NUTRITION, HEALTH AND PSYCHOSOCIAL PROFILE OF INSTITUTIONALIZED CHILDREN

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ABSTRACT

A study was undertaken to assess the health, nutrition and psychosocial profile of Institutionalized children in four States–Uttar Pradesh, Andhra Pradesh, Karnataka and West Bengal. A sample of 3,822 children from 70 institutions in 6-18 years age group formed the subjects of the study. It was observed that the destitute children were mainly taken care of in three types of institutions, viz., Voluntary, Government Aided and Government run institutions. Calorie deficiency and deficiency of Vitamins and minerals characterized the diets of these children. In general, there was no deficit of protein in their diets. Growth wise, these children were retarded both in height and weight compared to standards. However, they fared better in comparison to their age and sex counterparts in the rural and urban poor. Psychosocial profile of these children indicated that the prevailing environment in the institutions is less conducive for intellectual stimulation but not so for the development of skills of self-help, locomotion, socialization and imagery.

Key words: *Institutionalized children, Nutritional status, Growth, Psychosocial profile, Dietary deficiency*

In traditional societies, care of the orphaned and the destitute child used to be the responsibility of either a joint family or caste group of the child. But due to a host of adverse social and economic factors, more and more of such children now-a-days are seeking admission in institutions organized either by the state or voluntary agencies for obtaining food, shelter and to some extent education–the basic necessities of life. A steady rise in the numbers of such establishments over the past few decades, if anything, are an indication that the burden of caring for the destitute children in India, in future, is likely to be more on the State and organized social sectors. Hence, reliable data on health, nutrition and psychosocial status of institutionalized children are considered relevant to adequately plan for the appropriate action. The present study is an attempt in that direction.

Material and Methods

Area and Sample Selection: The study was conducted in the 4 States of Uttar Pradesh, Karnataka, Andhra Pradesh and West Bengal. Basic information such as the number and spatial distribution of the institutions, their sponsorship, *i.e.,* whether Government or Non-Government, number of children in each institution, their age and sex distribution was collected.

A two stage sampling procedure was adopted. In each State, the Districts having at least four institutions alone were consid-

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ered. Districts in each state were categorized into three groups, *viz.*, Group I–Districts with 4-7 institutions; and GroupII–Districts with 8-11 institutions; and Group III–Districts having 12 or more institutions. The survey was confined to 5 Districts in each State. Using proportionate allocation method, the Districts were selected from these three categories on random basis. The number of Institutions by type, *i.e.*, Government control and voluntary in each District formed the sampling frame, in the second stage of sampling. A total of 70 institutions were selected for the survey using proportionate sampling procedure. In the selected institutions, attempts were made to cover all the children for health and nutritional assessment. The assessment of dietary intake and psychosocial status was however, done on a sub-sample of children. Standardized methods of clinical examination, anthropometry (measurement of weight, height and arm circumference) and diet survey (institutional method) were employed. The psychosocial status of children was evaluated by applying Binet-Kamat text, Draw-a-man test and Vineland Social maturity scale. Morbidity was assessed through history and/or clinical examination. The reference period was previous one week from the date of examination.

The health and nutritional status of the children was analyzed to assess specific nutritional deficiency, morbidity and growth status. The growth was compared with those of NCHS standards(1) and community averages(2). The dietary intakes of nutrients was compared with recommended daily allowance (RDA) (Recommended by ICMR)(3). The psychosocial performance was analyzed to assess their profile of intellectual ability and social maturity and its relationship with the nutritional status.

Results

Coverage

Table I provides state level information on the number of institutions, their type and the number selected for the present study. *Table II* presents the distribution of children studied according to age and sex. While a sample of 3822 children in the age group of 6-18 years were covered for health and nutritional status, a sub-sample of 1150 children were selected for diet survey and 929 for the psychosocial assessment. The sample was drawn from 70 institutions distributed over four States (*Table I*).

