

# Nutritional Anthropometry, Diet and Morbidity of Tribal School Children in Kurnool

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Four hundred and ninety-one tribal school children from Ashram schools (residential) and single teacher schools (non-residential) of Kurnool district, Andhra Pradesh, were studied for their anthropometry, morbidity, food and nutrient intake. The study revealed that a majority (69 per cent) of the children belonged to the Chenchu tribe followed by other tribes, such as, Yerukula, Yanadi and Sugali. The health and nutritional status of the children was not satisfactory. However, compared to the diets of single teacher school children, Ashram school diets were better in quality and quantity indicating the beneficial role of Ashram schools.

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## **Introduction**

School age is a dynamic period of growth and development when children undergo physical, mental and social changes. A scientific study of the growth and development of school-going children, particularly those belonging to low socioeconomic groups, has its own importance in developing countries like India. Tribal children, in particular, are the most disadvantaged and deprived as they lack adequate nutrition and intellectual stimulation. In recent years, there has been increased emphasis on the development of tribal areas, and more so in the case of school-going age children. To ensure that tribal children receive proper education and nutrition and to make them efficient citizens of society, the Integrated Tribal Development Agency (ITDA) has established Ashram schools in Andhra Pradesh. Ashram Schools are residential schools providing facilities such as free boarding and lodging, free supply of books, writing materials and

clothes to the children. For those children who can not avail the Ashram school facility, single teacher schools (non-residential) have been established in the interior villages, which provide free education to the children.

Assessment of nutritional status is the first step in planning and programming nutrition intervention activities. It should be a continuous process aimed at evaluating and extending such activities to those communities most in need. The morbidity patterns can serve as the best index of the health status, described in terms of the incidence and/or prevalence of certain diseases or disabilities. This helps in proper evaluation of community health programmes and also in the detection and treatment of diseases related to malnutrition.

Andhra Pradesh, with a tribal population of 41.99 lakhs (India, 1991) occupies the seventh place in India. Various studies on the health and nutritional status of the tribal population are available, but not much work has been done on tribal school children. The present study focuses on the health and nutritional aspects of children studying in Ashram schools and single teacher schools in the tribal areas of Kurnool District, Andhra Pradesh.

## **Materials and Methods**

### *Selection of the Area*

Kurnool district in Andhra Pradesh, which has a population of a 55,985 thousand scheduled tribes (STs) (India, 1991) was selected for the study. The literacy rate of the ST population in the state is very low - 7.82 per cent (India, 1981) and ST children below 14 years constitute 41.33 per cent in the state (Nagendra Kumar, Prasad, Mohan and Vijaykumar, 1993).

The ST categories prevalent in the area are mainly Chenchus followed by Sugali, Yerukula and Yanadi. They live in the Nallamalai forest areas continuing their traditional professions of hunting and collecting minor forest produce. The Yanadi and Yerukula are confined to the plain areas while the Sugali are found both in the plains and forest areas.

### *Selection of Mandals and Schools*

The forest areas in which the tribes live fall under Atmakur, Velugodu, Kothapalli and Pamulapadu mandals of Kurnool Revenue Division,

and Bandi Atmakur, Mahanandi, Panyam, Allagadda, Chegalmarri and Rudravaram mandals of Nandyal Revenue Division.

Five mandals have Ashram schools and six mandals have single teacher schools in Kurnool district. For the present study three mandals, namely Atmakur, Kothapally and Mahanandi, with both single teacher and Ashram schools, were selected for the study.

### *Selection of Schools*

The present study covered four each of the Ashram schools and single teacher schools located in eight villages.

### *Sample Size*

All the children attending school at the time of the study were included. The ages of the pupils were noted as per the records available in the schools, which was confirmed using the local event calendar at the time of their admissions.

### *Collection of Information*

A pre-tested structured interview schedule was used to collect information on anthropometry, food intake and morbidity.

### *Anthropometry*

Two parameters, body weight and standing height, were employed to assess the nutritional status of the tribal school children following standard techniques (Jellifee, 1966). The body weight of the children was recorded with Salter spring balance (100 kg x 500 gm) to the nearest 0.5 kg. The children were weighed preferably before the midday meal with minimal clothing. An average of three measurements was recorded. The height was measured by using a portable height rod of two metres length calibrated in centimeters.

