I. COMMUNITY STUDIES

1. A RAPID SURVEY ON DIET AND NUTRITIONAL STATUS OF SAHARIA - A PRIMITIVE TRIBE IN RAJASTHAN

The 'Saharia' is one of the primitive tribes of the State of Rajasthan, inhabiting mostly the Shahbad and Kishanganj blocks of Baran district. It is economically most backward tribe. Baran is one of the chronically drought prone districts of Rajasthan. Recurrent droughts have adverse effects on the household food security leading to high prevalence of undernutrition of the tribe (Ann.Rep.2003-2004). There were reports in the media regarding starvation deaths among Saharia tribal community in Kishanganj block of Baran district. A rapid survey was therefore, carried out among the Saharia tribe during October-November 2004, to assess their nutritional status and to investigate the incidence of starvation deaths, if any.

Objectives

- To assess food and nutrient intakes at the household level among the Saharia tribe in Shahbad and Kishanganj blocks of Baran district.
- To assess the nutritional status of <5 year children and adults in the community, in terms of anthropometry and prevalence of clinical signs of nutritional deficiency and
- To collect information on the cause of deaths if any, that had occurred during previous six months, by conducting verbal autopsy.

Methodology

Keeping in view the quick nature of the survey, it was decided to cover a total of 200 children for the nutritional assessment among <5 year children @ 40 children in each group of 0+ to 4+ years. With an expected coverage of 25 children per village, it was proposed to cover a total of 8 viallges selected randomly from the two blocks namely Shahbad and Kishanganj of Baran district @ 4 villages/block.

In each village, starting from the north east corner of the Saharia colony, the survey was carried out in the contiguous households (HHs) till the targeted number of 25 children of 0-5 years was covered for nutritional assessment. Family diet survey was carried out in a sub-sample of 5 households, having atleast one pre-school child. The information on infant and child feeding practices was also collected from the house wife in all the HHs covered for diet survey.

Coverage

A total of 314 households from 8 villages from two blocks were covered. A sub-sample of 40 households was covered for family diet survey, as well as for the assessment of knowledge and practices of women on breast-feeding and complementary feeding. Nutritional anthropometry and clinical examination was carried out on 238 children of 0-5 years and 422 adults. History of morbidity during the previous fortnight was also collected on all the individuals covered for anthropometry. Verbal autopsy was done in the Saharia households where deaths were reported during the past six months to assess the probable cause of these deaths.

Results

Household particulars

A majority (70%) were nuclear families with average family size of 5.6. Many male heads of the HHs (81%) and their spouses (96%) were illiterate. Forty two percent of the households surveyed were possessing varying extent of land. Major occupation of head of the 82% households was agricultural labour or other labour. Bore wells formed the major source of drinking water in about 75% of the HHs; while in the rest, draw well was the main source. About 50% of the HHs surveyed had to travel a distance of >10 km. to reach nearest primary health centre.

Food and Nutrient intake

The average intake (per CU/day) of various foods except cereals & millets were lower than the RDI. The intakes of protective foods such as pulses, green leafy vegetables, milk and that of sugar & jaggery were less than 40% of the RDI, while the consumption of roots & tubers, other vegetables and fats & oils was to the extent of 45-50% of RDI.

The average daily intake of protein, calcium, iron, thiamin and niacin was comparable to the recommended allowances, while that of other nutrients were below the RDA. The extent of deficit in the intakes compared to RDA was relatively more with respect to vitamin A (62%) followed by vitamin C (43%), total fat (35%), free folic acid (22%), riboflavin (14%) and energy (9%). In general, the nutrient intakes among Saharias were marginally better as compared to that observed in general population in the drought affected areas of Rajasthan State (NIN Annual Report-2003-04). This could be attributed to availability of employment opportunities at the time of survey, which was the harvesting season and also availability of wheat through PDS at highly subsidized rate under "Saharia Special Component Programme". The frequency distribution according to consumption of various nutrients expressed as percent of RDA indicated that the proportion of HHs with intakes of less than 50% of RDA was relatively higher with respect to vitamin A (75%) and vitamin C (55%). None of the HHs, at the time of survey were found to be consuming energy below 50% of RDA, as against a figure of 5% reported for the drought affected areas of the State.

Nutritional Status

Clinical signs of nutritional deficiency

About 4% of infants were emaciated, while an equal proportion had conjunctival xerosis. About 1% of 1-5 year children had oedema (suggesting Kwashiorkor) and 5.7% were emaciated. The prevalence of vitamin A deficiency signs such as conjuntival xerosis (17.6%) and Bitot spots (8.3%) was much higher in these children than that reported earlier for the State of Rajasthan (0.3%) (DWCD 1998). The prevalence of nutritional deficiency signs was observed to be negligible among adults.

Anthropometry

Children (0-5 years)

About 72% of the 1-5 year children were underweight (weight for age < median-2SD of NCHS standards), while the prevalence of severe underweight (weight for age < Median-3SD) was to the extent of 24%. The prevalence of underweight was relatively higher (72%) than that reported during the drought survey (66%) as well as the figures reported (48%) for Rajasthan in District Nutrition Profile Survey (DWCD, GOI, 1998).

