

Chapter 9

The Food and Nutrition Status in India: A Systematic Review



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Abstract With undernutrition, overnutrition, and micronutrient deficiencies afflicting the country, India experiences a triple burden of malnutrition. Recent decades have seen modest progress when it comes to health in India, but progress has been uneven and inequitable. This study reviews food and nutrition status in India. The diversity in food is enabled by variety in nutrition, which is only possible with serious crop diversification. The nutrient uptake is majorly cereal-centric as food production, availability, and access are impacted by the agricultural policy that has placed a significant thrust on food grain production spurred by the green revolution and supported by the institutions. India is not only affected by malnutrition amongst the poor but also amongst all socio-economic groups. India ranks 101 out of 116 countries based on the Global Hunger Index 2020. The Global Nutrition Report 2018 clearly mentions that India is home to 46.6 million stunted children and 25.5 million wasted children. India ranks 103 out of 119 qualifying countries per the Global Hunger Index 2018. Malnutrition was the predominant risk factor for death in children younger than five years of age in every state of India in 2017 (GBD), accounting for 68.2% (95% UI 65.8–70.7) of the total under-5 deaths and the leading risk factor for health loss for all ages, responsible for 17.3% (16.3–18.2) of the entire disability-adjusted life years (DALYs). In India, nutrition status has deteriorated over decades because of ineffective policy interventions and inadequate food systems, which are neither affordable nor sustainable. There are severe gaps in India's nutrition statistics, and even the most important nutrition trends are far from explicit; practical action in this field requires regular and reliable large-scale surveys that would make it possible to monitor the nutrition situation at the district levels at intervals.

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9.1 Introduction

India had a population of 1.21 billion in 2011 (Census of India 2011), which increased to 1.39 billion in a decade (2021) (World population prospects 2019). In order to meet its food and development needs, India's population places immense pressure on its land and natural resources. Food production and the socio-economic status of rural people determine the growth of agriculture and rural prosperity (Kumar 2017). By measuring the health of its citizens, a nation evaluates its health quality; people, regardless of their income level, face various health problems due to underdeveloped economies (Dambal 2017). Malnutrition is a dual issue in the country, both overweight and underweight. In India, malnutrition affects people from all socio-economic backgrounds, not just those below the poverty line. However, India is home to nearly one-quarter of the world's poor and undernourished population (Kumar 2017).

Amongst the critical drivers of urban malnutrition, urbanization is responsible for profound shifts in urban food systems (namely, the prevalence of cheap ultra-processed food and beverages), urban diets (convenient and processed food), and urban lifestyles (Nguyen et al. 2021; Popkin et al. 2020). Globally, approximately 55% of the population lives in cities; by 2030, that number is expected to rise to 60%, and by 2050, it is expected to reach 68% (Revision of World Urbanization Prospects 2018). The triple burden of malnutrition is just one of the many challenges facing urban dwellers regarding health and nutrition., i.e. the coexistence of undernutrition and micronutrient deficiencies and overweight/obesity is increasingly affecting public health in urban areas and worldwide (Ruel et al. 2017).

Over the past few decades, India's health has improved, although uneven and inequitable progress has been made (Nguyen et al. 2021). Poverty disproportionately affects the prevalence of maternal and child undernutrition (Young et al. 2020). It is especially striking to see how poor urban dwellers fare when it comes to undernutrition and other health conditions (Goli et al. 2013), and sometimes even worse than in rural areas (Usmani and Ahmad 2018). On many healthcare outcomes, India has witnessed positive strides, but the state of nutrition and health security needs improvement. While India made significant progress toward meeting the Millennium Development Goals (MDGs) during the MDG era, there is still a need for more sustained efforts to achieve progress, particularly in food security (Food and Nutrition Security Analysis, India 2019). Between 1993–1994 and 2011–2012, the average daily per capita consumption of both energy and protein decreased in rural India, while in urban areas, there was no consistent trend, and the decline has happened despite the increase in household income (Food and Nutrition Security Analysis, India 2019). India will not meet many of its MDG targets. The problems of low birth weight and maternal anaemia are still worryingly significant. The undernutrition

leading to poor growth and stunting continues to take its toll on succeeding generations of children (Gopalan 2013). The study attempted to gain an understanding of the food and nutrition situation in India.

9.2 Food and Nutrition

The multifaceted food systems are dependent on agriculture, food, eating, and health and well-being. As consumers, people are the central focus of a resilient food system. As a result of this system, environmental integrity, economic independence, and social well-being are maintained and reinforced. Sobal et al. (1998) take a holistic perspective on the food and nutrition system; it can help design more comprehensive policies and programmes that include elements from the food chain, cycle, and web models. It is essential to recognize that the food and nutrition system works in a context that is further subdivided into biophysical and social environments. A healthy lifestyle requires energy, protein, and nutrient requirements that are fulfilled by food security, which results in access to adequate, secure, and nutritious food for everyone, regardless of their socioeconomic status.

Overall progress notwithstanding, hunger remains an everyday challenge for almost 795 million people worldwide, including 780 million in the developing regions (McGuire, FAO, IFAD and WFP 2015). More than a hundred million people are afflicted by diseases triggered (Food Aid for Health and Development, WFP and WHO 1997) or exacerbated by insufficient and unbalanced nutrient intakes and aggravated by unsafe food and drinking water. People everywhere have the opportunity, throughout their lives, to achieve and maintain their highest attainable level of health, according to the WHO's universal health goal of health for all (Nutrition for Health and Development, WHO 2000), and this is impossible in the presence of hunger, starvation, and malnutrition.