The subjects were measured barefoot and made to stand erect with feet parallel on a flat floor, heels together, buttocks, shoulders and back of head touching the upright rod, and arms hanging at the sides in a natural manner. The headpiece was gently lowered so that it made contact with the top of the head and the measurement taken to an accuracy of 0.1 cm. An average of three measurements was recorded.

### *Weight-for-age Status*

The weight measurements of Ashram school and single teacher school children were expressed as percentages of 50th percentile values of

body weights of National Centre of Health Statistics (NCHS) standards. The cutoff levels used for categorising children into normal, mild, moderate and severe grades of growth retardation are as follows.

<i>Standard Weight</i>	<i>Nutrition grade</i>
90	Normal
75-90	Grade I (mild)
60-75	Grade II (moderate)
60	Grade III (severe)

#### *Clinical Morbidity (Nutritional and Non-nutritional)*

A thorough, systematic clinical examination of the children was carried out to obtain the morbidity pattern. Each child was questioned about his/her present health, complaints, if any, and also the occurrence of illness over the previous one month. Presence of frank signs and symptoms related to nutritional deficiency and non-nutritional origin were examined clinically with the assistance of the Public Health Centre (PHC) doctor, homeopathy personnel, health workers and/or *anganwadi* workers who were available in the village at the time of the survey. Information was also collected from school health records.

#### *Dietary Intake of Ashram School Children*

Dietary intake of Ashram school children was recorded using the inventory method (food list method) and weightment of raw and cooked foods for three consecutive days.

In the inventory method information regarding the menu pattern for three days and number of inmates partaking the meals was obtained from the warden of each Ashram school hostel. Data on recipes and quantity of ingredients used in different recipes, were collected from the records maintained by the warden. The information on food intake was also obtained by weightment method.

Apart from the inventory method, weightment of raw and cooked foods was also obtained, since it provided information on the actual consumption pattern of individuals. Weightment of food was undertaken for three consecutive days to know the day-to-day variations in the dietary intake of the children. Weightment of raw foods used in each recipe, according to meal pattern, was undertaken using the standard pan balance. The accuracy level of the balance was adjusted to the nearest 1 gm. Similarly, weightment of total cooked amount of each recipe was also done taking into consideration the weight of the empty vessel. Based on this, the conversion factor (CF) of each recipe

was calculated. Batches of children of specific age groups (5-15 years, both sexes) were asked to sit and a measured (weighed) amount of each recipe was served to them. After the children has eaten, leftover amounts, if any, were also weighed. Later on, the intake per person (per caput)/ day was calculated taking into consideration the net cooked food consumed (that is, total cooked amount served - left over amount). Raw equivalents of each food item were calculated using the conversion factor.

$$\text{CF} = \frac{\text{Raw amount (g/ml)}}{\text{Cooked amount (g/ml)}}$$

$$\text{Average intake per child per day (raw equivalent) (g/ml)} = \frac{\text{Total raw amounts (g/ml)}}{\text{Total cooked amount (g/ml)}} \times \frac{\text{Net intake of children (cooked amount) (g/ml)}}{\text{No. of children} \times \text{No. of days of survey}}$$

#### *Dietary Intake of Single Teacher School (non-residential) Children*

To obtain information on the general meal pattern of the families and the individual dietary intake of the children, the mothers of the children residing in the same village were approached. A personal interview schedule was designed, pretested and refined for obtaining information.

The general meal pattern of the households was obtained by twenty-four hour recall method, interviewing the mother/elder female member of the family. The actual diet survey by weighment method was done on a sub-sample of 45 per cent selected through the systematic random sampling method.

