Prevention of Protein-Energy Malnutrition Through Socioeconomic Development and Community Participation

Dr. Soekirman

Bureau of Health and Nutrition, National Development Planning Agency (BAPPENAS), Jakarta, Indonesia

The 1987 report on the status of world nutrition indicates that, except in Asia, hunger and malnutrition in the Third World are increasing, a trend that is likely to continue unabated for the rest of this century (1). For purposes of definition, malnutrition may be regarded as a state of deprivation of those nutrients necessary to sustain life. Although its effects are relative to the level of deprivation, in its severest form, it will cause death. Its most vulnerable victim is, of course, the child.

From the epidemiologic point of view, malnutrition is not always a clear-cut case of food versus no food. Rather, the problem is compounded by complex socioeconomic factors including poverty, population growth, lack of employment, food availability, sanitation, educational level, and cultural patterns. The role of the concerned government in ameliorating malnutrition is to assess the various contributing factors in order to develop the most effective and most appropriate program for the specific country. It is understood that no design will be completely effective without being an integral part of an overall national socioeconomic program of development. For example, in developing countries, especially in those with large populations such as Indonesia, community participation has played an important role in national development and is, therefore, also used as a tool in preventing malnutrition.

This chapter will review the complex causes of malnutrition in the developing world and the social and economic programs that may affect its outcome. Most data have been taken from the First Report on World Nutrition issued by the United Nations Administrative Coordinating Committee/Sub-Committee on Nutrition (UN-ACC/SCN) in 1987.

MALNUTRITION: RECENT TRENDS

The UN-ACC/SCN report indicates that, in most parts of the world, nutritional status has improved during the past 25 years. However, continued prevalence in
many countries of low weight-for-age in preschool children indicates that the improvements in nutritional status did not progress at the same rate in the 1980s as in the 1970s (Fig. 1). In addition, the prevalence of low-birth-weight infants, who are at high risk of developmental delay and death, has also remained significantly high. These combined data demonstrate the relatively poor nutritional status of children from developing countries.

In Sub-Saharan Africa, eight separate national surveys showed that, from 1975 to 1980, 17 to 31% of the child population were underweight. The mean figure, 24%, represented approximately 16 million children (Fig. 2A).

In the Near East/North Africa, the situation appears to be somewhat better. The prevalence of malnutrition was estimated to have fallen slightly between 1969/71 and 1979/81 and continued to decline during the ensuing years (Fig. 2B). In South America, the prevalence of malnutrition is estimated to have remained at about 8% since 1979/81. With population growth, this means that the absolute number of malnourished children has risen. The percentage of low-weight-for-age children is, however, estimated to have declined from 8% in 1974/76 to 6% in 1979/81. Since then, the number of underweight children has remained at around 2.3% (Fig. 2C).

In China, there has been an obvious improvement in nutritional status in both urban and rural schoolchildren in the past 10 to 15 years (Fig. 2D). In Middle America and the Caribbean, including Mexico and Central America (Fig. 2E), the incidence of underweight children is estimated to have declined from 13% in 1974/76 to 9% in 1983/84. The most significant decline has been seen in Mexico, which accounts for almost 70% of the total child population in this group of countries. In the Caribbean countries, the situation is less favorable. During the late 1970s and early 1980s, malnutrition increased, and hospital admission for severe malnutrition doubled between 1975 and 1985.

FIG. 1. Changes in prevalence of underweight children by groups of countries from 1980 to 1984. (From ref. 1.)
Differences in prevalence of underweight children among these countries are reflected in the differences in the mortality rates of infants and children. In Cuba and Costa Rica, infant mortality rates in 1980/85 were estimated at 17 and 20 per 1,000 respectively, which approaches the infant mortality rates in high-income countries. On the other hand, in Haiti, Honduras, and Nicaragua, the rates for the same period were 128, 82, and 76, respectively.

In part of South and Southeast Asia (Fig. 2F and G), there was a slight decline in the incidence of malnutrition in children, from 70% in 1980 to 67% in 1983/85. However, due to a continued high birthrate, absolute numbers of underweight and malnourished children continued to increase, from about 94 million in 1974/81 to almost 98 million in 1983/84. Southeast Asia, specifically, showed almost no change from 1979/81 to 1983/85, with approximately 18 million children, or 34%, suffering from malnutrition.

