



NFI

BULLETIN

Bulletin of the Nutrition Foundation of India

Volume 32 Number 2

April 2011

Nutrition transition in India

Prema Ramachandran

Six decades ago when India became a republic, the country faced numerous challenges. A majority of the population was poor, illiterate and under-employed. The Bengal famine in the previous decade had taken a huge toll on human life. Apart from the overt evidences of frank undernutrition, the not-so-dramatic, chronic energy deficiency (CED) and micronutrient deficiencies such as goiter, beriberi, blindness due to Vitamin A deficiency and anaemia were very widespread and perhaps took an even higher toll in terms of both morbidity and mortality than the successive famines. Life expectancy at birth was less than 35 years, mainly because of the high prevalence of nutritional deficiencies and infections. India being a developing country with a high population density, its planners recognized that improvements in the nutrition and health status of the population were pre-requisites for human development, and critical inputs for economic and social development. They gave high priority to improving food and nutrition security of the households and the nutrition and health status of the citizens through planned socioeconomic development and public health interventions.

During the last six decades, the country has been undergoing socioeconomic, demographic, nutrition and health transitions. The pace of these interrelated transitions has been steady, though slow and uneven, across the decades, across States and across segments of the population. While the overall impact of these transitions has been beneficial, it is inevitable that there

are some undesirable consequences. For example, economic growth has led to reduction in poverty but has also widened economic disparity. As a result, India today is a nation of contrasts: it is the second-fastest growing global economy but has persistent poverty; it is self sufficient in food production for the past four decades, but there are still pockets of hunger; decline in undernutrition among the poor is slow but there is rapid escalation of obesity among the affluent; India is an important medical tourism destination and its hospitals provide world-class health care at competitive rates to Indians and foreigners who can afford to pay, but the public health system is struggling to provide essential health care for all the citizens based on need rather than on ability to pay.

Any country's true wealth lies in the quality of its human resources. The demographic transition has led to the current phase of "demographic dividend" with a large young workforce; but this young generation can drive economic growth and development only if they are made productive, with appropriate jobs. People are living longer; but increase in longevity brings in its wake the need for support systems to improve the quality of life of the elderly. Education has made major strides although there is still much ground to cover; but there is still a major mismatch between demand and supply. For instance, the demand for skilled personnel is not fully met while, at the same time, there is growing unemployment among the educated youth. The country still has to tackle undernutrition and communicable

diseases and high maternal and child health problems; meanwhile obesity and non-communicable diseases have emerged as added public health problems.

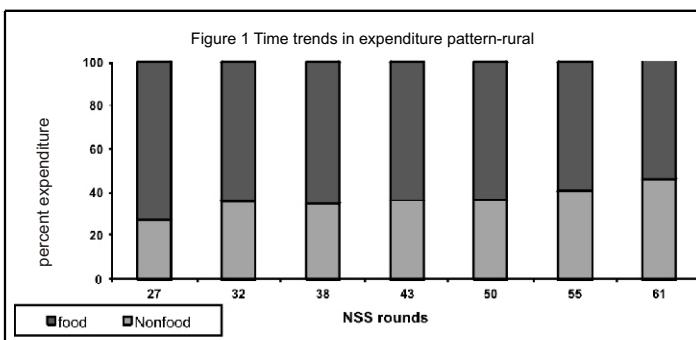
Changes are an inevitable part of growth and development; but if changes are anticipated, they can be shaped or modified to be more beneficial; appropriate measures for adapting to the changes can be put in place. It will then be possible to maximize the impact of beneficial changes and minimize the impact of adverse changes. This paper reviews the significant trends that signal the ongoing nutrition transition in India, and assesses the challenges and opportunities that these pose to nutrition scientists and policy planners.

Changes in patterns of household expenditure on food

Access to food at affordable cost is an essential prerequisite for food and nutrition security. The National Sample Survey Organization¹ (NSSO) has been carrying out Consumer Expenditure Surveys quinquennially since 1972-73 (27th, 32nd, 38th, 43rd, 50th, 55th and 61st rounds of NSS, at roughly 5-year intervals)¹. In the seventies, expenditure on food constituted 70% of the total expenditure. Between 1972-73 and

CONTENTS

● Nutrition transition in India Prema Ramachandran	1
● Health Care in India: Past and Present C Gopalan	6
● Foundation News	8



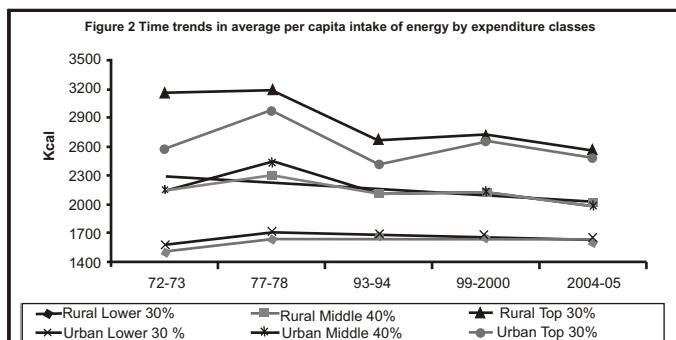
2004-05, the share of food in consumer expenditure has fallen from 73% to 55% in rural areas and from 64% to 42% in urban areas (Figure 1).

This was mainly due to fall in share of expenditure on cereals from 41% of consumer expenditure to 18% in rural India and from 23% to 10% in urban India. Among low income groups the lower percentage of expenditure on food is mainly due to low cost of cereals, especially subsidized cereals from the public distribution system(PDS); the per capita amount consumed by this segment of the population has in fact shown a small rise over the last four decades (Figure 2).