Information about the total quantity of raw foods and cooked foods prepared for the family, and the individual child intake of the cooked food was obtained using a set of standardised vessels. The raw amount of foods taken by an individual child was calculated using the following formula:

$$\text{Amount of raw food consumed by the individual child} = \frac{\text{Total raw quantity of food used for family}}{\text{Total cooked quantity of the food}} \times \text{Individual intake of the cooked portion}$$

Having, thus, known the raw portion consumed by an individual child, the intake of nutrients from the diet was calculated using nutritive values of Indian foods (Gopalan, Ramasastry and Balasubramanian, 1984). The adequacy of foods, in terms of quantity was compared with a balanced diet (Gopalan *et al*, 1984).

## Results and Discussion

It is evident from Table 1, that a majority of the children belonged to the Chenchu tribe which is predominant among the various tribes in the district. The strength of the girls admitted in Ashram schools was found to be less as compared to boys which was not so in the single teacher schools. This was because Ashram schools are co-educational residential schools and many parents were unwilling to send the girls away from home. Ashram schools established separately for girls, and if properly run, may encourage more admissions.

It is also observed that the strength of the adolescent (Table 1) group (13-15 years) in all the schools was less compared to other age groups. The school attendance registers indicated that the number of school dropouts (irrespective of sex) was more in the 10-11 years age group. This is perhaps due to the fact that older children are required by the families for income-generating activities such as collection of minor forest produce or as wage earners through agriculture labour. In the case of girls, the onset of puberty was the main reason for school dropouts. Besides the girls were kept at home to look after their younger siblings and to assist in household chores. This, in turn, reflects the low socioeconomic conditions of the tribal population.

## Anthropometry

When compared with the Indian Council of Medical Research (ICMR) standards, the mean body weights and the mean standing heights of Ashram school children (Table, 2) corresponded well in the age group of 5-12 years, and were found to be lower than the necessary standards in the age groups of 13-15 years. It was also observed that the mean body weights and mean standing heights of single teacher school children were below the ICMR standards (Tables 3 and 4). The low socioeconomic status and nutritional constraints in early childhood may be solely responsible for the low body weights and heights of these children. The low body weights coupled with low heights for children above ten years of age, shows that the children were chronically malnourished, and this fact may be responsible for the onset of

TABLE 1

Distribution of the School Children According to their Age, Sex and Tribe

Tribe	Sex	5-6 (Years)		7-9 (Years)		10-12 (Years)		13-15 (Years)		Total		% Total (Boys+Girls) n=491
		AS	SS	AS	SS	AS	SS	AS	SS	AS	SS	
Chenchu	Boys	30	34	47	25	20	3	2	2	99 (29)	64 (44)	69
	Girls	30	35	43	27	27	8	4	2	104 (30)	72 (50)	
Sugali	Boys	13	3	11	2	22	2	5	-	51 (15)	7 (5)	17
	Girls	8	-	7	1	5	1	2	-	22 (6)	2 (1)	
Yerukula	Boys	1	-	3	-	3	-	-	-	7	- (2)	4
	Girls	-	-	3	-	2	-	1	-	6 (2)	-	
Yanadi	Boys	-	-	1	-	-	-	1	-	2 ((0.5))	-	1
	Girls	-	-	-	1	-	1	-	-	-	2 (0.5)	
Others (BC, SCs)	Boys	11	-	12	-	13	-	6	-	42 (12)	-	10
	Girls	2	-	8	-	1	-	6	-	(11) (3)	-	
Total		95	72	136	55	94	14	21	4	346	145	

Note : Figures in parenthesis indicate percentages

AS = Ashram School; SS = Single Teacher School

TABLE 2  
 Mean  $\pm$  Standard Deviation for Weights and Heights of Ashram Schools and  
 Single Teacher School Children of Kurnool District, Andhra Pradesh.

