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not just the lack of food

SPECIAL SKILLS ARE REQUIRED TO FEED AN INFANT PROPERLY AND PROTECT IT FROM INFECTIONS. MANY CHILDREN SOMEHOW THRIVE DESPITE FAMILY POVERTY AND INADEQUATE LEVELS OF NUTRITION

by Leonardo Mata

Those who are familiar with rural areas of developing nations are often amazed to find malnourished children in families where food is available in amounts sufficient to ensure an adequate diet. There may seem to be plenty of food in the house and, quite strikingly, the mother of the malnourished child, as well as other adults, may appear well nourished, or even overweight.

Health workers ask themselves why malnutrition does not affect more children when there is widespread food shortage. In low-income families, with deficient education and living under unsanitary conditions, malnutrition occurs only in *certain* children.

The distribution of malnutrition in today's world reveals a distinct concentration of endemic foci in the tropical and sub-tropical regions. Yet in some of these areas an excess production of proteins and calories is often recorded. In Central America, for example, acute malnutrition may appear in villages at times of abundance instead of when food is scarce, contrary to what might be expected from a simple cause-effect relationship between lack of food and malnutrition. The occurrence of severe malnutrition in such cases follows epidemics of infectious diseases, and indicates the relevance of such conditions in the genesis of nutritional disease.

It is apparent that non-food factors play a definite role in the occurrence of malnutrition. Epidemiological studies help to pinpoint these factors, which may conveniently be divided into the chemical, the biological and the socio-cultural environments. Environmental forces act more strongly on human society in the tropics and sub-tropics, retarding or preventing its development. It is in these areas that the interaction of physico-chemical, biological and socio-cultural factors intensifies and tends to favour the occurrence of malnutrition.

Physico-chemical environment

The physico-chemical factors range from climate to soil composition. Steady high temperatures and humidity, abundant rainfall, drought and similar natural phenomena tend to diminish, independently or in conjunction with other factors, the productivity and creativity of man. Such conditions increase nutrient losses and augment body demands. They encourage the proliferation of insect and other vectors of parasites and the maintenance of cycles and transmission of parasites and viruses. They also foster the proliferation of weeds, rodents, insects and plant pests, all of which are detrimental to food production.

Man has learned much about the physico-chemical environment and ways of controlling it. The application of such knowledge is fundamental if all sectors of society are to enjoy proper food.

Biological environment

The tropical and sub-tropical regions offer ideal conditions for the persistence

of infectious agents among the human population. Biological factors include the viruses, bacteria, parasites and other kinds of infectious agents with pathogenic potential. Their occurrence in man depends on interactions between host and environment, and their overall effect is to harm human development and growth, particularly during infancy and early childhood.

For some children the interaction of infectious agents with nutrition and growth begins in the womb. Maternal infections may cause a variety of adverse effects such as abortion, fetal growth retardation, prematurity, infectious disease, and embryopathy.

In industrial societies the risk of the mother acquiring an infection during pregnancy is relatively low, but in underdeveloped areas the mother is exposed to a significantly higher risk and does not have access to adequate systems of health care and disease prevention. In some Central American villages approximately 15 per cent of newborn babies show signs at birth of having been affected by antigens during intra-uterine life. More than 10 per cent of village women are infected with cytomegaloviruses, herpes simplex virus or toxoplasma during pregnancy, as the rates of antibody responses show. Furthermore, as many as 25 per cent of the women in rural areas suffer at least one bout of urinary tract infection.

Maternal infection, coupled with a deficient calorie intake, is the main cause of fetal malnutrition. The added effect of the small stature of village women (which in turn reflects a background of malnutrition) contributes in great part to the high incidence of

prematurity and fetal growth retardation observed in developing countries.

Most of the negative effects of infection on nutrition, however, occur after birth, particularly in the first two years of life. Infection begins with labour and delivery and increases as the child grows older.

In unsanitary rural areas childbirth practices combined with the high rates of maternal infection offer many opportunities for the child to be contaminated by infectious agents harboured by the mother. Intestinal infections of the newborn child, on the other hand, are generally asymptomatic and short-lived, disappearing in a few days. The remarkable resistance to infection shown by infants in rural areas is attributed to the nutritive value of breast milk and the resistance inherent in it. When weaning begins, usually after two to five months of age, the susceptibility of the child changes because the food and water it receives are easily contaminated or polluted, while the protective effect of maternal milk begins to decline.