In middle- and high-income group households, the expenditure on food as a proportion of overall expenditure has consistently been lower than in poorer households; during the past two decades this percentage has fallen even further. This could be partly because of reduction in energy consumption and partly because of tardy progress towards dietary diversification encompassing foods other than cereals. With increasing awareness and access to health care services, there has been a reduction in the nutritional toll of infections. With increasing use of mechanised transport there has been reduction in physical activity levels, and consequently in energy requirements. Thus, increasing household expenditure on transport, education and health care has indirectly reduced the energy and nutrient requirements of the population. Perhaps, the aware Indian population realized this and middle and higher income groups of population reduced their energy consumption

Redefinition of criteria for poverty line

In the 'Seventies', income was one of the major determinants of food security; in spite of ~70% household expenditure going towards food, ~70% of households were food-insecure and ~70% of the children were undernourished. All-India poverty line baskets (PLB) were derived for rural and



urban areas separately, anchored in the per capita calorie norms of 2400 (rural) and 2100 (urban) per day. As stated earlier, over the decades the percentage of household expenditure on food has decreased because needed amount of food could be procured with that expenditure as food prices were low and subsidized food through PDS was available to the poor; expenditure on other items such as transport, education and health care have increased. The earlier poverty lines assumed that basic social services such as health and education would be supplied by the State, and therefore did not take into account either the increase in the proportion of expenditure on these to the total expenditure over time, or of their proper representation in available price indices.

The Tendulkar Committee² had recommended that actual private expenditure per capita on food, education and health consistent with optimal nutritional, educational and health outcomes should be used to define "poverty line". Using the new poverty line definition, the urban population near about the poverty line continue to be able to afford the original calorie norm of 2100 per capita per day, but their actual observed calorie intake (from the 61st Round of NSSO) is 1776 calories per capita¹. This actual intake is very close to the revised calorie intake norm of 1770 per capita per day currently recommended by the Food and Agriculture Organization (FAO)³ and Indian Council of Medical Research (ICMR)⁴. The actual observed calorie intake of rural populations near about the new poverty line (1999 calories per capita) is higher than the FAO and ICMR recommendations. Thus, the economists have taken into account the current recommendations regarding energy requirements of Indians while redefining the poverty line.

Changes in dietary intakes of urban and rural populations

National Nutrition Monitoring Bureau

(NNMB) has been undertaking diet surveys and assessing nutritional status of the population since 1973. Data from diet surveys carried out by NNMB⁵ indicates that between 1975 and 1996 there was an increase in the total energy, protein and fat intake. There was no significant change in the intake of micronutrients. However, over the past decade there has been a reduction in the energy intake. NNMB reports, thus, confirm the trend of decline in energy intake reported by the NSSO consumer expenditure surveys. Globally, a rise in per capita income is associated with an increase in energy intake. Indians are an exception to this, and have shown a decline in energy intake during the period when there was a sharp increase in per capita income and food prices were low. Perhaps, some segments of the population have perceived that, due to their increasingly sedentary lifestyle, their energy needs are lower and have, therefore, deliberately reduced their energy intake. Nutrition and health professionals should inform this perceptive population that in order to remain normally nourished and healthy, they should not further reduce food intake but should increase their discretionary physical activity. If the population adopts appropriate life style changes, it is possible that the prediction regarding wide-scale escalation in obesity and non-communicable diseases may not come true.

Revision of Recommended Dietary Allowances (RDA) for Indians

Recommended dietary allowances for Indians, form the basis of several important interventions to improve the nutritional status of the population, including efforts to maintain national self sufficiency in food production, poverty line computations, interventions for improving the food and nutrition security of people living below the poverty line and food supplementation programmes aimed at bridging the gaps between dietary intake and requirements of the vulnerable segments of the population. Over the past two decades, newer technologies have emerged, which

Table 1 Energy requirement of Indian adults

Body Wt Kg.	BMR*	MALE		Body Wt Kg.	FEMALE		
		PAL**			PAL**		
		1.53	1.4		1.53	1.4	
45	1298	1986	1817	40	1031	1577	1443
50	1370	2096	1918	45	1101	1685	1541
55	1443	2208	2020	50	1171	1792	1639
60	1515	2318	2121	55	1241	1899	1737
65	1588	2430	2223	60	1311	2006	1835
70	1660	2540	2324	65	1318	2113	1933

NNMB surveys indicate that median weight was 51 Kg in men and 46 Kg in women

*Basal metabolic rate; **Physical activity level

enable more precise estimation of the nutrient requirements. Changes in lifestyles have resulted in alteration in energy requirements. Taking all these into account, the ICMR Expert Committee⁴ has revised the RDA for Indians (Table 1).

The recommendations take into account the fact that body weight and physical activity are major determinants of energy requirement. The recommendations on energy requirements are not only for the reference man (60 Kg, moderately active) and reference woman (55 Kg, moderately active), but also for adults with different body weights and different levels of activity (sedentary, moderate physical activity, and strenuous physical activity). Similarly the Expert Committee has provided recommendations for energy requirements for reference children (+2SD of the NNMB weight for age) as well energy requirements per kilogram, so that the gap between the energy requirement and energy intake can be computed on the basis of current stature. This is an important contribution, because the country has entered the dual nutrition burden era and neither low nor high energy intake is desirable.