Age (years)	School	Boys				Girls					
		N	Weight (Kg)		Height (cm)		N	Body weight (kg)		Standing height (cm)	
			Mean	SD	Mean	SD		Mean	SD	Mean	SD
5-6	AS	55	16.81 $\pm$ 3.44**		113.63 $\pm$ 15.12**	40	15.00 $\pm$ 1.5**		108.30 $\pm$ 8.2**		
	SS	37	13.91 $\pm$ 2.99		103.94 $\pm$ 10.46	35	12.75 $\pm$ 3.4		104.00 $\pm$ 10.7		
7-9	AS	74	20.25 $\pm$ 4.1**		126.52 $\pm$ 11.48**	62	20.78 $\pm$ 7.5**		122.39 $\pm$ 8.1**		
	SS	27	18.66 $\pm$ 3.78		120.71 $\pm$ 5.22	28	18.25 $\pm$ 5.2		117.90 $\pm$ 7.6		
10-12	AS	58	24.80 $\pm$ 4.9		135.60 $\pm$ 8.33**	36	25.08 $\pm$ 6.2		133.90 $\pm$ 10.4		
	SS	5	23.25 $\pm$ 4.5		125.50 $\pm$ 4.70	9	24.50 $\pm$ 5.0		135.20 $\pm$ 10.8		
13-15	AS	14	29.50 $\pm$ 4.8**		139.00 $\pm$ 5.60**	7	31.20 $\pm$ 6.0		144.90 $\pm$ 9.4*		
	SS	2	22.25 $\pm$ 1.7		129.50 $\pm$ 1.40	2	29.50 $\pm$ 9.8		138.65 $\pm$ 14.3		

Notes: Mean of 3 values

\* significant at 5 per cent level

\*\* significant at 1 per cent level

AS = Ashram School

SS = Single Teacher School



puberty in such children. However, the data of body weights and standing heights of a cross sectional population do not throw much light on the association between current food intake and nutritional status, as the current body weight and standing height of an adolescent reflects past nutrient inadequacies in diet over a number of years. Also, compared to Gomez's classification, the percentage of normal children was very (low (16.4 per cent) in Ashram schools, whereas in single teacher schools it was only 10.2 per cent. It is also evident from the study of Nagendra Kumar *et al* (1993) that diarrhoea, malaria and measles were the most prevalent communicable diseases affecting the pre-school age population of the tribal communities which in turn might have affected chronic undernourishment in the later period (Gopalan *et al*, 1992). Tuberculosis is reported to be rapidly spreading in Chenchugudem in Kurnool district (Andhra Pradesh, 1993-94).

TABLE 3

Comparison of Various Anthropometric Measurements of Ashram School and Single Teacher School Children with the Standards (Girls)

Age (In Years)	School	N	Body weight (kg)	Standards weight (cm) ICMR	Standing height (cm)	Standards height (cm)
5-6	AS	40	15.00	15.05	108.30	104.30
	SS	35	12.72	-	104.00	-
7-9	AS	62	20.78	19.16	122.39	117.80
	SS	28	18.25	-	117.90	-
10-12	AS	36	25.08	26.06	133.90	133.26
	SS	9	24.50	-	135.20	-
13-15	AS	7	31.20	36.36	144.90	147.53
	SS	2	29.50	-	138.65	-

Notes: AS = Ashram School  
SS = Single Teacher School

### Meal Pattern

The three meal pattern was followed in Ashram schools, whereas the diets of single teacher school children, as observed from their family meal pattern, followed two meals a day. Rice formed the staple food of Ashram school children, whereas their general family diets consisted of *jowar* (millet) in the form of *Sankati* and/or *roti* made from *jowari* flour. Rice is consumed less frequently by the tribals. A majority of the tribals own 0.5-2 acres of land and cultivate *jowar* as

they are cultivable in a wide range of soils and in semi-arid regions. Millet provide more proteins, vitamins and minerals and fibre compared to rice.

**TABLE 4**  
**Comparison of Various Anthropometric Measurements of Ashram School and Single Teacher School Children (Boys) with the Standards (Boys)**

Age (In Years)	School	N	Body weight (kg)	Standards weight (cm) ICMR	Standing height (cm)	Standards height (cm)
5-6	AS	55	16.18	19.95	113.63	114.30
	SS	37	13.91	-	103.94	-
7-9	AS	74	20.21	19.73	126.52	119.20
	SS	27	18.66	-	120.71	-
10-12	AS	58	24.80	25.40	135.60	133.43
	SS	5	23.25	-	125.50	-
13-15	AS	14	29.50	35.46	139.00	150.30
	SS	2	22.25	-	129.50	-

Note: AS = Ashram School

SS = Single Teacher School

Food and nutrient intake was found to be comparatively better in Ashram schools, both in quality and quantity, than that in single teacher school children, at home. Daily inclusion of rice with red gram dhal, green leafy vegetables and buttermilk was observed in Ashram school diets, whereas the diet of single teacher/school children was found to be monotonous *with jowar*, chillies and chutney/tamarind *rasam*.

