

Nutrition and Health Challenges for India and Possible Solutions

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A significant part of a nation's development depends on the health of its people. A well nourished and healthy nation is a prerequisite to the sustainability of a nation's economy. Health is the overall indicator of the nutritional status of a person, which is again determined by the adequacy of food intake of in terms of both quantity and quality. Nutrition plays a vital role in the casual chain of many diseases. Malnutrition is one of the leading causes of morbidity in humans - be it over-nutrition as in obesity, diabetes mellitus etc, or under-nutrition. Good nutritional status can only be realized and sustained when individuals, families and communities are food-secure. Food security has been defined as access by all people at all times to the food needed for a healthy life (FAO/WHO, 1992a). Thus, infectious disease, malnutrition, food insecurity and impaired productivity form a vicious cycle. Further, the impact of nutrition on the occurrence, morbidity and mortality pattern in infectious diseases like TB and HIV has been noted but not well recognized.

Promotion of good nutrition in early life is particularly important for health later in life because either undernutrition or overnutrition can cause lifelong, irreversible damage. This affects the poorest families in low-income and middle-income countries more than the rich and leads to a vicious cycle of cognitive under-performance, poor earning capacity and persistent under-nutrition in the next generation.

Why is nutrition in early life so important? Since the Barker hypothesis in the 1980s, cohort studies from high-income countries showed that fetal growth restriction is associated with adult diseases, especially cardiovascular and metabolic conditions. Over time, emphasis has shifted from low birthweight to growth during the first 2 years of life, and from the harmful effects of undernutrition to the dangers of rapid weight gain and of child obesity.

Nine out of ten children, however, are born in low- income and middle-income countries where under- nutrition is common. There is enough evidence from these countries that maternal, fetal, and child undernutrition increase short-term morbidity and mortality in young children. Recent long-term follow-up studies—including birth cohorts and intervention trials give convincing evidence that early undernutrition also affects adult human capital. Good nutrition in early life helps adults to become taller, stronger, and more intelligent, thus improving school achievement, economic productivity, and earnings.

If early nutrition is so important, when is the ideal time to intervene? The window of opportunity is short. National surveys show that growth faltering occurs from conception to about

2 years of age. After that, the average growth of children from low-income and middle-income countries is similar to that of children from high-income populations. Hence, interventions to reduce under nutrition have the most positive effects on human capital when targeted to children aged 3 years or younger, but, except in the few countries where wasting is frequent, interventions after this age do not seem to confer benefit. Longitudinal body-composition studies from low-income and middle-income countries also show that growth in utero and in the first 2 years of life is essential for building lean mass, but later rapid weight gain mainly results in fat-mass deposition.

Therefore the net balance between positive and negative consequences of rapid weight gain depends on when it occurs, and thus intervention strategies need to be targeted to the right group. How to promote rapid weight gain in the first 2–3 years of life, but not thereafter, is a major challenge to policy makers. The combination of undernutrition in early life and rapid weight gain during late childhood and adolescence is the worst combination and is a grave risk factor for diabetes and metabolic syndrome.

Along with programs for macro and micronutrient supplementation where needed, strong investments in community-based approaches—eg, the promotion of breastfeeding and appropriate complementary foods— which have well-established effects on child survival and nutritional status - are important. Dietary diversity and promotion of locally available, inexpensive and nutritious foods must be included in nutritional counseling. Anganwadis and mid day meal programs are ideal places to give a balanced, nutritious diet to the child. The National Nutrition Monitoring Bureau surveys all show that intake of green leafy vegetables and fruits is < 30% recommended daily allowance almost uniformly across India. At the same time, intake of roots and tubers is > 100% RDA.

Current Status of Undernutrition in India

Despite economic growth over the past two decades, India remains home to a large concentration of food insecure and undernourished people. According to the 2013 Global Hunger Index (GHI), India ranked 63rd out of 120 countries with the situation being described as alarming. The Global