Changes in patterns of intra-family distribution of food

NNMB surveys⁵ have shown that there has been steady improvement in household food security and a decline in the proportion of households in which the dietary intake of all the members of the family were below their respective requirements. However, in the past three decades, there has been a two-fold increase in the proportion of households in which the dietary intakes of adults is adequate but that of preschool children is inadequate. This suggests that poor intra-family distribution of food is emerging as a major factor associated with undernutrition in young children.

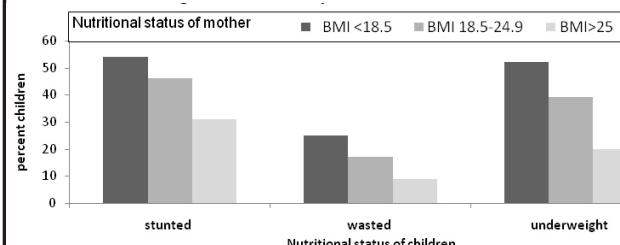
Analysis of data from National Family Health Survey (NFHS) 3 on the nutritional status of women and children from the same family⁶ (Figure 3) showed

that the prevalence rates of stunting, wasting and underweight in children were higher when the mother was undernourished (BMI <18.5). But even when the mother was overnourished (BMI>25), approximately one-third of preschool children were stunted and one-fifth were underweight (Figure 3). Data from NFHS-3 confirm that the dual nutrition burden is now seen within the family; by implication, therefore, poverty and household food security are no longer the only determinants of childhood undernutrition.

Changes in patterns of physical activity

Physical activity is a major determinant of energy requirement. Six decades ago most of the agricultural and construction activities, household chores and transportation were not mechanised. As a result of physical activity in these sectors, a majority of men and women in both rural and urban areas were moderately active and enjoyed the health benefits of this moderate physical activity, despite the absence of any discretionary physical activity. Over the past two decades, there has been progressive increase in mechanisation in occupational, domestic and transportation spheres, both in urban and rural areas, and consequently a steep reduction in physical activity in all segments of the Indian population. There has not been any concurrent increase in discretionary physical activity. Increasing access to TV and arm-chair entertainment has reduced the inclination of the population to take up discretionary physical activity. NNMB surveys have shown that, even in rural areas, a majority of women and one-third of the men are sedentary. As a result of these changes, there has been some reduction in energy requirements in all segments of the adult population. However, the reported reduction in energy intake is less than the assessed reduction in energy requirements. The small but persistent positive energy balance of 50-100 Kcal per day has been

Figure 3 Intrafamily differences in nutritional status



the major factor responsible for the creeping increase in weight and consequent increase in the prevalence of obesity in the Indian population. Moderate physical activity is essential for health. There is an urgent need to make the population aware of this; providing facilities to increase discretionary physical activity at home, in schools, and in workplaces may encourage the population to increase their discretionary physical activity; this will prevent overnutrition and the non-communicable diseases associated with it, and also improve bone and joint health.

Changes in the nutritional status of adults

Data from NNMB surveys⁵ have shown that between the 1970s and the 1990s there was a slow but steady decline in undernutrition in both men and women. Till the mid-Nineties, overnutrition rates were very low. However, over the past two decades there has been a progressive increase in overnutrition rates in adults. Both under- and overnutrition rates are higher in women than in men. There has been a concomitant increase in fat fold thickness, suggesting that the increased body weight mainly comprised of body fat.

The NFHS-3 survey⁶ data show that both under- and overnutrition do exist in populations of all income levels; only approximately 50% of the population is normally nourished in any segment of the population. In rural, tribal populations and among the low-income group, undernutrition is common and the prevalence of overnutrition is low. In contrast, among the high-income urban population, the prevalence of overnutrition is high and undernutrition rates are low. Every effort should be made to achieve rapid reduction in undernutrition rates. Simultaneously, the rise in overnutrition should be prevented through efforts to promote increase in physical activity, because overnutrition is

associated with increased risk of developing noncommunicable diseases that require lifelong treatment.

Changes in the nutritional status of preschool children

Preschool children are recognized as a group that is vulnerable to undernutrition, and therefore receive special attention. Data from NNMB surveys⁵ indicate that, over the past four decades, there has been a sustained reduction in undernutrition rates among preschool children. This is attributable mainly to improvements in access to healthcare and the consequent reduction in the nutrition toll of infections. NHFS has provided time trends on the prevalence rates of undernutrition in preschool children during the past two decades. A comparison of data from NFHS1⁷, 2⁸ and 3⁶ show that rates of stunting have declined; there has been a small reduction in underweight rates, whereas wasting rates had increased (Figure 4).

The apparently inconsistent trends in undernutrition rates, as assessed by the three commonly used indices, have led to a lot of debate. Many economists and policy makers have expressed concern that increasing investment in nutrition programmes has not resulted in a rapid decline in underweight rates; on the contrary there has been an increase in wasting rates. Nutrition scientists have responded to this concern by stating that, in children, the three indices respond differently to chronic energy deficiency (CED) (Figure 5). The first response to CED is mobilisation of body fat and to some extent even muscle mass to meet the energy and protein needs of the body. Loss of fat and muscle mass manifest as underweight (low weight for age) and wasting (low BMI for age); the height of the child is unaffected at this stage. If CED is corrected at this stage both underweight and wasting will get readily reversed and the child will grow normally. If however chronic energy deficiency continues there will be reduction in the rate of linear growth and the child becomes stunted. Stunting is an adaptation mechanism, where linear

growth is compromised but body composition is maintained; at this stage the stunted child is underweight because of lower height but is no longer "wasted" i.e. has a normal BMI. If there is no further CED, the child will grow but stunting cannot be reversed and the trajectory of linear growth will therefore be lower. Further CED will lead to wasting and the child becomes stunted, underweight and wasted. Underweight and wasting are readily reversible with adequate energy intake but stunting in childhood is generally considered as being irreversible. Therefore the drop in stunting rates recorded between the three surveys is a significant finding and an encouraging trend. Convergence between health and Integrated Child Development Services (ICDS) programmes with focus on early detection and effective correction of wasting and infections, will ensure that wasted, underweight children regain their weight and appropriate BMI and stunting is prevented; there will be improvement in nutritional status as assessed by all the three indicators