Consumption of nuts and oilseeds, sugar and jaggery, milk and milk products, flesh foods, fruits, green leafy vegetables was almost nil in the diets of single teacher school children. The nutrient intake of Ashram school children, as compared to the recommended dietary allowance (RDA) (ICMR, 1994) was found to be deficient in calcium, riboflavin and iron, and in the case of single teacher school children, all the nutrients were found to be less than the RDA (Table 5 to 8).

The low consumption of vegetables and fruits in single teacher school children might be attributed to the continuous drought experienced in these areas, and deforestation which affected tribal income as most of the tribals subsist on collection of minor forest produce (MFP) during the lean season. Though Chenchus are hunters, their shift to consumption of vegetables and fruits can be attributed to deforestation, stringent forest laws and restriction on hunting. Consumption of milk

**TABLE 5**  
**Per cent Adequacy of Nutrients in the Diets of the School Children (5-6 Years) as Compared to RDA**

Nutrient	Ashram School		Single Teacher School		RDA	% RDA met			
	Boys n=20	Girls n=20	Boys n=15	Girls n=15		AS		SS	
						Boys	Girls	Boys	Girls
Calories (Kcals)	1656±390	1483±153	580±134	457±65	1690	98	88	34	27
Protein (gm)	36±4	33±3	18±3	14±2	30	120	110	60	46
Fat (gm)	14±3	13±1	8±1.5	7±2	25	56	52	32	28
Calcium (mg)	192±20	187±29	80±16	71±6	400	48	47	20	18
Iron (mg)	6±0.8	5±0.2	7±1	6±0.7	18	33	28	38	33
Carotene (ug)	1226±346	1226±223	149±20	133±12	1600	77	77	9	8
Riboflavin (mg)	0.40±0.03	0.36±0.12	0.27±0.02	0.22 ±0.2	1.0	40	36	27	22
Folic Acid (mg)	89±11	85±8	52±9.7	45±6.3	40	222	212	130	112
Vitamin C (mg)	36±6	36±3	11±1	11±1	40	90	90	27	27

Note: AS = Ashram School  
 SS - Single Teacher School

TABLE 6  
Per cent Adequacy of Nutrients in the Diets of the Schools Children (7-9 Years) as Compared to RDA

Nutrient	Ashram School		Single Teacher School		RDA	% RDA met			
	Boys n=20	Girls n=20	Boys n=15	Girls n=15		AS		SS	
						Boys	Girls	Boys	Girls
Calories (Kcals)	1916±164	1570±121	886±122	712±85	1950	98	80	45	36
Protein (gm)	41±4	34±7	28±4	23±3	41	100	83	68	56
Fat (gm)	14±3	14±4	10±1	7±1	25	56	56	40	36
Calcium (mg)	199±69	189±15	122±9	109±22	400	50	47	30	27
Iron (mg)	8±0.6	7±0.4	11±9	9±1	26	31	27	42	35
Carotene (ug)	1226±205	1226±171	237±17	213±29	2400	51	51	10	9
Riboflavin (mg)	0.46±0.04	0.37±0.05	0.44±0.10	0.38±0.1	1.2	40	37	36	32
Folic Acid (mg)	95±20	87±11	72±6	62±6	60	158	145	120	103
Vitamin C (mg)	36±12	36±2	18±1	18±4	40	90	90	45	45

Note: AS = Ashram School

SS = Single Teacher School

TABLE 7

Per cent Adequacy of Nutrients in the Diets of the Schools Children (10-12 Years) as Compared to RDA