Nutritional Deficiency Signs

The extent of prevalence of nutritional deficiency signs in boys and girls in the four States studied are presented in *Figs. 1 & 2* for the ages 6 to 11 years and above 11 years, respectively. The common nutritional deficiencies encountered among the children were those of vitamin A (Bitot's spots), Vitamin B-complex, (angular stomatitis), and phrynoderma. The prevalence of pallor suggestive of anemia was also seen. In general, the younger children between the ages of 6-11 years tended to manifest Vitamin deficiency signs than their elder counterparts (12 to 18 years), except in case of children in Andhra Pradesh. The highest prevalence of Bitot's spots (8.5%) was seen in the boys of 6-11 years in Uttar Pradesh and the lowest (less than 2%) in children of Karnataka. Highest prevalence of angular stomatitis (32%) was seen in the boys of Andhra Pradesh and the lowest (less than 1%) in children of Karnataka. Prevalence of phrynoderma, whose etiogenesis is yet to be resolved (whether it is due to essential fatty acid deficiency or vitamin B complex deficiency

TABLE I—*Total Number of Institutes for Destitute Children by Type and the Number Selected for the Study in Each State*

State	Total No. of Institutes				Selected Institutes			
	Govt.	Aid.	Vol.	Total	Govt.	Aid.	Vol.	Total
Andhra Pradesh	120	17	0	137	14	5	0	19
Karnataka	NA	89	2	91	2	17	0	19
Uttar Pradesh	22	72	3	97	5	13	3	21
West Bengal	19	51	1	71	0	10	1	11
Pooled	161	229	6	396	21	45	4	70

NA = Not available.

TABLE II—*Coverage for the Assessment of Health and Nutritional Status for Institutionalized Children*

Age in years	Andhra Pradesh		Karnataka		Uttar Pradesh		West Bengal	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
6+	33	39	35	25	34	18	11	27
7+	69	71	40	40	33	19	24	29
8+	86	80	29	30	42	20	27	45
9+	73	67	31	44	43	19	46	40
10+	106	76	47	47	56	26	57	52
11+	77	48	53	28	64	16	42	49
12+	69	40	53	31	41	22	36	54
13+	62	35	92	26	36	18	45	66
14+	40	39	85	17	34	19	41	76
15+	42	29	85	8	19	14	43	56
16+	30	15	42	15	15	13	22	51
17+	4	10	11	6	7	23	18	27
18+	Nil	Nil	Nil	Nil	13	14	Nil	Nil
Total	691	549	603	317	437	241	412	572
Total (both sexes)	1240		920		678		984	
Grand Total (All States)			3822					

or both)(4), was higher (1.2 to 6.8%) in the State of Uttar Pradesh compared to other States and girls seemed to suffer more than boys. While maximum prevalence (17%) of pallor (suggestive of anemia) was seen in girls of 12-18 years from the State of Andhra Pradesh, the minimum prevalence of less than 2% was seen in children of Karnataka. In the other States, it ranged from 2 to 15%.

Dental mottling indicating fluorosis was seen in children of Uttar Pradesh (18%), Karnataka (8%), West Bengal (4%), and Andhra Pradesh (1%).

The prevalence of Dental caries was seen in all the four States and ranged from 1 to 22%.

Morbidity

Fever, common cold, cough, diarrhea, infections of skin and eyes and otolaryngological complaints were the most common complaints encountered and the prevalence, in general, was higher in younger age group (6-11 years). Highest prevalence (*Figs. 3 & 4*) was seen in the State of West Bengal (57%) followed by Uttar Pradesh (45%), Karnataka (32%) and Andhra Pradesh (13%).

Growth Status

Statewise age and sex specific body measurements of children in terms of means and standard deviations are provided in *Tables III & IV*.

The distance curves of height and weight drawn in respect of boys and girls separately for the four States are presented in *Figs. 5 to 8*. Between the States, values of Karnataka children consistently run below those of the other States, *viz.*, Andhra Pradesh, Uttar Pradesh and West Bengal. When compared to the NNMB data available for these four states (rural as well as urban slum areas) the differences between the present and NNMB data were obvious in case of West Bengal and Andhra Pradesh rather than Karnataka and Uttar Pradesh. In general, the heights and weights of the institutionalized children, though tended to be better than the rural and urban slum counterparts, were far below the NCHS figures suggesting a high degree of growth retardation. The extent of retardation, in terms of age was upto 3 years.