Assessment of nutritional status in children during the dual nutrition burden era

Approximately one-third of Indian neonates are born with low birthweight and about 1/5 are short as compared to the WHO standards⁹. Numerous studies in India have shown that birth weight and length are major determinants of growth in the first five years of life. The shorter Indian preschool children weigh less and are classified as undernourished even though their weight is appropriate for their height. WHO has now provided standards for BMI for ages 0-18 years and has recommended that these should be used for detection of both under- and overnutrition^{9,10}. Data from NFHS 3⁶ indicate, if weight for age is used as the criterion 46% of Indian preschool children are undernourished; using the height for age standards 38.4% are stunted; if BMI for age is used as the criterion for detection of under nutrition only about 19% of Indian preschool children are undernourished. This is

because majority of the underweight children are stunted and have appropriate BMI for their age. Early detection and effective management of wasting by using BMI for age will go a long way in preventing further stunting and improving the nutritional status of preschool children. When BMI for age is used as the standard for assessment of overnutrition, about 2% preschool children are overnourished. Though the prevalence of overnutrition in these children is low, it is essential that they are identified and managed appropriately right from preschool age so that they will not grow into overnourished adults with high non-communicable disease (NCD) risk

Nutritional status of school children

The computed prevalence of under- and overnutrition in preschool children and adults, using BMI as the criterion for assessment of nutritional status, is shown in Figure 6. Prevalence of undernutrition in adults is double than that of preschool children; prevalence of overnutrition is 2% in preschool children and 9-13% in adults⁶. Obviously, the steep increase occurred during the school age. Every effort should be made to ensure that school children are screened, and that under and overnutrition are detected early and corrected. Adolescence is an important period of growth spurt. It is also a period when lifestyles are formed. Schools should, therefore, take adequate steps to ensure maximal utilization of this opportunity window and inculcate optimal dietary habits and physical activity in the future citizens of the country. If this is done, it will be possible to prevent increase in both under and overnutrition rates in this group and ensure that the majority of Indians remain normally nourished in the coming decades.

Health impact of ongoing nutrition transition

Growing concern over the increase in overnutrition rates stems from the fact that obesity is one of the major risk

Figure 4 Time trends in prevalence of under-nutrition

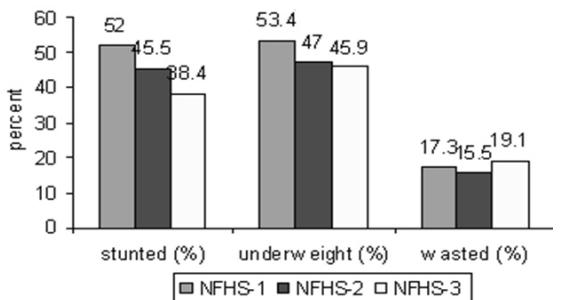
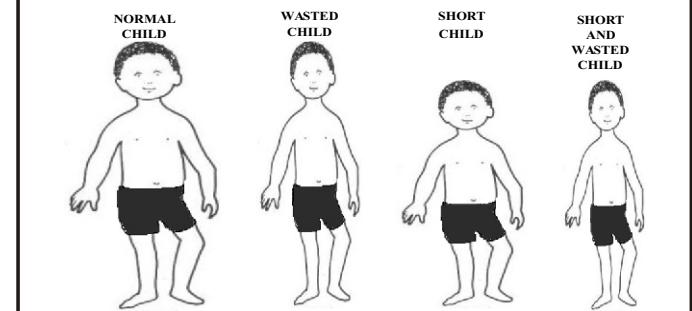
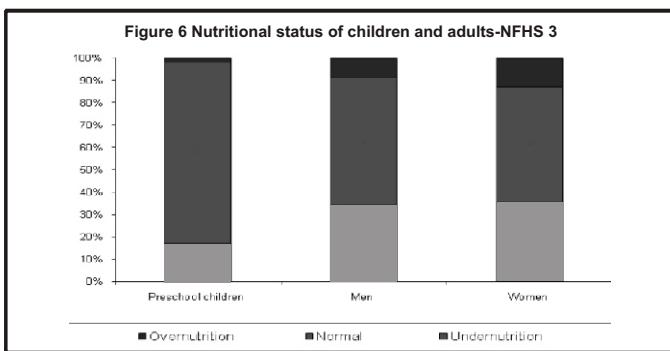


Figure 5 Effect of CED on nutritional status

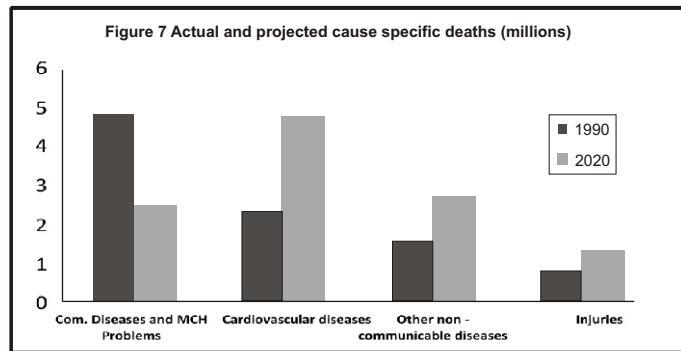




factors for noncommunicable diseases. The association between obesity (high BMI), cardiovascular diseases and diabetes has been well documented. Indians have a higher adiposity for a given BMI as compared to Caucasians, right from birth through childhood and adolescence, and into adulthood. They are more prone to abdominal adiposity and metabolic syndrome. Rising overnutrition rates can substantially accelerate the rate of increase in non communicable diseases during the nutrition transition.