According to Capone et al. (2014) by 2050, in order to meet the world's food needs, the world agricultural system could provide food for a rapidly growing population while also offering economic opportunities for the rural poor population whose livelihoods rely on agriculture, and reducing carbon emissions. Overpopulation and food consumption are the two major causes of the increase in food demand. However, malnutrition (undernutrition, overnutrition, and malnutrition of micronutrients) and insecurity of food are the most significant global crises. In addition to these, the globally inflexible food system can be attributed to its damaging social, economic, and environmental effects (Capone et al. 2014). A significant determinant of nutritional status is consuming high-quality and nutritious foods in sufficient quantities (Battersby 2019).

A person's health is not only dependent upon physical well-being but also on personal and psychological well-being and good nutrition (Upadhyay and Tripathi 2017). Nutrition is defined as the food at work in the body; nutrition involves all that happens to food from the moment it is ingested until it is being used in the body for different functions (Srilakshmi 2006). In nutrition, an individual's physiological state

is based on what occurs when nutrients intake matches nutritional needs, as well as the capacity of the body to digest and absorb nutrients (Zulkarnaen 2019). The state of dietary disparity is referred to as malnutrition, and the two causes that cause malnutrition could be overnutrition and undernutrition (Huysentruyt et al. 2021). Thus, malnutrition and its adverse consequences depend upon altered intake, functional changes, and finally, anthropometric effects (Jeejeebhoy et al. 1990; Christensson et al. 2002).

Both “malnutrition” and “under-nutrition” frequently refer to nutritional circumstances indicative of people belonging to developing countries’ low-income and poor socio-economic groups, but under- and overnutrition occur concurrently within different population groups in many developing countries (Söderström et al. 2014). India seems to have the questionable characteristic that low-birth-weight incidence is growing (LBW). The primary underlying type of undernutrition is micro-nutrient malnutrition. It is also referred to differently because it can therefore co-exist with inadequate macronutrient intake (i.e. overweight and obesity, more below) and has health effects different from those correlated with stunting (Gómez et al. 2013).

There are numerous factors determining the nutritional status of a person, and it varies; knowing all the factors distressing nutritional status, such as evaluating malnutrition and managing and assisting solutions for the nutritional issues (Fogel 2004). Factors influencing the nutritional status, which are the affordability of food and its delivery system, food intake, source of consumption expenditure, family size, illiteracy, socio-cultural and religious values, sanitation facilities, and health services (Somalia et al. 2017).

9.3 Nutritional Profile of India

Over the last two decades, India’s population has grown tremendously, surpassing 1.3 billion people. Despite India’s phenomenal industrial and economic growth and despite being able to produce sufficient food to feed its population, a large number of people, particularly women and children, lack access to food. The Indian States are practically equal to small countries, each with its socio-economic level, ethnic groups, eating habits, health infrastructure, and communication systems. Consequently, the population’s nutritional status varies considerably between states due to a variety of factors.

According to its annual report, the FAO estimates there are 189.2 million undernourished people in India (The State of Food Security and Nutrition in the World 2020). Approximately 14% of India’s population (189.2 million) is undernourished, and Between 15 and 49 years old, 51.4% of women are anemic. The report finds that 34.7% of children under five are stunted, and around 20% have wasted. India ranks 101 out of 116 countries based on the Global Hunger Index 2020, which measures three major indicators such as wasting and stunting among children under 5 years, undercarriage mortality rate, and prevalence of undernutrition. The prevalence of underweight amongst children aged 1–5 years in states ranging from Meghalaya to

Gujarat is 13 to 77%; in Goa, 20% of children are stunted, while 83% in Gujarat. Almost the same states in the country have the highest prevalence of stunting and underweight, i.e., the States with the highest prevalence of underweight also have the highest prevalence of stunting. Across India, stunting and being underweight does not usually coincide with wasting, other than in Madhya Pradesh and Arunachal Pradesh, which have the worst nutritional situation nationwide. Nutritional status is markedly improved in children under five years of age by reducing the prevalence of underweight. With more than half of the adults in Karnataka, Gujarat, Madhya Pradesh, and Orissa having a BMI under 18.5 kg/m², these states have the highest rates of adult malnutrition. Child and adult malnutrition patterns are similar, with extremely poor nutritional status occurring in Gujarat, Orissa, Arunachal Pradesh, Karnataka, Maharashtra, Madhya Pradesh, and Andhra Pradesh. In most states, being underweight, stunting, and wasting are considered severe public health problems.

In the context of nutrition, India has some of the worst anthropometric indicators in the world, both for adults and children, and even though most sub-Saharan African countries are currently poorer, the growth is slower, and infant and child mortality rates are higher than in India, India's undernutrition levels remain higher than those of most of these countries (Deaton et al. 2008). Recent decades have seen health improvements in India, but progress has been uneven and inequitable (Nguyen et al. 2021). The poor bear a disproportionate burden of maternal and child malnutrition (Nguyen et al. 2021; Young et al. 2020). There has been an increase in undernutrition and other health conditions among the urban poor, especially those living in poverty (Goli et al. 2013; Nguyen et al. 2021), and sometimes even worse than in rural areas (Usmani and Ahmad 2018). On many healthcare outcomes, India has witnessed positive strides, but the state of nutrition and health security in the country really needs improvement. Despite India's extensive progress toward the Millennium Development Goals (MDGs) during the MDG era, it was noted in the 2016 India MDG Country Report that more sustained efforts are required to accelerate progress, particularly regarding food and nutrition (Food and Nutrition Security Analysis, India 2019). Between 1993–1994 and 2011–2012, the average daily per capita consumption of both energy and protein decreased in rural India, while in urban areas, there was no consistent trend and the decline has happened despite the increase in household income (Food and Nutrition Security Analysis, India 2019).