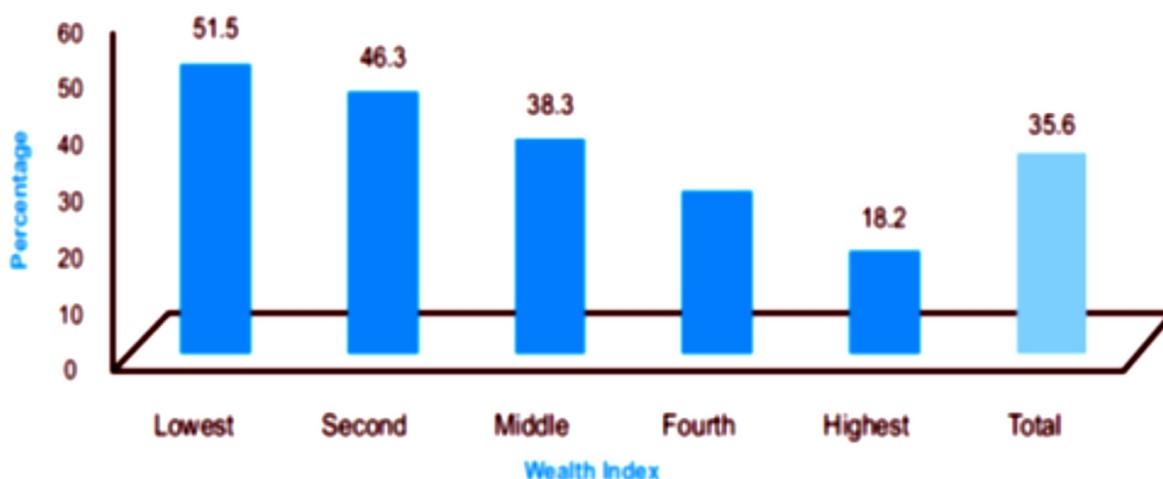


Figure 1: Prevalence rate of undernourished women based on wealth quintile

Nutrition report 2014 on India, presenting the occurrence of undernourishment over a period of three decades, reports that though the rates of undernutrition have come down from 26% to 15%, the period of progress over the decades is quite limited. According to National Family Health Survey (NFHS-3), the percentage of malnourished adults was 33% for women and 28.1% for men. The magnitude of the problem of under-nutrition of women is evident from the fact that every third woman of reproductive age in India is undernourished (with a Body Mass Index (BMI) lower than 18.5 kg/m²). The prevalence of undernourished women is observed most significantly across India in the lowest wealth index.

In children under five years of age, NFHS-3 indicates 48% children are stunted (22% severely), 42.5% children are underweight (15.8% severely) and 19.8% children are wasted (7.9% severely). Children from poor households are approximately three times more likely to be affected by under-nutrition than their peers in wealthier families.

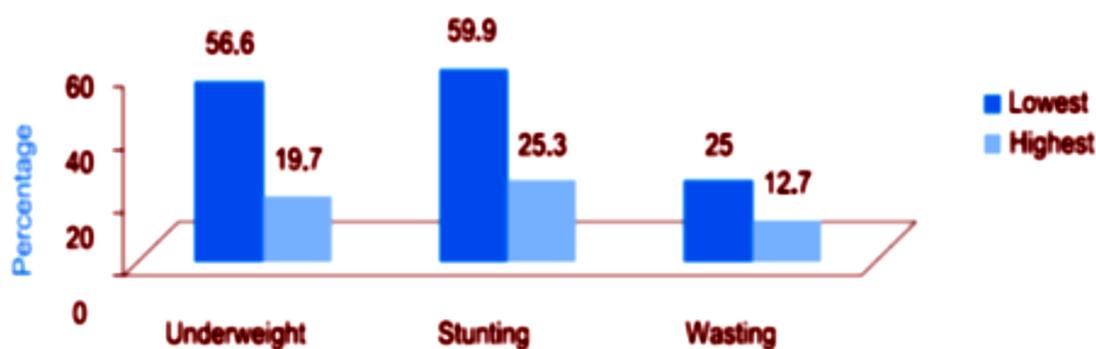


Figure 2: Under-nutrition prevalence rates for all three indicators by wealth groups

Food and Nutrient Intake: Despite a range of schemes to address under-nutrition, nutrient gaps are still rampant across India. The gaps observed in food and nutrient intake reveal that the average diet is adequate in cereals but lacks adequate and good sources of quality protein such as pulses or dairy products, fat intake and absorption of fat-soluble vitamin A, D and K. The nutrition situation is worst in the lowest wealth index of the population.

Micronutrient Deficiencies: The intake of all micronutrients is grossly inadequate. These include micronutrients such as iron, zinc, folic acid and vitamin A. Deficiencies in intake of these micronutrients constitute a major public health concern as they have adverse effects on survival, growth and brain development.

Nutrition and Infections

Under nutrition and infection are the major causes of morbidity and mortality in the developing world. These two problems are interrelated. In fact, one-third of under-five deaths in the world have undernutrition as an underlying factor, though the death is often caused by pneumonia or diarrhea. Under nutrition compromises mucosal barrier function, allowing easier access to pathogens, and compromises immune function (especially cell mediated immunity), decreasing the ability of the host to eliminate pathogens once they enter the body. Thus, malnutrition

predisposes to infections. Infections can alter nutritional status mediated by changes in dietary intake, absorption and nutrient requirements and losses of endogenous nutrients. Thus, the presence of infections can contribute to the malnourished state and this often forms a vicious cycle.

