Growth Promotion for Child Development

Proceedings of a colloquium held in Nyeri, Kenya, 12-13 May 1992
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Edited by
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Causal Factors Influencing Childhood Malnutrition

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The "G" in GOBI (the UNICEF eponym for growth monitoring, oral rehydration, breastfeeding, and immunizations) is being subjected to increasing scientific scrutiny because implementation of growth monitoring in national programs has not met expectations and has, in fact, been the least successful of the four child survival interventions. Although very effective in smaller projects, growth monitoring and promotion (GMP) has tended to become an empty healing ritual when implemented in mass programs.

The situation may parallel the observation that the historical antecedents of many ancient healing rituals suggest that they became culturally entrenched when empiric practices that worked with individuals were selectively oversimplified when applied generally. As a result, symbols and charms were substituted for effective healing measures. For sustainable progress, scientific understanding of causal factors through research must replace rituals based only on dogma, faith, and fervour. Experience of the past decade in trying to apply GMP as part of the child survival and development revolution (CSDR) suggests that a similar shift from a flexible, local, problem-solving approach to associated symbols may have occurred when programs expanded to address the needs of large populations of children requiring nutritional care.

Evidence from UNICEF's evaluation of GMP in seven countries (UNICEF 1992; Pearson 1992) and numerous other reviews (Gopalan and Chatterjee 1985; Gerein 1988; Hendrata and Rohde 1988; Lotfi 1988; Nabarro and Chinnock 1988; Taylor 1989; ACC/SCN 1991) have defined many problems and pitfalls that contributed to the ritualization of GMP. Programs focused primarily on technical details concerning weighing and charting rather than on correcting the causes of malnutrition. Major changes in policy are needed so that scarce international and national funding, and especially the time of hard-pressed community health workers and parents in poor countries, will be used to best advantage. From the mass experiment of the past decade, it is most important to learn again the
principle that before going to scale we should be certain that procedures have been adapted to local conditions. There must also be an infrastructure to make them sustainable.

The underlying problem can be illustrated by a personal experience. In the late 1970s, one of us was working at the Health Services Research Institute in Surabaya, Indonesia, and became involved in an evaluation of the national GMP program that was considered to be one of the best in the world. The monthly weighing days were a community celebration. We have pictures showing three stations. At the first, a large tripod holding the scale from which the baby was suspended always drew a large interested crowd, laughing when the babies cried. The second station was a table where weights were charted and a trickle of mothers and babies went to get growth charts filled in. The third station was a table where mothers were "educated" or given medicine but almost always no one was there and even the staff tended to wander away.

Less than half the babies in a village were being weighed so we did home visits. The sick and malnourished babies were at home in poor families some distance from the weighing stations, which were always near the headman's house. Mothers told us that they did not go because they did not want to be embarrassed in front of their neighbours when their baby was not growing well. They said that mothers who went to the weighing days dressed up their babies and themselves but that poor mothers didn't have good clothes. In any case, they were too busy to attend what was mainly a social event. It was apparent that the achievements in improving malnutrition in the more intensive original projects out of Jogjakarta would be difficult to repeat in a mass program in Indonesia. No one seemed interested in our findings at that time. In spite of a great deal of investment in money and much excellent work to improve the educational and counselling components, the pattern we found in Surabaya has been shown to be repeated in subsequent evaluations of the Indonesia program, as well as in other countries.

Since 1985, multiple reviews and conferences (UNICEF 1986; UNICEF 1987; AED 1988; Gussler et al. 1988; AED 1989) have stressed the conclusion that it does little good for a mother to know that a child's growth is faltering if she is not then helped with appropriate action. Rather than just telling the mother to provide more food, a flexible, local, problem-solving process is needed. Educational messages became standardized, dull, and irrelevant in adapting to local realities. It was supposed to be an incentive for parents to feel pride in front of their neighbours when their children were growing well but, in practice, it has been a disincentive for poor families (among whom malnutrition is concentrated) to learn that their child's growth is faltering. It has become evident that the
participation in GMP of the village elite as role models will not spontaneously spread to poor families with malnourished children any more than any other effort to promote trickle-down development.

