

TECH. REPORT - 4 - A

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NATIONAL NUTRITION MONITORING BUREAU

Report
for the year 1977

NATIONAL INSTITUTE OF NUTRITION
Indian Council of Medical Research
Hyderabad-500 007.

1978

The National Nutrition Monitoring Bureau (NNMB) was established in June 1972 by the ICMR with the objective of collecting data on nutritional status and dietary intakes of representative segments of the population adopting accepted standardized methodologies. The National Institute of Nutrition is the Central Reference Laboratory with the responsibilities of technical guidance and supervision along with the task of coordinating the work of various state units. The aims and objectives of the Bureau have already been reported, in detail (Plan of Operation, NNMB - 1972).

During the year 1977, the NNMB has expanded its area of operation to include the State of Orissa. Thus, at present, the bureau is collecting and compiling data-base on the aspects of food consumption and nutritional status of population groups in ten States - Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamilnadu, Uttar Pradesh and West Bengal. In Table-1, data on the coverage by the bureau since its inception in 1972 are presented. The results of analysis of the data collected by the regional units for the previous years with respect to rural households have been reported from time to time (NNMB-Interim Report, 1974; NNMB Reports - 1975, 1976 and 1977).

The present report is divided into two sections. Section-I deals with results of analyses of data according to States, while in Section-II district-wise information on diet and nutrient consumption patterns in different per capita income groups has been provided.

In Section-I, no attempts have been made to interpret results at the district level. Also, since Orissa unit has started very recently, the results of this State unit have not been included.

Coverage: From January to December 1977 a total of 4298 households have been covered during the period for diet and nutrition surveys. Of these, 3049 households were from the rural areas while the remaining 1249 households were from the urban areas (Table-2). The yearly target of 400 rural households has been achieved by the States of Karnataka, Andhra Pradesh and Gujarat while the target of 250 urban households was achieved only by Andhra Pradesh. In the States of Tamilnadu, Gujarat and Karnataka, the Units have covered all the urban groups excepting those belonging to the high income. The names of the districts covered by the regional units are given in Table-3.

Income Status: The coverage of rural households according to daily per capita income showed that about a third of the

households surveyed during the year 1977 had an income of less than a rupee per person per day while an equal number fell in the income category of Rs. 1 - 2 per capita per day (Tabled). Only 7 % of the households had a daily income of more than Rs.5 Per person. The distribution of coverage of households according to income status during the years of 1976 and 1977 remained essentially similar. It should be noted that in the compilation of these results, no attempts were made to standardise for the possible differences in the rupee value over the period of survey as well as between different States.

Pattern of food and nutrient intake

Family diets: The average intakes of foodstuffs and nutrients per Consumption Unit (C.U.) per day are presented in Tables 5 and 6. These are based on data collected at the household level by the method of weighment of raw foods used on the day of survey.

Foodstuffs (g/cu/day) - (Table-5)

Cereals and millets formed the bulk of the dietaries in all the States. Interstate comparisons revealed that the highest levels of intake are seen in Andhra Pradesh, Karnataka, West Bengal, Uttar Pradesh, forming a cluster, while Tamil Nadu, Maharashtra and Madhya Pradesh formed

another cluster. The lowest level of consumption of cereals and millets was seen in Kerala.

pulses: The mean intake of pulses ranged from 50 g. in Maharashtra and Madhya Pradesh followed by Karnataka (43 g) Uttar Pradesh (39 g), Gujarat (37 g), Tamil Nadu (35 g), Andhra Pradesh, West Bengal (21 g) and Kerala (13 g) in descending order. The mean consumption of pulses in all the States fell far below the recommended intake of 75 g. per C.U. This was also true of the consumption of protective foods such as, leafy vegetables, nuts and oilseeds, fruits, animal foods and milk and milk products.

Onions and potatoes formed the main roots and tubers consumed in all the States except in Kerala where Tapioca was consumed as a part of the staple food. Consumption of coconut (fresh and dried form) formed the bulk of the 44 g. intake of nuts and oilseeds seen in Kerala.

Consumption levels of fruits were far from satisfactory inspite of including ripe tomatoes in this category.

