



DIETARY INTAKE OF PRESCHOOL CHILDREN OF DHARWAD TALUK, KARNATAKA

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ABSTRACT

Nutrition of preschool child is of paramount importance, because foundation for life time health, strength, and intellectual abilities are laid down during this period. Intake of all the foods by rural children was on par with urban counterparts, except pulses. Higher per cent of rural than urban children consumed cereals (111.28 and 104g, respectively) other vegetables (33.17 and 32.42g, respectively), milk (98.30 and 90.97ml, respectively) visible fat (7.98, 6.59 g, respectively) and sugar (9.68 and 8.43g, respectively) though not significantly different. The mean intake of major nutrients among all the preschool children studied was less than the Recommended Dietary Allowances of ICMR and that of urban and rural children was on par with each other except sodium. Intake of protein was similar in both groups (20.0 in rural and 19.57 g/d, in urban) and could meet 99.50 and 97.36% of RDA, respectively. The intake of minerals like calcium, iron and zinc was lower than the RDA among both rural and urban preschool children. Irrespective of age, gender and locality, higher proportion of children suffered from fever and cold (24.96 and 23.19 %, respectively) followed by cough (19.29 %) and stomach ache (10.62 %) for the past one month. Dietary intake assessment is one of the indirect methods of assessing the nutritional status, as the diet and nutrients consumed will influence the physical and mental growth and development.

KEY WORDS: Preschool, Dietary intake.

INTRODUCTION

Children are wealth of any nation as they constitute one of the important segments of the population. Childhood is a critical period in which dietary and lifestyle patterns are initiated, and these habits can have important immediate and long-term implications (Murphy, 1998). The foundation of good health and sound mind is laid during preschool, so it is a basic milestone in life of an individual and responsible for many changes that may take place during later life. Nutrition of preschool child is of paramount importance, because foundation for life time health, strength, and intellectual abilities are laid down during this period. Preschool age is in between stages of infancy and school age, when rapid physical, mental and emotional development takes place. Ten per cent of physical growth and 80 per cent of mental growth are believed to take place from conception to 6 years of age. So, childhood diets need to be paid more attention to improve health of children so that health of nation is improved. But food available to many children in developing nations is neither adequate nor suitable for building resistance to diseases, mental and physical development. So, a large number of pre-school children suffer from growth retardation of various degrees and nutritional deficiency (Manu and Khetarpaul, 2006). So, a large number of pre-school children suffer from growth retardation of various degrees and nutritional deficiency. This is understandable because malnutrition affects the capacity for work and the productive life expectancy. Malnutrition plays a major role in the cause of preventable deaths and disabilities that occur within the developing

world, especially among children. Dietary intake assessment is one of the indirect method of assessing the nutritional status, as the diet and nutrients consumed will influence the physical and mental growth and development. Hence, the study has been undertaken with the objective to investigate the nutrient intake of rural and urban preschool children

METHODOLOGY

The study was conducted in rural and urban areas of Dharwad taluk, Karnataka, India during 2013-2015. Preschool children attending *anganwadis* from rural and urban areas were selected for the study, with the prior written permission of Women and Child Welfare department. A total of 13 rural *anganwadis* were contacted from five selected villages. Similarly, from urban Dharwad, preschool children attending 22 *anganwadis* were selected from north, south, east and western parts of the city. A total of 120 preschoolers (both gender) of 3 to 6 years were selected from both areas of Dharwad. Information on food consumed was obtained by interviewing the mothers of the children, personally with the use of 24 hour recall method. The intake or nutritive value of the food items consumed was computed using software, Annapurna VAR 3 developed by M.R. Chandrasekhar of Bangalore. Food intake was compared with Dietary guidelines for Indians A manual, NIN (2011), and nutrient intake were compared with Recommended Dietary Allowances (RDA), ICMR, 2010. Observation of morbidity pattern of preschool for the past one month was recorded by interviewing the mothers of the children. The

data were analyzed using the SPSS (Statistical Packages for Social Sciences) software version 16.0.

