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11

A Public Health Approach to the "Food-Malnutrition-Economic Recession" Complex

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The authors in this volume disagree as to whether the current economic world recession and its accompanying adjustment policies affect nutrition and health. Based on the data presented throughout this volume and the discussions at the Takemi Symposium, I am not convinced that current world economic conditions have significantly changed the nutritional state and survival of children in less developed countries—except in certain regions of Africa. This is not to say that such an effect does not exist—economic adjustments made by nations at the macro level and by families at the household level might have acted as a buffer.

Any serious attempt to correlate economic phenomena with nutrition and health must take into account certain fundamental variables not immediately obvious to economists and policymakers. Discussions of this topic, for example, may suffer from problems in data collection which are particular to the field of public health. In addition, if the concept of malnutrition is to be used in a discussion of economics, it must be precisely defined in biological terms, and what we know of its causes must be understood and considered. Health factors, including illness, and other sociological factors which cause malnutrition need to be described. To understand these variables we must step outside the

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realm of policymaking and the discipline of economics. This chapter discusses some of these variables and their effects on analyses of health, nutrition and economic policy.

Causality of Malnutrition

First I will attempt to summarize, in simple terms, how malnutrition originates in most traditional and transitional nations (Mata, 1978). This knowledge is pivotal to hypotheses of possible interactions between changes in the macroeconomy and health.

The Role of Infectious Disease

Longitudinal monitoring of pregnancy, childbirth, growth, and survival in poor ecosystems is the best way to understand how children become malnourished (Mata, 1978, 1985). Figure 11.1 presents the growth chart of a typical child from a village in the Guatemalan highlands. Like 40 percent of village infants, this one had low birth weight due to intrauterine growth retardation. Although many people assume that a deficient diet during pregnancy accounts for low birth weight, the etiology is much more complex. Factors include low maternal education, poverty and negative influences dating back to the mother's own childhood and adolescence (Guyer et al., 1985–86; Mata et al., 1976). Scientists are continuing to explore other plausible causal factors such as infection with *Mycoplasma* and other microorganisms during pregnancy, physical exertion, pollution, and deficient or insufficient prenatal care (Guyer et al., 1985–86; Mata et al., 1976; Braun et al., 1971; Tafari, 1981). However, the etiology and correction of some intrauterine growth retardation still puzzles physicians the world over.

The weight gain of the child shown in Figure 11.1 was adequate during exclusive breastfeeding, despite his low birth weight. With commencement of weaning—a process extending for one to three years in this village—the child underwent progressive malnutrition resulting primarily from recurrent infections. Most people working in hospitals or health centers or conducting nutrition surveys would classify a child like this as malnourished if seen at any point after weaning began. Little or nothing would be known about his past, even if the mother is interviewed, as language and other cultural barriers will frustrate interpretation. The cause of the child's malnutrition will probably be accepted as "lack of food."

Lack of food indeed helped cause this child's malnutrition, but not because food was not available. In fact, the child did not eat, or ate