Nutrient	Ashram School		Single Teacher School		RDA		% RDA met			
	Boys	Girls	Boys	Girls	Boys	Girl	AS		SS	
	n=20	n=20	n=15	n=15	Boys	Girl	Boys	Girls	Boys	Girls
Calories (Kcals)	2176±473	1916±137	1124±447	859 ±42	2190	1970	99	97	51	44
Protein (gm)	51±4	41±2	36±2	28±1	54	57	94	72	66	49
Fat (gm)	15±2	14±2	16±0.8	15±1	22	22	68	64	72	68
Calcium (mg)	353±55	199±3.2	139±34	76±3	600	600	59	33	23	13
Iron (mg)	9±0.4	8±0.8	13±0.6	10±0.3	34	19	26	42	38	53
Carotene (ug)	2916±436	1226±360	272±12	237±6	2400	2400	121	51	11	10
Riboflavin (mg)	0.59±0.03	0.42± 0.02	0.51±0.020	0.42±0.01	1.2	1.2	49	35	42	35
Folic Acid (mg)	164±11	95±10	95± 6	80±3	70	70	234	135	135	114
Vitamin C (mg)	66±8	36±9	19± 0.7	19±0.6	40	40	165	90	47	47

Note: AS = Ashram School

SS = Single Teacher School

TABLE 8  
Per cent Adequacy of Nutrients in the Diets of the Schools Children (13-15 Years) as Compared to RDA

Nutrient	Ashram School		Single Teacher School		RDA		% RDA met			
	Boys	Girls	Boys	Girls	Boys	Girl	AS		SS	
	n=20	n=20	n=15	n=15			Boys	Girls	Boys	Gi
Calories (Kcals)	2607±132	2090±101	1299±226	1212±54	2450	2060	106	101	53	59
Protein (gm)	59±2	49±2	40±7	38±1	70	65	84	75	57	58
Fat (gm)	16±1.5	15±3	17±0.07	17±2	22	22	73	68	77	77
Calcium (mg)	365±25	351±37	152±17	146±2	600	600	61	58	25	24
Iron (mg)	10±0.5	9±0.4	15±3	14±0.3	41	28	24	32	36	50
Carotene (ug)	2916±317	2916±44	298±35	286±3	2400	2400	121	121	12	12
Riboflavin (mg)	0.94±0.02	0.58±0.01	0.59±0.10	0.56±0.001	1.5	1.2	62	48	39	47
Folic Acid (mg)	174±33	162±17	106±11	101±2	100	100	174	162	106	101
Vitamin C (mg)	66±6	66±9	19±1	19±0.3	40	40	165	165	47	47

Note: AS = Ashram School

SS = Single Teacher School

among tribals is a taboo. At the same time, inaccessibility of the tribal areas and the high cost of food items available in the market add to the problem.

Indigenous production of alcohol is most common with tribal people. Sex and age too are no barriers and even children consume liquor in tribal areas. Excess alcohol consumption also contributes to lesser expenditure on food.

The net result is that several tribals, including children, suffer from starvation and disease. The study was conducted in 1994 before the prohibition of alcohol in Andhra Pradesh. In tribal families, children are directly weaned to an adult diet which is more coarse and spicy. Besides no special attention or care is given to children, who are often left on their own at home when the parents are at work.

The clinical morbidity (nutritional) of the children indicated deficiencies of riboflavin (that is, angular stomatitis, Cheilosis, glossitis) and anaemia. Mottled enamel was also observed. Incidence of Vitamin A deficiency (Bitot's spots and night blindness) was found in single teacher school children. The incidence of non-nutritional morbidity identified among the children included scabies, upper respiratory tract infections, fevers, diarrhoea, eye and ear infections and dental caries (Table 9 and 10).

Tuberculosis is reported to be prevailing rapidly in Chenchu-gudem in the study area. Health is an obvious function of nutrition. In most of the underdeveloped areas in the world, food deficiencies arise in a hostile environment where there is poor personal and environmental hygiene, inadequate housing, ignorance and lack of adequate potable water. In addition to malnutrition, multiple illnesses resulting from infection sap the health and well-being of the children to an even greater extent. Diseases like fevers, diarrhoea, malaria, skin ailments and respiratory tract infections are very common among the tribals. Most of the tribals depend on native medicine for their ailments and underutilise government health and medical facilities in the tribal areas.

