Combating the dual nutrition burden in children

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AT the time of independence, India faced the twin problems of acute and chronic undernutrition of its children. This was essentially a result of low dietary intake because of poverty and low purchasing power, high prevalence of infection because of poor access to safe drinking water, sanitation and health care and poor utilization of available facilities due to low literacy and lack of awareness.

Recognizing the importance of nutrition for health and human development, the country adopted a multi-sectoral, multi-pronged strategy to combat undernutrition. India achieved self-sufficiency in food production and built up buffer stocks, as efforts at improving economic growth resulted in significant decline in poverty levels. Food for work and PDS provided subsidized food to persons below the poverty line enhancing food security of the poor. Recognizing that children are a vulnerable group, special efforts were made to bridge the gap in their energy requirement through food supplementation. India's ICDS and mid-day meal programmes are perhaps the largest food supplementation programmes for children in the world. Finally, improved access to health care has reduced the nutritional toll due to infections.

Even though all these interventions did result in some improvement in nutritional status of children, the pace of improvement was slow. In the last five decades, though the mortality rate has come down by 50% and the fertility rate by 40%, the reduction in undernutrition in children is only 20%. There is growing concern that an increase in outlays for the nutrition sector has not brought about commensurate improvement in quality and coverage undernutrition programmes and nutritional status.

Even as the country is yet to overcome undernutrition in children, it increasingly faces problems of overnutrition and obesity, especially among urban high-income group children. Research studies in India have highlighted the possibility that under nutrition in childhood might be one of the predisposing factors for overnutrition and obesity in adult life. This article reviews some major dimensions and determinants of a dual nutrition burden on children and suggests appropriate interventions to combat them.

Currently, nationwide data on birth weight in different states and districts is not available because a majority of births occur at home and these infants are not weighed soon after birth. Estimates based on available data from institutional deliveries and smaller community-based studies suggest that nearly one-third of all Indian infants weigh less than 2.5 kg at birth. Over the last three decades there has not been any significant reduction in low birth weight (LBW) rate. Maternal undernutrition, anaemia and poor antenatal care are major factors responsible for low birth weight in India. Universal good

quality antenatal care will go along way in reducing the preterm births and achieve some reduction in low birth weight rate.

Studies in the sixties showed that unlike the situation in developed countries, a majority of Indian LBW neonates are born at term; their birth weight is low because of intrauterine growth retardation (IUGR). Unlike preterm infants, a majority of IUGR infants survive if given essential care, warmth, breast-feeding and remain free from infection. The progressive reduction in IMR in the country despite unchanged birthweight is the best testimony to the correctness of this landmark observation. Kerala has shown that even modest improvement in birthweight through good antenatal care, when coupled with essential paediatric care, can result in IMR comparable to developed countries.

The National Rural Health Mission has adopted a two-pronged strategy for improving neonatal mortality. In states that have an adequate infrastructure, institutional deliveries are encouraged so that the neonate gets adequate care. In states where a majority of deliveries occur at home, it is proposed that *anganwadi* workers (AWW) will weigh the neonates soon after delivery and refer those neonates weighing less than 2.2 kg to a hospital for appropriate care. The feasibility of this simple strategy, demonstrated in small studies, shows that if operationalized on a large scale, it will result in a significant reduction in neonatal deaths in otherwise poorly performing states.

The nutrition and health status of infants during infancy and childhood depends upon birth weight, adequacy of infant feeding and absence of infection. The studies carried out by Nutrition Foundation of India (NFI) in urban low income group children in Delhi, show that exclusively breast fed infants grow well during the first six months; thereafter, exclusively breast fed infants weigh less (Figure 1). In exclusively breast fed infants, morbidity rates are lower in the first six months but there is a progressive increase in the prevalence of morbidity with increasing age (Figure 2). Undernutrition rates are higher in children who were ill in the last fortnight.

