

7.1 NUTRITION SURVEYS IN INDIA

Surveys to assess dietary intake and nutritional status of the population are essential to monitor ongoing nutrition transition and initiate appropriate interventions. In India, routine reporting of nutritional status by the health and social welfare functionaries is suboptimal. India has therefore invested heavily in periodic surveys to obtain data on nutrition transition. Given its size and variation it is important that at least state level data are available. In view of the known interdistrict variations in the same state and the current emphasis on decentralised district based planning, implementation and monitoring of intervention programmes, efforts are currently under way to collect and report district specific data where ever possible. A brief summary of agencies collecting and reporting data on dietary intake and nutritional status in India is given in the following pages.

National Nutrition Monitoring Bureau (NNMB)

Recognizing the need for good quality data for monitoring nutritional status, ICMR in 1972 established the National Nutrition Monitoring Bureau (NNMB) in the National Institute of Nutrition (NIN), Hyderabad. Since 1973, surveys carried out by the NNMB have been a major source of data on diet and nutritional status of the Indian population.

The objectives of NNMB are:

- To collect data on dietary intake and nutritional status of the population in the states of India on a continuous basis
- To monitor the ongoing national nutrition programmes and to recommend mid course corrections to improve their effectiveness

Initially, NNMB units were established in nine States- Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Gujarat, West Bengal, Maharashtra, Uttar Pradesh and Madhya Pradesh. In 1976, another unit was established in Orissa. In each state there is a unit with a medical officer, nutritionist and supporting staff. The Central Reference Laboratory located at National Institute of Nutrition is responsible for preparation of the survey protocol, sampling, and training of the field staff, quality control, data analysis and report writing.

From 1974 to 1981 annual surveys were carried out in each of the 10 states on a probability sample of a total of about 500 households each year (rural and urban). The households were selected from four representative districts. Villages were selected in proportion to the population; households were selected to represent different socio economic categories in each village. In 1983, NNMB linked its sampling frame to that of the National Sample Survey Organization (NSSO) because the NSSO sampling frame was more representative. In subsequent years a sample of about 750 households in rural areas and 250 households in the urban areas of each of the ten states have been surveyed. Data on dietary intake are collected on 80% of the rural sample of households

State	No. of villages surveyed			Households *			Nutrition assessment
	75-79	88-90	96-97	75-79	88-90	96-90	96-97
Kerala	106	91	119	979	835	1180	8,864
Tamilnadu	110	96	54	978	865	530	5,813
Karnataka	167	126	112	999	783	1020	12,606
AP	136	119	115	1071	908	1142	9,545
Maharashtra	126	128	85	615	837	824	6,883
Gujarat	120	116	83	697	711	791	4,866
MP	55	50	36	234	255	-	-
Orissa	98	156	109	524	824	1064	12,024
Pooled	918	882	713	6497	6018	6,551	60,601

* Covered for diet survey
Source: Reference 7.1.7

using one-day weighment method on the day of survey. In the remaining 20% of households individual dietary intakes are assessed using a single 24-hour recall for estimating intra-familial distribution of food. NNMB had carried out surveys in 1975-79, 1980-85, 1988-90, 1996-97, 2000-01 and 2004-05 in rural areas and in 1975-79 and 1993-94 in urban areas.

In order to get time trends in dietary intake and nutritional status in rural population, the NNMB carried out two repeat surveys in 1988-90 and in 1996-97, of the rural areas surveyed in 1975-79. Over 100 villages in each state were covered in all the three surveys with sixty villages being common between repeat surveys. Table 7.1.1 gives the coverage under the two rural repeat surveys carried out by NNMB. In 2000, using data from the above surveys, NNMB produced separate reports on dietary intake and nutritional status of adolescents (10 to 17 years of age) and elderly (60+ years).

India has a large tribal population and hence a special tribal survey has been carried out by NNMB during the years 1985-87 and the first repeat survey of this sample was done in 1998-99. In India, droughts continue to be a problem in several drought prone districts. NNMB has carried out surveys in drought-affected areas over years. The most recent one was a survey in nine states affected by drought in the current decade. The drought surveys provide information on impact of drought and the relief operation on nutritional status of the population.