The Global Burden of Diseases assesses the incidence, prevalence, mortality, years of life lost (YLLs), years lived with disability (YLDs), and disability-adjusted life-years (DALYs) due to 369 diseases and injuries, for both sexes, for 204 countries and territories. According to GBD, the malnutrition was the leading cause of death in children younger than five years old in every state of India in 2017, accounting for 68.2% (<https://gdc.unicef.org/resource/burden-child-and-maternal-malnutrition-and-trends-its-indicators-states-india-global>) of all deaths and it is the leading risk factor for health loss in most age groups, causing 17.3% of total disability-adjusted life years (DALYs). India recorded a 21.7% prevalence of low birth weight in 2017, a 39.3% prevalence of stunting, a 15.7% prevalence of child wasting, a 32.7% prevalence of child underweight, 59.7% of children having anaemia, 54.4% of women 15–49 years of age having anaemia, and 11.5% of children having overweight. If

in India, if the projections up to 2017 continue for each indicator in the National Nutrition Mission (NNM) 2022, there would be an excess prevalence of low birth weight, stunting, underweight, 11.7% of anaemia in youth, and 13.8% of anaemia in women compared to the 2022 target. The trends up until 2017 would result in an excess prevalence of wasting of 10.4%, overweight of 14.5%, and exclusive breastfeeding of 10.7% for the additional indicators in the WHO/UNICEF 2030 targets (India State-Level Disease Burden Initiative Malnutrition Collaborators 2019).

In addition to other challenges urban dwellers face regarding health and nutrition, malnutrition carries a double burden, i.e., the coexistence of undernutrition (Caroline et al. 2019) and micronutrient deficiencies and overweight/obesity is globally, and especially in urban areas, public health has become a significant issue (Ruel et al. 2017). Urbanization is a strong driver of the double burden of malnutrition because it causes remarkable shifts in urban food systems (particularly the availability of cheap ultra-processed food and beverages), in urban diets (convenient and processed foods), and lifestyles (lower levels of physical activity related to the labour-saving technologies, more sedentary work, more leisure, and motorized transportation) (Popkin et al. 2020; Nguyen et al. 2021).

There are serious gaps in India's nutrition statistics and even the most basic nutrition trends are far from clear; effective action in this field requires regular and reliable large-scale surveys that would make it possible to monitor the nutrition situation at the district levels at intervals (Deaton et al. 2009). When individuals seek nutrition or health care, India's health system must reorient and retool itself to ensure prevention, early detection, and effective management of dual nutrition and disease burdens (Ramachandran and Kalaivani 2018).

9.4 An Overview of the Factors Maintaining Malnutrition in India

Amongst young children, malnutrition is regarded as the most significant risk factor for illness and death and is associated with 52.5% of all deaths (Muller and Krawinkel 2005; Black et al. 2003, 2008; Caulfield et al. 2004). The following factors increase the risk of malnutrition in children: low birth weight, feeding problems, diarrhoea, recurrent illness, measles, pertussis, and chronic disease (Rikimaru et al. 1998; Ighoboja 1992; Tomkins and Watson 1989). Children under five years of age are most at risk, and social factors also play a role in malnutrition. Other causes of malnutrition include inadequate antenatal care, not deworming children regularly, low birth weight, diarrhoea episodes, and delayed development. Despite the fact that the latter three conditions can be a consequence of malnutrition, a lack of health services can exacerbate malnutrition (Tette et al. 2015).

There is a number of factors that influence a child's nutrition level. For example, socio-economic factors such as income, ethnicity, geographic location, sanitation, hygiene, and parental and child-level factors play an important role in nutrition

levels. In general, parents, particularly mothers, strive to provide their children with every means of getting proper health care and to ensure their health status is appropriate for their potential (Ettinger 2004). It is becoming increasingly evident that a mother's education can provide better access to knowledge about proper feeding practises and better hygiene (Moestue et al. 2007; Webb and Block 2004). According to some studies, mother's employment is beneficial as it provides them with a sense of empowerment, while others claim it is detrimental as it limits the time they have to spend with their children. Mother's health awareness and education are powerful factors for improving their children's nutrition. It has been shown that domestic violence has harmful effects on physical and psychological health, but there is little information regarding domestic violence and malnutrition (Ghosh 2020).

9.5 Nutrition Programmes and Policies in India

The majority of the programmes and policies are aimed at providing additional nutrients to target groups to fulfil the gap between food intake and requirements. In the "National Policies and Strategies" category, work is being done to accelerate progress toward the World Food Summit of 1996.

According to the Director-General's Foreword in The State of Food Insecurity in the World 2001, where this challenge is currently at:

In the poorest countries, most people are affected by hunger, greatly magnifying the dimensions of other correctable defects in efforts to meet basic human needs. Once problems are understood at the community level, resources can be focused first on the direct relief and essential service interventions that ensure people have the health and energy to participate in their development (National Policies and strategies, FAO 2001).

It is critical to address nutrition at multiple levels, as it is a multisectoral issue, and it is important to address the problem of nutrition both directly by addressing particularly vulnerable groups and indirectly by using various development policy tools that will create conditions for better nutrition. Nutrition activities in India were aimed at increasing food production during the First and Second Five-Year Plans, initiating nutritional surveys of complementary feeding, and preventing food adulteration (Kapil et al. 1992). India has a number of nutrition supplementation programs Fig. 9.1 shows the timeline of India's nutrition supplementation programs. In these programmes, the Mid-day Meal Programme (1961) was revised in the year 2014 and the National Goitre Control Programme (NGCP) (1962) in 1992 the programme was renamed as National Iodine Deficiency Disorder Control Programme. The governments in various states are implementing numerous other supplementary programmes also.