Reasonable levels (52 g.) of consumption of fish was seen only in Kerala. In none of the households surveyed in Gujarat and Madhya Pradesh was this foodstuff consumed.

Gujarat had the higher mean level of milk consumption (224 ml) while the minimum mean level (29 ml) was seen in Kerala.

NUTRIENTS (Per consumption unit per day)

Data on the average nutrient intakes in different States were calculated based on family diet surveys. These are presented in Table -6.

The average intake of protein was found to be above the recommended level (55 g.) in all States except Kerala where the figure was 42 g. The maximum average consumption of protein was found in Uttar Pradesh (75 g.) followed closely by Maharashtra and Karnataka. These in turn were followed by the cluster of States of Tamil Nadu, Andhra Pradesh, Gujarat (62 g.) with Madhya Pradesh (59 g) with West Bengal (58 g.) following close behind.

CALORIES (Kcal):

The average calorie intakes in different States varied from 2665 in Andhra Pradesh to 1722 in Kerala with Karnataka (2588), Tamil Nadu (2477), Maharashtra (2407). West Bengal (2381) Uttar Pradesh (2292), Gujarat (2177) and Madhya Pradesh (2045) filling the middle order.

These intake figures compare well with those presented in the last report for Andhra Pradesh, Maharashtra, Gujarat and West Bengal. In Tamil Nadu and Uttar Pradesh, however, levels of consumption during the year 1977, appear higher

than those reported for 1976 In Kerala, Karnataka and Madhya Pradesh, the present data show lower levels of calorie consumption as compared to those observed In 1976.

MINERALS

CALCIUM:

The mean intakes ranged from 282 mg. In Madhya Pradesh to 744 mg. In Andhra Pradesh. Mean Intakes met recommended allowances (500 mg.) in Karnataka (562 mg.), Tamil Nadu (604 mg.), Gujarat (608) and Andhra Pradesh (744 mg) with Kerala (472 mg.) coming close to the recommended level. In Maharashtra, West Bengal and Uttar Pradesh, intake levels were around 400 mg.

IRON:

Almost in all the States surveyed, the mean intake of iron was equal to or more than the recommended level of 20 mg. per day.

VITAMINS

VITAMIN-A:

The Vitamin-A content of dietaries in all the States was below recommended allowance (750/ug). The lowest mean level of consumption was seen in Kerala (97 /ug) and the highest level of 387/ug in the dietaries of West Bengal.

THIAMINE AND RIBOFLAVIN:

The mean intakes of thiamine ranged from 0.48 mg in Kerala to 2.41 mg in Uttar Pradesh. Mean intakes in Kerala (0.48 mg), Andhra Pradesh (1.16 mg) and West Bengal (0.95 mg) fall below the recommended level of 1.2 mg.

The mean riboflavin intake was found to correspond with the recommended level of 1.3 mg only in Uttar Pradesh; in all the other States, it was well below the recommended value.

PROTEIN CALORIE ADEQUACYHousehold As a unit:

Consumption figures for proteins and calories obtained from the weighment of raw foods for a particular household have been expressed as intakes per consumption unit for that day. These figures denote or represent the "average" intake for that particular household. To determine the adequacy or otherwise of intakes of proteins and calories, standard errors for the requirement curve were, therefore, considered in the fixation of cutoff levels. In the calculation of the standard error, the number of consumption units in the family was taken for the sample size and 15% of the average requirement was taken to represent the standard deviation. In other words, if the intakes of proteins/

calories in any household fell below the mean-2SE level, that household was then considered as consuming inadequate amounts of proteins/calories.

The coverage of the households according to protein calorie adequacy is presented in Table - 7.

The proportion of households consuming inadequate amounts of proteins and calories showed marked variations between States. The highest proportion of such households was seen in Kerala (51.0) followed by West Bengal (25.9), Madhya Pradesh (22.1), Tamil Nadu (19.6), Karnataka (17.4), Gujarat (15.7), Maharashtra (14.8), Andhra Pradesh (13.3) and Uttar Pradesh (6.8). In all the states put together about 19% of households consumed diets which provided inadequate amounts of these two nutrients. In a small proportion of the total households surveyed (less than one per cent) the diets provided adequate calories, without providing adequate protein. Excepting in Kerala, in all other States a majority of households were found to be consuming adequate amounts of both proteins and calories. In all the states considered together, 59% of the total households fell into this category. The number of households consuming inadequate amounts of protein was found to be lower than the number of households who consumed inadequate amounts of calories.