In Indonesia, anthropometric data collected in the nationwide surveys in 1979/80 and 1986 indicate that there has been a significant reduction in the prevalence of underweight children (children at 60–70% of the standard weight-for-age), from 15.9% in 1979/80 to 12.9% in 1986. Severe malnutrition (<60% of the standard weight-for-age) declined from 3.7% to 1.7% in the same period (2). Acute adult malnutrition due to starvation, previously common in certain areas of Indonesia during droughts, no longer exists.

DETERMINANTS OF MALNUTRITION

It is well-understood that malnutrition is a complex problem involving social, economic, cultural, and environmental factors as well as food intake. Attempts have been made to describe the complex interaction among these variables and their relationship to malnutrition in children. Two such conceptual models are those of Williams (3) and Cravioto et al. (4). Both Williams and Cravioto et al. describe malnutrition in the context both of the individual and also of the household (inadequate child care; oversized, poorly spaced families; low educational levels; poor sanitation; and personal poverty; as well as the more broadly based socioeconomic problems such as general poverty, generally low educational and technological levels, and inadequate health care). From a planning point of view, these models serve the purpose of identifying indicators to monitor and evaluate programs dealing with malnutrition.

A more recent schematic overview is presented by Anderson in his paper (5). This model outlines the relationships between macroeconomic variables, development programs, and microsocial variables such as food consumption and health, showing that even factors such as balance of payments and interest rates can be related to the problem of malnutrition. Attempts to quantify the relative strengths of socioeconomic variables impinging on malnutrition have been made. The ultimate aim is to refine the analysis of the importance of these factors in order to be more effective in planning programs to combat malnutrition (6–8).
It appears clear that any effective program to ameliorate or prevent malnutrition must deal with multiple socioeconomic problems as well. In addition, the program must reflect general national policy and fit comfortably into its present level of development.

Nutritional problems, ranging from the mildest to the most severe forms of malnutrition, arise from the relatively simple fact of there not being enough food to sustain life and health. The simple answer is, of course, to provide more food. However, in a complex world, the problems are also more complex and include the questions of supply and demand, distribution of wealth, social status, and education. In addition, those communities with the greatest incidence of malnutrition are those with the poorest health care, so that children already in a weakened nutritional state are also those who will be most vulnerable to disease.

Primary malnutrition is most prevalent in developing countries, where there is a fundamental problem of meeting the basic needs of the population. Infants and children do not obtain sufficient breast milk and/or proper weaning foods. They are unlikely to be immunized or to have access to clean water and sanitary conditions. In addition, child rearing is likely to be substandard.

The unmet needs of infants and children reflect, of course, problems in meeting basic needs in a general population. Women, for example, will rarely be able to eat adequately during pregnancy or after delivery. Health care during pregnancy and lactation is minimal or lacking altogether. These problems are compounded by a low educational level as well as by unhealthy traditional child rearing practices. Programs to circumvent these problems must be well thought out. Often, such programs are most successful if they plan intervention through family and community action.

The UN-ACC/SCN report on the status of world nutrition stated that there is likely to be a correlation between the prevalence of malnutrition and per capita food availability. However, on a community level, it appears rare for low food intake to be due to limited availability of food in the marketplace. In this case, other factors must be accessed, the most important of which may be purchasing power.

With the exception of Sub-Saharan Africa, food production in most countries in the world has increased at an accelerated rate. In the Near East and North Africa,
food production began to increase in 1960. With the addition of food imports, the dietary energy supply per capita per day in this region is between 2,300 kcal/kg in Yemen and 3,000 kcal/kg in Cyprus, Kuwait, Libya, Saudi Arabia, and United Arab Emirates. A similar trend can be seen in Asia during the past 25 years: per capita food production in China has increased by 75%, or 15% above the population growth. In both South Asia and Southeast Asia, food production has also increased above the population growth, although not at such a high rate as in China.

Until 1983/84, Indonesia had been known as the largest rice importer in the world. Modern technology helped Indonesia begin to become self-sufficient in 1984, with rice production increasing an average of 3.5% annually, or 1.5% above the rate of population growth.