A National Prophylaxis Programme against Nutritional Blindness due to Vitamin A Deficiency (NPPNB due to VAD) was launched in 1970 specifically to address nutritional blindness due to keratomalacia (WHO 2005). In the 1950s and 1960s, there was an unacceptable level of xerophthalmic blindness in the country. So, it

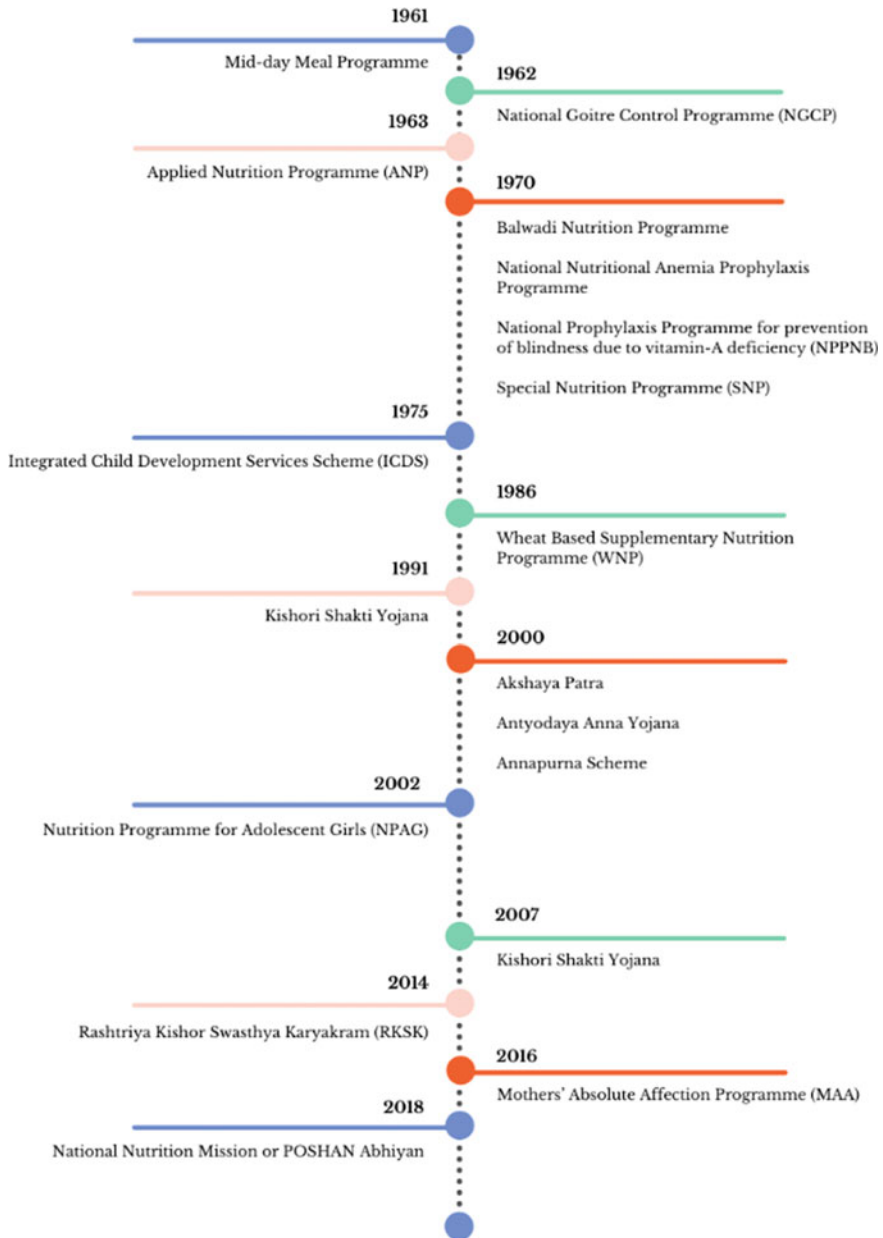


Fig. 9.1 National nutritional programmes

was necessary to implement this urgent remedy. At first, the program was launched in 11 states only, and later it was extended to all the states of the country. In 1976, the National Institute of Nutrition (NIN), Hyderabad conducted evaluation studies in two states and found the programme to be effective (Kapil et al. 1992). The country is at a point in which universal vitamin A supplementation must be converted into a targeted program very soon (Kapil and Sachdev 2013).

In 1993, the Government of India adopted the National Nutrition Policy (NNP) under the auspices of the Department of Women and Child Development. The NNP aimed to eradicate malnutrition by achieving optimum nutrition for everyone with a multi-sectoral approach. According to the revised NNP (1993), the Direct and Indirect interventions for the nutrition policy instruments were Direct Intervention (Short Term) such as nutrition intervention for especially vulnerable groups, fortification of essential foods, popularisation of low-cost nutritious food, control of micronutrient deficiencies amongst vulnerable groups and the indirect Policy Instruments are Long Term Institutional and Structural Changes which includes Food Security, Improvement of Dietary pattern through Production and Demonstration, Policies for Effecting Income Transfers to improve the entitlement package of the rural and urban poor, Land Reforms, Health and Family Welfare, Bask Health and Nutrition Knowledge, Prevention of Food Alteration, Nutrition surveillance, Monitoring of Nutrition Programmes, Research, Equal Remuneration, Communication, Minimum Wage Administration, Community Participation, Education lit Literacy, Improvement of the Status of Women.

The National Food Security Act (NFSA)-2013 indicates food and nutritional security for people through a life cycle approach to agriculture by providing access to affordable, quality food at reasonable prices so they can live a dignified life, and other related matters thereto. On an all-India basis, NFSA has been implemented in all states/UTs, and an estimated 80 crore people have covered under it for highly subsidized food grains out of 81.34 crore people (<https://nfsa.gov.in/portal/nfsa-act>).

The POSHAN Abhiyaan or National Nutrition Mission-2018 is the Government of India's nutritional programme to improve nutrition outcomes for children, pregnant women, and breastfeeding mothers, and it aims to ensure a malnutrition-free India. The broad themes of the programme were: antenatal care, optimal breastfeeding (early and exclusive), complementary feeding, anaemia, growth monitoring, girls'—education, diet, right age of marriage, hygiene and sanitation, eating healthy—food fortification (<https://www.niti.gov.in/poshan-abhiyaan>).