Though there is an increase in the adult obesity population with 11% overweight and 2% obese, the percentage of women of reproductive age who are thin is 40% and short statured 12%. This indicates the disparity of haves and have-nots in India and is a pre-disposing factor toward developing tuberculosis and other infectious diseases.

Undernutrition and Tuberculosis

Tuberculosis and under nutrition are both problems of considerable magnitude and importance worldwide. The relationship between TB and nutrition is bidirectional, i.e. having active TB leads to loss of weight, and being underweight is a known risk factor for developing TB, whether through reactivation of latent TB or developing progressive primary disease upon infection. A systematic literature review showed a strong and consistent log-linear relationship between TB incidence and body mass index (BMI) across a variety of settings with different levels of TB burden - the risk of TB increases by about 14% for each unit reduction BMI.

Closer to home, patients with active TB, especially those with pulmonary TB, have co-existing undernutrition which can be severe and life-threatening in its own right, but yet is under-recognized and ignored; one in four patients with TB and one in three malnourished children in the world live in India. Overall, half of all TB cases among adolescents and adult men and women in India could be attributable to the effect of under nutrition. In a population based study from north India, the distribution of under nutrition was highest among the younger age groups, women, villagers, members of the scheduled tribes and people in the lower quintiles of the wealth index. A notable finding in this study was that up to two-third of incident TB cases in the youngest age group (15–19 years) could be attributable to under nutrition.

Another study, using the published data on the risks of TB associated with temporal changes in BMI, diabetes prevalence and population age structure in rural and urban areas for men and women in India, calculated expected changes in TB incidence between 1998 and 2008. According to their report, TB incidence cases would have increased (28% from 1.73 million to 2.11 million) faster than population size (22%) because of adverse effects of aging, urbanization, changing BMI and rising diabetes prevalence, generating an increase in TB incidence per capita of 5.5% in 10 years. In India, general nutritional improvements were offset by a fall in BMI among the majority of men who live in rural areas. The strongest adverse effect on TB incidence per capita in India was the fall in BMI among men living in rural areas.

In a large study in rural India, 90% of patients were found to have some degree of undernutrition. Majority (80% of women and 67% of men) of patients had evidence of chronic severe under-nutrition at diagnosis. Weights increased by only 3-4 kg and did not return to normal even at the end of treatment. Nearly half of women had severe undernutrition at the end of treatment. Moreover, severe under-nutrition at diagnosis was associated with a 2 fold higher risk of death.

Undernutrition as a risk factor for TB mortality has been documented in multiple studies across the world. A study among tuberculosis patients in South India reported high death rates among patients with low baseline weights, even among patients with smear negative TB. It also suggested micronutrient support (e.g., Vitamin A) and/or other interventions to enhance host response could potentially have a role in reducing early mortality in these severely malnourished patients. In a population-based cohort study from Mumbai, around 27% male tuberculosis deaths were attributable to their being underweight and smoker, while 22% male and 37% female deaths were attributable to their being underweight and smokeless tobacco user. Undernourished patients also have increased severity of disease, which in turn increases the risk of mortality.

Undernutrition is also a risk factor for other adverse outcomes in patients with tuberculosis. Young children are at high risk of developing primary progressive disease, and the risk appears to be higher among malnourished children and children under 3 years of age. A study that conducted TB screening of severe acute malnourished children attending a nutritional rehabilitation centre in Karnataka, demonstrated that of children who were evaluated as per the diagnostic algorithm of National TB Programme 4% were diagnosed with TB when compared to 0.3% who were not evaluated as per the diagnostic algorithm. Malnutrition can also impair the protective efficacy of Bacillus Calmette–Guerin (BCG) vaccine among a nutritionally deficient vaccinated population. In a study done in the 1960s it was shown that following BCG vaccination, malnourished children were twice as likely to contract TB as their appropriately nourished peers. Undernourished patients have higher risk of hepatotoxicity, which is a major side effect of TB therapy and can contribute to default. Patients with a poor nutritional status at the end of treatment are likely to have poor performance status because of poor muscle strength. Undernourished patients have higher risk of relapse too after completion of therapy. Undernourished contacts of TB patients, (especially those with MDR-TB) have higher risk of development of active TB

Agriculture plays a key role in the interplay between nutrition and health: It is the primary source of calories and essential nutrients, it is a source of income for 80 percent of the world's poor, and it is essential for human life, health, and culture. On the other hand, livestock and wild animals are also the source of the great majority of human infectious and emerging disease. As a result, agricultural development is fundamental for sustaining the nutritional and health status of billions of people. However, many challenges (such as population growth, urbanization, and climate change) threaten the availability of water, land, and other natural resources needed to sustain the world's population, and these must also be addressed. The failure of agriculture to provide access to nutritious foods and high-quality diets could aggravate the widespread problem of micronutrient deficiencies. Diets centered on cheap, calorie-dense, nutrient-poor foods rather than vegetables, fruits, and animal-source foods could deepen the emerging epidemic of obesity and chronic diseases in countries undergoing economic and nutrition transitions.