Increased production and availability of food in the market do not, as stated previously, necessarily correlate with a lowered prevalence of malnutrition. The World Bank Report stated the following: ‘‘Developing countries—and the world in general—are justifiably concerned about malnutrition. The causes of widespread malnutrition, however, are often not the insufficiency of food production, but rather poverty and uneven distribution of income’’ (9). This statement reminds policymakers and planners not to be deceived by per capita income and per capita food consumption as reported by the food balance sheet of a country. The average figures from aggregate data should be complemented with data at a regional household level.

Availability of Health Services

Health status of children worldwide is dependent on the availability of health services. In developing countries, especially, this is a function of government planning and centers around programs of immunization, mother and child health care, nutrition, diarrhea control, health and nutrition education, and the availability of a clean water supply and adequate sanitation.

As part of a campaign aimed at more universal child survival, UNICEF and WHO have assisted developing countries in accelerating both immunization coverage and diarrhea control using oral rehydration therapy. A declaration of commitment to immunize all children by 1990 was signed by 21 governments on the 25th anniversary of the United Nations on October 25, 1985 (10). Immunization of children in 1984/85 was about 50% in North Africa, Central and South America, East Asia excluding China, and West Asia (10). The rates were lower, 27 to 33%, in Southeast and South Asia, Africa south of Sahara, and South America. In Indonesia, the coverage in 1986/87 ranged from 25% for pregnant women to 66% in children. Although the relationship between immunization and the occurrence of malnutrition is unclear, it is assumed that immunization enhances efforts to prevent malnutrition when nutrition intervention is also supplied (11).

There was a similar correlation between oral rehydration therapy (ORT) and mal-
PREVENTION OF PEM

nutrition during 1982/84. The use of ORT was highest in Asia (70%) and lowest in Africa (<10%). While utilization of ORT may be directly related to the decline of infant and child mortality, it is only related to the prevalence of malnutrition when there is also nutritional support such as breast-feeding, supplementary feeding during and after diarrhea, etc. (12).

Although the efficacy of providing clean water and sanitation alone in preventing diarrhea in children is argued by Black et al. (13), it seems obvious that both are necessary adjuncts to nutritional and health support, and their lack undermines the effectiveness of any program in health care of children. Data from UNICEF indicate that only 44% of the rural population were served by a clean water supply in the developing world between 1970 and 1985 (10).

There is little question that economics plays an important role in the availability of health care throughout the world. Jolly (14) and Anderson (5) have both expressed concern about declining government expenditure on health care in many countries since 1980, a phenomenon mainly resulting from the "oil crisis" and its ramifications. Most countries in Latin America, for example, reduced expenditures on health services between 1976 and 1983. In Argentina and Mexico, government health expenditure dropped from 4% to just over 1% during this period. Anderson also noted, however, that the average government expenditure on health per capita had increased slightly in Asia.

A drastic cut in government health expenditure is expected to have negative effects on the health and welfare of the poor unless appropriate adjustment programs in prevention are created. In Indonesia, expenditure on health services has remained at approximately 2% of the total government budget in 1980. The actual amount, however, has risen from about $178 million in 1980 for a population of 107.5 million to $274.5 million in 1987/88 for a population around 175 million. This is reflected in an increase in the availability of community health facilities. There were, by 1988, 5,725 health centers and 17,377 subcenters in Indonesia. There were also 3,521 mobile health centers that served remote areas. In addition, an integrated service known as POSYANDU, which is an Indonesian acronym for "integrated service post," exists in rural areas. At present, there are 133,000 POSYANDUs, or approximately three for every village of 5,000 households. These centers are managed by local mothers who are assisted by health center personnel (Table 1). This

<table>
<thead>
<tr>
<th>TABLE 1. Number of Health Personnel, Indonesia, 1980–1987</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Medical doctors</td>
</tr>
<tr>
<td>Nurses and midwives</td>
</tr>
<tr>
<td>Other paramedics</td>
</tr>
<tr>
<td>Population</td>
</tr>
</tbody>
</table>

From ref. 20.
system of health care is believed to contribute significantly to better health coverage, especially in immunization, and to the declining morbidity and mortality rates of Indonesian children (1).