Agricultural efforts should be geared towards a crop-neutral focus; greater diversification of production will help alleviate poverty and improve diet diversity. For policies and programmes to be implemented adequately, the government should allocate appropriate resources. To ensure that nutrition reaches all, must be a joint effort between state governments and the Centre. Nutritional disparities within the domestic sphere must be mapped.

9.5.1 National Family Health Surveys in India

A health information system is an essential component of any health system but is weak in low-income countries like India because of poor data quality, which can make it difficult to inform health policy (WHO 2007; AbouZahr and Boerma 2005; Boerma and Stansfield 2007; Stansfield et al. 2006). The National Family Health Survey (NFHS) is a multi-round, large-scale survey conducted on representative samples of Indian households nationwide. NFHS was first launched by the Ministry of Health and Family Welfare (MoHFW), Government of India, in 1991, in New Delhi. As the nodal agency for survey coordination and technical guidance, the MoHFW has designated the International Institute for Population Sciences (IIPS) Mumbai. The survey and the sample size of NFHS are summarized in Table 9.1. The NFHS has been designed to achieve two specific goals, such as providing the Ministry of Health and Family Welfare and other agencies with essential health and family welfare data and providing information about important emerging health and family welfare issues. The first survey of NFHS was conducted in 1992–93; the following rounds were conducted in 6–9-year intervals. Women were surveyed in all rounds of surveys, NFHS-3,4, and 5 also included never-married women. The ever and/or currently married women interviewed in all rounds of surveys were of reproductive age; women up to 49 years of age were selected as respondents in all rounds of NFHS. The lower age limit for NFHS-1 was 13 years, which was raised to 15 years during subsequent rounds. Male representation across surveys has been inconsistent. Only in four rounds have men represented, and men aged 15–54 years were interviewed in NFHS-3 and 4.

In all rounds of NFHS, questions about women's employment status and fertility preferences were asked. In rounds 2,3,4 and 5 of the NFHS, questions were asked regarding health services quality, sexually transmitted infections (STI), HIV/AIDS, and women's autonomy. In NFHS-2,3,4,5 height and weight measurements for women and men were taken. In later rounds of the surveys, different biomarkers were evaluated. As part of NFHS-2, anaemia was assessed among children 6–35 months of age and ever-married women 15–49 years old. Also, an anaemia test was done for men in NFHS-3,4, and 5.

NFHS-1 collected a piece of detailed information on infant and child nutrition in India, where chronic undernutrition and acute malnutrition are high. Nearly half of children under the age of four are underweight and stunted. The wasting amongst children is also quite prevalent and, it affects more than one out of six children. As a child's age varies significantly, undernutrition is lowest during the first six months of life when most are breastfed. There are relatively low levels of undernutrition amongst young children in Kerala, even though more than a quarter are underweight and stunted. As with infant mortality, wasting is most evident in Bihar and Orissa, which also have amongst the lowest levels of undernutrition in the country (IIPS 1995).

The second round of NFHS provides the important aspects of nutrition, health, and healthcare. In India, 47% of children under the age of three are underweight. There

Table 9.1 Survey and sample size for National family health surveys in India, 1992–2020

Survey	Years	States covered	Reports	No. of households in the sample	Information
NFHS-1	1992–93	24 + NCT Delhi	National & State Level	88,562	Population, health, and nutrition, with an emphasis on women and young children
NFHS-2	1998–99	26 + NCT Delhi	National & State Level	91,196	The quality of health and family planning services, domestic violence, reproductive health, anaemia, the nutrition of women, and the status of women
NFHS-3	2005–06	29 + NCT Delhi	National & State Level	109,041	Population, health, and nutrition, slum, and non-slum areas, household indicators, women and men
NFHS-4	2015–16	All states + NCT Delhi	National, State & District Level	568,200	Population, health, and nutrition, malnutrition, anaemia hypertension, HIV, high blood glucose levels, household indicators, women and men, biomarkers
NFHS-5	2019–20	All states + NCT Delhi	National, State & District Level	610,000	Population, health and family welfare, nutrition, and others

Source IIPS (1995), IIPS and ORC Macro (2000), Arnold et al. (2009), IIPS and ICF (2017, 2020)

is 46% of children were stunted and 16% were wasted. Compared to urban areas, undernutrition is more prevalent in rural areas and is particularly prevalent amongst children from disadvantaged socio-economic backgrounds. The majority of children aged 6–35 are anaemic. Children whose mothers are not anaemic have anaemia at different levels in different parts of India. In Kerala and Nagaland, 44% have anaemia, whereas 80–84% have it in Haryana, Rajasthan, Bihar, and Punjab. Nearly two-thirds (35%) of women are undernourished. Nutritional deficiencies are more prevalent among women in rural areas, young women, and women in economically disadvantaged groups. In Orissa and West Bengal, the percentage of undernourished women is highest, while it is lowest in Arunachal Pradesh, Sikkim, and Delhi. Obesity is a considerable problem among several groups of women in India. Women with anaemia are least likely in Kerala, Manipur, Goa, and Nagaland, where 23–28% are anaemic and the highest anaemia prevalence in Assam, Bihar, Meghalaya, Orissa, West Bengal, Arunachal Pradesh, and Sikkim, where 61–70% are anaemic. There is a potential threat of iodine deficiency disorders in India (IIPS and ORC Macro 2000).

The NFHS-3 shows in every state of India, the nutritional problems are severe. The children under the age of five years who are underweight range from 20% in Sikkim and Mizoram to 60% in Madhya Pradesh. Furthermore, more than half of young children in Jharkhand and Bihar are underweight. The states with the highest percentages of underweight (40%) children are Meghalaya, Chhattisgarh, Gujarat, Uttar Pradesh, and Orissa. Despite the relatively low prevalence of underweight in Mizoram, Sikkim, and Manipur, more than one-third of children are stunted. Madhya Pradesh is the most prevalent state of wasting (35%), followed by Jharkhand (32%), and Meghalaya (31%). Seven in ten children in India aged 6–59 months are anaemic. The prevalence of nutritional deficiency is high amongst women (36%) and men (34%). Generally, the geographic distribution of anaemia among men and women is similar (Arnold et al. 2009).