RESULTS & DISCUSSION

The results pertaining to daily intake of foods by the rural and urban preschool children are presented in Table 1. The intake of all the foods was below the Suggested Balance Diet (SBD), irrespective of gender and locality. Intake of all the foods by rural children was on par with urban counterparts, except pulses. The consumption of pulses was significantly higher in rural children. Higher per cent of rural than urban children consumed cereals (111.28 and 104g, respectively) other vegetables (33.17 & 32.42g respectively), milk (98.30 and 90.97 ml, respectively) visible fat (7.98, 6.59g, respectively) and sugar (9.68 and 8.43 g, respectively) though not significantly different. However, intake of eggs was higher in urban (25.83g) children compared to their rural counterparts (13.33g). The lower values of anthropometric measurements could be reasoned to reduce consumption (data not shown) of foods like pulses, visible fat, sugar and milk which have resulted in reduced intake of energy and other body building nutrients. Though the

amount of protein consumed was meeting the RDA, the quality of protein was poor as the diet was cereal based with less of animal foods (Table 1, 2 and Figure 1), besides lower intake of energy results in diversion of protein to meet energy needs rather than body building. Similar studies indicating lower anthropometric measurements of preschool children were reported (Amosu *et al.*, 2011 in Ipokia of Nigeria, Indu *et al.*, 2013 in Bihar, and Bant, 2013 in Hubli). Intake of foods varies according to age, gender, economic status, food availability, purchasing capacity, likes and dislikes. Adequate nutrition should be ensured to meet the recommended values. In the present study the intake of all the foods among the rural and urban preschool children was lower than the Suggested Balanced Diet (Table 1). This may be due to lower income, poor socio economic status, unavailability of quality foods, low purchasing power, ignorance and more number of members in the family, lack of hygiene and sanitation. Several scientists working with preschool children have also reported that the intake of foods was below the SBD (Kapur *et al.*, 2005, Ahmed, 2012, Kumar and Prasad, 2012).

TABLE 1. Food intake of preschool children

Foods (g/day)	SBD [‡]	Rural (n=60)	Urban (n=60)	N=120	
				't' value	
				Rural & Urban	
Cereals	120	111.28±27.89	104.78±24.29	1.36 ^{NS}	
Pulses	30	16.62±6.95	10.25±7.07	4.97**	
Other vegetables	100	33.17±10.77	32.42±11.84	0.36 ^{NS}	
Fruits	100	16.83±27.29	17.67±27.53	0.16 ^{NS}	
Milk (ml)	500	98.30±83.11	90.97±82.75	0.48 ^{NS}	
Visible fat	25	7.98±2.44	6.59±2.76	2.92 ^{NS}	
Sugar	20	9.68±4.97	8.43±4.85	1.39 ^{NS}	
Egg	50	13.33±20.64	25.83±22.65	3.16 ^{NS}	
Nuts and oil seeds	-	15.92±10.11	15.34±10.04	0.31 ^{NS}	

Dietary guidelines for Indians A manual, NIN, (2011)

SBD – Suggested Balance Diet

Mean nutrient intake of subjects computed from food consumption is furnished in Table 2 and the percent adequacy is depicted in Figure 1. It can be visualized from the Table and Figure that the mean intake of major nutrients among all the preschool children studied was less than the Recommended Dietary Allowances of ICMR and that of urban and rural children were on par with each other except sodium. Irrespective of gender, energy intake of rural and urban children was 823 and 790 Kcal/d, respectively with the adequacy of 60.96 and 58.52 per cent. Intake of protein was similar in both groups (20.0 in rural and 19.57 g/d, in urban) and could meet 99.50 and 97.36 per cent of RDA, respectively. The intake of fat among urban children was higher than rural counterparts (17.43 and 16.14 g, respectively) and was meeting 64.56 and 69.72% of the ICMR recommendations. Among both

rural and urban children, the fiber intake was around nine g (9.04 and 8.25 g/d, respectively), could meet 99.50 and 97.36 percent of RDA, respectively and the difference was not statistically significant. The intake of minerals like calcium, iron and zinc was lower than the RDA among both rural and urban preschool children. The calcium, iron, and zinc intake among rural and urban children was 126.45, 8.80, 2.21 mg and 145.33, 7.05, 1.32 mg with the adequacy of 27.67, 129.23, 17.14 percent and 38.34, 84.31, 4.00%, respectively. The intake of potassium and magnesium was higher in the rural (394.96 and 205.78 mg, respectively) children compared to urban counterparts (358.78 and 185.40 mg, respectively) though not statistically significant. Urban children compared significantly higher amounts of sodium compared to rural children (150.56 v/s 99.56mg, respectively).