Rationale for Causal Analysis

Childhood malnutrition can be greatly improved even under conditions of extreme poverty (Pelletier 1991a). Lack of progress in achieving the nutrition goals of the 1990 World Summit for Children is not because of insufficient scientific knowledge but because that knowledge has not been effectively applied. Lack of political will is usually blamed for poor implementation in national programs but, with GMP, an abundance of political will and resources seems to have been misdirected. It is not enough to say that mass programs tend to lose the capacity for appropriate and sustainable action when implemented by a bureaucracy, either as a component of national primary health care or as a separate vertical program.

The new UNICEF nutrition strategy has the potential for making program corrections to ensure that interventions used for child growth and development are as effective as those used for child survival. UNICEF's new nutrition strategy is based on intensive consultation with field workers (UNICEF 1991c). Although hunger programs continue to attract international and national funding, 25–50% of children in many countries continue to be deprived of the basic human right of reaching their development potential.

Numerous scientific reviews (Berg 1987; ACC/SCN 1991) in recent years have documented the complexity of the factors that influence the nutritional status of children, but they also stress that there is great potential for improvement. Many of these publications have developed their arguments around schematic diagrams showing conceptual models of how causal factors fit together. The balance and relative prominence given to individual factors typically depend on the professional orientation of the authors.

In general, they tend to fall along a spectrum emphasizing varied concerns, for example: economists are concerned about issues such as price policy and food subsidies (Behrman 1988; Lipton 1988; Pinstrup-Andersen 1988, 1989; Gunatilleke 1989); agricultural experts about food production (Sisler 1988); national planners about food security, distribution, national surveillance, and stockpiling for emergencies (Timmer 1988; Tucker et al. 1989; Habicht and Pinstrup-Andersen 1990); anthropologists about feeding practices and food taboos (Scrimshaw and Hurtado 1987); other social scientists about intrafamily food distribution and gender discrimination (Huffman 1985; Leslie 1987); nutritionists about
measurement of dietary intake especially in terms of balance among food components (Ewing and Morse 1988–89; Calloway 1989; Pinstrup-Andersen 1990; Latham 1990); infectious disease specialists about energy loss, interference with assimilation and interactions with immune function (Scrimshaw et al. 1971; Taylor et al. 1979; Tomkins and Watson 1989); maternal and child health specialists about low birth weight and growth curves (Morley and Woodland 1979; Quinn 1992); and child development specialists about psychomotor indicators (Chavez 1979); etc.

The orientation of this paper does not reflect a specific scientific discipline’s understanding of causal factors, but a synthesis balancing factors influencing care by the mother in the home. It seems probable that the dilemma of how to move from effective local programs to mass implementation may frequently be solved by flexibility in adapting procedures based on better understanding of local causal factors at family and community levels. The rationale mainly follows the analysis of Gerein (1988) Nabarro and Chinook (1988) and others (Gopalan and Chatterjee 1985; Taylor 1989; Gillespie and Mason 1991; UNICEF 1991b). We have tried to define a middle position in the continuing polarization between proponents of comprehensive and selective primary health care with the conviction that sustainability depends on changes that focus care on the poorest children.

**Categories of Causal Factors**

Relevant causal factors have been grouped under three headings by a recent ACC/SCN (Administrative Coordinating Committee/Sub-Committee on Nutrition of the United Nations) policy paper: food security, prevention of infections and environmental protection, and home care (ACC/SCN 1991).

UNICEF’s new nutrition strategy identifies four groupings of functions of importance to nutritional status: food security, health services, environmental protection and home care (UNICEF 1991b). Obviously the main purpose of the middle two functions in UNICEF’s list is to prevent infections. There is not complete congruence between these categories and the analysis that follows because most of the specific factors influencing nutrition care overlap. It is also important to realize that the organizational location of services also follows these general groupings but should be differently structured at national, at district and community, and at household levels.
Food Security

Economic Forces For poor people, food may represent 60 – 80% of family expenditures. There is growing consensus about principles related to food security. The World Bank and UNDP (UNDP 1990; World Bank 1990) have identified three policy tracks for international food security support in the 1990s. First, benefits for the poor are essential for long-term solution of problems of poverty. Second, a "safety net" of social security is essential, and sustained access to "food security" is the main component of basic living needs. Third, building local and national capacity to solve problems of food supply and distribution provides an essential foundation on which the first two tracks of activity depend.