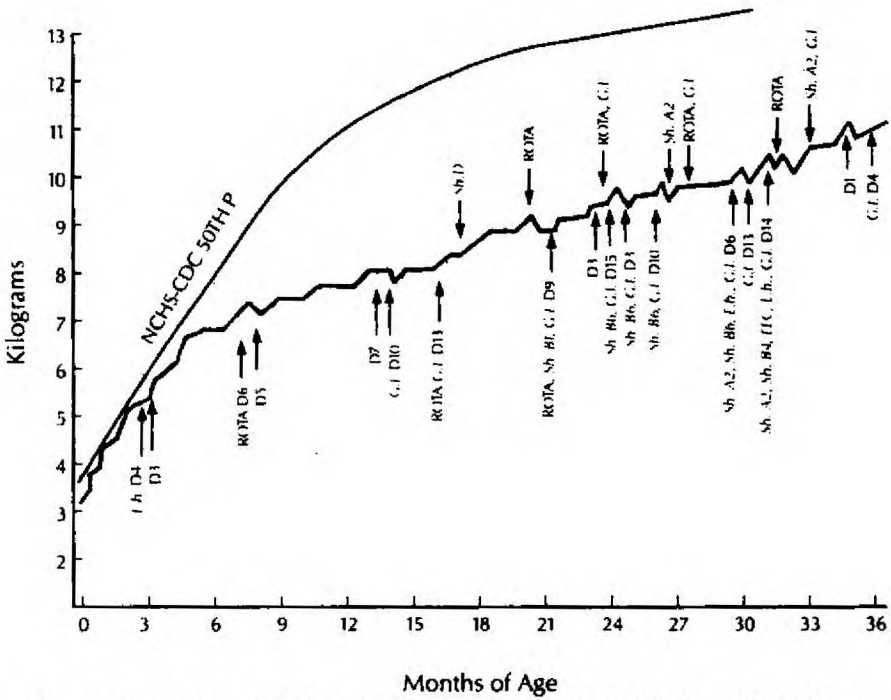

Figure 11.1. *Growth (weight in kilograms) of a typical child from Santa Maria Cauque, observed prospectively from birth to age three years. The growth curve is compared with the 50th percentile of the NCHS curve, to show that the child grew at adequate velocity during the first five to six months (while exclusively at the breast), and then began losing weight in connection with recurrent diarrheal disease episodes of various causes. By twelve months of age the child was evidently malnourished and remained so throughout. Deficits in weight (wastage) are generally accompanied also by deficits in height (stunting). Many episodes of diarrhea (and other infectious diseases not shown in the figure) are associated with fever, vomiting, anorexia, and metabolic alterations leading to malnutrition. Even if food was available, children may not be able to eat the required amount to compensate for successive losses due to infections.*

Key:

D = diarrhea. Numbers indicate duration in days.
ROTA = rotavirus
Sh.A. = Shigella dysenteriae
Sh.B. = S. flexnerii
Sh.D. = S. sonnei. Numbers indicate serotype.
EEC = enteropathogenic E. coli
E.h. = Entamoeba histolytica
G.l. = Giardia lamblia

poorly, as a result of frequent and recurrent infectious diseases often accompanied by anorexia. Actually, the longitudinal study showed that most children experience chronic recurrent diarrhea and other illnesses during one-third or more of their first three years of life (Mata, 1978, 1985).

The effect of diarrhea and other infectious diseases is multiple: anorexia, vomiting, impaired digestion, impaired absorption, metabolic alterations and increased nutrient needs and wastage (Mata, 1985; Mata et al., 1977; Tomkins et al., 1983). To illustrate one aspect of the impact of infection on the nutritional state, I will refer to negative effects of two hormonal substances—*Interleukin 1* and *cachectin* (tumor necrosis factor)—both released by body monocytes under the stimulus of infections or other stressful factors (Dinarello, 1983; Ceramy, 1983). These hormones account for formidable actions: in the brain, the beginning of fever and anorexia; in muscle, the breakdown of proteins and loss of tissue mass; in liver, the synthesis of abnormal macroglobulin; etc. These phenomena represent a host defense against infection—at a high nutritional cost. Even with mild infections, the body loses cells, plasma, electrolytes, amino acids and vitamins. Infected children may not accept food, even of the best quality. The paradox of "hungry children who cannot eat" actually exists. Lack of appetite in children is a common complaint of mothers throughout the world.

The problem described likely cannot be corrected by dumping food. The provision of food at the individual level would be effective if anorexia is resolved first, if recuperation from illness is achieved and if the child is removed or protected—at least temporarily—from his contaminated environment. However, nutritional recuperation is required in special cases, for instance, for malnourished children and for those at high risk, that is, when they are wasted (Waterlow and Rutishauser, 1974). Wasting is defined as a deficit of weight for height greater than 20 percent. Thus, energy-protein malnutrition will persist or even recur with greater severity after dumping food unless the basal social and biological conditions leading to growth retardation are corrected. Unfortunately, few long-term investigations have been conducted on the natural history of malnutrition, and most of them have not included the extensive studies on the microbiology and infectious diseases which are needed to document the staggering force of infection. Even worse is the fact that many people still have not heard or understood the significance of high rates of infection for the conditioning of malnutrition throughout the world.

