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# THE CHANGING PATTERN OF MALNUTRITION IN THE CHILD

by

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Malnutrition in the child, the same as most diseases, is the result of the interplay of the triad: causative agent - host - environment, and it is in this dynamic context that the epidemiology and ecology of malnutrition should be analyzed. The rapid changes that are being brought about in many countries as the result of the independence from the old colonial powers, the process of industrialization, the development of new sources of wealth, the penetration of mass information media and above all the universal trend to urbanization, have affected the pattern of malnutrition in the young. The lesson that can be learnt from countries that are further along the pathway of economic development and that have already experienced these changes can, undoubtedly, be of use to other nations.

The pioneering work of Cicely Williams (1), Scroggie (2), Pena-Chavarria (3),and Brock (4), who recognized malnutrition in the pre-school child as an important clinical and public health problem twenty-five years ago, is still meaningful. Their observations can be said to be valid today

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principally for the tropical areas of the world, where village life is the rule.

Classical kwashiorkor, syndrome pluricarencial, culebrilla or infantile pellagra is characterized by a history of late weaning, to the family diet which is very low in protein content, but only moderately low in calories. The usual clinical picture is in a pre-school child one and a half to three years of age, with 60 to 70% of the ideal weight for age, that shows a symptomatic complex of oedema, skin lesions, hair changes and hepatomegaly. It is characterized biochemically by hypoalbuminemia, anaemia and fatty infiltration of the liver. The results of the dietary treatment are prompt and mortality in the hospital is generally low.

Figure 1 (colour slide) shows such a child and Figure 2 indicates the evolution of his weight with age. The birthweight was about normal and he progressed adequately until the seventh or eighth month. His monthly weight increments are lower from then on and fall disastrously in the second year of life, after weaning.

What is not generally realized by many authorities is that this classical picture of malnutrition is not at all the most common form of the disease, at least in many parts of the world. In Lebanon (5), Turkey (6), Peru (7), Chile (8) and recently in Iran (9), reports indicate that the neglected syndrome of marasmus is the more common form of protein-calorie malnutrition.

The child suffering from marasmus usually belongs to a family living in a shanty town, the breadwinner with no settled or secure job, and that has probably arrived to the city from the village only a few years ago. In the Christian countries of Latin America illegitimacy, abandonment by the father and alcoholism is also very common. A history of early weaning to bottle-fed diet of low nutritional value and prepared under unhygienic conditions, with repeated periods of diarrhoea, many of them accompanied by food restriction, is very common. Clinically, the picture is characterized by a child in his first year and a half of life, that shows severe wasting, with a weight deficit

of 50% or more, and that does not exhibit the oedema, hair changes, skin lesions or hepatomegaly of classical kwashiorkor. Biochemically, anaemia and hypoalbumenemia, if existant, are less marked than in kwashiorkor and fatty liver is absent (10, 11). There is a protracted response to the dietary treatment and intrahospital mortality is high. Figure 3 (colour slide) shows such a child, and Figure 4 the evolution of his weight. Breast feeding was stopped before one month of age and the child was then bottle-fed. Weight increments have been very poor, and diarrhoeal episodes common.

This type of malnutrition - marasmus - has received considerably less attention than kwashiorkor. For example, in a recent monograph on nutrition twenty pages are dedicated to kwashiorkor and only one and a half to marasmus (12). In many areas physicians seem to equate malnutrition in the child only with kwashiorkor, because the clinical appearance of the marasmic child is less spectacular. Table 1 shows that in a hospital in Isphahan (13) of 100 children hospitalized because of different diseases only 9 were diagnosed as malnourished. That this is not the case can be seen by the distribution of their weights for age.

Figure 5 shows that in Teheran hospitals about half of the cases of malnutrition are in children below one year of age. This clearly indicates the importance of early malnutrition over that of the pre-school child (9).