Among the many causal forces that influence food security, price fluctuation has particular impact on the poor, especially for children and their mothers. This may be seasonal as in Bangladesh where child mortality typically rises before harvests. Or it may be caused by climatic or political forces interfering with production or distribution. One of the most important benefits resulting from national nutritional surveillance programs (Habicht and Pinstrup-Andersen 1990) is the development of price stabilization and early warning systems, which usually require use of buffer stocks and price controls (Pinstrup-Anderson 1988, 1989, 1990).

The need for government controls to prevent exploitive patterns of hoarding for private gain is among the most obvious ways of maintaining equitable prices. There are few instances of exploitation of the poor more common or more disastrous to long-term development than the use of food catastrophes for private gain. Fluctuations in the attention paid to poverty reduction has usually been linked to food emergencies. Because of its publicity value and because causal relationships tend to be direct, much has been learned from relief efforts during periods of crisis and famine. In the past decade, epidemics of diseases that had been considered extinct, such as pellagra and scurvy, have recurred massively in refugee camps in Africa.

Organizational Issues Rather than focusing on causal factors usually identified as scientifically important, it seems more practical to talk first about the organization and management framework needed to support a poor family's care of their children. These are presumably complementary to the causal factors that are the subject of most biomedical or sophisticated socioeconomic studies.

Central to community and family problem solving is the need for official support mechanisms involving multiple sectors such as agriculture, food distribution, transport, and marketing. Sustainability in any service program requires a national policy to promote self-reliance of families. Such self-sufficiency
is often not supported by government officials or by health professionals who tend to encourage dependency to increase their status and income from private practice.

High costs are forcing most governments to decentralize and give up the idea that tax funds can support food security and health and nutrition care (UNICEF 1991a). It is particularly important, therefore, to make sure that delegation of responsibility for self-financing carries with it authority for decision-making and controls to promote equity.

If the International Monetary Fund (IMF) and other international agencies were to take seriously the concept of "Adjustment With a Human Face" (Cornia et al. 1987; Thorbecke 1988) they could use their conditionalities to encourage community-based initiatives that give priority to equity. Of special importance is the need for a process of surveillance using equity indicators to make sure that the basic needs of the poor and deprived are met. Monitoring for equitable distribution should use outcome indicators of actual change produced rather than just monitoring access or coverage.

_Prevention of Infection and Environmental Protection_

**Role of Health Services and Integration with Primary Health Care** Recent reviews have stressed the importance of prevention and have deemphasized the benefits of trying to identify and treat malnutrition (Gerein 1988). This dichotomy leaves out the basic principle of secondary prevention, which uses early treatment to prevent severe disease. An important distinction needs to be made between three levels of interventions that have been used in CSDR (Taylor and Ramalingaswami 1992). The first level of primary prevention includes mass preventive measures such as immunization and iodinization of salt. They are usually highly cost-effective if everyone has equal access to them. Secondary prevention includes interventions such as oral rehydration, case management for childhood pneumonia, high-risk pregnancy monitoring, and growth monitoring and promotion.

These highly cost-effective approaches depend on early diagnosis through surveillance in the home and prompt care. At the third level are numerous changes in behaviour, life style, home environment, and child care practices such as breast feeding that produce long-term improvement in underlying health status and child development. All three groups of interventions can be made sustainable at the community level through systematic surveillance to find out what the problems are, which families are affected, what causal factors are important locally, and then what changes can be made by community and family action.
A new role of service personnel is to promote the capacity of communities to solve their own problems. They can provide technical expertise, guidance, incentives, rewards, recognition, and set standards and norms that communities are expected to meet. It will seldom be possible to get the high-level, official social mobilization for nutrition, which was largely responsible for the success of the Iringa nutrition program in Tanzania (Pelletier 1991b). More commonly, nutrition promotion should be part of routine primary health care, whether these services are under health or local government. Where malnutrition and low birth weight are common, abundant evidence can be mobilized to support the need to give greater priority to nutrition. One reason for the low priority currently given to nutrition by policymakers is that expectations were raised by putting "G" first in GOBI, but the apparent great waste has produced disillusion about the feasibility of any program to reduce malnutrition. If new approaches can demonstrate positive results and if the effort and resources required for nutrition programs can be significantly reduced, then it should be possible to justify new programs. The sort of local studies now being done as part of the Bamako Initiative (UNICEF 1991a) show promise for community-based, integrated primary health care.