India Nutrition Profile (INP) Survey

Food & Nutrition Bureau in the Department of Women & Child Development of

Region	States / UTs
Northern	Haryana*, Himachal Pradesh*, Punjab*, Rajasthan, Chandigarh, Delhi
Eastern	Bihar, Sikkim.
North Eastern	Arunachal*, Assam*, Manipur, Meghalaya, Mizoram, Nagaland*, Tripura
Western	Dadra & Nagar Haveli*, Daman & Diu*, Goa,

* In these States/UTs only rural areas were covered

the Ministry of Human Resource Development of the Government of India organized a survey in 1995-96 to obtain a reliable nutrition profile of all districts (India nutrition profile INP) in 18 States and Union Territories in which NNMB was not conducting nutrition surveys (Table 7.1.2). The INP survey used sampling design and survey methodologies similar to NNMB. Overall 187 districts were covered in 18 states and UTs. INP provides data on dietary intake and nutritional status of all age groups, in all states of the country, in urban and rural areas in mid nineties.

Both NNMB and INP surveys have used 24-hour dietary recall for assessment of dietary intake. The amounts consumed were compared with the Recommended Dietary Allowance (RDA) for Indians drawn up by the Indian Council of Medical Research (ICMR) published in 1989 (ICMR 1989). Household food intake obtained by 24-hour dietary recall is used to compute the average intake of the household members expressed per consumption unit (CU) per day (NNMB 1981). The Consumption Unit for different age and sex groups were worked out on the basis of the energy requirements by taking the energy consumption of an average adult male doing sedentary work as one consumption unit (Text Box 7.1.1).

Computation of nutrient intake

Nutrient intake is computed using Nutritive Value of Indian Foods (NIN, 2004), which was first, published in 1971. Since then it has undergone many reprints. Analysis of iron content of Indian food stuffs by newer techniques have shown that the available iron is only about 50 percent of the earlier values reported and hence in the latest edition values for iron content have been revised.

Assessment of nutritional status

Both these surveys report data on prevalence of chronic energy deficiency in all age groups. For children, the data is reported using the following three classifications:

Text Box 7.1.1: Consumption Unit	
Adult male (Sedentary worker)	1.0
Adult male (Moderate worker)	1.2
Adult male (Heavy worker)	1.6
Adult female (Sedentary)	0.8
Adult female (Moderate)	0.9
Adult female (Heavy)	1.2
Adolescent – 12 to 21 years	1.0
Children – 9 to 12 years	0.8
Children – 7 to 9 years	0.7
Children – 5 to 7 years	0.6
Children – 3 to 5 years	0.5
Children – 1 to 3 years	0.4

Source: Reference 7.1.7

Table 7.1.3: z score and percentile classification system		
Nutritional status	z-scores	Percentiles
Normal	-1 and +1 SD Median	15 th to 85 th percentile 50 th percentile
Mild	≥ -2 and < -1 SD; or > +1 and +2 SD -1 SD and +1 SD	3 rd to 15 th or 85 th to 97 th percentile 3 rd and 85 th percentiles
Moderate	≥ -3 and < -2 SD; or > +2 and +3 SD -2 SD and +2 SD	< 3 rd or > 97 th percentiles 3 rd and 97 th percentiles
Severe	< -3 or > +3 SD -3 SD and +3 SD	

Source: Reference 7.1.10

Grades of undernutrition	Value
Normal	≥ 80 % median
Mild UN (Gr I)	Between 80 % & 70 % of med.
Moderate UN (Gr II)	Between 70 % & 60 % of med.
Severe UN (Gr III)	Between 60 % & 50 % of med.
Very severe UN (Gr IV)	Less than 50 % of med.