In 1990, the WHO carried out a global exercise to assess ongoing health transition in countries and estimate disease burden and mortality over the next three decades. Actual cause specific mortality in 1990 and the projected cause-specific mortality in 2020 in India are shown in Figure 7. In 1990, maternal and child health problems and communicable diseases were the major causes of death. While communicable diseases were responsible for nearly 5 million deaths and cardiovascular diseases accounted for only ~2.25 million deaths in 1990, by 2020 the situation will be reversed. The causes of death reported by the Registrar General of India in 2005¹⁰ (middle of the period 1990-2020) indicate that deaths due to non-communicable diseases and injuries exceed those due to communicable diseases and maternal and child health problems. These data suggest that India is undergoing a rapid health transition and unless energetic and specific interventions are undertaken to combat the rising prevalence of noncommunicable diseases, the projections on causes of mortality and disease burden for the year 2020 are likely to be realised.

In the early years of the nutrition and health transition, obesity and noncommunicable diseases were seen predominantly among affluent segments of the population. However, over the years, there has been a change in the profile of the persons with obesity and at



risk of developing NCDs. The results of a recent study carried out in employees working in industrial establishments showed that the highly educated executives with better access to nutrition and health education strove to reduce the risk factors in their life styles; nearly half of them undertook daily physical activity, and <20% used tobacco; though >25% of them had hypertension, diabetes rates were only 8%. In contrast, among the employees who were illiterate or had only primary education, ~75% used tobacco, only 13% had regular physical activity, and 25% had metabolic syndrome. The prevalence of hypertension was higher among these workers than among the educated executives. It is, therefore, essential that the efforts for prevention, early detection and effective management of obesity and other risk factors for noncommunicable diseases should cover all segments of the population.

Conclusion

India, like all the developing countries, is currently undergoing rapid socioeconomic, demographic, nutrition and health transitions. While the country is yet to overcome poverty, undernutrition and communicable diseases, it is increasingly facing problems related to industrialization, urbanization and economic growth. There has been substantial reduction in physical activity in all segments of the population and consequent reduction in energy requirements. Undesirable lifestyle alterations, decreased physical activity, excessive energy intake as compared to energy requirement, addiction to tobacco and alcohol, and increase in psychosocial stress have led to the emergence of overnutrition, heart disease and diabetes as newer public health problems. Henceforth the country will have to gear itself up to prevent and combat both undernutrition and overnutrition and associated health problems. Overnutrition, diabetes and heart disease are no longer confined to the better off segments of the population but are increasingly seen among the

poorer and less educated segments; morbidity and mortality risks are higher among poorer segments of the population because of late detection of these diseases and the lack of effective continuous intervention. Health interventions should henceforth focus not only on providing acute care for MCH problems, infections and emergencies, but also on effective screening for chronic nutritional and health problems and providing continuous management over decades for those with NCDs.

The author is Director, Nutrition Foundation of India

References

- Reports of the National Sample Survey Organization NSSO. 1975-2000.; http://mospi.nic.in/mospi_nsso_rept_pubn.htm; last accessed on 24/09/07
- The Tendulkar Committee report on poverty estimation, 2009
- FAO Report of the Joint FAO/WHO/UNU expert consultation on Human Energy requirements Food and Nutrition technical report series 1 Rome 2004 <http://www.fao.org/docrep/007/y5686e/y5686e00HTM> last accessed on 12/09/2009
- Nutrient requirements and recommended dietary allowances for Indians. A report of the expert group of Indian Council of Medical Research. National Institute of Nutrition, Hyderabad. 2010.
- NNMB National Nutrition Monitoring Bureau. 1979-2005. NNMB Reports: National Institute Of Nutrition, Hyderabad
- National Family Health Survey (NFHS-3); <http://mohfw.nic.in/nfhsfactsheet.htm>; last accessed on 24/09/10.
- National Family Health Survey (NFHS-1); <http://mohfw.nic.in/nfhsfactsheet.htm>; last accessed on 24/09/10. NFHS 1
- National Family Health Survey (NFHS-2); <http://www.nfhsindia.org/india2.html>; last accessed on 24/09/10
- WHO. Growth Reference Data for 5-19 years. <http://www.who.int/growthref/en.2007>.
- Census India. Website:gov.in/vital_statistics/SRS/sample_registration_system.aspx.

Health Care in India: Past and Present

C Gopalan

The ideals of universal health and a good standard of living have been enshrined in the Constitution of India. "It is the duty of the State to raise the level of nutrition and the standard of living and to improve the public health." Part IV, Art. 47, *Constitution of India, Directive Principles of State Policy*. In addition, various courts at various times have interpreted Article 21, dealing with fundamental rights, as also encompassing the right to good health and nutrition.