The higher number of households with calorie inadequacy was seen in Kerala (81 %) followed by Madhya Pradesh (55 %), Gujarat (48%), Maharashtra (42 %), West Bengal (40 %), Uttar Pradesh (39%), Tamil Nadu (35 %), Karnataka (29%). Andhra Pradesh had the lowest number of such households (23%).

INDIVIDUALS:

Data obtained by the oral questionnaire method of diet survey provide information about the consumption of nutrients by an individual in the family. Using the same criteria applied at the household level, individuals were also categorised into four categories of adequacy or otherwise of proteins and calories. Cutoff levels for adequacy or otherwise of consumption of proteins/calories were taken as mean-2SD. The other assumptions were kept essentially unaltered. In Table-8 are presented the results obtained from this analysis.

Consumption of inadequate amounts of both dietary proteins and calories by individuals within the families surveyed varied from as low as 2 % in Uttar Pradesh to about 20 % in Kerala. Taking all the states together, about 11 % of the individuals were found to consume both these nutrients in inadequate amounts. On the other hand, the maximum per cent of those consuming both proteins and calories in adequate

quantities varied from as high as 71 % in Karnataka to as low as 19 % in Kerala with an average of about 50 % for States put together. In about 39 % of the people surveyed, protein consumption was found to be satisfactory while that of calories was inadequate.

QUALITY OF DIETS

PROTEIN-CALORIES:

The per cent of protein-calories in relation to total calories of a diet is generally accepted as indicating the qualitative aspect of the diet. It has been suggested that the diets having NDPCal % of 4.8 (equivalent to about 8 % of protein calories) is satisfactory for growing children. The diets, at household level, having 8 % of protein-calories were, therefore, considered to be more than satisfactory. Data collected at household level were considered for this purpose and the per cent distribution of households surveyed according to the contribution of calories from protein (protein-calories) are presented in Table-9.

Excepting for a very small proportion of households (most of them in Kerala) a great majority of those surveyed in all the States consumed diets which provided 8 per cent or more of protein-calories. In Maharashtra, Gujarat and Uttar Pradesh, none of the households surveyed were found to consume diets containing less than 8 % protein-calories. A small per cent of the households consumed diets which

provided with more than 14 per cent of calories coming from protein. In Madhya Pradesh and Uttar Pradesh, however, 17 and 32 % of households consumed diets which provided over 14 % of protein calories,

CARBOHYDRATE-CALORIES:

The percentage distribution of carbohydrate-calories in the diets, given in Table-10, suggests that the mean levels vary from 69 % in Gujarat to 85 % in West Bengal.

These results clearly show that, in general, the quality of rural Indian diets is satisfactory as far as proteins are concerned while they are poor in respect to fat-calories.

NUTRITIONAL STATUS:

Number of individuals covered during one year is not adequate to attempt evaluation of nutritional status. It was decided, therefore, that the clinical and anthropometric status of respective population groups should be attempted on data collected over a two year period. Hence, the data collected during 1977 were not analysed for this purpose.

Table - 1

NNMB - Total Coverage of Population (Till the end of December, 1977)

State	Coverage of households for diet survey			Individuals covered for nutritional assessment
	Rural	Urban	Total	
Kerala	1432	900	2332	13992
Tamil Nadu	1170	751	1921	11526
Karnataka	1751	882	2633	15798
Andhra Pradesh	1833	839	2672	16032
Maharashtra	1235	800	2035	12210
Gujarat	2038	877	2915	17490
Madhya Pradesh	1328	450	1778	10668
West Bengal	1486	400	1886	11316
Uttar Pradesh	1204	314	1519	9114
Total:	13477	6213	19690	118140

Table - 2

NNMB - Coverage during the year 1977

State	Number of households for diet survey				Individuals covered for nutritional assessment
	Rural		Urban	Total	
	Weighment	Oral			
Kerala	152	38	150	340	2040
Tamil Nadu	259	66	200	525	3150
Karnataka	328	82	200	610	3660
Andhra Pradesh	348	87	250	685	4110
Maharashtra	268	67	150	485	2910
Gujarat	344	86	200	630	3780
Madhya Pradesh	156	39	-	195	1170
West Bengal	316	79	-	395	2370
Uttar Pradesh	267	67	99	433	2598
Total:	2438	611	1249	4298	25788