The index weight for height(6), has been considered to reflect current nutritional status of children. Analysis of the data according to this index is presented in *Figs. 9 & 10*, and compared with that of NCHS standards. The figures indicate the weights of the children to be appropriate for their attained heights suggesting a satisfactory level of current nutritional status but not in case of height for age which showed considerable stunting-the hall mark of chronic (past) nutritional status.

Nutrient Intake

In general (*Table V*), the levels of protein intake were adequate not withstanding few exceptions seen in certain age and sex groups in the States of Andhra Pradesh, Karnataka and Uttar Pradesh. Barring few exceptions in children of West Bengal and Uttar Pradesh, that too only certain age groups, energy intakes fell short of RDA in most of the children. Intake of calories according to age groups (*Table VI*) showed that the deficit was greater in older (10-18 years) age group of children when compared to younger (4-9 years) children.

Psychosocial Assessment

The average as well as the distribution

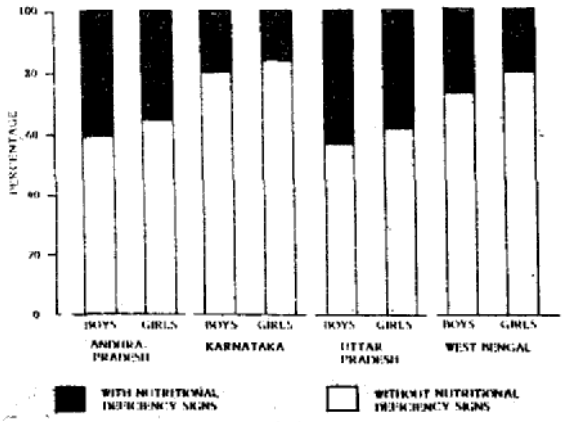

Fig. 1. Prevalence (%) of Nuritional Deficiencies in Institutionalized Children (6-11 Years).

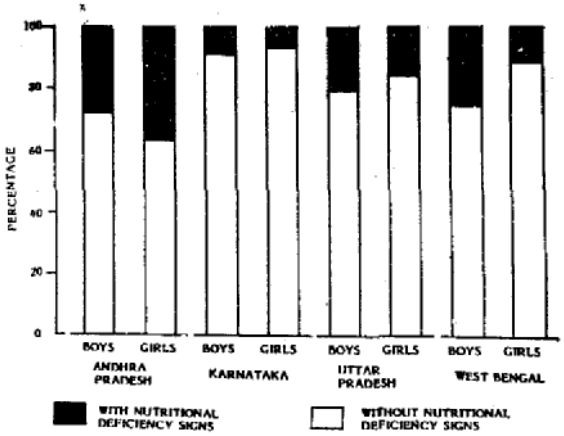

Fig. 2. Prevalence (%) of Nutritional Deficiencies in Institutionalized Children (≥ 12 Years).

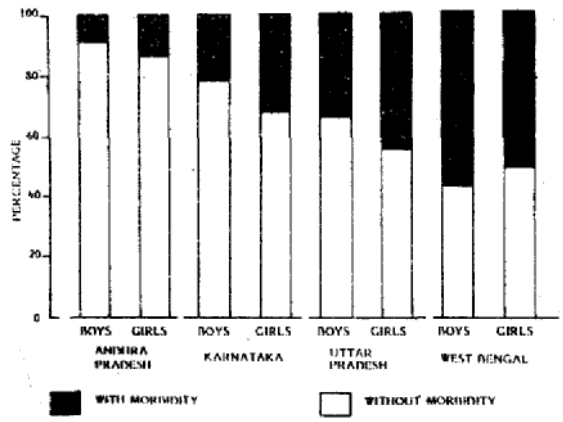

Fig. 3. Prevalence (%) of Infective Morbidity in Institutionalized Children (6-11) Years.