In India, steps taken for the protection and promotion of breast feeding have been effective and the practice is today almost universal. However, the message that exclusive breast feeding up to six months and gradual introduction of semisolids from six months are critical for the prevention of undernutrition in infancy has not been effectively communicated. Data from National Family Health Survey – NFHS 1,2 and 3 indicated that though breast feeding was nearly universal and mean duration of lactation is over two years, exclusive breast feeding among infants in the age group of 0-5 months continues to be low. Despite the emphasis on the need for timely introduction of complementary food, it remains poor among the infants in the age group of 6-9 months. There are substantial inter-state differences in exclusive breast feeding and timely introduction of semi-solid food. Too early introduction of supplements is a major problem in states like Delhi, Himachal Pradesh and Punjab and too late introduction of supplements is a big problem in Uttar Pradesh, Madhya Pradesh, Rajasthan, and Orissa. Kerala fares well in terms of appropriate infant feeding practices and this might be a reason for the relatively low undernutrition rates there. Faulty infant feeding/caring

practices and poor access to health care are recognised as major factors responsible for the continued high prevalence of undernutrition during infancy and early childhood.

The early introduction of milk substitutes and late introduction of complimentary food are associated with increased risk of infection and undernutrition. If infections are not detected and treated effectively in the primary health care settings, they may result in death. It is computed that exclusive breast feeding and appropriate complementary feeding can lead to a 20% reduction in IMR (Figure 3). Improvement in infant and young child feeding (IYCF) which can be achieved through coordinated efforts of ICDS and primary health care personnel, will result in substantial improvement both in nutritional and health status during the critical first year of life.

Pre-school children constitute one of the most nutritionally vulnerable segments of the population and their nutritional status is considered as a sensitive indicator of community health and nutrition. However, there has not been any substantial improvement in their dietary intake over the last couple of decades.

Data on energy intake in children, adolescents and adults from surveys in rural areas in nine states carried out by National Nutrition Monitoring Bureau (NNMB) in 2000, shows that mean energy consumption, as percentage of recommended dietary allowances (RDA) is the least among preschool children, inspite of the fact that their requirement is the lowest.

NNMB data on time trends in intra-familial distribution of food indicate that while the proportion of families where both adults and preschool children have adequate food has remained at around 30%, over the last 20 years the proportion of families with inadequate intake has come down substantially. However, the proportion of families where pre-school children receive inadequate food intake while adults have adequate intake has nearly doubled. This is despite the fact that the RDA for preschool children forms a very small proportion (on an average 1300 Kcal/day) of the family's total intake of around 11000 Kcal/day (assuming a family size of 5). It would, therefore, appear that young child feeding and caring practices, and not poverty and lack of food at home, are becoming major factors responsible for inadequate dietary intake in preschool children.

Data from NNMB on time trends in energy intake and prevalence of undernutrition in under three children shows that there has been a steady decline in undernutrition, even though the dietary energy intake has not shown a major change over the years. The decline in undernutrition is most probably attributable to better access to health care and effective management of infections.

Over the last three decades there has been a steep decline in the prevalence of moderate and severe undernutrition as assessed by weight for age and height for age. In spite of the steep decline in the prevalence of stunting, the change in the mean height of children is

very low. Notwithstanding a decline in underweight children, nearly half of them remain underweight as compared to National Council for Health Statistics/World Health Organization (NCHS/WHO) norms.

It's worth noting that the nutritional status of poor children in Kerala is similar to the rich in Uttar Pradesh (Figure 4). This is probably due to better access to health care and equitable distribution of food between members of the family in Kerala, and a lack of these in Uttar Pradesh. The data confirm that lack of access to nutrition and health care is an important determinant of undernutrition in preschool children.

In view of the above, it is essential that the focus of our efforts should be on:

1. Prevention of undernutrition through nutrition education by interpersonal communication by ANM/AWW aimed at:

* ensuring appropriate infant feeding practices (exclusive breast feeding up to six months, introduction of semisolids at six months);

* promotion of appropriate intra-family distribution of food

2. Operationalization of universal screening of infants, pre-school and school children for early detection of undernutrition.