TABLE 2. Nutrient intake of preschool children

N=120

Nutrients (/day)	RDA [‡]	Rural(n=60)		Urban(n=60)		‘t’ value Rural & Urban
Major nutrients (g)						
Energy (kcal)	1350	823±52.33	790±12.73			1.08 ^{NS}
Protein	20.1	20.00±5.01	19.57±4.16			0.52 ^{NS}
Visible fat	25	16.14±4.94	17.43±0.46			1.46 ^{NS}
Fiber	-	9.04±2.61	8.25±1.91			1.81 ^{NS}
Carbohydrate	-	149.82±11.38	141.33±1.48			1.44 ^{NS}
Minerals (mg)						
Calcium	600	126.45±55.67	145.33±31.68			1.64 ^{NS}
Iron	13	8.80±6.42	7.05±1.41			1.67 ^{NS}
Sodium	-	99.56±41.56	150.57±102.39			3.60**
Potassium	-	394.96±151.05	358.77±14.42			1.45 ^{NS}
Magnesium	70	205.78±72.67	185.40±67.10			1.65 ^{NS}
Zinc	7	2.21±1.32	1.86±1.06			1.81 ^{NS}
Copper	-	0.83±0.99	0.56±0.35			1.88 ^{NS}
Vitamins (mg)						
carotene (µg)	3200	105.17±44.93	147.23±369.11			2.37 ^{NS}
Thiamine	0.7	0.74±0.29	0.76±0.00			0.29 ^{NS}
Riboflavin	0.8	0.36±0.10	0.38±0.00			1.11 ^{NS}
Niacin	11	6.38±2.25	5.69±2.49			1.90 ^{NS}
Folic acid (µg)	100	37.11±14.89	33.90±11.88			1.18 ^{NS}
Ascorbic acid	40	6.82±3.89	5.88±7.92			1.34 ^{NS}
Pyridoxine	0.9	0.07±0.05	0.07±0.07			0.68 ^{NS}