The present study revealed that the health and nutritional status of both the Ashram school and single teacher school children was not satisfactory. However, the diets of Ashram school children were comparatively better, with better variety, quality and quantity than that of single teacher school children.

TABLE 9  
Morbidity Pattern (Nutritional) Observed among the School Children of Kurnool District, Andhra Pradesh

Clinical signs	Age Group (in years)								% prevalence	
	5-6		7-9		10-12		13-15		AS	SS
	AS n=95	SS n=72	AS n=136	SS n=65	AS n=94	SS n=14	AS n=21	SS n=4	n=346	n=145
Night Blindness	-	6 (8)	-	-	-	-	-	-	-	6 (4)
Bitot Spots	-	2 (3)	-	-	-	-	-	-	-	2 (1)
Angular Stomatitis	31 (33)	38 (52)	36 (26)	26 (40)	29 (31)	6 (43)	4 (19)	1 (25)	100 (29)	71 (49)
Other B-complex deficiencies	28 (29)	37 (37)	20 (15)	16 (25)	19 (20)	8 (50)	14 (66)	-	81 (23)	61 (42)
Anaemia	13 (14)	11 (15)	26 (19)	9 (14)	11 (12)	3 (21)	5 (21)	-	55 (10)	23 (16)
Mottled Enamel	12 (13)	6 (8)	11 (8)	5 (8)	8 (8)	-	4 (19)	1 (25)	35 (10)	12 (8)

Note: Figures in the parenthesis indicate percentages

AS = Ashram School

SS = Single Teacher School



TABLE 10

## Morbidity Pattern (Non-nutritional) Observed among the School Children of Kurnool District, Andhra Pradesh

Clinical signs	Age Group (in years)									
	5-6		7-9		10-12		13-15		% prevalence	
	AS n=95	SS n=72	AS n=136	SS n=65	AS n=94	SS n=14	AS n=21	SS n=4	AS n=346	SS n=145
Skin infection	41 (43)	37 (51)	20 (15)	20 (31)	4 (4)	5 (36)	-	2 (50)	65 (19)	62 (43)
Eye infection	24 (25)	21 (29)	3 (2)	11 (17)	-	3 (21)	-	1 (25)	27 (8)	36 (25)
Ear infection	23 (24)	31 (43)	17 (12)	13 (20)	19 (20)	4 (28)	-	3 (75)	59 (17)	51 (35)
Upper respiratory tract infection	28 (29)	20 (27)	14 (10)	19 (29)	20 (20)	4 (28)	2 (9)	-	64 (18)	43 (30)
Fever	21 (22)	29 (40)	22 (16)	26 (22)	1 (1)	4 (28)	2 (9)	3 (75)	46 (13)	62 (43)
Diarrhoea	2 (2)	32 (44)	-	21 (40)	-	-	-	-	2 (0.5)	53 (36)
Dental caries	21 (22)	19 (26)	3 (2)	8 (12)	-	-	-	-	24 (7)	27 (19)
Other diseases	-	3 (4)	1 (0.7)	-	1 (1)	-	-	1 (25)	2 (0.5)	4 (3)

Note: Figures in the parenthesis indicate percentages

AS = Ashram School

SS = Single Teacher School

## Recommendations

### *Ashram School Children*

- Proper implementation of the services provided to the children by the concerned authorities. For instance, regular health/medical checkup of the children should be undertaken.
- Physical exercise should be made compulsory for the children by including sports and games in their curriculum.
- Cultivation of kitchen garden should be encouraged as it serves as a part of nutrition education and also makes it possible for inclusion of diverse foods in their diet.
- ICMR dietary recommendations can be followed to make their diets adequate in quantity.
- *Jowar* forms their staple diets at home and should be included in their daily diet.
- Prevention and treatment of non-nutritional disorders should be undertaken by providing proper health education and through proper implementation of health facilities.

### *Single Teacher School Children*

- Regular health/medical checkup of the children should be undertaken.
- Supplementary feeding programmes should be properly provided to the children as childhood/adolescence are periods of active growth.
- Prevention and treatment of minor ailments related to health and hygiene should be given more importance and education in this regard should be imparted to children and parents.

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