3. Operationalization of nutrition interventions for the management of undernutrition through:

* targeted food supplementation and health care for those with undernutrition;

* effective monitoring of these individuals and their families.

In April 2006, the WHO released the new growth standards for pre-school children based on a multi-country study on breast-fed infants in which India also participated and recommended that instead of the NCHS/WHO growth standards, member states may use new standards in view of the WHO policy on promoting breast feeding, and the urgent need to use the standards for BMI for age for early detection and correction of under and overnutrition in preschool children .

Analysis of data on weight for age of 2.4 lakh preschool children from the district level household survey (DLHS) showed that there were substantial differences in prevalence of undernutrition (weight for age) as assessed by NCHS and WHO standards. The maximum difference in underweight rates is during the critical first year of life. Computed underweight rates using new WHO standards are higher as compared to the computed underweight rates using NCHS standards in the first six months. This should be viewed as a correction of a historical fallacy of using NCHS standards based on formula fed infants and not as an alarming rise in underweight rates in the 0-6 age group.

After the first year, the prevalence of underweight rates computed on the basis of WHO standards is lower than the underweight rates computed using the NCHS standard. This should not be interpreted as a fall in undernutrition rates, leading to a sense of complacency that undernutrition rates are falling.

Data from studies carried out by The Nutrition Foundation of India in Delhi showed that while undernutrition afflicts children from low income groups who are studying in government schools, overnutrition is a cause for worry in high income group children in public schools, right from six years of age.

Data on height and weight distribution (as compared to NCHS/WHO norms) in Delhi school children from affluent segments of the population investigated by the Nutrition Foundation of India shows that even among affluent segments there are some children who are stunted (-2SD height for age). There are overweight children in all classes right from play school. After the age of ten there is a reduction in overweight children. This might be because the adolescents have greater awareness and make a conscious effort to lose weight, either through exercise or by skipping meals. However, there is little consistency in eating and exercise; as a result these children suffer cyclical weight gain and loss and experience all the associated health hazards.

India has now entered the era of a dual nutrition burden where under and overnutrition are a major public health problem. In this context, we need to ask whether we are using the right indices for early detection of both under and overnutrition. Currently used indices for assessment of nutritional status in children are height for age, weight for age and BMI for age. Indian children are shorter than their developed country counterparts and, therefore, will weigh less and be classified as undernourished by weight for age index even though they have appropriate weight for their height.

Clinicians readily recognize several categories of children.

* those who are normal height and weight (no intervention needed);

* those who are tall and slim (need more food);

* children who are normal weight for their height even though they are short (stunted but appropriate BMI requiring no intervention);

* children who are short and overweight for their height (requiring exercise).

This categorization for the child is based on body mass index for age. This index has not yet been widely used, perhaps because BMI varies with age in children and computation of BMI for age in growing children appears complicated. Studies carried out by the Nutrition Foundation of India indicate that BMI for age is a more sensitive index for detection of both under and overnutrition in children as compared to weight for age.

To sum up, all developing countries in the world are undergoing socioeconomic and nutrition transition; in the last decade the pace of nutrition transition in India has accelerated. While undernutrition remains a major public health problem in India, overnutrition too is emerging as a problem, especially among the urban high income group. Poverty was the major cause of undernutrition five decades ago; during the current decade, poor infant and young child feeding and poor access to health care are emerging as equally important determinants of undernutrition in children.

Nutrition and health education and improved access to health and nutrition care can result in substantial reduction in undernutrition in children over the next decade. Fortunately, prevalence of overnutrition in India, except among urban high income groups, is relatively low. As health hazards associated with overnutrition in children are well understood, effective nutrition and health education targeted to school children might enable the country to prevent any escalation of the overnutrition rates in children. The current phase of dual nutrition burden should, therefore, be viewed as an opportunity for effectively combating both under and overnutrition in children.