Table - 3

NNMB - Districts surveyed during the year 1977

State	Developmental Category			
	A Jan.- March	B April - June	C July - Sept.	D Oct.-Dec.
Kerala	Palghat	Alleppey ⁺	Kottayam ⁺	Kozhikode
Tamil Nadu	Chingleput	Thiruchira- palli	Coimbatore	Tirunelveli ⁺
Karnataka	South Kanara	Bidar	Chikmaglur	Shimoga
Andhra Pradesh	Krishna	Warangal	Srikakulam	Cuddapah
Maharashtra	Chanda	Aurangabad	Amaravati	Nanded ⁺
Gujarat	Mehsana	Rajkot	Gandhinagar	Broach
Madhya Pradesh	Bilaspur [*]	Morena ⁺	Jhabua [*]	Panna
West Bengal	Midnapur	Burdwan	Nadia	Darjeeling [*]
Uttar Pradesh	Jhansi	Bulandshahr [*]	Bareilly	Pratapgarh

+ Not covered * Partially covered

Table - 4

NNMB - Coverage (%) of households according to daily per capita income

Year	Income category			
	Less than Re.1	Rs.1 - 2	Rs. 2 - 5	Rs. 5 & more
1975	41.6	32.2	20.9	5.3
1976	33.4	34.3	25.2	7.1
1977	32.3	34.5	26.2	7.0

Table - 5

NNMB - Average intake of foodstuffs (Gross per C.U. per day)

State	Total cereals and millets	Pulses	Leafy Vegetables	Other vegetables	Roots and tubers	Nuts and oil seeds	Condiments and spices	Fruits	Fish	Other flesh foods	Milk	Fats and oils	Sugar and jaggery
Kerala	311	13	-	51	126	44	16	10	52	*	29	2	16
Tamil Nadu	540	35	6	57	41	10	21	22	3	7	127	17	20
Karnataka	580	43	16	63	25	18	23	4	2	*	85	8	28
Andhra Pradesh	600	21	7	39	44	3	24	17	8	9	105	14	8
Maharashtra	509	50	10	58	19	2	13	24	1	1	70	18	33
Gujarat	397	37	1	56	34	3	2	27	-	*	224	26	45
Madhya Pradesh	482	50	10	38	21	-	5	18	-	*	54	6	12
West Bengal	571	21	34	101	100	-	3	5	13	3	43	8	14
Uttar Pradesh	561	39	19	55	66	-	*	13	2	3	56	5	6

* Less than one gram

Table - 6

NNMB - Average intake of nutrients per consumption unit per day

State	Protein (g)	Calo- ries	Calcium (mg)	Iron (mg)	Vit.-A (/ug) (Reti- nol)	Thia- mine (mg)	Ribo- flavin (mg)	Nicoti- nic Acid (mg)	Vita- min-C (mg)
Kerala	41.3	1722	472	17.7	97	0.48	0.56	9.5	51
Tamil Nadu	61.7	2477	604	29.1	258	1.22	0.93	14.1	37
Karnataka	67.0	2588	562	36.7	313	1.57	0.92	16.2	39
Andhra Pradesh	63.5	2665	744	30.8	235	1.16	0.85	15.2	30
Maharashtra	68.6	2407	421	35.6	304	1.99	0.99	18.3	36
Gujarat	62.1	2177	608	28.7	240	1.76	1.24	15.6	29
Madhya Pradesh	59.1	2045	282	22.6	192	1.42	0.74	13.3	27
West Bengal	58.0	2381	409	29.7	387	0.95	0.74	16.1	70
Uttar Pradesh	75.4	2292	416	33.2	337	2.41	1.30	23.6	42
Recommended intake (ICMR, 1968)	55.0	2400	400-500	20.0	750	1.20	1.30	16.0	50

Table - 7

NNMB - Percent Distribution of Households According to Protein-Calorie Inadequacy

