Current Issues in Nutrition

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The term malnutrition includes both under- and over-nutrition. This thematic issue on nutrition examines the problem of under- as well as over-nutrition, their putative causes and consequences, the mechanisms involved and the way forward. The present collection of articles spans clinical, public health, biochemical/molecular, social and economic aspects of the complex problem of malnutrition and issues related to food and nutrition security.

Despite the good economic growth, India contributes to about a third of the total number of undernourished in the world. While florid clinical forms of under-nutrition have become rare, over 30% preschool age children are stunted and underweight. Deficiencies of micronutrients (vitamins and minerals), particularly anaemia afflict over 70% women and children. The problem begins in the womb with almost 19% newborns in India having low birth weight (<2.5 Kg), pointing to the neglect of health and nutrition of women. The adverse effects are multi-generational. Over 30% of children and adolescents consume diets inadequate in calories with or without protein deficiency. Dietary deficiency of micronutrients (the hidden hunger) is more rampant since the cereals and legumes-based Indian diets are qualitatively poor in micronutrients, particularly iron, vitamins A, B2, folic acid and B12 (Vijayaraghavan, pp 1341-1350). While India has achieved the United Nation’s Millennium Development Goal of 50% reduction in poverty between the years 2000 and 2015, it has failed to achieve the goals of reduction in child nutrition, under 5 mortality rate (U5MR), and maternal mortality rate (MMR). Thus India has begun with a handicap towards achieving the UN’s new targets of Sustainable Development Goals (Ramachandran and Kalaivani, pp 1351-1365). The malady according to one of the authors (Rao, pp 1367-1379), is “A forgotten national nutrition policy without a national programme”. Niti Ayog needs to revise the National Nutrition Policy drafted way back in 1993, and most importantly address the multi-dimensional issue of food and nutrition security through a National Nutrition Mission.

In the past, no one thought that a tropical country like India can have the problem of vitamin D deficiency. Nor did we think that vitamin B12 which is needed in very minute amount (1µg/day) can be a problem. Yet these two deficiencies have emerged in a big way as public health problems (Shalini et al., pp 1381-1394; Sivaprasad et al., pp 1395-1412). Their hitherto not recognised functions and adverse consequences of their deficiencies have become a focus of recent research. Raised level of serum homocysteine due to dietary deficiencies of folic acid, vitamins B12 and B6 (perhaps B2), involved in its metabolism, seems to be an important aetiological factor for cardiovascular and other chronic diseases. Genetic predispositions recognised in the functioning of the enzymes of this pathway, point to the need for individualised nutrition (Raman, pp 1413-1424; Sivaprasad et al., pp 1395-1412).

Fascinating new knowledge on the interaction of nutrients with genes (the epigenetic effects) and the cross talk between nutrition, the microbiota (that we harbour particularly in our gastro-intestinal track), genes and health have revolutionised our understanding of nutrition and health. Three separate papers in this collection deal with this subject (Raman, pp 1413-1424; Rao et al. pp 1367-1379 and Hemalatha, pp 1437-1447). Importance of probiotic and pre-biotic foods for health is also discussed (Hemalatha, pp 1437-1447).

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We have adopted some criteria for labelling foetal growth standards. Can one size fit all or are their country and region wise differences (Jain and Paul, pp 1449-1463)? According to the developmental origins of non-communicable diseases hypothesis, under-nutrition in foetal life can sow the seeds of late age-onset, degenerative diseases like obesity, and associated metabolic syndrome, especially if there is later age change in diet and lifestyle of individuals raised under resource poor conditions (Yajnik et al., pp 1465-1476). This has become a big issue since the burden of chronic non-communicable diseases like obesity, cardiovascular diseases, and cancer is increasing in India. India has become the diabetes capital of the world. Indians succumb to the age-onset degenerative diseases at a younger age than other population groups. The article on Diet and Nutrition in the Prevention of Non-Communicable Diseases discusses this problem and suggests remedial measures (Krishnaswamy et al., pp 1477-1494). Under-nutrition in early life can have devastating effect on brain development and cognition (Vazir and Sesikeran, pp 1495-1506). The first 1000 days from conception are the most critical period for nurturing. Some studies suggest that post natal over nutrition resulting in fast linear growth, can be also harmful in terms of susceptibility to chronic diseases (Yajnik et al., pp 1465-1476). Best practices of infant and young child feeding and of management of severe acute malnutrition are presented in two separate articles (Bhandari and Chowdhury, pp 1507-1517 and Kulkarni, pp 1519-1528).

The current buzz word for combating hidden hunger is the food based approach, particularly the nutritionally sensitive and environmentally sustainable farming practices. Homestead production of nutrients-rich foods like vegetables (particularly the green leafy vegetables), fruits, and livestock (dairy, poultry, etc) increase access to and consumption of these foods (Bamji and Nair, pp 1529-1540). There is urgent need to increase the production and consumption of millets and pulses. Besides being nutritious, they are climate resilient. The review dealing with grain legumes for nutrition security deals with the technological aspects of production (including genetically modified foods) processing and use of grain legumes in feeding programmes (Janila et al., pp 1541-1553).

Food fortification is a powerful tool. However, for its effective implementation, correct estimates of requirement of each nutrient (the recommended dietary allowance) and the safe limits of intake, particularly for nutrients like iron and fat-soluble vitamins that are stored in the body, are necessary. Latter, is particularly needed with fortified foods flooding the market. Reduction in the incidence of iodine deficiency disease (goitre) after the introduction of iodised salt is a success story (Swaminathan et al., pp 1555-1563). Pharmaceutical supplements are, however, needed when the problem is severe as in the case of anaemia. Unfortunately, anaemia continues to be a problem despite the anaemia prophylaxis programme of supplementation of pregnant women and children with iron and folic acid. Is this only due to administrative infirmity and poor compliance or, is scientific re-look needed? Trials with an enlarged basket of nutrients like vitamins B12, vitamin C and zinc are needed (Bamji and Nair, pp 1529-1540). Recent studies show that excessive supplementation of women with folic acid to prevent neural tube defects can create folate-vitamin B12 imbalance, and increased susceptibility to insulin resistance and diabetes in mother and child (Yajnik et al., pp 1465-1476).

The health benefits of foods can go beyond the known functions of nutrients contained in them. This relatively new science of Functional foods and nutraceuticals is presented. Many traditional foods like fenugreek, turmeric and some other spices have functional attributes (Bhaskarachary et al., pp 1565-1577). India’s food security issues are covered in reviews dealing with demand vs supply of food in India, and dynamics of food consumption and nutritional security (Praduman Kumar et al., pp 1579-1586 and Joshi et al., pp 1587-1599).

Nutrition security goes beyond food security, and demands access to disease-free environment, clean drinking water and health care outreach. The non-food aspects, however, are beyond the scope of this collection. Along with technological interventions, behavioural changes, education and communication strategies are extremely important for achieving best results.
This special collection of reviews will be of interest not only to all researchers and practitioners of the science of nutrition, but to scientists in general. World over there is resurgence of interest in the old and relatively neglected science of nutrition – which was the basis of the science of biochemistry, and medicine. Lot remains to be understood on scientific, technological and sociological aspects of food and nutrition security. There is a clear message for India and its developmental pundits, since no nation can develop without frontal attack on the scourge of malnutrition. Nutritional interventions make good economic sense also through better productivity and decreased medical expenses.

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