The Past:

The common advice to athletes on the race-track is "Don't look back over your shoulder. Keep looking ahead." Yet, even as we strive towards the elusive goals of universal health and nutritional care in India, it may be instructive to remind ourselves where we started and how far we have come. Even at the time of Independence in 1947, India's leaders had given high priority to health care. On the eve of Independence, the Health Survey and Development Committee headed by Sir Bhore (Bhore Committee) had come out with a blueprint for bringing about universal health care with adequate attention to the rural population. The Bhore Committee Report¹ actually preceded the Beveridge Committee Report of the U.K.². India's performance in the field of health care in the first three decades after Independence can also be considered commendable. At the time when British rule ended (1947), India was a veritable museum of florid and frank nutrition deficiency diseases: for example, beriberi (both wet and dry) along the Eastern coast; pellagra in the Deccan plateau; hard, pendulous goitres in the sub-Himalayan regions; and keratomalacia and kwashiorkar in several thousands of the population in the south and east of the country. It is to the credit of the health system of the country that, with the relatively meagre means at its disposal, these formidable problems were banished within three decades and have ceased to be of significance³.

In the early 1960s, there were some real fears of impending food shortages. There were dark predictions that India would be devastated by large-scale famines. With the timely advent of the Green Revolution, this catastrophe was avoided. The Bengal Famine in the 1940s, that killed several thousands of people, was the last of a series of recurrent famines that took a toll of millions of lives during the years of British rule. There have been no large-scale

famines in India after the Bengal famine.

The Present

All this is not to deny that many of the concerns raised in various forums about the deficiencies in the present healthcare system are both valid and relevant. It is true that life expectancy has risen to 65 years from an abysmal 34 years in 1947; and infant mortality has dropped to 50 from 146 during the same period. But these gains pale into insignificance compared to the achievements of some other Asian countries, such as China, or even Bangla Desh. The present state of the health system in India urgently requires far greater inputs and attention.

Jawaharlal Nehru had described India as "a rich country with poor people". In many ways, this continues to be true even today. While the country has experienced significant macroeconomic growth, this has not resulted in any striking reduction in the overall picture of poverty. The rich are much richer, while the improvement in the condition of the poorer sections has been only marginal. This inequitable distribution of wealth inevitably manifests as grossly unequal standards of living including health and nutritional wellbeing. The hoped-for 'trickle-down' effect may be too little too late. We have now to ask ourselves: what are the factors that have led to the present unsatisfactory situation, and what could be the short- and long-term measures to overcome the deficiencies?

Factors Contributing To Poor Health And Nutrition Outreach:

(i) Population

A statistic that has to be factored in when discussing delivery of health care in India is the growth in population. With just about ~2.4% of the total land area of the world, India has ~17% of the world population. To put things in perspective, in the approximately 200 years of British administration, the population of undivided India rose by just ~100 millions, from ~ 250 millions to ~ 345 millions. This very low rate of population growth was largely because of large-scale deaths due to famines, and high mortality rates due to infections and morbidities. In 2010, India alone (minus Pakistan and Bangla Desh) had a population of close to ~1.2 billions, which is predicted to grow to 1.32 billions as early as 2020⁴. Catering to the health and nutrition needs of a fast-growing population calls for enormous efforts and

investment in production as well as the logistics of distribution of food and services; it demands that the personnel deployed are sufficient in number and well-trained; that the "pipeline" of resources is not depleted by leakages, and that the people themselves are aware of their rights and responsibilities in the matter of maintaining good health. There have been lacunae in all these aspects. The population of a country represents its human assets. India can reap the 'demographic dividend' from its largely young population well into the present century only if growth is inclusive and all the people can be enabled to contribute to national development.

(ii) Food production: distortions and shortages

The Green Revolution that started in the mid-Twentieth century saved India from famines and severe food shortages. However, it led to some deleterious effects such as a fall in the production of millets, pulses and legumes, which are important sources of high-quality protein and minerals essential for ensuring the nutritive value of cereal-based vegetarian diets. The steep fall in the production of pulses, coupled with the sharp rise in their prices would certainly have an adverse effect on the nutritional quality of diets in millions of Indian homes. But there are other factors in play as well. There have been concomitant changes in dietary preferences. This is illustrated by the observation that pulse intake has declined not only among the poor but also among the more affluent. There is clearly a need for more vigorous promotion of pulse production and consumption.

Though India has been acclaimed as the leading producer of milk in the world, the average per capita intake remains extremely low. Milk is a valuable source of protein, especially in vegetarian diets and particularly for growing children and pregnant and lactating mothers. Recent price pressures on milk raise concerns that this valuable source of nutrition may move out of the reach of those who need it the most. With its extensive coastline, India should strive to augment the production and consumption of fish, which are sources of valuable and essential nutrients. Patterns of food production should be oriented towards achieving better nutrition for the people.

(iii) Developmental Transition

a) Migration from rural to urban areas: Factors relating to developmental transition have also had an impact on the health picture in India. During the past several decades there has been a shift of populations from rural to urban areas. The urban population grew from 17% in 1951 to 27% in 2001⁵. Migration to urban areas leads to overcrowding in the cities, the mushrooming of slums, and all the

attendant problems of poor sanitation, with deleterious effects on the health of these populations. Such migration also involves changes in lifestyles, dietary habits and even value systems. A major change is with regard to the drop in the levels of physical exercise, coupled with the consumption of junk food.

b) Transition from poverty to middle class: Poverty alleviation and socioeconomic development programmes have resulted in a reduction in the proportion of people living below the poverty line, from 55% in 1970-71 to 22% (as per the old method of calculation) or 27.5% (as per the revised method) in 2003-04. However, there is an emerging consensus that inadequacy of energy intake alone is no longer acceptable as the sole indicator of poverty^{6,7}. Using the revised norms, which include access to health care and education, the Tendulkar Committee estimated that currently 32.7% of Indians are living below the poverty line. Whichever method is used, it is obvious that several millions of people are rising above the poverty line. The emergence from poverty into the middle class also involves changes in lifestyles, dietary habits and exercise levels, some of which could lead to increase in obesity and risk of developing non-communicable diseases.

c) Poverty in childhood to relative affluence in adulthood: More than 30% of babies in India are of low birth weight, and most of these are born to mothers from poor income groups. The studies of Barker⁸ have shown that low-birthweight infants may be 'programmed' by nature towards a lower growth trajectory. Studies in a Delhi cohort showed that when children who were undernourished in infancy and childhood grew to adulthood, >50% of them were overweight and therefore vulnerable to all the potential health problems that accompany it⁹.

