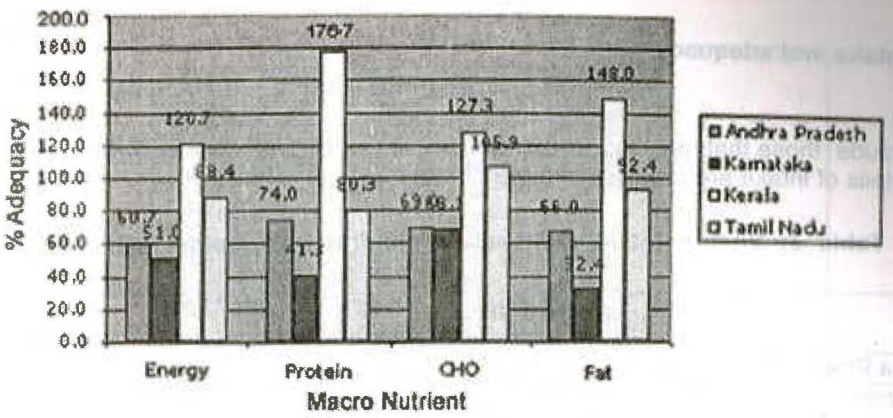

Fig 1 Percent of Macro nutrient adequacy of pre school children in different states

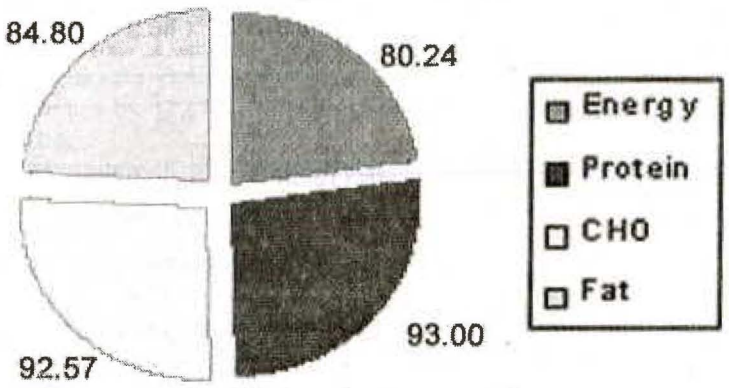

Fig. 2 Percent of macronutrient adequacy in all the states studied

Macronutrients such as energy, protein, carbohydrates and fat are most important for the assessment of dietary adequacies of pre school children. Variations in macronutrient adequacy are observed.

Over all states it was observed that the mean values of energy, Protein, CHO and Fat intake was found to be 995 k.cal, 27.8 gm, 173 gm & 21.2 gm respectively. Intake of these nutrients are lower than the suggested allowances. High intakes of energy, protein, CHO & fat were observed among the pre school children of Kerala, followed by the preschool children of Tamilnadu. Lowest intake of macro nutrients was observed among the children of Karnataka. Lowest macro nutrient adequacies in Kerala children are more than 100% . Protein adequacy is 176.7%. Energy adequacy is 120.7%. Fat was also adequate by 148% of the recommended allowances.

Percent of micronutrient adequacy of pre school children in different states as well as for all the states are given in Fig. 1 & 2.

(ii) Vitamin intake and adequacy

Micro nutrients include those that are required in smaller amount. They include B. Complex Vitamins and Vitamin C. Details of intake are provided in table 3.

Table 3: Vitamin intake of preschool children (per capita / day)

Sl.No	State	B1(mg)	B2 (mg)	Niacin (mg)	Vit C(mg)	Total ranks	$\bar{\chi}$
1	Andhra Pradesh	0.55 (0.20)	0.56 (0.20)	8.1(2.7)	28.4 (4.2)	10	2.50
2	Karnataka	0.32 (0.04)	0.10 (0.02)	5.5(0.7)	4.2 (4.7)	15	3.75
3	Kerala	1.00 (0.40)	1.00 (0.00)	19.0(4.9)	35.0 (29.0)	4	1.00
4	Tamilnadu	0.60 (0.20)	0.80 (0.10)	0.8(0.1)	22.3 (4.3)	11	2.75
5	**Overall Mean**	**0.62**	**0.62**	**8.35**	**22.5**		
6	**RDA**	**0.90**	**1.00**	**11**	**40**		
7	**Adequacy of overall mean %**	**69.8**	**62.0**	**75.9**	**56.3**		