Environmental Protection Providing access to water and sanitation have long been primary objectives of international assistance. The results are tangible and something concrete is left with units that can be counted and costed. The diseases prevented have been classified under headings such as water-borne or water-wash infections, which include many more than the diarrheal diseases that continue to be the first cause of death in many countries. Perhaps even more important are the general improvements in hygiene and health habits that result from the availability of water and sanitary facilities. Such improvements are given high priority in local decisions primarily because of the time saved and convenience, especially for women (Leslie 1986; Agarwal 1990).

Partnership Between Community and Health Services Community participation is best facilitated by two parallel components. The first is some kind of community committee to promote nutrition and health and mobilize community interest and resources. The second is the need for volunteer community health workers (CHWs) to bridge the interface between the community and primary health care system. Health personnel usually are responsible for training and supervising CHWs. Many special projects have used peripheral health centre staff rather than volunteers to do nutrition surveillance and promotion. This can be justified for research precision, but is usually too expensive for sustainable mass programs. Training local people who have major responsibility for implementation also helps greatly in community empowerment. Volunteers tend to be self-selected and have more service motivation than community health workers who are paid by health services. Paid CHWs are seen by their neighbours as having become part of health services, and they gradually become less identified with the
community. There is usually a high turnover of volunteers, but that has the advantage that community values and norms change as more community members receive training and experience.

The dialogue between the health system and community needs to be flexible. Local priorities should be met first and as information is gathered about the distribution and causes of nutrition problems, discussion can turn to new interventions and patterns of behaviour promoted by the health services.

Synergism with Infections Great progress has been made in understanding synergism between malnutrition and infections since a WHO monograph brought together a synthesis of diverse streams of research in a unified conceptual framework (Scrimshaw et al. 1971). It is generally agreed that the malnutrition and infection complex remains the most prevalent public health problem in the world today (Tomkins and Watson 1989). In many places, infections are responsible for most of the malnutrition (Mata 1984, 1987). Much has been learned about mechanisms that control the two-way interactions, which vary greatly with particular pairs of nutrient deficit and infectious agent. Specific nutritional deficiencies produce multiple changes in host resistance. These range from permitting initial entry of organisms because of changes in mucosal integrity with altered capacity to resist colonization by pathogens, to basic changes in host immunity. In general, malnutrition increases the duration and severity of infections more than incidence (Kielmann et al. 1983). The host’s metabolic responses may be directly influenced and deficits of specific nutrients impair both antibody and cellular immune functions.

The reverse interactions are equally important. Infections have multiple effects on absorption and intake of nutrients, which include anorexia and decreased transit time in the gut. Fever and associated metabolic changes drastically alter the utilization of nutrients. Dietary support during and after infections has been shown to be critical in recovery, especially for children who need to achieve catch-up growth. In sum, the interactions of malnutrition and infections lead to a descending spiral in health and whereas no one event would cause death or permanent disability, the concatenation of synergistic effects is the major cause of mortality and morbidity in poor communities.

Even today, few field reports are available on the impact of deliberate programs to demonstrate synergism between interventions, rather than between particular pairs of nutrients and infectious agents (Scrimshaw et al. 1968, 1969; Kielmann et al. 1983; George 1992). Some practical principles can be defined about how synergistic programs for nutrition and infection control can be most cost-effectively implemented. First, is the basic need to fit activities into a general infrastructure for primary health care. Second, is to recognize that the balance
between the effects of malnutrition and infections varies at different ages. At Narangwal, nutrition was most important prenatally, infection control during infancy, and (between 1 and 3 years of age) the two were equally balanced (Kielmann et al. 1983). Third is to focus on family empowerment to improve child care through community-based learning. It has been demonstrated that general nutritional interventions that include food supplements tend to cost about twice as much as infection control, when applied at the community level (Kielmann et al. 1983), so that some form of nutrition subsidy for children may be necessary.