State	No. of households covered	PI CI	PI CA	PA CI	PA CA	PI	CI
Kerala	151	51.0	2.0	29.8	17.2	53.0	80.8
Tamil Nadu	260	19.6	-	15.0	65.4	19.6	34.6
Karnataka	327	17.4	1.8	11.6	69.2	19.2	29.0
Andhra Pradesh	347	13.3	-	9.5	77.2	13.3	22.8
Maharashtra	263	14.8	-	27.4	57.8	14.8	42.2
Gujarat	343	15.7	0.3	32.1	51.9	16.0	47.8
Madhya Pradesh	154	22.1	0.7	33.1	44.1	22.8	55.2
West Bengal	313	25.9	1.0	14.1	59.0	26.9	40.0
Uttar Pradesh	266	6.8	-	32.3	60.9	6.8	39.1
Average	-	20.7	0.6	22.8	55.9	21.3	43.5

PA = Protein Adequacy, PI = Protein Inadequacy
CA = Calorie Adequacy, CI = Calorie Inadequacy

Table - 8

NNMB - Percent Distribution of Individuals according to Protein-calorie Inadequacy

State	No. of Individuals surveyed	PI CI	PI CA	PA CI	PA CA	PI	CI
Kerala	119	20.2	-	60.5	19.3	20.2	80.7
Tamil Nadu	328	13.4	-	30.2	56.4	13.4	43.6
Karnataka	409	10.5	1.0	17.6	70.9	11.5	28.1
Andhra Pradesh	403	9.2	0.2	34.0	56.6	9.4	43.2
Maharashtra	361	10.5	-	41.3	48.2	10.5	51.8
Gujarat	343	5.5	0.3	32.7	61.5	5.8	38.2
Madhya Pradesh	312	17.3	-	45.2	37.5	17.3	62.5
West Bengal	439	14.4	-	45.8	39.9	14.4	60.1
Uttar Pradesh	339	2.1	-	40.4	57.5	2.1	42.5
Average	-	11.4	0.2	38.6	49.8	11.6	50.0

Table - 9

NNNB - Percent Distribution of Households According to different levels of Protein-Calories

State	Protein-calories (percent)						Mean
	< 6	6 - 8	8 - 10	10 - 12	12 - 14	> 14	
Kerala	0.7	5.3	53.0	33.1	7.2	0.7	9.6
Tamil Nadu	0.4	-	56.6	25.3	16.1	1.6	10.1
Karnataka	0.3	0.9	52.9	18.1	24.8	3.0	10.2
Andhra Pradesh	-	0.3	70.3	19.9	8.9	0.6	9.5
Maharashtra	-	-	17.9	40.3	39.9	1.9	11.5
Gujarat	-	-	14.6	52.2	30.3	2.9	11.4
Madhya Pradesh	-	2.0	29.9	22.7	28.6	16.8	11.5
West Bengal	-	0.6	59.8	31.0	8.7	0.9	9.8
Uttar Pradesh	-	-	5.6	14.3	47.8	32.3	13.2

Table - 10

NNNB - Percent Distribution of Households According to different levels of Carbohydrate-Calories

State	Carbohydrate-calories (Percent)								Mean
	< 55	55-60	60-65	65-70	70-75	75-80	80-85	> 85	
Kerala	1.3	0.7	2.7	5.3	24.5	41.2	19.0	5.3	76.5
Tamil Nadu	0.8	5.1	3.9	8.9	12.2	18.8	27.6	22.7	77.8
Karnataka	0.3	0.9	0.6	5.8	9.5	27.5	32.2	23.2	80.2
Andhra Pradesh	-	-	2.3	5.8	8.6	19.9	36.3	27.1	80.8
Maharashtra	0.8	3.4	5.7	11.0	13.3	27.0	33.1	5.7	76.2
Gujarat	2.9	9.6	21.8	23.0	21.8	12.0	7.0	1.9	68.7
Madhya Pradesh	2.0	-	0.7	2.6	16.8	23.4	18.1	36.4	80.7
West Bengal	-	-	-	1.0	2.6	8.9	36.7	50.8	84.6
Uttar Pradesh	-	0.4	1.9	3.8	12.4	34.2	40.5	6.8	78.9