Source: Reference 7.1.7

Weight for age (% of NCHS standard)	Nutritional Grade
≥ 90	Normal
75-89.9	Grade I (mild UN)
60-74.9	Grade II (moderate UN)
< 60	Grade III (severe UN)

- Standard Deviation (SD) Classification (to enable international comparison) (Table 7.1.3)
- Indian Academy of Paediatrics (IAP) Classification (to compare the data with the Integrated Child Development Scheme – (ICDS), reported data on under nutrition) (Table 7.1.4)
- Gomez Classification (to enable comparison with data pertaining to seventies and early eighties) (Table 7.1.5)

In April 2006, WHO came up with the growth norms for preschool children based on multicentre global data from breastfed infants and recommended that assessment of nutritional status of the preschool children. The WHO standards give BMI-for-age, which is useful for detecting both undernutrition and obesity, thus addressing the double burden of malnutrition.

National Family Health Survey (NFHS)

Three National Family Health Surveys NFHS-1 conducted in 1992–93, NFHS-2 conducted in 1998–99 and NFHS-3 conducted in 2004-05 provide national and state-level information on fertility, family planning, infant and child mortality, reproductive health, child health, nutrition of women and children, and the quality of health and family welfare services. These surveys also provides estimates at the regional level for four states (Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh) and estimates for three metro cities (Calcutta, Chennai, and Mumbai), as well as slum areas in Mumbai. The NFHS-2 sample covers more than 99 percent of India’s population living in all 26 states. It does not cover the union territories. NFHS-2 is a household survey with an overall target sample size of approximately 90,000 ever-married women in the age group 15–49. Data on nutritional status of women and children from NHFS 1, 2 and 3 provide information on time trends in prevalence of undernutrition in the last 15 years. In addition, NFHS -2 provides information on dietary diversity among the women surveyed.

District Level Household Survey

This survey is conducted by the Department of Family Welfare to assess performance under the Reproductive and Child Health programme. The first round was conducted in 1998-99 and the second round of the survey was conducted between 2002 and 2004. The survey used a systematic multi-stage stratified sampling; stages of selection are districts, primary sampling units (PSUs) and households; 1000 representative households were identified for the survey using appropriate sampling procedure from each district. Thirty percent of the sample was from urban areas and were based on NSSO urban sampling frame. The survey provides district level information on prevalence of undernutrition (weight for age using the SD classification) in children in the age group 0-72 months, prevalence of anaemia (Hb estimation by cyanmethaemoglobin method) in children (0-72 months), adolescent girls (10-19yrs) and pregnant women, household availability of iodised salt and coverage under the massive dose vitamin A programme.

Micronutrients Surveys

NNMB and ICMR have conducted micronutrient surveys at subnational level during the last few years. In addition, NFHS and DLHS provide information on the household availability of iodised salt and coverage under massive dose vitamin A programme. NHFS-2 and 3 undertook haemoglobin estimation in women and children but the method used (haemocue) has been shown to overestimate haemoglobin and consequently underestimate the prevalence of anaemia.

References

- 7.1.1 District Level Household Survey http://www.rchindia.org/dlhs_india.htm; last accessed on 24/09/07
- 7.1.2 Department of Women and Child Development. 1995-96. *Indian Nutrition Profile*. Government of India, New Delhi
- 7.1.3 Indian Council of Medical Research. 1989. *Nutrient Requirements and Recommended Dietary allowances for Indians*. New Delhi
- 7.1.4 National Family Health Survey (NFHS-1): <http://www.nfhsindia.org/india1.html>; last accessed on 24/09/07
- 7.1.5 National Family Health Survey (NFHS-2): <http://www.nfhsindia.org/india2.html>; last accessed on 24/09/07
- 7.1.6 National Family Health Survey (NFHS-3): <http://mohfw.nic.in/nfhfactsheet.htm>; last accessed on 24/09/07
- 7.1.7 NNMB National Nutrition Monitoring Bureau. 1979-2002. *NNMB Reports*: National Institute Of Nutrition, Hyderabad
- 7.1.8 National Institute of Nutrition. 2004. *Nutritive Value of Indian Foods*. Hyderabad.
- 7.1.9 National Sample Survey Organization NSSO. 1975-2000.; http://mospi.nic.in/mospi_nssso_rept_pubn.htm; last accessed on 24/09/07
- 7.1.10 WHO child growth standards, 2006: <http://www.who.int/childgrowth/en/>; last accessed on 24/09/07