According to the fourth round of NFHS, 38.4% of children under five years are stunted, 21% are wasted, and 35.8% are underweight. Twenty-six per cent of women and 18% of men were overweight or obese. There is 58.6% of children aged 6–59 months are anaemic. A total of 53.1% of all women aged 15–49 and 22.7% of men aged 15–49 are anaemic (IIPS and ICF 2017).

In the latest round of the NFHS-5, Children under the age of 5 were more likely to be stunted, wasted, and underweight at 36.5%, 19.3%, and 32.1%, respectively. Amongst overweight and obese women there is 24%, and amongst overweight or obese men, it is 22.9%. Anaemia prevalence in children aged 6–59 months is 67.1%. A majority of women (57%) aged 15–49 are anaemic, and a quarter of all men (25%) are anaemic (IIPS and ICF 2020).

Since the NFHS is one of the largest data sets in the world in terms of health measures, it offers a unique source for observing many aspects of health, especially women's health and children's health. Indicators related to population, health, family welfare, nutrition, and others are essential for measuring the progress toward Sustainable Development Goals in the country. Based on the surveys, it is apparent that there are several issues for consideration in improving their use of these surveys.

9.6 Progress Towards Global Nutrition Targets

Considering the current pace of progress, in most countries, the global nutrition targets won't be met by 2025. Over 194 countries, there is a considerable variation in the availability of nutrition-related data and the progress made toward the global nutrition targets. By 2025, only seven countries will achieve four of the six nutrition targets for maternal, infant, and young child nutrition. As a result of the Covid-19 pandemic, global nutrition targets are being impeded. The global population has been pushed into extreme poverty by an estimated 155 million people, during the pandemic of Covid-19 (Cesare et al. 2021). In order to facilitate the achievement of Sustainable Development Goals, nutrition plays a key role; a healthy and sustainable diet and food security are prerequisites for meeting the proposed targets of quality nutrition for all and protection of the environment (Grosso et al. 2020).

In India, most households are middle class or poor; a small number are wealthy. In terms of nutrition, the country's economic condition was not good during independence. Nevertheless, India has developed socially, economically, and globally in the years since. However, much more needs to be accomplished. The World Health Assembly recently published the Global Nutrition Report of 2020. The 2020 Report examines how nations have progressed in achieving the global nutrition targets for 2025. These targets include anaemia, low birth weight, exclusive breastfeeding, childhood wasting, and childhood overweight, amongst others. It marks the progress of a total of 194 countries. Of these, India is amongst the 88 countries that are not on track for achieving their 2025 targets. According to the report, India is not on track to meet its nutrition targets for 2025.

Several surveys on nutrition are conducted intermittently in India, but it is unclear which of these will provide the required data to track the World Health Assembly Targets (John et al. 2015). The insufficient investments in welfare programmes and economic slowdown that have marked the last few years, combined with the growing food security amongst poor households, have brought India to a state where the Government of India has to take drastic measures to stem the tide. As well, the first phase of NFHS-5 shows the situation just before the COVID-19 lockdown, which means child nutrition has deteriorated further over the last year, necessitating urgent action (www.theigc.org).

9.7 Conclusion

Overall, the findings clearly demonstrate the decline in India's nutritional status over the decades and call for policy interventions and immediate adjustments to the food system. Nutrition and health services, as well as our population, are not in a position to provide such routine periodic assessment and appropriate counselling for early detection and effective management of undernutrition and overnutrition as well as their health consequences (Ramachandran and Kalaivani 2018).

Public health issues like micronutrient deficiency and inadequate nutrition continue to be significant concerns. The need for frequent nutritional data is fundamental, to educating the public about nutrition through the media. Boosting growth through fortification can also be economically, practically, and flexibly achievable. There is a need to improve and proper implementation of the current nutritional programmes.

References

- AbouZahr C, Boerma T (2005) Health information systems: the foundations of public health. *Bull World Health Organ* 83(8):578–583
- Arnold F, Parasuraman S, Arokiasamy P, Kothari M (2009) Nutrition in India. In: National Family Health Survey (NFHS-3), India, 2005–06. International Institute for Population Sciences, Mumbai; ICF Macro, Calverton, Maryland, USA
- Battersby J (2019) Urban food systems governance and poverty in African Cities. pp 1–26. <https://doi.org/10.4324/9781315191195>
- Black RE, Morris SS, Bryce J (2003) Where and why are 10 million children dying every year? *Lancet* 361(9376):2226–2234. [https://doi.org/10.1016/S0140-6736\(03\)13779-8](https://doi.org/10.1016/S0140-6736(03)13779-8)
- Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M et al (2008) Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet* 371(9608):243–260. [https://doi.org/10.1016/S0140-6736\(07\)61690-0](https://doi.org/10.1016/S0140-6736(07)61690-0)
- Brand C, Bricas N, Conaré D, Daviron B, Debru J, Michel J, Soulard C-T (ed) (2019) Designing urban food policies concepts and approaches, urban agriculture. Springer, Switzerland
- Boerma JT, Stansfield SK (2007) Health statistics now: are we making the right investments? *Lancet* 369(9563):779–786. [https://doi.org/10.1016/S0140-6736\(07\)60364-X](https://doi.org/10.1016/S0140-6736(07)60364-X)
- Capone R, Bilal HE, Debs P, Cardone G, Driouech N (2014) Food system sustainability and food security: connecting the dots. *J Food Secur* 2(1):13–22
- Caulfield LE, de Onis M, Blossner M, Black RE (2004) Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles. *Am J Clin Nutr* 80(1):193–198
- Census of India (2011) Primary Census Abstract (PCA) directorate of census operations Kerala. <https://censusindia.gov.in>
- Cesare Di M, Ghosh S, Osendarp S, Mozaffarian D (2021) A world free from malnutrition: an assessment of progress towards the global nutrition targets. <https://globalnutritionreport.org/reports/2021-global-nutrition-report/assessing-progress-towards-the-global-nutrition-targets/>
- Christensson L, Unosson M, Ek AC (2002) Evaluation of nutritional assessment techniques in elderly people newly admitted to municipal care. *Eur J Clin Nutr* 56:810–881. <https://doi.org/10.1038/sj.ejcn.1601394>
- Dambal S (2017) Malnutrition in India: an overview. *Int J Med Pharm Sci (IJMPS)* 7(6):41–52. www.tjprc.org
- Deaton A, Drèze J (2008) Income, health, and well-being around the world: evidence from the gallup world poll. *J Econ Perspect* 22(2):53–72
- Deaton A, Drèze J (2009) Nutrition in India: facts and interpretations, working paper no. 170. *Econ Political Wkly* 44(7):42–65
- Ettinger AS (2004) Children’s health, the Nation’s wealth: assessing and improving child health. *Environ Health Perspect* 112(14)
- Fogel RW (2004) Health, nutrition, and economic growth. *Econ Dev Cult Change*. 52(3). University of Chicago and National Bureau of Economic Research. <https://doi.org/10.1086/383450>