PROBLEMS OF EFFECTIVE DISTRIBUTION

Income

As previously discussed, the problem of childhood malnutrition is not simply a problem of the marketplace availability of food but rather of the power or lack of power of the people to acquire food. That power is almost directly related to the distribution of wealth within a country.

As is often cited in economic literature, there is an inverse relationship between personal wealth and percentage of income spent on food, with lower-income families spending between 60 and 80% of their income on food. In addition, any change in income will have more of an effect on the buying power of smaller-income families than of those in the upper-income levels.

Buying power may also change the composition of the diet, affecting energy consumption and nutrient intake. This paradigm indicates that the largest proportion of dietary energy (approximately 75%) for the poor comes from carbohydrate. The proportion of carbohydrate declines sharply to only 30% at high-income levels, with fat and animal protein accounting for more than half of the change. Timmer applied the paradigm to the Indonesian diet using data from the National Socioeconomic Survey, 1969–1970 (15). It is interesting to note that, even at high-income levels, energy sources for Indonesians still come primarily from starchy food, especially rice.

The effect of income on energy consumption indicates that, during periods of economic difficulty, when the income of most people may decline and the prices of food rise, energy consumption is not affected. Data from Sri Lanka, however, indicate that the change in income results in a serious decrease in energy consumption among the poor (5), and, in Chile, daily energy consumption per capita in the poorest quartile decreased from 1,925 kcal in 1969 to 1,626 in 1978, a reduction of 16%. During the same period, however, calorie consumption increased in the richest quartile (5).

The Effect of Other Socioeconomic Factors

It is understood that, besides income and prices, there are other noneconomic variables influencing demand, e.g., education, number of household members, caretaker and home, traditional practices, etc. These and other complex variables can be combined with income as a composite index to represent socioeconomic factors.
Studies examining the effect of socioeconomic factors on the nutritional status of 7-year-old children indicate that nutritional health status, rather than genetic determination, is the predominant factor in height differences among children. In a study by Martorell (16), there was no significant difference among “well-to-do” children from various countries, while there were gross differences in children from different socioeconomic levels in the same country.

COMMUNITY PARTICIPATION

In his address on the “Prospects for Better Nutrition Through Primary Health Care” (17), Mahler, Director General of WHO, stated that the declaration of “Health for All in the Year of 2000” of Alma Alta in 1978, refers most of all to people and therefore starts far from the hospital and clinic. It begins in homes, in community, in schools etc. It includes what people themselves can do to shape their lives and those of their families. . . . Community involvement is considered a prerequisite, not only in making use of services, but in developing suitable mechanisms for the planning, operation, and control of community health care programs.

James Grant, Executive Director of UNICEF, in his address to the Symposium on Child Survival, Population and Development for Parliamentarians of the Asian Countries in June 1987 (18), also emphasized the important role of the community in the Child Survival and Development Revolution:

The Child Survival and Development Revolution rests upon one central foundation embodied in the concept of primary health care: that people can and ought to be enabled to take far greater care of themselves. Consistent with this, these technologies offer a new relevance to the family—enabling people to take action—compared with the days when health care was only available through minimally accessible large institutions reliant exclusively on experts in white coats intervening.

In Indonesia, community participation is a natural outgrowth from a tradition known as “gotong royong.” This inherited cultural pattern of mutual help in the community has been adopted as one of the 15 principal guidelines for the national development of Indonesia.

In rural development in Indonesia, community participation may be found in many different forms. These include consultation to the village; help in actual labor, for example, in clearing land; specific expertise, for example, in designing roads or in the method of laying water pipes; the donation of money or materials; and in forms of health care such as weighing children or providing information and education in nutrition (19).

Community participation in nutrition began in the 1970s with the applied nutrition program. This program trained village nutrition cadres to disperse nutritional education into the villages. With a slightly changed concept, it has continued as the National Family Nutrition Improvement Program, which is based primarily on community participation.

In 1979 and 1983, this National Family Nutrition Improvement Program, which
is known as "UPGK," grew from only a few hundred to 45,000 villages out of 65,000 villages in Indonesia. This growth was possible as a result of the active participation of a village women's organization known as PKK, which exists at various levels of activity in most of the 65,000 Indonesian villages.