**Micronutrients and Specific Components of the Diet** Mass public health interventions can have significant impact by preventing micronutrient deficiencies (Latham 1990). Most serious is the hidden hunger of massive, borderline deficiency in specific nutrients that can be corrected by better balanced nutriture. Specific examples currently receiving attention are the following:

- Iron deficiency is probably the world's most widespread deficiency, with many millions of people chronically anaemic (Scrimshaw 1990). Many of these cases of iron-deficiency anaemia are due to iron loss from infections such as malaria or hookworm. Women are particularly prone to low hemoglobin, and their deficient iron stores may influence the common anaemia of young children. Anaemia produces serious loss of work output and interferes with immune responses. A major consideration is to facilitate the absorption of iron by nutrients such as vitamin C and to prevent blocking of absorption by phytates and other organic chemicals in some vegetables or by tea. Supplementation of iron should be routine in maternal health care.

- Iodine is also a general deficiency in certain areas of the world. Goitre, cretinism, and mental retardation resulting from iodine deficiency are among the most easily and economically applied preventive interventions available. The usual practice of iodinization of salt can be supplemented by the use of iodized oil either by injection or capsules. Innovative alternatives include fortification of other foods such as tea in Tibet.

- Vitamin A is currently receiving special attention because the periodic use of a high potency capsule may justify its old label of an anti-infective vitamin. The main benefit is prevention of blindness from xerophthalmia in children (Gadomski and Kjolhede 1988). Vitamin A has been shown to improve host resistance in measles dramatically and may have a general impact on infant mortality.
Numerous other micronutrients show promise, but in general the old principle still holds true that a generally balanced diet is the most healthful. There is increasing evidence that diet early in life directly influences multiple, chronic diseases.

Quality of Home Care

Sociocultural and Behavioural Factors  Culturally determined feeding practices control decisions about what families do with whatever food they have available (Bolton 1990). Most cultures have complex patterns of belief and tradition related to food. Detailed ethnographic study may be required to find out why certain foods are eaten at specified times and circumstances, and why other nutritious foods are ignored. The origins of such traditions have usually been lost in ethnic history, but few cultural characteristics are protected with as much fervour as practices related to food. The distribution of food usually follows cultural rules that often include patterns of overt discrimination against women, such as requiring them to eat only after men. This discrimination is particularly severe in some cultures when girl babies are permitted to slip into malnutrition because of son preference. New approaches are needed for the systematic behaviour change required to alter practices related to food.

The caring capacity of families and communities can be directly improved by specific education. To meet the particular needs of poor children and their mothers, special provisions should be made to enhance the "coping skills" of women. Studies have been made of "deviant" mothers who achieve good nutritional status in their children even when very poor (Zeitlin 1990). Appropriate practices can be promoted by ensuring education of women, training in home skills relating to preservation and preparation of food, freeing up more time by technical innovations, breast feeding, improved maternal health care especially related to pregnancy, and general societal support. Numerous studies have shown that women in traditional societies often work much harder than their men (Agarwal 1990; Bolton 1990). In addition to major responsibility for agricultural production, they bear the primary responsibility for child care and nurtue. They receive minimal resources or rewards to support these great efforts.

Some practical options will help families, and especially women, to increase their caring capacity. Most obvious is direct transmission of knowledge through formal and informal education and visits to homes by extension and health workers. Indicators of the needed changes are straightforward, such as school enrolment by gender, adult literacy and changes in social norms and constraints.
Women's Time  Special effort is needed to introduce measures to help mothers with one of their most intractable problems — lack of time. With population growth, the availability of fuel and water has become a crisis in many communities around the world. In most cultures, these activities are considered women’s work, partly because they are directly related to the preparation of food. In countries such as Nepal, one person in a family of six works full time getting fuel and water. Labour-saving technologies are available for most domestic activities, including smokeless stoves to conserve fuel, arrangements for storage of food, and provision for better hygiene and cleanliness around the home. Breast feeding, preparation of appropriate weaning foods, and increased feeding frequency for children all require time investment by family members, as does getting children to weighing days or immunization posts. Women could be given more time for household and child care responsibilities if their children were spaced, if they had maternity leave, and if there were child-care arrangements for working women. A change in roles to persuade men to assume greater responsibility can sometimes be made part of introducing new technical innovations.

Income Generation for Women  Another practical option is to improve the availability of funds for women and their control of resources. Many studies have shown that child health and nutrition improves when women have greater control of household expenditures (Leslie 1986). This can be done through providing them with income-earning opportunities, access to ownership of animals and poultry, and social change to permit them to control a share of family income. Equalization of wages and home-based employment can be facilitated by government policy and international assistance. The social security support network can be targeted specifically to women and children.