- Food and Nutrition Security Analysis, India (2019) Ministry of statistics and programme implementation and the world food programme by the Government of India and World Food Programme. <http://www.indiaenvironmentportal.org.in/files/file/Food%20and%20Nutrition%20Security%20Analysis.pdf>
- Ghosh S (2020) Factors responsible for childhood malnutrition: a review of the Literature. *Curre Res Nutr Food Sci* 8(2):360–370. <https://doi.org/10.12944/CRNFSJ.8.2.01>
- Goli S, Doshi R, Perianayagam A (2013) Pathways of economic inequalities in maternal and child health in urban India: a decomposition analysis. *PLoS ONE* 8(3):e58573. <https://doi.org/10.1371/journal.pone.0058573>
- Gómez MI, Barrett CB, Raney T, Pinstrup-Andersen P, Meerman J, Croppenstedt A, Lowder S, Carisma B, Thompson B (2013) Post-green revolution food systems and the triple burden of malnutrition. In: *ESA Working Paper No. 13–02, Agricultural Development Economics Division Food and Agriculture Organization of the United Nations*. www.fao.org/economic/esa
- Gopalan C (2013) The changing nutrition scenario. *Indian J Med Res* 138(3):392–397
- Huysentruyt K, Brunet-Wood K, Bandsma R, Gramlich L, Fleming-Carroll B, Hotson B, Byers R, Lovelace H, Persad R, Kalnins D, Martinez A, Marchand V, Vachon M, Hulst JM (2021) On behalf of the Canadian malnutrition task force-pediatric working group. Canadian nationwide survey on pediatric malnutrition management in tertiary hospitals. *Nutrients* 13:2635. <https://doi.org/10.3390/nu13082635>
- Ighogboja SI (1992) Some factors contributing to protein-energy malnutrition in the middle belt of Nigeria. *East Afr Med J* 69(10):566–571
- India State-Level Disease Burden Initiative Malnutrition Collaborators (2019) The burden of child and maternal malnutrition and trends in its indicators in the states of India: the global burden of disease study 1990–2017. *Lancet Child Adolesc Health* 3:855–870. [https://doi.org/10.1016/S2352-4642\(19\)30273-1](https://doi.org/10.1016/S2352-4642(19)30273-1). <https://gdc.unicef.org/resource/burden-child-and-maternal-malnutrition-and-trends-its-indicators-states-india-global>
- International Institute for Population Sciences (IIPS) (1995) National family health survey (MCH and family planning), India 1992–93. IIPS, Mumbai
- International Institute for Population Sciences (IIPS) and ICF (2017) National family health survey (NFHS-4), 2015–16: India. IIPS, Mumbai
- International Institute for Population Sciences (IIPS) and ICF (2020) National family health survey (NFHS)-5, India and state factsheet compendium. IIPS, Mumbai
- International Institute for Population Sciences (IIPS) and ORC Macro (2000) National family health survey (NFHS-2), 1998–99: India. IIPS, Mumbai
- Jeejeebhoy KN, Detsky AS, Barker JP (1990) Assessment of nutritional status. *J Parent Enteral Nutr* 14:193–196
- John A, E Knebel, L Haddad, Menon P (2015) An assessment of data sources to track progress towards global nutrition targets in India. *POSHAN Research Note 6*. International Food Policy Research Institute (IFPRI), New Delhi. <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129722>
- Kapil U, Sachdev HP (2013) Massive dose vitamin A programme in India need for a targeted approach. *Indian J Med Res* 138(3):411–417
- Kapil U, Chaturvedi S, Nayar D (1992) National nutrition supplementation programmes. *Indian Pediatr* 29:1601–1613. <https://www.indianpediatrics.net/dec1992/1601.pdf>
- Kumar P (2017) Food and nutrition security in India: the way forward. *Agric Econ Res Rev* 30(1):1–21. <https://doi.org/10.5958/0974-0279.2017.00001.5>
- McGuire S, FAO, IFAD, WFP (2015) The state of food insecurity in the world 2015: meeting the 2015 international hunger targets: taking stock of uneven progress. *Adv Nutr* 6(5):623–624. <https://doi.org/10.3945/an.115.009936>
- Moestue H, Huttly S, Sarella L, Galab S (2007) ‘The bigger the better’-mothers’ social networks and child nutrition in Andhra Pradesh. *Public Health Nutr* 10(11):1274–1282
- Muller O, Krawinkel M (2005) Malnutrition and health in developing countries. *CMAJ* 173(3):279–286. <https://doi.org/10.1503/cmaj.050342>