The prevalence of severe underweight (weight for age<median-3SD) tended to increase significantly with age from 11% among infants to 36% in 1-3 years children, which, thereafter, decreased to 12.6% in 3-5 year age group. The overall prevalence of stunting (height for age<median-2SD), an indicator of long duration undernutrition was to the extent of 68%, while wasting (weight for height < Median-2SD), an indicator of short duration of undernutrition was seen in 13%.

The prevalence of underweight, though statistically not significant was relatively higher among boys than girls (27.6% Vs 16.4%). However, a significantly higher ($P<0.05$) proportion of boys were stunted compared to girls (42.3% Vs 24.6%).

The overall prevalence of chronic energy deficiency (CED) (BMI<18.5) among adults was 56%, which was higher than the figures reported during the drought (40%) as well as that in Rajasthan (45%) (DWCD, 1998). The prevalence of CED was relatively higher among males (60%) as compared to females (53%).

Breast feeding and complementary feeding practices

Majority of the women (85%) reported that they initiated breast feeding on the third day of delivery. The newborns were fed with Jaggery water (80%) or goat milk (20%) during the first two days. Eighty five percent of the mothers stated that they discarded colosotrum, the proportion of which was much higher than that reported for the State (53%) by DWCD. They reportedly did so because of the belief that colostrum is not good for health of the new borns (36.4%), as a traditional practice (33.3%) or because of elders' advice (30.3%). Among those who were currently giving complementary feeding 68% initiated the same during 13-18 months, while only about 26% started it during 7-12 months of age.

Particulars of mortality

A total of 27 deaths in different age/sex groups were reported during the previous six months in the villages covered, with an estimated crude death rate of 8.1 as against 8.9 per thousand population reported for the State by SRS (1997). Of these, seven were neonates, two were post neonates, two were preschoolers, one was a school age child, two were adolescents and 13 were adults. The major cause of death among neonates was prematurity, while in the case of others, death was due to infectious diseases like malaria, pulmonary tuberculosis or respiratory tract infections. None of the deaths could be attributed to starvation.

Comments

The Saharia is a primitive tribal group with poor socio-economic status and low literacy level. The major household occupation was either agricultural or other labour. The intake of various foods, barring cereals & millets was very poor, compared to levels suggested in balanced diets. The intake of protective foods such as green leafy vegetables and milk was very low which was reflected in higher prevalence of micronutrient deficiencies such as conjunctival xerosis and Bitot spots, indicating vitamin A deficiency among children. The prevalence of CED among adults was relatively higher.

About 90% of the HHs surveyed were availing the benefit of the Special Component Programme, being implemented by State Government for Saharia Community. In addition, the HHs were also participating in supplementary feeding programme under ICDS and MDM. These programmes could have averted severe forms of undernutrition to a certain extent.

No deaths attributable to starvation were reported in the villages surveyed. Premature delivery and infectious diseases contributed to a majority of the deaths among young children. Higher rate of illiteracy, ignorance, inappropriate infant and child feeding practices and lack of early treatment in case of morbidities seemed to have aggravated the situation. These observations highlight the need for strengthening health and nutrition programmes such as RCH, ICDS and MDM in conjunction with health and nutrition education.

2. STUDY ON THE CURRENT STATUS OF FLUOROSIS AND STEPS TO CONTROL HEALTH RISKS OF FLUOROSIS IN THE NORTH-WESTERN DISTRICTS OF TAMIL NADU

Fluorosis is one of the major public health problems in India affecting 62 million population, including 6 million children in 18 States and Union territories in the country. Drinking water is the main source of fluoride, though certain foods/beverages like tea also contribute to a significant amount of fluoride intake. Ingestion of low content of fluoride leads to dental caries, while excess intake over a period of time leads to dental and skeletal fluorosis.

Studies conducted earlier in Tamil Nadu State have shown that about 8 out of 29 districts were declared endemic for dental fluorosis and the districts such as Vellore, Krishnagiri, Dharmapuri, Salem and Erode were reported to be having relatively higher fluoride content in drinking water sources. No systematic studies were conducted in the area to assess the magnitude of fluorosis and its association with fluoride levels in drinking water. The present study was therefore, undertaken at the request of Ministry of Health and Family Welfare, Government of India in the five North-Western districts of Tamil Nadu viz., Vellore, Dharmapuri, Krishnagiri, Salem and Erode.

Objectives

- To estimate the fluoride content of drinking water sources,
- To assess the clinical prevalence of fluorosis,
- To estimate the population "at risk" of dental fluorosis at district level and
- To recommend suitable remedial measures.