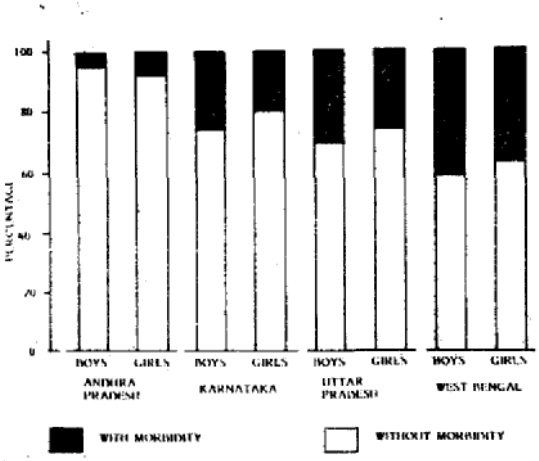

Fig. 4. Prevalence (%) of Infective Morbidity in Institutionalized Children (≥ 12 Years).

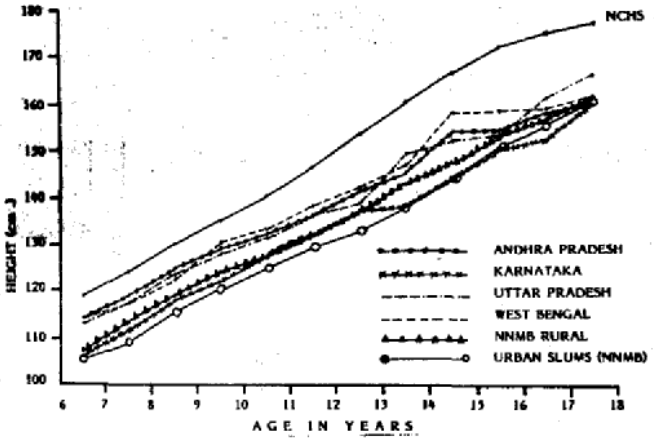

Fig. 5. Growth Curves of Institutionalized Children Height (Boys).

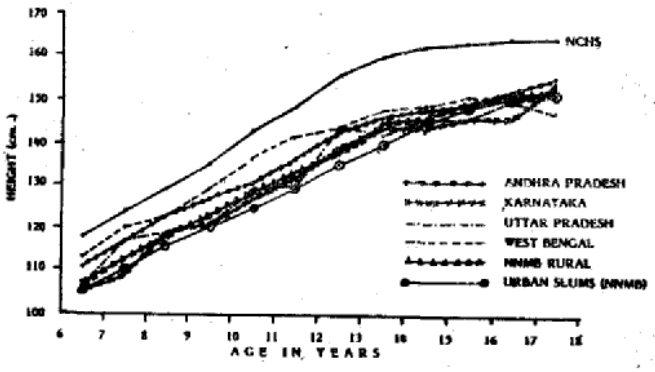

Fig. 6. Growth Curves of Institutionalized Children Height (Girls).

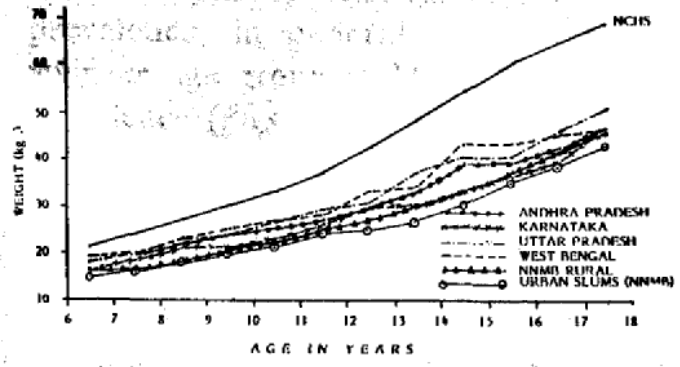

Fig. 7. Growth Curves of Institutionalized Children Body Weight (Boys).