The failure in breast feeding is probably the most important cause of malnutrition as it occurs today in the rapidly developing countries. Why does breast feeding fail? There does not seem to be an adequate or convincing explanation to this phenomenon, that is being observed throughout the world (12).

Life in the city, especially to newcomers, is full of incertitude: no job means, no food; there are no relatives or friends in the city that can help out when there is trouble; newcomers have no status, and have to meet new values that seem incomprehensible; they will have to live in crowded quarters, etc. All this can add up, in the wife, to a state of fright, psychological disarrangement and social resentment which is in no way conducive to the expression of normal biological functions such as breast-feeding.

The impact of the commercial advertising of baby foods should not be disregarded. It offers the theoretical possibility of feeding the baby, theoretical, because the costs are generally enormous when compared with the salaries. The idea that breast feeding is vulgar, not fitting for civilized people and animal-like, is strengthened in the semi-cultural populations by clever advertising that shows healthy babies being brought up thanks to the advertised product. The obvious success of bottle-feeding by the more cultured, the wealthier or the ethnically privileged groups of the population makes bottle-feeding something desirable as a status symbol. Little is it understood that adequate hygienic, economic and educational background is the key to such a success.

Figure 6 shows what has happened to breast-feeding in three different communities: a poor urban area in Santiago, Chile (14), an urban area in Teheran (15) and in Isphahan (16), Iran. The extreme case is Chile, where abou 80% of the infants are bottle-fed by six months of age. In Teheran and also Isphahan a tendency towards early weaning is also becoming noticeable. But by and by the impact of urbanization and industrialization will be felt through the penetration of mass information media in the rural areas. Figure 7 shows that the incidence of breast-feeding in a rural area in Chile is nearly as bad as in the city (17). This phenomenon has not yet reached Iran (18) but may well start to do so shortly.

Figure 8 indicates, that through an increase in the standard of living, a decrease in infant mortality should not always be rapidly expected. The figures, taken from Chilean statistics, show that only a very moderate drop in infant mortality was experienced in thirteen years. Something quite different occurs with pre-school mortality rates, which in the same time have dropped to about one third of the original values. If mortality is any indicator of malnutrition, the factors operating before one year of age seem less liable to be corrected, if not actually worsened, by urbanization and industrialization.

On the other hand, the fall of mortality in pre-school children is indicative that the nutritional problems at this age are easily and may be spontaneously corrected by the process of economic development (8). Ecological and epidemiological factors are operating in the developing nations that can shift the prevalence of malnutrition from the pre-school - kwashiorkor type to the infant-marasmic type. These are the industrialization in the cities that creates a demand for labour and provokes migration from the village to the town. The overflow of migrators conditions a glutt in the labour market, which means unsteady or scarce jobs. The attraction of the city for the villager is great: it means a flight from the boredom of village life, opportunities for economic and social advancement, cinema, spectator sports, educational facilities, etc. But, for a good number of newcomers the promise of a better life is not fulfilled: living quarters are crowded, far away from work; everything must be paid for at higher prices; lodging and transportation, items that did not exist at the village, take an important part of the budget. Even when the job becomes more stable, other items creep in that drain the already meagre amount of money available for food. Hire-purchase of radios, television and other household goods can be very strong competitors to a balanced food intake. Under these circumstances, it can be easily understood that failure in breast-feeding is an added economic catastrophe. The cost of feeding a six months old baby with commercial preparations can soak-up 25% of the daily salary of an unskilled labourer. Clearly, it cannot be expected that such an expense will be met, and if it is not, malnutrition in the infant will be the result. The expensive canned milk will be administered in homeopatic dilutions. Furthermore, because of the unhygienic environment and the ignorance of the mothers on the technique of artificial feeding, frequent diarrhoeal episodes are the rule. The unfortunate practice of restricted feeding, so frequently prescribed by physicians, adds the iatrogenic insult to the already poor condition of the baby.