The Role of Maternal Technology

Lack of food cannot be entirely ruled out in the causality of malnutrition inasmuch as there is evidence of some food deprivation with the com-

mencement of weaning. During exclusive breastfeeding—at about six months of age—human milk generally provides the calories and nutrients needed for optimal growth. Thereafter, food supplements should be given in adequate composition and amount to support growth. Many people do know enough about feeding mixes of sufficient nutriture and caloric density for good nutrition and growth. But this situation is complicated by frequent infections and episodes of anorexia, vomiting and fever. Thus, nutritional deprivation frequently relates to deficient "maternal technology" (meaning family technology).

Good maternal technology (Table 11.1) consists of: (a) adequate knowledge and technique for preparation and administration of weaning foods; (b) appropriate handling of human and animal feces; (c) knowledge about signs and symptoms of dehydration and other life-threatening conditions; (d) acceptance of immunizations and other elements of modern medicine; (e) basic nutrition and health education; and (f) proclivity towards family planning (Mata, 1979). Mothers are not entirely responsible for inadequacies in maternal technology, inasmuch as they are trapped in ecosystems and societies that have not permitted them to acquire an understanding and knowledge of the ubiquitous fecal contamination of food and environment and other threats to child nutrition and survival. On the other hand, many women in villages and city slums possess effective maternal technologies, and their children thrive well despite the odds and hardships.

Table 11.1
Maternal (Family) Technology

1. Adequate technique to store and handle water for drinking and cooking
2. Correct handling and disposal of human and animal feces
3. Hand-washing and use of soap or ashes before handling children and preparing food; sufficient hand-washing after handling feces
4. Successful breastfeeding and adequate food supplementation during weaning, and during illness and convalescence; knowledge about adequate mixing of traditional foods and child-feeding technique
5. Capacity to recognize dangerous signs and symptoms of disease, and seek prompt treatment
6. Knowledge of oral rehydration therapy and other resources to treat diarrheal and respiratory diseases
7. Acceptance and demand of health care: prenatal care, immunization, antibiotic treatment
8. Acceptance of family planning and adequate reproductive behavior
9. Proclivity for community participation

The control of infection and the promotion of maternal technologies are the base of the strategy of Health for All by the Year 2000. The GOBI approach (of growth monitoring, oral rehydration therapy, breastfeeding, and immunization) fundamentally addresses the control and prevention of infectious diseases and their consequences as means to improve the nutritional status.

Structure of Infant Mortality

The evidence advanced to show an effect of the current economic recession on health (Jolly and Cornia, 1984; Grant, 1986) actually does not show the expected impact on sensitive health indicators like infant mortality or prevalence of malnutrition (Preston, 1986; Behrman, 1986). This may imply that the crisis has not been severe enough to affect the indicators or that adjustments have cushioned its negative influence. Furthermore, it is puzzling that infant mortality has declined, or at worst remained stable, in countries such as Costa Rica and Chile that were seriously affected economically while certain socialist countries, where full employment and other measures are always in effect, are facing a rise in mortality of children and older individuals (Klinger, 1982; Anderson and Silver, 1986).

I want to address now the question of causes of death in childhood, which is neglected in other discussions here. When infant mortality is above 50 per 1000 live births (as in most less developed countries), the main causes of death are diarrhea, acute respiratory infections, tuberculosis, childhood diseases (measles and pertussis), and tropical diseases (e.g., malaria). One study in India showed a significant relationship between intake of supplementary solid food and survival (Wyon and Gordon, 1970), but this was an area where many children were kept at the breast *without supplements* for long periods extending into the second year of life, that is, they were "starved at the breast."