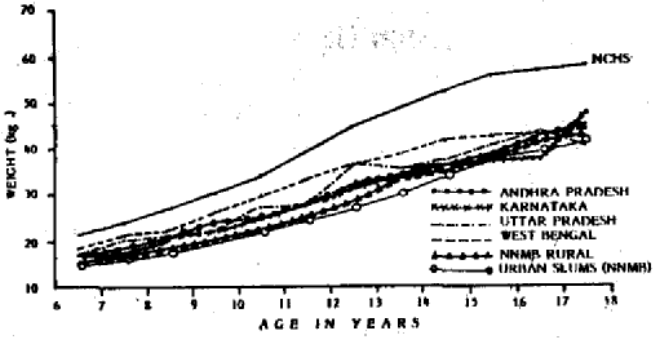

Fig. 8. Growth Curves of Institutionalized Children Body Weight (Girls).

TABLE III—*Mean Anthropometric Measurements of Institutionalized Children (Boys)*

Age in (years)	Height (cm)				Weight (kg)				Arm circumference (cm)			
	Andhra Predesh	Kar-nataka	Uttar Pradesh	West Bengal	Andhra Predesh	Kar-nataka	Uttar Pradesh	West Bengal	Andhra Predesh	Kar-nataka	Uttar Pradesh	West Bengal
6+ Mean	113.8	106.0	112.5	113.7	18.2	16.3	18.0	19.4	15.7	14.5	15.1	16.2
SD	7.36	6.52	10.23	9.42	2.73	2.18	3.45	3.27	1.25	1.04	1.33	1.19
7+ Mean	119.0	111.9	117.9	118.4	19.7	18.1	19.8	20.3	15.7	15.3	15.3	16.5
SD	8.72	8.97	9.20	5.22	3.24	3.20	3.66	2.37	1.17	1.07	2.90	1.28
8+ Mean	125.4	117.5	123.5	124.6	22.3	20.5	22.4	22.7	16.5	15.3	16.1	16.5
SD	7.19	8.19	8.81	8.06	3.15	3.22	2.87	3.71	1.20	1.12	1.38	2.11
9+ Mean	129.2	122.2	128.0	130.2	24.0	21.4	24.0	25.4	17.1	15.5	16.6	17.5
SD	7.51	6.90	9.51	7.22	3.36	2.94	4.56	4.05	1.76	1.40	1.40	1.12
10+ Mean	132.3	125.5	131.2	132.8	25.3	23.4	26.6	26.8	17.4	16.5	17.2	17.7
SD	7.01	7.43	9.65	7.35	3.91	3.19	5.01	5.20	1.39	1.30	1.79	1.58
11+ Mean	135.7	131.6	136.1	137.5	27.0	26.1	28.6	27.7	17.6	16.8	17.6	18.0
SD	9.20	7.48	8.48	9.14	4.72	3.67	4.56	5.49	1.54	1.36	1.50	1.58
12+ Mean	140.9	137.3	139.4	142.0	30.3	29.6	30.5	31.8	18.1	17.8	17.8	18.8
SD	8.28	7.10	12.10	8.91	3.09	4.00	6.93	7.00	1.62	1.73	1.86	1.66
13+ Mean	144.7	138.1	148.5	146.5	33.0	29.6	36.7	33.9	19.0	18.0	19.5	19.2
SD	8.73	6.60	10.85	10.50	6.21	3.71	7.80	7.51	2.04	1.48	2.12	1.23
14+ Mean	153.9	144.0	152.3	157.7	38.8	32.9	39.7	42.6	20.5	18.8	20.3	21.5
SD	9.64	6.66	8.16	7.30	7.56	4.83	7.32	5.74	2.23	1.67	2.47	1.91
15+ Mean	153.9	149.5	153.3	157.7	39.0	36.2	40.2	43.1	20.7	19.5	20.3	21.3
SD	9.36	7.25	9.96	9.32	7.32	5.97	7.22	7.18	2.28	1.79	2.14	2.38
16+ Mean	152.0	152.0	161.4	158.9	42.3	39.1	45.9	45.0	21.7	20.4	22.1	22.1
SD	10.12	6.68	11.01	6.62	7.27	5.48	7.19	5.35	2.23	1.89	1.54	2.17
17+ Mean	160.2	159.8	166.0	161.0	46.1	46.4	49.3	45.8	23.2	22.3	23.1	22.2
SD	5.29	5.29	9.49	5.14	0.48	3.44	6.96	5.57	0.60	1.55	1.46	2.22

