

## CHARACTERISTICS AND EPIDEMIOLOGY OF PROTEIN MALNUTRITION IN CHILDREN.

Moisés Béhar, Institute of Nutrition of Central America and Panama (INCAP),  
Guatemala, C. A.

In large areas of the world today, half of the children born in low-income groups die before they are five years of age; and a significant proportion of these deaths are attributable, directly or indirectly, to protein malnutrition, one of the most widespread and serious nutritional deficiencies in children.

Protein deficiency in growing children cannot be described as a single clinical syndrome, because it is usually associated with some degree of calorie inadequacy and deficiencies of other nutrients. The relative magnitude of the deficiencies may determine the resulting clinical picture. In practice, the clinical spectrum of severe protein deficiency ranges from kwashiorkor, where caloric intake can be adequate or even excessive, to marasmus, where the lack of calories is so great that it becomes the limiting factor and few signs and symptoms of protein deficiency are apparent. If reference is limited to the advanced states of each, the main clinical signs and symptoms of the kwashiorkor type are: pitting edema, which is a sine qua non of the diagnosis; a variable degree of dermatosis and hair alterations; psychic changes; gastro-intestinal disturbances and muscular hypotonicity.

In marasmus the predominant signs are retardation in growth and development, as evidenced by height, weight, and bone maturation, extreme muscular wasting and a virtual lack of subcutaneous fat.

Low total serum protein is a diagnostic characteristic of kwashiorkor due almost entirely to low albumin and is sometimes partially obscured by a relatively high gamma globulin resulting from a concurrent infectious process. Total alpha-amino nitrogen in plasma is abnormally low because most amino acids are decreased in amount. Low levels of urea in both blood and urine indicate decreased protein metabolism. All the various lipid fractions which have been determined in blood of children with kwashiorkor, including neutral fat, fatty acids, phospholipids and cholesterol, have been found low. The protein deficiency of kwashiorkor is severe enough to cause profound alterations in the activities of many enzymes. Potassium depletion is a major biochemical characteristic of kwashiorkor and is a direct consequence of the protein deficiency.