- National Nutrition Policy (1993) Government of India Department of Women & Child Development Ministry of Human Resource Development New Delhi. https://wcd.nic.in/sites/default/files/nnp_0.pdf
- National Policies and strategies, FAO (2001) https://www.fao.org/ag/AGN/nutrition/nationalpolicies_en.stm
- Nguyen PH, Scott S, Headey D, Singh N, Tran LM, Menon P et al (2021) The double burden of malnutrition in India: trends and inequalities (2006–2016). *PLoS ONE* 16(2):e0247856. <https://doi.org/10.1371/journal.pone.0247856>
- Popkin BM, Corvalan C, Grummer-Strawn LM (2020) Dynamics of the double burden of malnutrition and the changing nutrition reality. *Lancet* 395(10217):65–74. [https://doi.org/10.1016/S0140-6736\(19\)32497-3](https://doi.org/10.1016/S0140-6736(19)32497-3)
- Ramachandran P, Kalaivani K (2018) Nutrition transition in India: challenges in achieving global targets. *Proc Indian Natn Sci Acad* 84(4):821–833
- Rikimaru T, Yartey JE, Taniguchi K, Kennedy DO, Nkrumah FK (1998) Risk factors for the prevalence of malnutrition among urban children in Ghana. *J Nutr Sci Vitaminol (Tokyo)* 44(3):391–407. <https://doi.org/10.3177/jnsv.44.391>
- Ruel MT, Garrett JL, Yosef S, Olivier M (2017) Urbanization, food security, and nutrition. In: de Pee S, Taren D, Bloem MW (eds) *Nutrition and health in a developing world, part VII*, vol 705–735. New York. https://doi.org/10.1007/978-3-319-43739-2_32
- Sobal J, Khan LK, Bisogni C (1998) A conceptual model of the food and nutrition system. *Soc Sci Med* 47(7):853–863. [https://doi.org/10.1016/s0277-9536\(98\)00104-x](https://doi.org/10.1016/s0277-9536(98)00104-x)
- Söderström L, Rosenblad A, Adolfsson ET, Saletti A, Bergkvist L (2014) Nutritional status predicts preterm death in older people: a prospective cohort study. *Clin Nutr* 33(2):354–359. <https://doi.org/10.1016/j.clnu.2013.06.004>
- Somalia, Mogadishu, Mohamud A, Ibrahim WM (2017) Study on risk factors for poor nutritional status among <5 children in Yaqshid district Mogadishu-Somalia. Dissertation. https://www.researchgate.net/publication/323831532_Study_on_risk_factors_for_Poor_Nutritional_Status_among_5_children_in_Yaqshid_district_Mogadishu-Somalia
- Srilakshmi B (2006) *Nutrition science*, Revised 2nd edn. New Age International (P) Limited Publishers, New Delhi, India
- Stansfield SK, Walsh J, Prata N, Evans T (2006) Information to improve decision making for health. In: Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB et al (eds). *Disease control priorities in developing countries*, 2nd edn. The International Bank for Reconstruction and Development and The World Bank, Washington
- Tette EM, Sifah EK, Nartey ET (2015) Factors affecting malnutrition in children and the uptake of interventions to prevent the condition. *BMC Pediatr* 15:189. <https://doi.org/10.1186/s12887-015-0496-3>
- Tomkins A, Watson F (1989) Malnutrition and infection; a review. In: UN ACC/SCN. vol. *Nutrition policy discussion paper*. Administrative committee on coordination-subcommittee on nutrition, Geneva
- The state of food security and nutrition in the world, UNICEF. <https://www.unicef.org/reports/state-of-food-security-and-nutrition-2020>
- United Nations, Department of Economic and Social Affairs, Population Division (2018) *World population prospects 2018: highlights (ST/ESA/SER.A/423)*
- Upadhyay R, Tripathi KD (2017) How can we assess the nutritional status of an individual? *J Nutr Food Sci* 7(6):1–2. <https://doi.org/10.4172/2155-9600.1000640>
- Usmani G, Ahmad N (2018) Health status in India: a study of urban slum and non-slum population. *J Nurs Res Pract* 2(1):09–14
- Webb P, Block S (2004) Nutrition information and formal schooling as inputs to child nutrition. *Econ Dev Cult Change* 52(4):801–820
- WHO (2000) *Nutrition for health and development: a global agenda for combating malnutrition*. In: *Sustainable development and healthy environments (SDE) for health and development*. <https://apps.who.int/iris/handle/10665/66509>

- WHO (2005) Vitamin and mineral requirements in human nutrition, 2nd edn. World Health Organization. <https://apps.who.int/iris/handle/10665/42716>
- WHO (2007) Everybody's business strengthening health systems to improve health outcomes: WHO's framework for action. World Health Organization. <https://apps.who.int/iris/handle/10665/43918>
- World population prospects (2019) Highlights, United Nations department of economic and social affairs, ministry of statistics and programme implementation UN. <https://doi.org/10.18356/13bf5476-en>. <https://www.un.org>
- World urbanization prospects (2019) United Nations, department of economic and social affairs, population division. World urbanization prospects: the 2018 revision (ST/ESA/SER.A/420). New York, United Nations
- Young MF, Nguyen P, Tran LM, Avula R, Menon PA (2020) Double-edged sword? Improvements in economic conditions over a decade in India led to declines in undernutrition as well as increases in overweight among adolescents and women. *J Nutr* 150(2):364–372. <https://doi.org/10.1093/jn/nxz251>
- Zulkarnaen Z (2019) The influence of nutritional status on gross and fine motor skills development in early childhood. *Asian Soc Sci* 15(5):1–75