The Global Problem of Malnutrition

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Introduction

The field of biochemistry and enzymology that concerns intermediary metabolism has a relationship to the processes of the living cell and organisms that precedes the evolution of molecular biology and genomics. However, nutrition as a science and as an essential for healthcare is challenged in our current existence. The global importance of nutrition, food sources and water supplies has not retreated despite extensive knowledge about nutrition, improvements in agriculture, and the evolution of food science. The insurmountable problem is the long global history of centuries of European colonialism and more recent post WWII hegemony, repeated wars, the decay of states, rural and/or urban poverty, massive weather changes, and mass migrations. These have much to do about environment and of economic disparities that make continuation of the current situation unsustainable as it exists. The solutions are both economic and political.

The Nature of Protein-Calorie Under Nutrition

We concern ourselves here with macronutrient deficiency, such as carbohydrate, protein and fat. Carbohydrate is the fuel for short term energy and, in the form of lipoprotein, for structure. Fat, dense in caloric content, issued for long term energy and for structure in lipoprotein. I concern this discussion with essential proteins, which may bind to carbohydrate or to lipid in membrane structure. Deficiency of this major nutritional class is called protein-energy malnutrition, which exists as marasmus or as kwashiorkor, the latter which exhibits edema and wasting [1]. Edema may occur at a serum albumin concentration less than 2.8 mg/dl [2], at which water accumulates in the interstitial tissues, and in severely malnourished children accumulates in the peritoneal cavity. Serious Protein-Energy Malnutrition (PEM) can result in death, either from sufficient loss of lean body mass [3], or from co morbidity of infection, septicemia, or organ failure, and may also be concurrent with anemia, congestive heart failure, pulmonary edema, or viral or parasitic infection as co morbidity. On a global scale, PEM is most common in children under age 5-6 years age, and it is accompanied by stunting (growth failure) and mental retardation [4]. PEM in urban or rural areas is associated with high poverty rates. In some regions it is found concurrent with waste water contamination [5]. In other circumstances there is a lack of dietary animal protein from milk at birth into the first months of life. Still later there may well be lack of milk, eggs, chicken, fish, or meat intake [6].

Malnutrition is a major worldwide health problem, especially in developing countries. Water supply, sanitation and hygiene are critically important for preventing malnutrition, and these also have a direct impact on infectious disease, especially diarrhea. Poverty, inadequate water supply, poor sanitation, and war are all related to malnutrition [5,7]. However, in the Indian Hindu population along the Ganges, there is also a practice of outdoor defecation without sanitation [5,8]. This is a factor in a better health of the poorer Moslem co inhabitants. There is also an impact of repeated or persistent diarrhea on the impoverished population with an associated malnutrition. The effect of malnutrition on susceptibility to infectious diarrhea [7] reinforces the same elements of a vicious circle among children in developing countries.

Malnutrition increases the risk of disease and early death. Protein-energy malnutrition plays a major role in half of all under five deaths each year in developing countries [9-12]. The severe forms of malnutrition include marasmus (chronic wasting of fat); kwashiorkor (severe wasting of muscle and lean body mass); cretinism and irreversible brain damage due to iodine deficiency; and blindness and increased risk of infection and death from vitamin A deficiency. When people are exposed to high levels of infection due to unsafe and insufficient water supply and inadequate sanitation, they also develop compromised nutritional status. In secondary malnutrition, in addition, individuals who develop insidious diarrhea don’t benefit from food because of a consequent inadequate absorption of nutrients. In addition, those individuals who are experiencing Protein-Energy Malnutrition (PEM) are more susceptible to, and less able to recover from, infectious diseases.

Malnutrition and poverty both contribute to a situation that fuels an increase in the affected population burden of disease, stunted
Malnutrition in India

Stunting contributes to the deaths of a million children under the age of 5 each year [15,16]. Those children who survive suffer cognitive deficits. They are poorer and sicker than children not affected by stunting. India’s stunting problem affects 20 times more people in India alone than HIV/AIDS does around the world. Sanitation and air quality are among the worst in the world. Paratitic diseases and infections like tuberculosis, often linked with poor sanitation, are common in India [16]. More than one in four newborn deaths occurs in India. Open defecation has been an issue that Ghandi tried to address in India [17]. Even though widespread housing discrimination confines many Muslims to separate slums, nevertheless, their children are less exposed to the higher levels of waste in Hindu communities. This may save thousands of Indian Muslim babies from death each year. Moreover, few rural households have the latrines that have almost eliminated outdoor waste in neighboring Bangladesh.

Malnutrition of Children of Rural China

Chinese children in rural villages have a very high rate of poverty. The challenges that these children of rural China face are nonexistent in the cities. The struggle against malnutrition is most notable. It was reported that the prevalence of under nutrition in children less than 5 years of age was highest in poor rural areas in a study of nutrition in children under age 5 in China [21]. The overall prevalence of under nutrition has declined by 74% for underweight and 70% for stunting. There were significant downward trends in the prevalence of both underweight and stunting was observed for all areas (P < 0.001). However, in poor rural areas the prevalence...
of underweight and stunting was still high in 2010, at 8.0% and 20.3% [22]. UNICEF estimates that in China there are 12.7 million stunted children [22,23]. In addition to malnutrition, the rate of anemia is high on rural Chinese children [24]. Stanford University conducted at least on 1824 babies in China’s Shaanxi Province [25]. While forty nine percent of the babies tested were anemic and another 28 percent were near anemic, forty percent of these children also displayed cognitive or motor problems. This is because of inadequate intake of many micronutrients, such as iron, as well as fresh fruits and vegetables. In 2006, prevalence of overweight children was as high as 16.8%, while that of stunting was 57.6% among the children in the poor areas of China’s mid-western provinces [22,23]. The coexistence of stunting and overweight in the same child is a result of protein and energy malnutrition, which retards height despite increased body weight, and Chinese rural children have a lower daily protein intake than urban children.

Malnutrition in United States

A study of low-income areas of the United States found that 22-35% of children aged 2-6 years were below the 15th percentile for weight [26]. Another survey found that 11% of children in low-income areas had height-for-age measurements below the 5th percentile. It has been noted that 13.6% of children in rural populations experience poor growth. On the other end of the age spectrum, up to 55% of hospitalized elderly people are undernourished and up to 85% of institutionalized elderly people are undernourished.

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