All three factors mentioned here in relation to developmental transition are contributors to the emergence of a dual nutrition burden (both undernutrition and overnutrition) and an associated dual disease burden (communicable diseases and maternal and child health problems on the one hand and noncommunicable diseases on the other). In order to combat these problems, intensive nutrition and health education for all sections of the society is an imperative.

The Way Forward

Writing in an issue of Lancet magazine early this year, Prof. Amartya Sen asks: "What makes good health so problematic for so many people in India?" He concludes that a one-word answer would be "coverage". This may sound self-evident but experience has

shown that it is far from trivial. Complex problems such as the ones that India faces today need solutions involving both 'hardware' and 'software'. This is true also for coverage of health and nutrition programmes. In other words, coverage implies not only sufficient spread as regards geographical area, but optimal quality of coverage on a sustained basis throughout the country. It would appear that we have fallen short on both counts. The infrastructure and personnel are inadequate, and the quality is patchy and largely substandard. As regards health and nutrition care, the 'hardware' consists of primary health centres and anganwadis, peripheral hospitals, and the health and nutrition service providers at various levels. The 'software' would comprise efficiency, regularity of services, data gathering, support services, accountability and commitment. Obviously, there is a crying need for considerable improvement in all these areas.

The Right to Food Bill, which is soon to be introduced in Parliament and become an Act, seeks to provide a safety net against hunger for every Indian. This is a very progressive piece of legislation and can, in theory, raise the nutritional and health status of the poorest Indians. As with every other programme, however, the devil is in the detail. How well it will be administered at district level in the various States remains to be seen. Even in the case of a well-planned and closely-monitored programme such as the MGNREGA, the performance has been uneven and suboptimal in many areas where the needs have been the greatest.

Harnessing people power

While ensuring improvements in coverage, content and quality of the programmes, one should not lose sight of the most powerful potential engine for change....the people. Optimal health and nutritional wellbeing are not to be seen as items that can be gifted by the State to its citizens. The State is certainly duty bound to provide the facilities needed for the achievement of these objectives. But ultimately it is the individuals and the community that have to play a major part in ensuring their own health and nutritional wellbeing. Unfortunately, today large sections of the people do not have ready access to correct information, and are therefore not fully aware of practices that will promote health and nutritional wellbeing. Raising public awareness and creating a 'pull' effect among the community to avail of health and nutrition services calls for short-term as well as long-term measures.

Short-term measures:

Intensive targeted health and nutrition education: Despite the Government of India's attempts to promote universal

primary education by making it the right of every Indian child, this still appears to be a Utopian ideal. Several millions of children are still outside the school system, and millions of others, particularly girls, drop out early due to various reasons. As a result, we have been unable to tackle the problem of illiteracy adequately, and have been unable to reach many vulnerable sections, including rural adolescent girls, with health messages and information. These mothers of tomorrow continue to be poorly nourished and anaemic, and unequipped to adopt good environmental sanitation and child-rearing practices.

An intensive national programme of health and nutrition education beamed especially to the poor income groups and young rural women is now an absolute necessity. India has not so far instituted such a national-level programme to be carried out on a sustained basis by dedicated health workers. Departments of Food and Nutrition in the 400 Home Science Colleges in the country, and personnel from the Departments of Preventive Medicine in Medical Colleges should be involved in such a programme for providing guidance to the health workers in the field. This would greatly enhance the efficiency and usefulness of the personnel in these institutions by making them agents of change.

Long-term measures: Innovative uses of the school system: Once the coverage of primary education improves as a result of the rural population coming to appreciate the advantages of literacy and education for their children, the school system would be an ideal channel for the promotion of health and nutrition education of whole communities and for the inculcation of lifestyle and dietary habits conducive to good health. To be effective, the school system should consist of well-equipped and well-staffed schools with competent and committed teachers. At the time of the Second Five Year Plan, a School Health Committee was constituted by the Government of India. I was the Secretary of this Committee, and we recommended the launching of a universal School Health Service with emphasis on the promotion of health and prevention of diseases. This was accepted by the Prime Minister, but was never implemented, perhaps due to lack of resources at the time. It is an idea which could still fetch valuable dividends in the form of earlier tackling of health problems and better health awareness in the community. The Midday Meal programme should also be used as a means of instruction in good dietary habits, in addition to being a feeding programme.

Imaginative methods need to be evolved to train school children to become agents of change in their communities. I have been pleading for a Health Scouts

movement in schools to carry the message of sanitation, healthy lifestyles and good dietary habits into the community. We have yet to use this potentially very effective channel of communication. Most importantly, schools are the crucible of the future citizens. It is here that they can be taught not only the value of healthy lifestyles but also the inputs to be part of a peaceful and healthy community.