Figures given are mean (SD) values

RDA : Recommended dietary allowances for India, ICMR (1999)

$\bar{\chi}$ = Mean nutritive ranks

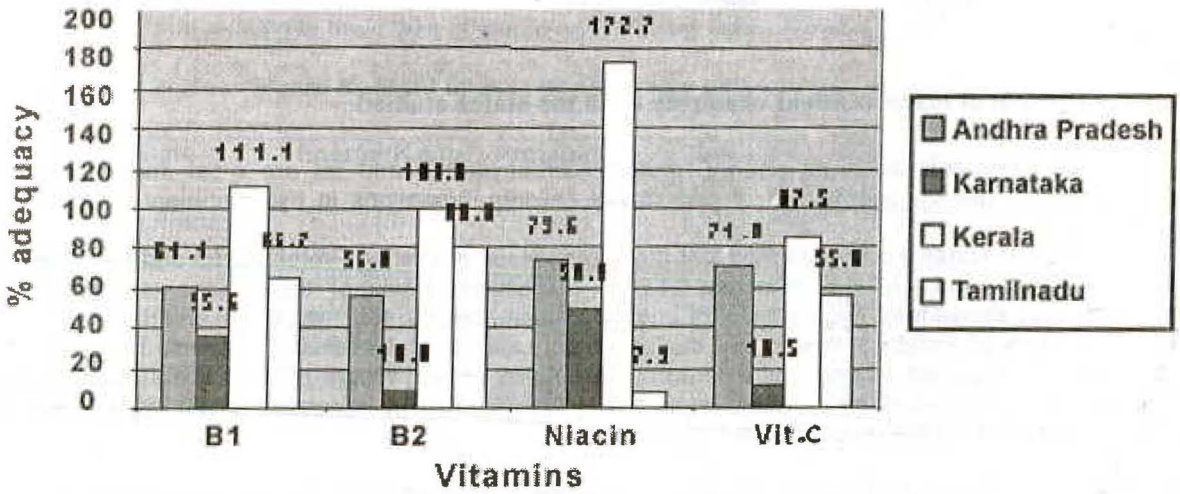

Fig. No. 3: Dietary adequacy of vitamins in pre school children by states

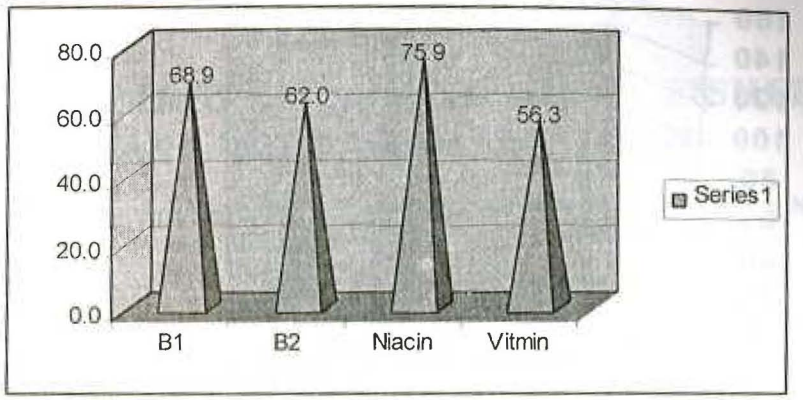

Fig 4: percentage adequacy of Vitamin intake of pre school children in all the states studied

Vitamin intake was highest among the preschool children of Kerala followed by the preschool children of Tamilnadu. Low intake of vitamins was observed among the children of Karnataka and Andhra Pradesh. Kerala children were only seen with intakes close to adequacy or more than adequacy of all the vitamins. Niacin was adequate by 172.7%. Intakes of B1 was adequate by 111.1%. Karnataka children were with highest in adequacy .

Percent vitamin adequacy of pre school children in different states as well as all states is given in Figs. 3 & 4.

(iii) Mineral intake and adequacy

Minerals form the structural component of some body parts and some others act as catalysts. Details of mineral content of the dietaries of pre school children are provided in table 4.