TABLE IV—*Mean Anthropometric Measurements of Institutionalized Children (Girls)*

Age in (years)	Height (cm)				Weight (kg)				Arm circumference (cm)			
	Andhra Predesh	Kar-nataka	Uttar Pradesh	West Bengal	Andhra Predesh	Kar-nataka	Uttar Pradesh	West Bengal	Andhra Predesh	Kar-nataka	Uttar Pradesh	West Bengal
6+ Mean	111.1	105.0	106.7	113.3	17.3	16.5	17.1	18.3	15.5	15.0	15.5	16.1
SD	6.43	6.30	9.77	7.79	2.30	2.00	3.69	3.09	1.02	0.78	1.53	1.23
7+ Mean	117.2	108.5	117.4	119.8	19.3	17.6	19.8	20.6	16.0	15.1	16.1	16.4
SD	7.20	8.24	11.15	7.79	3.72	2.52	4.96	4.07	1.47	0.98	1.55	1.55
8+ Mean	132.1	118.8	119.4	122.4	21.4	20.9	20.9	21.8	16.6	16.1	16.6	17.0
SD	6.29	6.03	6.87	7.28	3.03	2.37	2.91	3.88	1.43	0.80	1.62	1.50
9+ Mean	126.9	120.5	121.3	128.8	24.0	21.6	22.4	25.6	17.5	16.3	16.6	18.1
SD	8.14	7.31	8.51	9.28	3.99	2.69	4.79	5.98	1.37	1.07	2.19	1.85
10+ Mean	129.9	127.2	128.8	135.9	24.9	24.8	26.8	28.9	17.8	17.1	18.0	18.9
SD	7.93	8.30	12.94	7.28	3.98	5.00	7.64	5.77	1.38	1.78	2.13	1.74
11+ Mean	135.6	131.3	130.0	140.8	28.0	27.0	27.6	32.5	18.5	17.8	18.1	19.8
SD	8.33	9.73	12.64	6.97	4.63	5.12	8.73	7.04	1.51	1.78	2.65	2.15
12+ Mean	141.6	137.5	142.5	143.3	31.7	31.5	35.5	36.0	19.6	18.9	20.2	20.7
SD	7.26	9.73	8.24	7.50	4.82	6.36	6.30	7.90	1.70	2.02	1.93	2.48
13+ Mean	144.8	142.8	141.5	146.5	33.9	34.6	34.6	37.8	20.2	19.7	20.0	20.9
SD	6.84	7.90	7.23	5.74	5.54	5.45	5.84	5.70	1.74	2.19	1.80	1.91
14+ Mean	146.5	142.8	145.3	148.2	35.6	35.6	36.4	41.2	20.5	20.5	20.5	21.9
SD	5.19	5.73	6.89	5.72	4.26	7.04	6.67	5.55	1.62	2.93	2.48	1.82
15+ Mean	148.0	145.2	145.4	150.2	38.2	36.9	39.5	41.8	21.4	20.0	21.6	22.0
SD	7.35	6.50	4.65	5.60	5.91	4.16	6.45	7.85	1.54	1.22	2.30	2.14
16+ Mean	150.5	144.7	148.6	149.1	41.6	37.2	42.7	42.1	22.5	20.8	22.3	22.0
SD	4.87	8.77	3.88	5.34	4.40	6.94	6.57	5.80	2.17	2.71	2.67	1.93
17+ Mean	154.2	152.7	146.0	150.2	43.5	46.8	40.0	42.7	21.9	22.7	21.9	22.0
SD	5.64	5.24	8.26	4.03	4.03	9.66	6.16	5.89	0.55	3.59	2.38	1.83

of scores of psychosocial testing obtained by the children of the four States, were more or less comparable suggesting no significant differences between the States, hence they were pooled and presented in *Table VII*.