In women who do not increase their caloric intake, their milk output starts to fall off after the second or third month of lactation. The weaning period is usually protracted, and may extend into the second or third years of the child's life. This coincides with the occurrence of diarrhoea in the young child, a syndrome caused by the combined action of several infectious agents and the deteriorating nutritional status. Each of a succession of infections has a negative effect on nutrition and growth. Among all morbidity recorded, the high rates of diarrhoeal and respiratory illnesses are notorious. Children may be ill with debilitating diarrhoeal, respiratory and skin infections for as much as a third of their total first year of life. In some regions the situation is further aggravated by such chronic infections

as malaria, schistosomiasis, hookworm and tuberculosis, while in many lowland areas, dysentery, jungle fevers and other tropical diseases add to the toll. Detailed studies of individual children have revealed that most of the calorie shortage formerly attributed to the low quality and quantity of rural diets could be corrected if infections could be prevented. The occurrence of multiple and repetitive infections may contribute to the anaemia of children living in hookworm-free areas or whose diets are not necessarily deficient in iron sources.

Sociocultural environment

Sociocultural factors bear most directly on the quality of life and are the true determinants of malnutrition in society; to a great degree they determine whether food is available and whether infection occurs and induces adverse effects in the child; they also regulate food consumption and influence the conditions which enable infection to interfere with food utilization.

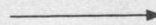
Patterns of land distribution, the level of agricultural technology, the systems of food distribution and marketing—these are all components of the sociocultural environment which influence food availability.

On the other hand, food habits and traditions and beliefs affect the endemicity and epidemicity of infectious diseases, and are important primary or secondary causes of malnutrition. When a child becomes ill, traditions, beliefs and taboos may enter into play to influence care and treatment. The result may be recommendations about food

Effect of Infection on Nutrition

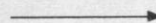
1. Direct effect

a. Anorexia, vomiting
Impaired digestion
and absorption



Decreased food intake
and utilization

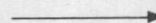
b. Loss of nutrients and cells
Overutilization, sequestration
and diversion of nutrients



Nutrient wastage

2. Indirect effect

a. Interaction of infection
with sociocultural factors



Decreased food intake
and nutrient wastage

suppression or restriction, alterations of the diet or the application of positively harmful "remedies". The indirect effect of infections may thus be more important than the direct one, particularly in traditional societies with a low level of education. This is summarized in the accompanying table.

Maternal education, that is to say the endowment of skills and technology rather than scholastic ability, plays a positive role in this context. Skills are required to feed an infant properly and protect it from environmental hazards, particularly infection. Health workers are often surprised to discover many children thriving under conditions of

poverty but with adequate levels of nutrition despite environmental circumstances. A close examination of conditions in the home may reveal that the mother is skilled in the techniques required to care for her children. Simple details such as the thorough preparation and cooking of local foods, the boiling of drinking water, the washing of children's hands and the avoidance of contact with soiled diapers before and during food preparation are of vital importance. Mothers who seek prompt medical attention when needed, or who actively participate in maternal and child health programmes are helping to keep malnutrition at bay. This is true even when food and material goods may not be abundant in the home.

The principle that an adequate level of maternal skills can do more than an abundance of food is strengthened by recent findings that village diets are, after all, not so poor and deficient as was once thought. In general, foods available in rural areas can provide a good quality and quantity of protein if properly mixed. A marked calorie restriction, however, is generally observed. There may be several reasons for this, such as the child's inability to eat

enough of the bulky, cereal-based diet. Another reason is the recurrence of anorexia (and often vomiting) resulting from infection, which restricts calorie intake; other negative effects aggravate the malnutrition that develops with anorexia. But, fundamentally, the skilled and hygienic mixing of available foods in the village will give the healthful nutrient diet that children need.

What becomes evident from the epidemiological understanding of the causes of malnutrition is that lack of food alone is not its only cause. This understanding is desirable in the light of the frequent failure of food programmes aimed at preventing malnutrition. On the other hand, improvement of the nutritional status has been recorded once certain measures of health education, water supply and vaccination are introduced. This tells us that the manifold causes of malnutrition necessarily call for a multi-dimensional approach to its solution. This includes measures aimed at an overall improvement of the environment, with emphasis on prevention and control of infectious diseases and on maternal education, in conjunction with the orthodox food programme approach. ■