[‡] Recommended Dietary Allowances (RDA), ICMR, 2010, NS- Non significant

TABLE 3. Morbidity pattern of preschool children

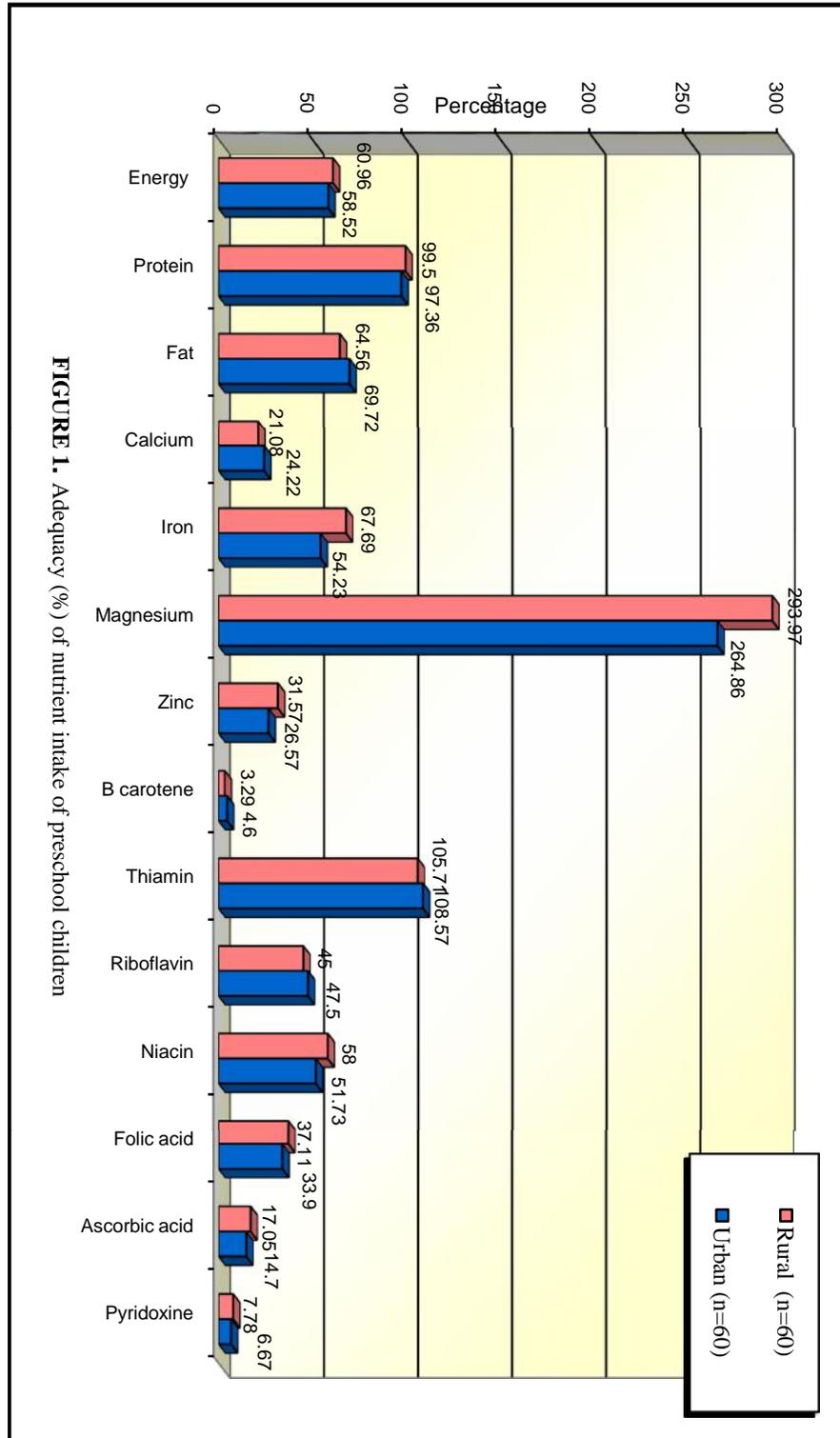
N=565

Morbidity	Rural (n=250)		Urban (n=315)		Total	
	n	%	n	%	n	%
Fever	60	24.00	81	25.71	141	24.96
Cold	72	28.80	59	18.73	131	23.19
Cough	42	16.80	67	21.27	109	19.29
Stomach ache	22	8.80	38	12.06	60	10.62
Vomiting	6	2.40	17	5.40	23	4.07
Diarrhoea	7	2.80	12	3.81	19	3.36
Constipation	4	1.60	13	4.13	17	3.01

Note: Previous one month

Among rural and urban preschool children of three to six years, the intake of carotene, riboflavin, niacin, folic acid, ascorbic acid, pyridoxine was 105.17, 0.36, 6.38, 37.11, 6.82 and 0.07µg in rural and 147.23, 0.38, 5.69, 33.90, 5.88 and 0.06 µg in urban respectively, which could meet only 3.29, 45.00, 58.00, 37.11, 17.05 and 7.78 percent and 4.60, 47.50, 51.73, 33.90, 14.70 and 6.67 percent of RDA, respectively whereas, thiamine intake could meet the RDA of ICMR in both groups. Irrespective of age and gender the intake of vitamins among rural and urban children was on par with each other. Intake of micronutrients like iron, calcium, carotene, folic acid and ascorbic acid was significantly lower than RDA (Table 2) which can be attributed to the reduced consumption of other vegetables, fruits and absence of green leafy vegetables in the diet (Table 1). The computed value of thiamine was on par with RDA owing to the fact that the consumption of cereals was nearer to the RDA and is good sources of thiamine. Singh and Grover (2003), Manu and Khetarpal (2006) and

Kumar and Prasad (2012) also reported a deficit in the intake of various nutrients compared to RDA. Table 3 provides data on morbidity pattern of preschool children. It was noted that irrespective of age, gender and locality, higher proportion of children suffered from fever and cold (24.96 and 23.19%, respectively) followed by cough (19.29%) and stomach ache (10.62%) for the past one month. Less than five per cent of children suffered from diarrhoea (3.36%), constipation (3.01%) and vomiting (4.07 %). In the urban locality higher per cent of children suffered from fever, cough, diarrhea, constipation, stomach ache and vomiting (25.71, 21.27, 3.81, 4.13, 12.06 and 5.40 %, respectively) than rural (24.00, 16.80, 2.80, 1.60, 8.80 and 2.40 %, respectively) children. When the consumption of foods was translated into nutrients, due to the inadequacy, a deficit was noted in intake of all the nutrients among children except zinc, thiamine and magnesium (Table 2).



Significantly lower intake of pulses, milk, fat, sugar, nuts and oilseeds, absence of roots and tubers in the diet, the major contributors of energy has led to significantly lower amounts of energy in the diets. Also it might be due to higher per cent of cold, cough and fever among rural (24 and 28.80%) and urban (25.71 and 18.73%) children during the study period might have contributed to lack of appetite and thus reduced food intake (Table 3).

CONCLUSION

Intake of foods varies according to age, gender, economic status, food availability, purchasing capacity, likes and dislikes. Adequate nutrition should be ensured to meet the recommended values. In the present study the intake of all the foods among the rural and urban preschool children was lower than the Suggested Balanced Diet. The mean intake of major nutrients among all the preschool children studied was less than the Recommended Dietary Allowances of ICMR and that of urban and rural children was on par with each other except sodium. The intake of minerals like calcium, iron and zinc was lower than the RDA among both rural and urban preschool children. The calcium, iron, and zinc intake among rural and urban children was 126.45, 8.80, 2.21 mg and 145.33, 7.05, 1.32 mg with the adequacy of 27.67, 129.23, 17.14 percent and 38.34, 84.31, 4.00%, respectively. Irrespective of age and gender the intake of vitamins among rural and urban children was on par with each other. Intake of micronutrients like iron, calcium, carotene, folic acid and ascorbic acid was significantly lower than RDA. So, childhood diets need to be paid more attention to improve health of children so that health of nation is improved.

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