The vicious circle of inadequate breast feeding-over diluted and contaminated bottle feeding - diarrhoea and vomiting - food restriction - malnutrition - increased susceptibility to infectious disease - more diarrhoea - etc., generally

ends by an episode of acute dehydration that leads to death, either in the hospital, where the mortality of this syndrome is very high or in the home once discharged (19).

I have talked about the clinically defined syndromes of kwashiorkor and marasmus. But these, together with the mixed forms, are only the visible - above the waterline part of the iceberg of malnutrition in the young. From the quantitative point of view, the number of children suffering from these syndromes is not very important compared with the overwhelming numbers that are simply underfed. Figure 9 shows the weights for age in a village (20) and in the children of a poor quarter of Teheran (15). The clinical cases of malnutrition in these populations are few, but the number of children under the third percentile (21) is very high. It is these numbers and not the clinical cases that make action mandatory. A further lesson from the figure is that malnutrition will be moving to an earlier onset (Table 2). It is known through analogies with experimental animals and through actual measurements in humans, that the permanent damage effected by malnutrition is more pronounced the earlier it sets in (22, 23), especially that to the nervous system (24). In the human species, 85% of the growth of the brain is during the first year of life. If malnutrition becomes prevalent at this early age, the developing nations will have to carry the economic burden of many physically and mentally retarded citizens.

What action can be taken to deal with the problem of malnutrition in its new form? As I have tried to explain, many of the factors are beyond the reach of the purely technical and reside in the domain of politics and/or economics. It is also clear that purely nutritional measures, such as the availability of weaning foods, can at the best be hoped to only alleviate part of the problem. What is needed is well integraded MCH activity. This has to involve at least :

a. Pre and post natal care of mothers plus family planning.

b. Education of the mothers on: importance of breast feeding, technique of artificial feeding, prevention and care of diarrhoeal disease.

c. Vaccinations, especially against whooping cough, measles, TBC.

d. Well-baby clinic with some medical attention.

e. Availability of supplementary feeding; weaning food and milk.

The results of such an integrated approach will make itself felt in two or three years. Such is, for example, the experience from an MCH Centre in Santiago, Chile, where in three years, infant mortality in a poor urban community was reduced to half, morbidity to one third, and malnutrition made to practically disappear (25, 26).

Another possibility of action lies at the curative side of the problem. Hospital treatment should be available for the treatment of malnourished children. However, the results of hospital treatment, as it is many times practiced, is discouraging because of the high cost and the low efficiency (19). The training of the physicians does not really make them aware of malnutrition, especially of the marasmic type, either clinically or as a public health problem. The treatment of dehydration, such a common and lethal complication of malnutrition (19), more common in the first two years of life, should be better understood. Rehydration centres (27) should be a constant feature of the paediatric hospitals and their services be made available in the poorer quarters of the big cities. Not only is the intrahospital mortality of malnutrition very high. Because of the pressure for beds, malnourished children leave the hospital with no real recovery in their nutritional status. The consequence is that deaths after six months can be shown to account for half of the discharged patients. Nutritional rehabilitation centres, where the discharged patients can be given an opportunity for recovery at a lower cost than in the hospital, are a necessity in the industrialized areas. These centres, first proposed by Bengoa (28) and now operating successfully in many parts of the

world, also provide for the rehabilitation of those children that are malnourished before they suffer an acute episode that will make their hospitalization necessary.

A further and much neglected area, is the development of crèches or nurseries with good nutritional standards, at the factories, where women are employed. This population is easily available for preventive action against malnutrition in the infant.

Summing up : Together with the changing environment (urbanization of the rural population, industrialization, loss of traditional pattern of life), malnutrition in the young will probably change from the kwashiorkor pre-school type to the marasmic-infant type. Because of the complex nature of the factors conditioning this change, purely nutritional measures - such as increased availability of protein foods - cannot be hoped to cope with infant malnutrition. Early malnutrition means the possibility of permanent damage, and if it is not prevented, a population of decreased physical and mental value will be an added, and may be unsurmountable, obstacle to the progress of the developing nations.

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