Table 4: Mineral intake of preschool children (per capita / day)

Sl.No	State	Minerals		Intake ranks	$\bar{\chi}$
		Calcium (mg)	Iron (mg)		
1	Andhra Pradesh	348.0 (46.0)	17.1 (5.90)	5	2.5
2	Karnataka	121.0 (56.0)	2.2 (0.41)	8	4.0
3	Kerala	499.0 (46.0)	27.0 (8.40)	2	1.0
4	Tamilnadu	372.0 (64.0)	12.1 (5.00)	5	2.5
5	**Mean**	**335.0**	**14.6**		
6	**RDA**	**400.0**	**18.0**		
7	**Adequacy of overall states mean %**	**83.8**	**81.1**		

Note: Figures are mean (SD) values
RDA : Recommended dietary allowances for Indians, ICMR (1999)

$\bar{\chi}$ = Mean of the relative ranks

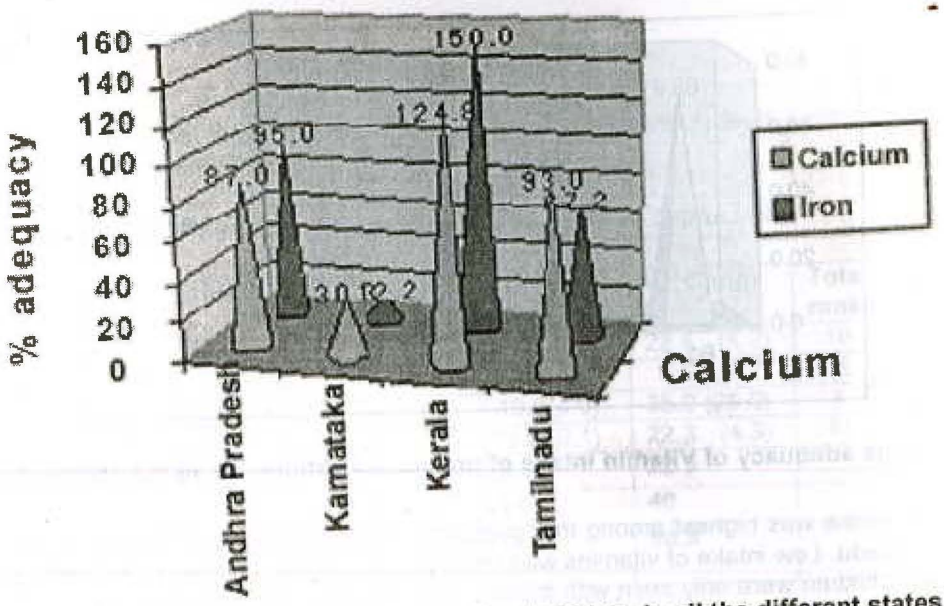

Fig. 5: Mineral adequacies in the dietaries of preschool children in all the different states

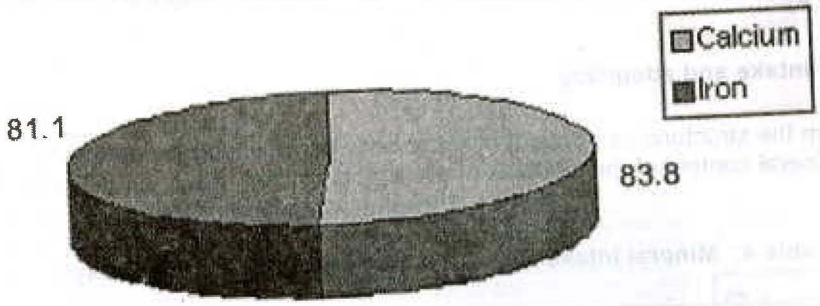

Fig. 6: Percent adequacy of mineral intake preschool children in all the states studied

It was observed that the calcium and iron intakes of preschool children of southern states surveyed were 335 mg and 14.6 mg respectively (table 4). The Percent adequacy of mineral intake in different states as well as for all states is given in Figs. 5 & 6. High mineral intake was observed among the preschool children of Kerala, followed by Tamilnadu and Andhra Pradesh. Lowest mineral intake was observed among the preschool children of Karnataka.

Conclusions

Food intakes by the preschool children of all states accept those of Kerala were observed to be inadequate when compared with the dietary requirements. This might be because of poor economic status, low literacy, lack of nutritional awareness of the mother & lack of time for the mother to attend on the children. Such low intake may lead to affect cognitive function, mood & behavior of children. Kerala children are seen with better dietaries and better nutritive adequacies