Methodology

A cross sectional survey adopting stratified sampling procedure was carried out. The data generated by the Tamil Nadu Water supply and Drainage Board (TWADB) formed the sampling frame for selecting the villages. The water sources in each of the districts were stratified into three categories on the basis of fluoride levels in drinking water viz., < 2, 2-4, and 4-6 ppm. One water source was selected randomly from each of these categories in the selected districts and the corresponding village was identified for the survey. About 250 households (HHs) with approximately 1000 population, residing around the selected water source were covered for carrying out various investigations.

Investigations

- Household socio-economic and demographic particulars such as community, family size, occupation and source of drinking water.
- Examination of all the available individuals for presence of clinical signs of dental and skeletal fluorosis in the households selected.

- Information regarding the type, depth, and age of the water sources of the HHs covered for clinical examination and collection of sample from drinking water source for estimation of fluoride levels and
- Assessment of intake of different foods associated with fluorosis in a sub sample of 25 HHs of the total HHs covered for clinical examination in each village by semi quantitative diet survey using food frequency questionnaire.

Estimation of population "at risk":

The prevalence of dental mottling observed in the current survey at a particular fluoride level was extrapolated on the proportion of population catered by water sources with that level of fluoride to obtain the population 'at risk'.

RESULTS

Coverage

A total of 8700 individuals, including 1745 children of 5-14 years of age from 2800 HHs from 13 villages in the five selected districts were examined for presence of clinical signs of fluorosis. In addition, water samples from 126 drinking water sources were collected for estimation of fluoride content, while semi quantitative diet survey was carried out in a sub-sample of 254 HHs.

Fluoride levels in drinking water

Bore wells fitted either with hand pumps (36-89%) or electric pump and connected to over-head tank (OHT) (11-100%) formed the major source of drinking water among the villages surveyed, while in two villages of Salem district and one village of Erode district, drinking water was also supplied from Cauvery river. Of the 13 water sources selected for the current study, 6 were found dry at the time of survey. The fluoride levels in remaining 7 sources ranged from a low of 1.0 ppm to a high 6.0 ppm. It was observed that the fluoride levels assessed during the current survey were comparable to those reported by TWAD board within intra class correlation coefficient of 0.96, $p<0.01$. The fluoride content of the water sources collected from various sources in these villages ranged from 0.47 ppm to 6.6 ppm. At village level, the mean fluoride levels ranged from a low of 0.6 to a high of 4.6 ppm. In 7 out of the 13 villages, the mean fluoride was more than the WHO cut off level of 1.5 ppm. However, considering ≤ 1 ppm of fluoride in drinking water as safe level for tropical climates, all the villages except for Cinniam Palayam village of Erode district had unacceptable levels of fluoride. The proportion of water sources having fluoride level of >1 ppm was found to be in the order of 62% in Krishnagiri, 60% in Vellore, 56% in Salem, 53% in Dharmapuri and 26% in Erode districts.

The mean fluoride level as assessed in current survey in different villages was found to be comparable with the mean values reported by TWAD board, with an intra class correlation of 0.7 ($p<0.05$), indicating that fluoride levels estimated by TWAD board are still valid and can be used for making reliable estimates of fluorosis.

Prevalence of Clinical signs of Fluorosis

The clinical prevalence of fluorosis was mostly in the form of dental mottling while that of skeletal fluorosis was found to be negligible.

Dental fluorosis

The overall prevalence of dental mottling among the total population ranged from a low 17% in the district of Vellore to a high of 36% in the district of Dharmapuri. A wide variation in the prevalence was observed in the three categories of villages surveyed within each district.

The age group wise prevalence of dental mottling pooled for all the districts was least (21%) among 5-9 years children, which increased to a maximum of 56% among 10-14 years children. Thereafter, the prevalence tended to decrease with increase in age to a minimum of 10% among 50-59 year individuals. Similar trends were observed in all the districts. The prevalence of dental mottling among the children of 10-14 years was maximum in Krishnagiri (67%), followed by Salem (58%), Dharmapuri (57%), Vellore (48%) and Erode (30%).

The prevalence of severe dental mottling (Grade III) was observed to be maximum in the districts of Salem and Dharmapuri (3%), followed by Krishnagiri (1.9%), Vellore (1.5%) and Erode (0.4%). A higher prevalence of dental mottling with very low prevalence of skeletal deformities among the children of 5-14 years in all the districts surveyed, indicate that the disease is of recent origin. The prevalence of dental mottling was observed in significant proportion of population above the age of 15 years in the districts of Dharmapuri and Salem as compared to other Districts which may be attributed to the presence of Granite cutting and polishing units which release silica dust into the atmosphere and exposure to silica in fluorotic area is known to aggravate the manifestations of fluorosis.

Skeletal Fluorosis

The overall prevalence of skeletal fluorosis in all the age groups was found to be less than 1%. The prevalence was relatively higher in the villages of Dharmapuri district (1.3%) and was least in the villages of Vellore district (0.5%). Only in the districts of Salem and Erode, skeletal fluorosis was observed to be prevalent in the age group of 5-14 years.