In countries with an infant mortality below 30 per 1000 (Malaysia, Chile, Costa Rica, Panama, Trinidad-Tobago and Cuba) the infant mortality profile is similar to that of industrial nations, with neonatal deaths being as many as or in excess of post-neonatal deaths. To illustrate, the structure of neonatal mortality for Costa Rica in 1982 is shown in Table 11.2 next to that of Massachusetts in 1984. The overall rates were low in both places. Dominant causes of death in these populations were congenital defects (especially of the heart), and respiratory infection of the newborn. Most of the mortality is not preventable, and some of it is related to premature pregnancy, fetal immaturity and deficiencies in prenatal care and delivery procedure; still more mortality suggests inadequacies in the conduction of childbirth, reflecting excessive obstetric

Table 11.2
Structure of Neonatal Mortality in Massachusetts (1984) and Costa Rica (1982)

Massachusetts, 79,700 births			*Costa Rica, 72,000 births*		
Rank	*Cause(s)*	*Rate**	*Rank*	*Cause(s)*	*Rate**
1	Congenital defects	3.91	1	Congenital defects and complications in pregnancy	5.3
2	Respiratory infections	1.56	2	Ill defined conditions	2.1
3	SIDS**	0.92	3	Respiratory infections	1.5
4	Ill defined conditions	0.88	4	Diarrhea	1.0
5	Maternal conditions	0.75	5	Other conditions	0.6
6	Immaturity	0.75	6	Immaturity	0.5
	Total	8.77		Total	11.0

* Rate per 1000 live births; data for Massachusetts provided by Dr. S. Franklin, Massachusetts Department of Public Health, Boston.

** Sudden Infant Death Syndrome.

intervention. No evidence is found that malnutrition is an important cause of death in either place. The rate of low birth weight infants was about the same in both populations, about 8 percent.

The similarity of neonatal mortalities in Costa Rica and Massachusetts is interesting in that total fertility rate in Costa Rica in 1980 (3.7) was twice that in Massachusetts at about the same time (1.8). The slightly lower neonatal mortality in Massachusetts likely is accounted for by its lower fertility and by greater medical intervention that averts death among the very small babies. No data were found on the resulting associated quality of life. Rates of malnutrition (defined as weight for age or height below the fifth percentile of the National Center for Health Statistics growth curves) in Massachusetts were similar to those for Costa Rica around 1982 (Mata, 1985; Guyer et al., 1985–6).

Economic Recession and Adjustments

The preceding discussion on causality of malnutrition and structure of infant mortality casts doubt on a possible effect of economic recession of the current magnitude on nutrition, health and survival of children, at least in the countries discussed in the Symposium. Nevertheless, economic recession might have induced changes in behavior and life styles, which might have led to unwanted pregnancy, stress during pregnancy, family disruption, deficient prenatal care, dehumanized

childbirth and child neglect and abandonment. If such changes occurred, their effects might take considerable time to become manifest. On the other hand, diminished food supply cannot be proposed to explain the current level of infant mortality in Costa Rica and similar countries, despite the fact that poverty is significantly greater and more obvious in them than, for instance, in Massachusetts.

It seems logical that economic recession may have an impact by inducing the following alterations: (a) deterioration of water supplies and sanitation; (b) attrition in programs for primary health care and delivery of medical services; (c) psychosocial disruption resulting in family and community instability and other manifestations of social distress; or (d) two or all of the above. Obviously, such changes will favor the occurrence of infectious diseases (Mohs, 1982) and/or child neglect (Mata, 1985) and hence will result in more malnutrition and death of children.