Community-Based Nutrition Care and Learning

Among successful examples of community-based nutrition care are the Iringa Project in Tanzania (Yambi et al. 1989) and Thailand’s national nutrition program (Thailand Ministry of Public Health 1992). Many smaller projects have provided detailed analytic data. The triple-A process of assessment, analysis, and action developed in the Iringa project is a simplified version of the more general learning process used in community-based primary health care.

The learning process for community-based nutrition care provides a methodology that is generally applicable even though the specific programs that emerge from this process will be different, depending on local conditions and resources (Gopalan and Chatterjee 1985; Gerein 1988). It depends on nutrition surveillance activities that will vary depending on a country’s administrative
structure and its functioning. It seems important for sustainability that community-based nutrition surveillance be separated from national surveillance for food security (Taylor 1989; Brown 1990). Even though screening may be relatively simple, complexity is introduced because of the multiple causal factors that produce malnutrition. Community-based nutrition surveillance should be linked to whatever organization is responsible for local health care, either the health services or local government authorities. In this discussion, the role of the health services is stressed because that is a common pattern.

Community-based surveillance depends on two activities. One is the local use of indicators to identify a problem or risk promptly when it occurs. The second is to make an appropriate response to correct the problem or prevent its progression.

Several community-based interventions can be monitored together using a diverse set of indicators including: families in which there are children with growth faltering; mortality with some estimate of causes of death as the ultimate outcome indicator for child survival; coverage and utilization of services, such as immunization, which can be used as output or process indicators; and a variety of direct indicators of input to measure access. For national nutrition surveillance, multiple indicators have been developed depending on local food availability.

The Iringa project was effective in mobilizing community-based action partly because they employed the simple indicator of growth monitoring that was readily understood by the people. The triple-A approach of the Iringa project and experience in Thailand have shown that a good balance can be maintained between the two main activities of screening for growth and action to promote nutrition. In both contexts, the screening assessment reached all babies and included going into the homes of those that did not show up spontaneously at weighing centres.

At first, weighing days in both Tanzania and Thailand were monthly but from experience it was found that quarterly weighing was sufficient. However, it was essential that babies identified as being at risk of malnutrition be followed up more frequently. The second triple-A step is analysis and provides a mechanism for community health workers and local leaders to work with parents in finding out why a baby's growth is faltering. This is where the analysis of causal factors that is the main theme of this paper is important in the community learning process. The third triple-A step of action derives directly from understanding of local causal factors to mobilize community-based procedures so that sustainable solutions are incorporated into local patterns of child care and feeding.
Alternative Approaches in Nutrition Surveillance and Action

From recent evaluations it has become evident that there is now a need:

- To recognize that childhood malnutrition has multiple causes but that in any local area three or four patterns of causation will predominate. Intervention programs should be designed to fit local circumstances.

- To distinguish three types of nutritional information systems that have different objectives, methods and levels of precision: GMP in individual care, which is used most effectively by clinical practitioners and educated mothers; community-based nutrition care to help community and primary health personnel apply a flexible and sustainable local learning process to mobilize the capacity of families to solve their own problems; and national nutrition surveillance concerned primarily with macroeconomic issues, such as price policy, food subsidies, and stockpiling food for emergencies. The latter two information systems can probably use periodic surveys designed to focus care on groups and families in greatest need.

- To analyze local causal factors under the three headings of food security, community-based health and environmental problems, and the quality of home care (ACC/SCN 1991; UNICEF 1991b).

- To develop in each region a capacity to analyze causal factors to facilitate complementary, mutually supporting activities at all levels. Interventions that are locally relevant need to be focused on priority problems and groups among whom malnutrition is concentrated rather than continuing to hope that a simple, universal package of interventions for mass programs can ever be defined. (See the "Growth Promotion in Primary Health Care" in this publication, for a more detailed description of this process.)

Summary

International and national policies relating to growth monitoring and promotion are changing rapidly. Programs should be expanded from current procedures that often work well for individual babies to population-based approaches and mass application. Community nutritional care must be based on dialogue between the health system and communities. Only then will it have the potential to empower families to solve their own problems. This requires systematic mechanisms to define major local causal factors and appropriate solutions.
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