Frequency of consumption of specific foods

Ragi, a rich source of calcium and known to reduce the risk of fluorosis was consumed by a majority of the HHs, either daily or twice a week, in all the districts surveyed, except in the district of Erode. Their proportion ranged from a high 82% in the district of Krishnagiri to a low 42% in Dharmapuri District. Consumption of milk & milk products, yet another source of calcium, was also observed to be regular in a majority of the HHs (62-84%) in all the districts surveyed.

The association between different foods consumed and the dental mottling, was however, not observed in the current study.

Estimated population "at risk"

It is estimated that about 30 lakhs population are "at risk" of fluorosis in all the five districts surveyed, of which 5-14 year children constitute about 9 lakhs. The Salem district is having highest number of cases of about 10.2 lakhs dental mottling of all age groups of which 2.8 lakhs are 14 year children, with an estimated prevalence rate of about 34% and 48% respectively. The estimated prevalence among total population and children of 5-14 years in the rest of districts were 30% & 45% in Dharmapuri, 24% & 30% in Erode, 23% & 25% in Krishnagiri and 17% & 34% in Vellore district respectively.

Recommendations

- Creating awareness among the community about fluorosis through health education and to discourage them consuming water from high fluoride sources.
- Sensitizing the concerned administrators regarding the need for identifying water sources with permissible levels of fluoride to provide safe drinking water to the community.
- Supplementation of the affected population, especially children and adolescents, with therapeutic doses of microntrients such as calcium, vitamin D and vitamin C to decrease the consequences of fluorosis.
- Propagation and supply of domestic de-fluoridators which is the most economic and practicable choice of supply of fluoride free water.
- Avoiding ingestion of fluoride rich foods such as tea, tobacco, and use of fluoride rich toothpastes and simultaneously encouraging the community to consume foods rich in calcium, vitamin C and protein.
- Plugging of bore wells identified to be having high fluoride levels in water and making concerted efforts to dig bore wells in low fluoride zones.
- Wherever feasible, surface water either from the sources of harvested rainwater or from rivers to be supplied as a permanent solution to alleviate the problem. In the context of districts surveyed in the State of Tamil Nadu, the river Cauvery, with the districts of Dharmapuri and Salem on one side and Erode on the other side can form the right choice for supply of drinking water in these districts. In the current study, it has also been observed that most of the villages were already having community based over-head tanks and pipeline system for the supply of drinking water. This facility can be utilized for the supply of safer drinking water from the river Cauvery.

3. SMOOTHING CENTILE CURVES OF BMI FOR RURAL INDIAN CHILDREN BY USING LMS METHOD

Anthropometric data are used world wide to assess the growth status of individuals of different age/sex groups. Body Mass Index (BMI) is being used for the past 25 years, as a simple summary measure of nutritional status of adults, especially, for assessing the chronic energy deficiency or over-weight/obesity. Changes in the BMI in adults with the advancement of age is fairly slow and hence common cutoff levels are being used in assessing the nutritional status, which are independent of age. The BMI, however, changes substantially with age among children below 18 years, rising during infancy, falling during the preschool age, and then again rising through adolescence to adulthood. Therefore, for assessing the nutritional status of children using BMI, age/sex specific centile curves have to be developed and used.

Objective

To construct age/sex specific BMI centile curves by applying the Lamda Mu Sigma (LMS) method for rural Indian children.

Materials & Methods

Anthropometric data on 21,070 children aged 1 to 17 years collected by the National Nutrition Monitoring Bureau (NNMB) in 9 States during 2000-01 surveys was utilized. T.J. Cole et al developed software to obtain normalized growth centiles, by using 'LMS' method which simplifies assessment of growth status of children using BMI. This software is obtained from Dr.T.J. Cole and the normalized mean (M), the Coefficient of variation (S) and the Box-Cox power (L) curves were obtained as smoothed functions of age/sex by using the above data base. These age/sex specific BMI centiles can be converted into SD scores.

Results

Curves were derived using Cole's LMS method, which adjusts the BMI distribution for skewness. LMS values served to generate sets of seven or nine centiles, from the 3rd to the 97th for boys and girls separately. The 50th centile values were slightly higher in boys up to the age of 9 years, while in later ages girls had higher values. LMS curves, Centile values and SD scores of boys and girls are provided in Tables 1 & 2 and Figure 1.