The crisis might also alter maternal behavior to induce child abuse and neglect. However, this is not likely to occur in traditional and transitional countries, as was the case throughout Latin America during the energy crisis of 1973, or more recently in countries stricken by the crisis of the 1980s. It should be mentioned here that malnutrition is not a primary killer, except in famine situations, and in isolated cases of severe edematous malnutrition (often called kwashiorkor), now in clear disappearance from developing countries. Malnutrition must be severe enough to render the host susceptible to die of other causes, primarily infections, but there is still a need for good data relating food intake, nutritional status and changes in immunity. On the other hand, infectious diseases are known to kill individuals of all sorts, including those who are wealthy and well nourished.

The lack of impact of economic recession might be related to socioeconomic adjustments in the household, or at the local and national levels, where some order of priorities is established. For instance, Costa Rica illustrates the impact of foreign aid in cushioning the adverse effects of the crisis.

Much could be done to ameliorate problems internally, however, if governments would decrease the emphasis in costly "paternalistic" programs of doubtful impact which cannot solve the basic social malady. Thus, it is apparent that economic strategies aiming at improving food availability will hardly have an effect on the nutritional status. Conceivably, an excess of food supplied to households might eventually be sold, and the money destined to satisfy other needs. This actually has been documented for a very small proportion of people that sell food obtained from national and international programs. Likely, the added income would alleviate intra-household tension and distress. I believe this and similar topics merit attention by economists and health professionals,

as they might bear more on causality of malnutrition than on low food availability itself.

Does this analysis apply to all nutritional situations in the world? The answer clearly is no. To elaborate, in countries periodically stricken by natural or manmade disasters, food shortage may reach levels incompatible with survival, demanding relief action. Also, deprived rural and urban populations, and individual families, may suffer from shortage of food, and in these cases food must be provided until a dignifying solution is found. In such situations, however, food programs are only a palliative measure, perpetuating the status quo (Mata, 1978). Even after alleviation of famine, there is prompt return to underdevelopment with its mounting population problem (Watkins and Menken, 1985).

The Danger of Misconception

My final remarks are to stress the danger of equating malnutrition with lack of food, or the converse, good nutrition with adequate supply of food. Good nutrition and health result from a constellation of interacting factors, one of which is food availability. Evidence indicates that households throughout the world generally have enough food to satisfy the needs of most people (Johnson, 1984), particularly the highly vulnerable infants and toddlers; furthermore, many mothers know how to make good use of what is available (Mata, 1978; Mata, 1979). However, many factors interfere with proper food consumption and utilization, for instance, infections and inadequate family or maternal technologies. If malnutrition is equated with lack of food, the likely outcome is the prescription of food as the solution. Food intervention programs have not had a resounding effect on curtailing diarrhea and malnutrition (Mata, 1985; Beaton and Ghassemi, 1982; Feachem, 1986), because they leave causal factors undisturbed, namely, deficient maternal behavior, poor education, unsanitary environment, and deficient primary health. On the other hand, there is growing evidence to show that the cultural and technological endowment (maternal technologies) and the application of scientific knowledge on disease prevention and control (development of sanitary infrastructure and medical services), are more relevant than socioeconomic factors in explaining the dramatic improvement in health and survival throughout the world in recent decades (Mohs, 1982; Rosero-Bixby, 1986; Mata and Rosero, 1987; Halstead et al., 1985; Preston, 1985; Mensch et al., 1985).

It is essential to continue exploring relationships of economic recession and its ensuing adjustments with other determinants of nutritional status and health. For instance, it would appear logical to investigate

possible influences of economic recession on the quality and quantity of primary health care, availability of transport and curative services. Also, the effects on the behavior and wellbeing of the family, as it relates to pregnant women, infants and young children, should be considered.

Conceptual models should be engineered for the determinants of nutritional status and health in marginal societies—the chief interest of the Takemi Symposium—during the pre-recession period and during economic recession itself. The latter, in turn, should be clearly defined and described. On the basis of a model of this kind, it would be possible to discern the kinds of data which should be gathered for a pre-recession period, specifically those which one expects will show significant changes during economic recession in nutrition and other indices of social malady.

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