The members of PKK established village nutrition centers or "Taman Gizi" in the 1980s. Once every month, approximately 20 to 30 mothers and their children gather in the center for nutrition education, recording the weights of the children, supplementary feeding, etc. Most of the activities in the center are carried out by the village nutrition cadres trained under the auspices of government nutrition programs. Activities are funded by the mothers with local products such as rice, eggs, and vegetables, or with cash. Since 1986, the village nutrition centers have been gradually integrated with other primary health care services and have become known as POSYANDU (see section entitled "Availability of Health Services").

CONCLUSIONS

The prevalence of malnutrition in developing countries appears to have worsened during the 1980s in specific areas. Food production per capita, on the other hand, has shown improvement with the exception of some African countries. Malnutrition, while directly the result of poor food intake, is exacerbated by more complex problems including socioeconomic level, education, size of household, levels of sanitation, and interfering traditional practices. It is also true that, even in a nation that has increased its food production, if the distribution of wealth is not also changed, the lower socioeconomic levels of the population will still be incapable of acquiring sufficient food, and little change will be seen in the nutritional status of their children.

To prevent or ameliorate malnutrition, a program must be devised that touches both the microsocial aspects of life (including education, family planning, incorporation of more healthy ways of eating, maintenance of more sanitary living conditions) and the macrosocial governmental aspects that actively seek to create programs to educate, to provide employment and, thus, income, and to maintain a more equitable distribution of wealth within a country. In Indonesia, this political commitment has been part of national development programs for 15 years and will continue in the next Five Year Development Plan, starting in 1989.

REFERENCES


DISCUSSION

*Dr. M. Mehta:* I am sure we all agree that while the work done in the laboratory is a significant factor in solving the problems of malnutrition, it is the work in the community toward prevention that is most important. One problem in emphasizing increases in grain production is that we often do not consider the simultaneous rise in population and the question of the food actually getting to the people. Could you comment on the actual impact that your programs have had on the prevalence of malnutrition?

*Dr. Soekirman:* Even when data indicate sufficient food production, a lack of equitable distribution produces deprivation within specific regions or income levels.

The major impact we have seen in Indonesia is the decline, within the past 10 years, in third-degree protein-energy malnutrition (PEM).

*Dr. Karyadi:* The prevalence of PEM, as well as the infant mortality rate, has recently shown a definite declining trend. The highest rate for PEM and infant mortality is in the less-developed areas of Indonesia.

*Dr. M. Mehta:* What are the actual benefits that have accrued as a result of community participation?

*Dr. Soekirman:* Ten years ago, we had 65,000 villages with only about 100 centers for nutritional education. Now we have 33,000 centers, essentially organized, with governmental support, by the women.

*Dr. Monckeberg:* I should like to discount the use of numbers when assessing world malnutrition. They vary grossly from one organization to the other, depending on the definitions of malnutrition. Organizations seeking support may tend to exaggerate them.
Information published on the world's food production is also very erratic, because of the difficulty in accurate data collection.

There is one basic reason why malnutrition exists: poverty. To prevent malnutrition, one must increase socioeconomic development.

I believe, however, there are ways to prevent malnutrition, even when poverty exists. For this, some basic needs, such as nutritional, educational, sanitation, and health, must be met. Success is predicated on carefully planned political strategies for short- and long-term goals.

Dr. Soekirman: I look at international indices as an impetus for governments to become aware of a problem and begin to find solutions for it.

For the past 15 to 20 years, in Indonesia, our goals have been set at 5-year intervals by the legislature.

Dr. Okeahialam: In Sub-Saharan Africa, within the past decade, the nutritional status of children, especially in rural communities, has deteriorated. This is closely associated with drastic societal changes, the vagaries of nature, such as droughts and floods, and by huge national debts. There are also high levels of unemployment, inflation, and decreased food production, in spite of agrarian reform.

National economic and social programs appear feasible on paper, but after years, no impact on the nutritional status of children is seen. Why? While the basic problem of poverty must be addressed, the exacerbating factor of lack of education should take strong priority. The importance of stressing breast-feeding and high-quality, locally obtained weaning foods cannot be overemphasized, especially in those areas where mothers are being subtly, but effectively, pressured to feed their babies commercial formula and tinned foods.