Existing Govt. of India Programmes / Policies / Schemes for Nutrition

The Prime Minister's National Council for India's Nutrition Challenges provides policy directions, reviews, and coordinates amongst various programmes. There are various programmes for provision of food/supplementary nutrition-

Supplementary nutrition as a gap filling measure is provided to children below six years of age, pregnant and nursing mothers as one of the services under the Integrated Child Development Services Scheme (ICDS). Under Integrated Child Protection Schemes (ICPS) and Creche Scheme also support is given to the eligible children for food as per norms of the Scheme.

The “Midday Meal Scheme” is a school meal programme of the Government of India designed to improve the nutritional status of school-age children nationwide. The programme supplies free lunches on working days for children in Primary and Upper Primary Classes in Government, Government Aided, Local Body, and Alternate Innovative Education Centers. This programme serves 120,000,000 children in over 1,265,000 schools and Education Guarantee Scheme centers.

The recently introduced Rajiv Gandhi Schemes for Empowerment of Adolescent Girls (RGSEAG), namely SABLA provides a package of services including health and nutrition to adolescent girls in the age group of 11-14 years for out of school girls and 15-18 years for all girls for nutrition in 200 districts as a pilot. Also, the Indira Gandhi Matritva Sahyog Yojana (IGMSY) provides cash assistance as an enabling environment for improved health and nutrition to pregnant and lactating mothers and support for providing early and exclusive breastfeeding for the first six months of life. It is being implemented on pilot basis in 52 districts. There is availability of essential food items at subsidized cost through Targeted Public Distribution System, Antodaya Anna Yojna for general public.

The “Antyodaya Anna Yojana” (AAY), contemplates identification of one crore poorest of the poor families from amongst the below poverty line families within the States and providing them food grains at a highly subsidized rate of Rs.2/ per kg. for wheat and Rs. 3/ per kg for rice. The States/Union territories are required to bear the distribution cost, including margin to dealers and retailers as well as the transportation cost. Thus the entire food subsidy is being passed on to the consumers under this scheme.

Furthermore, the Government has also introduced the Food Security Bill. National Food Security Act, 2013 (also Right to Food Act) is an act of the Parliament of India which aims to provide subsidized food grains to approximately two thirds of India’s population. It was signed into law on September 12, 2013. This act converts into legal entitlements the existing food security programmes of the Government of India. It includes the “Midday meal Scheme”, “Integrated Child Development Services” scheme and the “Public distribution system”. The Midday Meal Scheme and the Integrated Child Development Services Scheme are universal in nature whereas the PDS will reach about two-thirds of the population (75% in rural areas and 50% in urban areas). Under the provisions of the bill, beneficiaries of the public distribution system are entitled to 5 kilograms per person per month of cereals at subsidized price. Pregnant women, lactating mothers, and certain categories of children are eligible for daily free meals or “take home rations”.

Conclusions

Despite rapid progress in food production in India, the intake of food and nutrients continues to be inadequate, both in terms of quantity and quality. There is a high prevalence of stunting and under-nutrition among children as well as anaemia in women and children. Micronutrient deficiencies, including iron and iodine, continue to be big public health challenges. The rising

prevalence of obesity even among children and rural adults is of concern. One fourth of adults in India have hypertension (mostly asymptomatic) and 76 million adults have Impaired Glucose Tolerance/Diabetes Mellitus. India is passing through a critical phase, facing a triple burden of malnutrition, non-communicable and communicable diseases.

A focus on agricultural development and growth presents great opportunities. If agricultural intensification can be managed in a sustainable way, the health and nutrition of vulnerable populations can be vastly improved. Better food safety, water quality, and sanitation can reduce disease risks and improve health and nutrition. Greater access to more nutritious and diversified diets can go a long way in reducing malnutrition and diet-related chronic diseases and infections. Improved nutrition and health, in turn can reduce poverty for the 800 million people living on less than \$1.25 a day. The role of women in agriculture is very important, because of their role in household and individual food and nutrition security and intra-household food allocation. The health, nutrition, and agriculture communities are beginning to recognize that only by working together will they have a chance to meet their common goals of reducing poverty, malnutrition, and ill health.