Table VIII presents the results of analysis of psychosocial performance tests and IQ of children according to nutritional status defined in terms of grades of height for age index(6). The mean scores on Binet-Kamat and Draw-a-man tests in different nutritional grades showed significant differences. The mean IQ levels showed a decreasing trend with lower nutritional grades. However, in case of social maturity scale the scores were above average in all the nutritional groups.

TABLE V—*Per cent Distribution of Institutionalized Children According to Nutrient Intake*

State	% RDA-calories				% RDA-proteins				
	n	<70	70-100	≥100	n	<55	55-75	75-100	≥100
Boys									
Andhra Pradesh	185	16.8	56.8	26.4	185	0.5	2.7	18.4	78.4
Karnataka	158	67.1	22.8	10.1	158	8.9	25.3	26.6	39.2
Uttar Pradesh	179	24.6	41.9	33.5	179	0.6	1.7	11.7	86.0
West Bengal	159	22.0	23.3	54.7	159	5.7	11.3	6.3	76.7
Pooled	681	31.7	37.2	31.9	681	3.7	9.7	15.7	70.9
Girls									
Andhra Pradesh	114	55.3	41.2	3.5	114	—	20.2	50.0	29.8
Karnataka	124	48.4	48.2	3.2	124	—	8.9	33.1	58.0
Uttar Pradesh	61	60.7	36.1	3.2	61	4.9	3.3	29.5	62.3
West Bengal	168	8.3	52.4	39.3	168	—	2.4	4.8	92.8
Pooled	467	37.3	46.5	16.2	467	0.6	8.6	26.6	64.2

TABLE VI—*Per cent Recommended Dietary Intake of Calories in Institutionalized Children*

State	4-9 years	10-18 years
Andhra Pradesh	79.7	80.3
Karnataka	70.8	62.0
Uttar Pradesh	87.9	73.7
West Bengal	104.3	94.2
All States	85.7	77.5

TABLE VII—*Mean Scores on Binet-Kamat Test and Their Distribution*

State	Mean score	Per cent of children having scores	
		≥90	<90
Andhra Pradesh	88.3	43.15	56.85
West Bengal	88.9	46.83	53.17
Uttar Pradesh	85.0	48.78	51.22
Karnataka	85.3	39.24	60.74
Pooled		44.25	55.75

Note: A child with Score of 90 or above is considered to have normal Intelligence.

TABLE VIII—*Mean Scores According to Nutritional Grades Based on Height for Age*

Nutritional grades	Height for age (% Standard)		Psychosocial tests		
			Binet-Kamat	Draw-A-Man	Social Maturity Scale
Normal	≥95	n	274	387	403
		$\bar{X}$	91.04	102.73	117.25
		SD	13.20	17.46	14.53
Grade I	90-95	n	169	258	270
		$\bar{X}$	86.58	102.31	115.67
		SD	13.45	13.95	15.85
Grade II + III	<90	n	126	211	228
		$\bar{X}$	82.26	93.85	117.5
		SD	13.93	15.51	18.38
Results of analysis of variance:					
Between Nutritional Grades:			P<0.001	P<0.001	NS

Discussion

The study revealed that the Institutions which provide care for destitute children are mainly of three types, *viz.*, Government Managed Institutions, Government Aided Institutions and Institutions exclusively run by the Voluntary Agencies. Of the three, the first two categories form the bulk (98.7%) of the Institutions. All the types of the Institutions seemed to perform one general function that of providing shelter, food and dehandling facilities for the inmates. But there existed differences in the kind of facilities provided.

The differences in the kind of shelter provided, the quality of feeding and health care facility and more importantly the number of children per caretaker seemed to matter most in determining the outcome of institutional care. Most of the institutions managed by voluntary agencies had less than 15 children per caretaker. The institutions receiving grant-in-aid from Government but being managed by private agencies followed next, while those managed solely by the Government had much larger number of children per caretaker.