Table 1. LMS and Centile BMI values of rural Indian boys

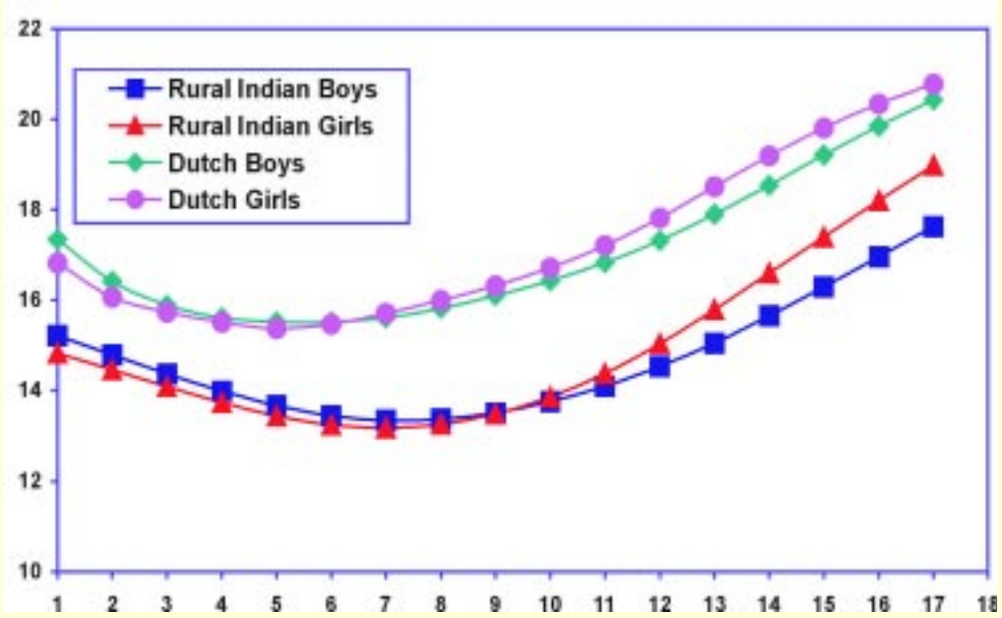
Age	L	M	S	-2.0001	-1.3334	-0.6667	0	0.6667	1.3334	2.0001
1	0.44	14.83	0.11	11.77	12.74	13.77	14.83	15.94	17.10	18.31
2	0.40	14.46	0.11	11.57	12.49	13.45	14.46	15.51	16.60	17.74
3	0.36	14.09	0.10	11.37	12.23	13.14	14.09	15.08	16.12	17.20
4	0.31	13.74	0.10	11.17	11.99	12.84	13.74	14.68	15.66	16.69
5	0.27	13.44	0.10	11.00	11.77	12.58	13.44	14.33	15.27	16.25
6	0.23	13.24	0.10	10.88	11.63	12.41	13.24	14.10	15.01	15.97
7	0.19	13.18	0.10	10.86	11.59	12.36	13.18	14.03	14.93	15.88
8	0.15	13.26	0.10	10.92	11.66	12.44	13.26	14.13	15.05	16.01
9	0.11	13.49	0.10	11.07	11.83	12.63	13.49	14.39	15.34	16.35
10	0.07	13.86	0.10	11.32	12.12	12.96	13.86	14.81	15.83	16.91
11	0.03	14.38	0.10	11.68	12.52	13.42	14.38	15.41	16.51	17.68
12	-0.01	15.04	0.11	12.13	13.03	13.99	15.04	16.16	17.36	18.65
13	-0.05	15.79	0.11	12.65	13.62	14.66	15.79	17.02	18.34	19.77
14	-0.09	16.60	0.12	13.20	14.24	15.37	16.60	17.93	19.38	20.96
15	-0.13	17.40	0.12	13.76	14.87	16.08	17.40	18.85	20.44	22.18
16	-0.17	18.20	0.12	14.31	15.48	16.78	18.20	19.76	21.49	23.39
17	-0.21	18.98	0.13	14.84	16.08	17.46	18.98	20.66	22.53	24.61

The L values show the skewness of the BMI distribution, a value of 1 indicate normality and smaller values represent progressively greater skewness. The degree of skewness is reflected in the spacing of the BMI centiles. The S values which define the coefficient of variation of BMI of boys and girls are given in Tables 1 & 2 respectively, which on multiplication with 100, provide percentages. The extent of variability in S values was about 11% in younger age groups (1-4 years) which tended to decrease to 9% in 5-10 year age group and then again rise with age to reach a peak value of 12-13% at 17 years. This rise occurred two years earlier in girls, reflecting the timing of the onset of adolescent growth spurt.