Health care for the poor in rural areas:

Bringing about changes in the dietary and lifestyle habits of the people will call for sustained education and consideration, commitment and empathy on the part of health workers. These workers must receive periodic retraining and must be supported by qualified staff of Home Science colleges and Departments of Preventive Medicine. In recent times there have been tremendous advances in medical science and technology. Medical and surgical therapeutic interventions that were unheard of as recently as twenty or thirty years ago have now become possible. This has resulted in the widening of the urban-rural as well as the rich-poor divide as regards availability of health care. The sophisticated infrastructure necessary for state-of-the-art tertiary health care would be impractical to provide in a rural setting. The situation cannot be resolved merely by asking doctors to move to rural areas until the minimal requisites in the form of infrastructure are made available. Some years ago I had suggested the institution of a course in B.Sc. Health Science which could be offered to candidates who were willing to undertake health care in rural areas. They would be adequately trained in primary health care, immunisation techniques, the identification of major diseases for referral, and perhaps even minor outpatient surgical procedures. This proposal was accepted by the University of Madras at the time when Dr. Malcolm Adiseshiah was the Vice-Chancellor, but it was turned down by the Medical Council of India. While this may not be an ideal solution, it could be attempted as an interim measure to raise standards of medical care in rural areas till full-scale infrastructure can be put in place. Alternative systems of medicine can also play their role in meeting the challenge of health care, especially in rural areas.

Even after better infrastructure is put in place, it will be necessary for the government to support or underwrite medical treatment for those who are unable to pay for the facility. For instance, Brazil is reported to have started a programme of totally subsidizing diabetes and hypertension treatment for its poor population. Other imaginative and innovative steps should also be devised to improve availability and quality of health care, especially for

the disadvantaged sections of the population.

Accountability and social audit:

The Government of India has come out with several important programmes designed to improve the health status of the people. The concepts behind these programmes are no doubt good but, as has been widely acknowledged, the implementation of these at the grassroots level still needs considerable improvement. There should be a mechanism of social audit to monitor the implementation of these programmes at the grassroots level and ensure accountability. Such social audit programmes should be fact-finding ones, and not fault-finding exercises. This would help to provide supportive supervision and help to bring about timely correction of deficiencies in the system. Some States have commenced this exercise and tried to take corrective measures based on the findings.

Thinking Out Of The Box

India is a vast and diverse country with wide variations in economic status and cultural habits. The current problems and deficiencies in the health and nutrition scenario in India are equally heterogeneous and require multiple approaches. A one-size-fits-all, top-down, approach will not yield dividends on the ground. India's policy makers and planners can look back on six decades to see what has worked and what has not. While obviously one should not abandon the carefully constructed public health programmes, it is not sufficient to resort to patchwork solutions. We must do things differently; but we must simultaneously also do different things. In recent times, there has been a lot of emphasis on the need to innovate and encourage entrepreneurship in this country. The field of health and nutrition could benefit vastly from such an approach.

In India, there are thousands of non-governmental organisations; many of them are doing commendable work in the areas of health care and health education among communities that need these services most. Many of their project models, with sufficient support, can be replicated or expanded. Entrepreneurial ideas from NGOs and others should be incubated and promoted. Many of these new ideas reflect the latest advances in electronics, telecommunication, and networking. For instance, a fledgeling NGO has recently been awarded an initial grant from the Bill and Melinda Gates Foundation for a project that will monitor immunisation coverage using mobile communication networks and biometrics. The Aadhar Project, promising as it does to make targeting of services more efficient by

giving each Indian a unique biometric identity, can also provide a quantum improvement in ensuring that interventions reach the intended beneficiaries and that resources are not frittered away or diverted.

Time and population do not stand still. Globalisation and economic cycles will continue to cause additional pressures of shortages and price inflation. Global warming may play spoilsport in even the best-made plans. The next decade or two will be absolutely crucial in determining the future of India, and health and nutrition must be the bedrock on which the people of India can plan a bright future.

The author is President, Nutrition Foundation of India

References

1. Government of India, Health Survey and Development (Bhore) Committee, Report, Volume-1, Delhi, Publications Division, 1946.
2. Beveridge Committee Report of the U.K. 1942.
3. Gopalan C. The changing epidemiology of malnutrition in a developing society - the unforeseen factors, Current Science, Vol 77(10), pp. 1257-1262, 1999.
4. Registrar General of India, 1901 - 2001. Website:http://populationcommission.nic.in/fact_s1.htm.
5. Census of India 2001. Website: www.censusindia.gov.in.
6. The Tendulkar Committee report on poverty estimation, 2009.
7. International Fund for Agricultural Development. The multidimensional poverty assessment tool (MPAT): A new framework for measuring rural poverty. 2009.
8. Barker DJP. Intra-uterine growth retardation and adult disease. Curr Opin Obstet Gynecol, 3:200-206, 1993.
9. Bhargava SK, Sachdev HPS, Fall CHD, Osmond C, Lakshmy R, Barker DJ, Biswas SKD, Ramji S, Prabhakaran D, Reddy KS. Relation of Serial Changes in Childhood Body Mass Index to Impaired Glucose Tolerance in Young Adulthood. N Engl J Med; 350:865-875, 2004.

FOUNDATION NEWS

Study Circle Lectures

- 'National Perspective on Micronutrient Deficiencies and Their Impact on Health and Productivity' by Dr C S Pandav on 19th January 2011.
- 'Promoting Equity in Health Role of Decentralized Planning' by Dr K Kalaivani on 23rd February 2011.
- 'Nutrition and healthy ageing' by Dr Seema Puri, on 23rd March 2011.