Assessment of nutritional status in terms of clinical deficiency signs, growth performance and food consumption showed that the height and weight of institutionalized children, were retarded when compared to international standards (NCHS). The extent of retardation was of the order of 2 to 3 years. However, they fared better in comparison to their age and sex counterparts in the rural and urban poor (slum dwellers) in all the four regions studied. It may be mentioned here that the children in the institutions mainly come from the rural areas or the urban poor segments of the population. This is not to suggest that the growth status of the

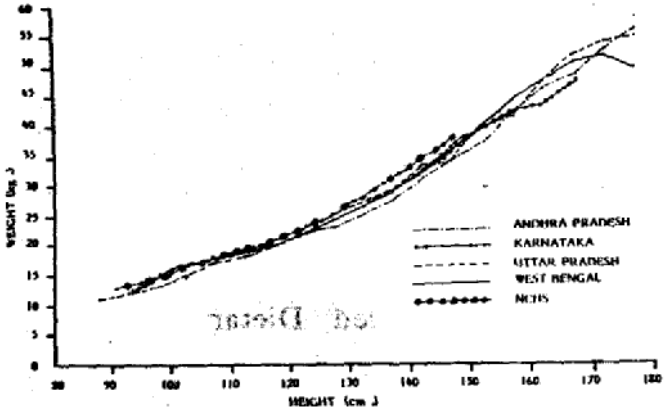

Fig. 9. Weight for Height Curves-Boys (6-18 Years).

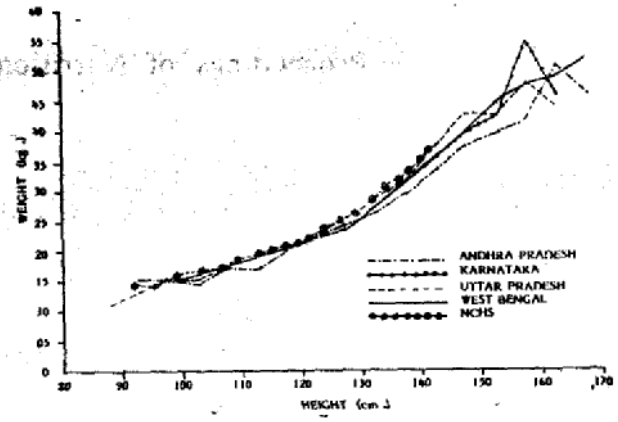

Fig. 10. (Weight for Height Curves-Girls (6-18 Years).

Institutionalized children is adequate but to indicate that the conditions of families in rural areas and urban slums is far worse and cannot provide the food needs of their children.

The growth curves showed that the gap between the institutionalized children and the standards widened with age, the deficit in weight tending to be more than that of height. This observation clearly indicates that children in the institutes are suffering from current form of undernutrition and the effect is greater in older age groups. The latter observation points to the factor that the age factor gets neglected during the serving of daily food ignoring higher requirements for older children. The height for age index showed a very high degree of prevalence of chronic long duration undernutrition.

Growth curves based on weight for height (*Figs. 9 & 10*) suggested that the current nutritional status of the Institutionalized children in the four States studied in terms of growth was similar and indicates nutritional dwarfism.

Clinical status of Institutionalized children showed that the prevalence of deficiency signs was similar to that observed in community surveys. Vitamins A and B-complex deficiency signs were the most common nutritional deficiency signs. Common morbid conditions of cough, fever, sore throat, sore eyes and scabies were also prevalent among the Institutionalized children. Higher prevalence of morbidity and deficiency was noted in the younger age groups.

The dietary pattern observed in the institution was one of calorie deficiency and deficiency of vitamins and minerals. When the nutrient intake of the children in different types of institutes was compared, it was observed that the intakes of most of the nutrients tended to be consistently better in the Voluntary or Aided institutions than the Government run institutions.

The psychosocial assessment indicated that the environment including nutrition situation of inmates in the institutions was less conducive for proper intellectual development, but not so for the development

of skills of self-help, locomotion, socialization and imagery.

Thus, the health, nutrition and psychosocial profile of institutionalized children is far from the desired optimum and scope for improvement in their structure and functioning exists.

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