Table 2. LMS and Centile BMI values of rural Indian girls

Age	L	M	S	Centiles						
				3rd	10th	25th	50th	75th	90th	97th
				(-2.0001)	(-1.3334)	(-0.6667)	(0)	(0.6667)	(1.3334)	(2.0001)
1	0.64	15.22	0.11	12.08	13.09	14.14	15.22	16.33	17.46	18.63
2	0.54	14.79	0.10	11.87	12.81	13.78	14.79	15.83	16.89	18.00
3	0.45	14.37	0.10	11.66	12.53	13.43	14.37	15.35	16.36	17.40
4	0.36	13.99	0.10	11.46	12.27	13.11	13.99	14.91	15.87	16.86
5	0.26	13.67	0.09	11.28	12.04	12.84	13.67	14.55	15.46	16.42
6	0.17	13.45	0.09	11.16	11.88	12.64	13.45	14.29	15.18	16.12
7	0.07	13.34	0.09	11.11	11.81	12.55	13.34	14.18	15.06	15.99
8	-0.02	13.37	0.09	11.14	11.84	12.58	13.37	14.21	15.10	16.05
9	-0.11	13.51	0.09	11.26	11.96	12.71	13.51	14.37	15.29	16.28
10	-0.21	13.76	0.09	11.44	12.16	12.93	13.76	14.66	15.62	16.67
11	-0.30	14.10	0.10	11.69	12.43	13.23	14.10	15.05	16.09	17.21
12	-0.40	14.54	0.10	12.00	12.77	13.61	14.54	15.55	16.67	17.90
13	-0.49	15.05	0.10	12.37	13.18	14.07	15.05	16.15	17.36	18.72
14	-0.58	15.65	0.11	12.79	13.65	14.59	15.65	16.83	18.16	19.66
15	-0.68	16.29	0.11	13.26	14.16	15.16	16.29	17.57	19.02	20.69
16	-0.77	16.96	0.11	13.75	14.69	15.75	16.96	18.34	19.93	21.78
17	-0.87	17.63	0.12	14.24	15.23	16.35	17.63	19.12	20.86	22.91

Figure 1. Median BMI curves of rural Indian boys and girls aged 1-17 years compared with Dutch boys and girls



Age in years

4. NUTRITION PROFILE OF COMMUNITY IN UTTAR PRADESH - A DISTRICT LEVEL SURVEY

Government of India in its National Plan of Action on Nutrition (1995), as a part of the National Nutrition Policy (1993), envisages preparation of plan of action on nutrition at district levels. Earlier, the results of nutrition profile of the States of Punjab, Haryana, Himachal Pradesh, Assam, Orissa and West Bengal based on district level surveys were presented (Ann. Rep. 1995-96, 1996-2000, 2001-2002). At the request of Department of Women and Child Development (DWCD), Government of India, the study was extended to the state of Uttar Pradesh to assess the food and nutrient intakes of rural communities and to assess the nutritional status of the representative segments of population in terms of anthropometry and clinical status at district level during the year 2001-2002.

Methodology

Keeping in view the manpower and the time frame, a total of 400 HHs were covered in each of the 54 districts for demographic, socio-economic particulars and anthropometry and clinical examination of the individuals. Every alternate household of these 400 HHs was covered for the assessment of food and nutrient intakes by 24 hour recall method of diet survey. From these households, mothers having at least one preschool child were interviewed to assess their knowledge and practices (K & P) on breast feeding, child-rearing and socio-cultural aspects with reference to food consumption.

The results can be summarized as below:

1. A total of 21,739 households from 1080 randomly selected villages from 54 districts were covered for the assessment of nutritional status of all the available individuals. Family diet survey was carried out by 24-hour recall method in a sub- sample of 10,291 households by selecting every alternate household covered for nutrition assessment; individual dietary intakes were also assessed on 22,416 individuals of different age and sex groups from every alternate HH covered for diet survey. Assessment of knowledge and practices (K&P) on breast feeding, child rearing practices and socio cultural aspects of food consumption was carried out on 7,963 women, having at least one preschool child.

2. A majority of the HHs surveyed (44%) belonged to backward castes, followed by Scheduled Caste (35%), other castes (19.4%) and Scheduled Tribe (1.2%). About 46% houses were kutcha in nature and about 31% of HHs were landless. The major occupation of the head of the HHs was cultivation (36%) or non-agricultural labour (31%).

3. The average intake of cereals & millets (533 g) was above the RDI (460g), while that of pulses and legumes (37g) was comparable to the RDI (40g). The average intake of protective foods such as GLV is very much below (8g) as compared to RDA. Consumption of income elastic foods such as milk (111 ml) and sugar and jaggery (16 g) were below the recommended levels.

4. The mean intakes of energy (2445 Kcal), protein (73g) and calcium (517 mg) either comparable or more than the recommended levels, while that of other micronutrients like Iron (25mg), Vitamin A (214 µg) and riboflavin (1 mg) were below the RDI.

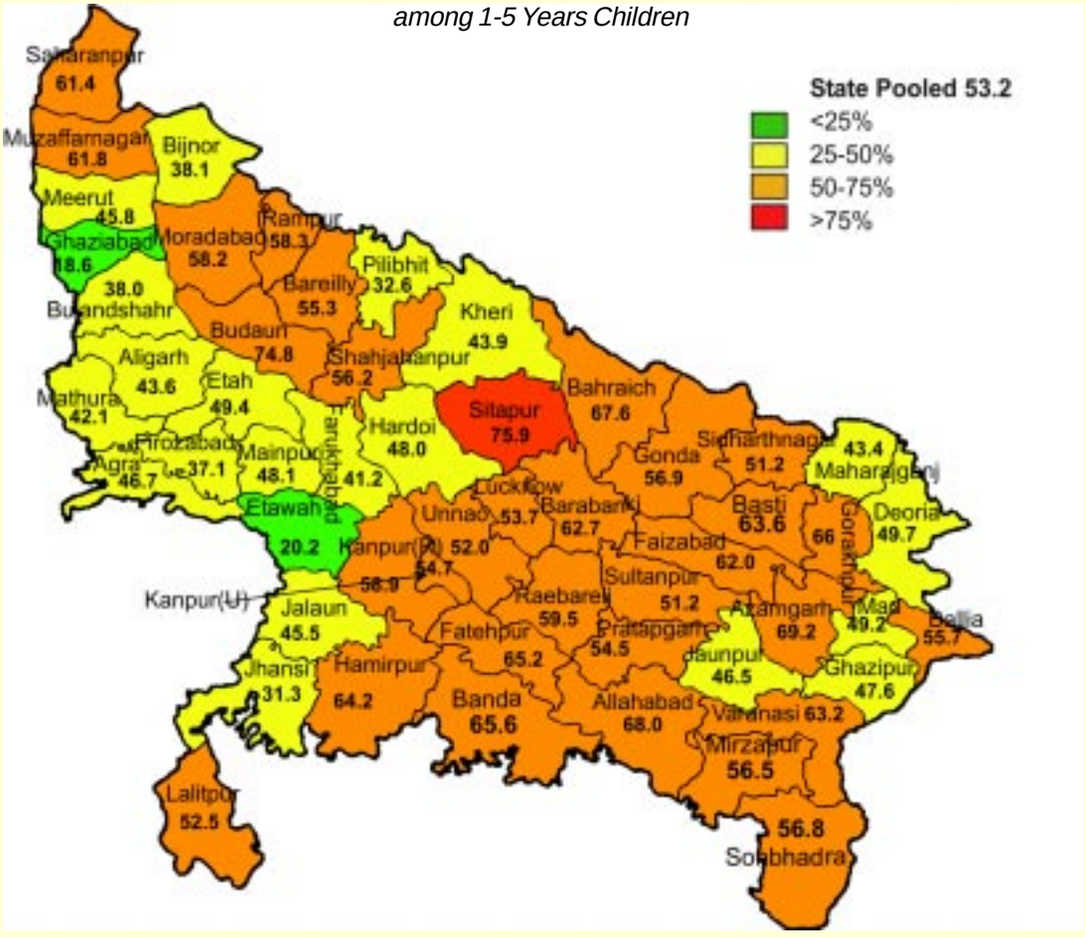
5. Distribution of households according to protein calorie adequacy status revealed that in about 64% of the HHs, the intake of both the nutrients was adequate, while in 28% of HHs, the intake of dietary energy was inadequate while that of protein was adequate. In 8 % of HHs, the intake of both the protein and energy were inadequate.

6. At the individual level, in general the intake of roots & tubers was above the recommended levels among preschool children and school age children. The deficit was more with regard to intake of income elastic foods such as milk & milk products, fats & oils and sugar & jaggery. In case of children of other age groups and adults, the intakes of cereals & millets, roots & tubers and other vegetables were above the RDI. The intake of all the nutrients except for protein, thiamin and niacin was below the recommended levels in children of all the age groups. In case of adults, the mean consumption of protein, energy, calcium, thiamin, niacin and vitamin C was above the RDI. The diets in general were grossly deficient with regard to iron, vitamin A and riboflavin.

7. The prevalence of severe underweight among preschool children, as judged by weight for age (<60% of standard), was observed to be 9%. The proportion of severe grade undernutrition was higher in 1-3 year children (11.4%) as compared to 3-5 year group (6.7%).

8. Stunting (height for age < Median -2SD) was observed in about 72% of preschool children, while wasting (weight for height < Median -2SD) was noticed in about 13%, indicating that chronic undernutrition was more common. Underweight (< Median -2SD) was observed in 53% of children (Figure 2).

Figure. 2. Prevalence (%) of Underweight (Weight for Age <Median - 2SD) among 1-5 Years Children



9. Prevalence of chronic energy deficiency (CED) among adults, as assessed by BMI (<18.5), was about 38%; with the prevalence being relatively higher among males (42.4%) compared to females (34.4%).

10. Among the mothers who were currently giving complementary food to their children, a majority (50.2%) of them initiated the same to their children during 7-12 months of age. The most commonly used complementary foods were rice/roti (45.3%) and milk (35%). Majority of the mothers, in general, were aware of nutritional deficiency disorders such as night blindness (87.3%), anaemia (76.5%) and protein energy malnutrition (80%). Major causes attributed for the same were dietary inadequacy and vitamin deficiency.

11. A majority of the mothers interviewed preferred to consume foods such as milk and fruits during pregnancy, while during lactation, milk was preferred. Also, mothers reportedly avoided certain foods such as papaya fruit, flesh foods and colocasia during pregnancy and green leafy vegetables, fermented rice and spicy foods during lactation.

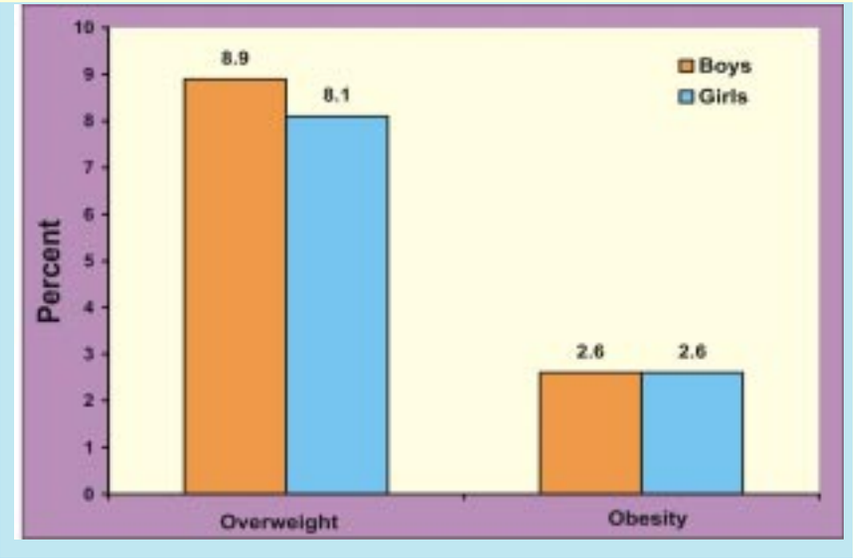
12. Study of dietary preferences during illness indicated that majority of the mothers preferred green gram pulse, milk, fruits and rice during diarrhoea and measles while flesh foods and spicy / oily foods were avoided. In general, the majority of mothers opined that the foods such as cereals & millets, pulses, meat & poultry, GLV and milk & milk products were useful for providing energy, maintaining healthy eyes, better growth and to improve blood.

5. PREVALENCE OF OVERWEIGHT AND OBESITY AND ITS PREDICTORS AMONG URBAN ADOLESCENT SCHOOL CHILDREN (12-17 YEARS) OF RANGAREDDY DISTRICT, ANDHRA PRADESH

Rising prevalence of overweight and obesity and its health consequences has prompted the World Health Organization (WHO) to identify it as one of today's most important public health problem posing global epidemic ramifications. The problem is not only confined to adults but also exists among children and adolescents. Adolescence is an important period in the life cycle of human beings, which is characterized by rapid rate of growth. The prevalence of overweight and obesity among children and adolescents has been reportedly increasing significantly in both developed and developing countries during the past two decades. The most significant long-term consequence of childhood and adolescent obesity is its persistence even during adulthood, with all the associated health risks. Estimation of prevalence of overweight and obesity and its correlates is, therefore, of paramount importance for the formulation of strategies to avert overweight and obesity. Therefore, a study was undertaken in continuation of an earlier study carriedout in the twin cities of Hyderabad and Secunderabad, with an objective to estimate the prevalence of overweight & obesity and its correlates among urban adolescent school children (12-17 years) in the urban agglomeration of Rangareddy district.

Fourteen schools catering to low (3), middle (4) and upper middle-income (7) groups were selected by multistage stratified random sampling procedure. Anthropometric measurements, viz., height (cms) and weight (kgs) were taken on 1825 adolescent school children (Boys: 1048; Girls: 777) using standard procedures. Information on socioeconomic and demographic particulars, their perceptions and practices on diet, life style patterns, and physical activities was assessed using pre-tested questionnaires. Obesity (95 percentiles) and overweight (85th - <95 Percentiles) were defined using BMI for age and sex specific percentiles (NHANES). Chi-square test was applied to identify the association between prevalence of overweight & obesity. The results revealed that in general, the prevalence of overweight and obesity was 11%, (Figure 3), and was comparable among the girls (11.5%) and boys (10.7%). The prevalence was significantly ($p < 0.001$) higher among children studying in private and private aided institutions (12.7% and 17.2%) as compared to those studying in government institutions (3%); among those belonging to high socioeconomic status (19.3%) as compared to the low (4.5%) and low middle (9%) socio-economic status (Figure 3)

Figure. 3 Distribution (%) of adolescents (12-17 Years) according to overweight and Obesity and Gender



BMI ≥ 85-< 95 centiles BMI ≥ 95 centiles

It was marginally lower among the children who were reportedly participating in the household activities for 3hrs/day. On the other hand, it was marginally higher among children (11.5%) who are watching TV for more than one hour/day as compared to the children, who are watching TV for less than an hour (6.5%). Thus, the study revealed that prevalence of overweight and obesity among urban adolescent school children in the Rangareddy District of Andhra Pradesh was higher (11%) than in their rural counterparts (0.6%: NNMB 2001). The prevalence was more among the children of upper middle and high socioeconomic status groups compared to the children of low and lower middle socioeconomic status. The prevalence was relatively less among children participating in games & sports or engaged in physical exercises and higher among the children with no physical exercise or who were watching TV for long hours. There is a need to initiate programmes on health and nutrition education for the school children incorporating benefits of physical activity in the form of games and sports and sticking to healthy food habits and good life styles.