

Growth Promotion for Child Development

**Proceedings of a
colloquium held in
Nyeri, Kenya,
12-13 May 1992**

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Growth Promotion for Child Development

Proceedings of a colloquium
held in Nyeri, Kenya, 12–13 May 1992

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Foreword

This book contains the proceedings of the colloquium "Growth Promotion for Child Development," held in Nyeri, Kenya, from 12 to 13 May 1992. The meeting was organized by Cornell University, USA, the Canadian International Development Agency (CIDA), and the International Development Research Centre (IDRC), Canada. The meeting brought together 24 participants from 12 countries, and were selected for their experience and expertise in health promotion. Besides bringing field and programmatic experience from more than 20 countries in Africa, Asia, Latin America, and North America, these participants brought knowledge gleaned from a number of scientific disciplines ranging from community health, nutrition, policy formulation and planning, anthropology, education, and public policy analysis. Although attempts had been made in the planning of the colloquium to ensure the representation of key agencies and individuals involved with growth monitoring and promotion (GMP) initiatives, it was regretted that a number of persons who indeed were invited, were unable to attend, for a variety of reasons.

The participants met to discuss critically growth monitoring (GM) and produce recommendations useful in the promotion of child growth and development. The broad objectives of the Colloquium were to:

- Review what is known about growth promotion and growth monitoring;
- Consider the scientific basis to judge the effectiveness of child GM strategies and the role of growth monitoring in these programs;
- Outline the circumstances, conditions, and actions that are necessary for GM to be successful and, in this context, to discuss to what extent the current forms of GM have contributed to growth promotion;
- Identify gaps in research knowledge; and
- Produce recommendations on growth promotion strategies and program management that might be useful for governments (local health policymakers, planners, and communities), international agencies, NGOs, and donor organizations.

The Colloquium was to focus on growth promotion, rather than be confined to an evaluation of recent experiences with GM programs. Our hopes were that this could be a constructive colloquia that by reviewing past experiences and considering the diversity of views about GMP would lead to an articulation of possible actions to promote growth for optimum child development. The final purpose was to reach some international consensus on how best to promote the growth of children.

In the Colloquium, the historical evolution of GMP in developing countries and different perspectives on GMP were described. Conceptual frameworks that examined growth promotion were presented by some of the participants, whereas others made presentations about research studies, pilot projects, and national level experiences in implementing national GMP programs that began as pilot projects.

The timing of this meeting was set so that it would directly benefit from a UNICEF-organized workshop on "Evaluation of Growth Monitoring and Promotion (GMP) Programs" held in Nairobi, Kenya, from May 7 to 9, 1992. The UNICEF meeting discussed lessons learned from UNICEF-supported GMP programs. About half of those at the Colloquia had attended the Nairobi workshop. We see the two meetings as being complementary to each other.

These proceedings include the revised edited version of the papers presented. The summary sections that precede sections provide the reader with the context for understanding the discussion points, which are also presented.

On a more personal note, I have been a strong supporter and advocate of growth monitoring for many years. Soon after David Morley published his findings from Nigeria in 1968 and described the use of the Ilesha weight chart, I began to write, lecture, and advocate its use. Now GMP, by which we mean weighing and charting, as a strategy to promote good growth, has become controversial with strong proponents and opponents.

There are many different strategies and actions that individual families and international or local agencies can, and do, take to promote good and healthy growth and development of children. But the most visible programs supported by agencies (including UNICEF) and by governments consist mainly of the provision of weighing scales, growth charts, and instructions for weighing and charting.

During work and travel in several countries in Africa and Asia, I much more often see "bad" GM than "good" GM programs in operation. "Bad" GM certainly does not achieve the objective of improving growth, and "good" GM programs have not been adequately evaluated to determine their effectiveness.

I have, in the last several years, become very concerned that so much money, time, and energy, including the time and energy of mothers, are devoted to this one, poorly managed strategy. I see so much more "GM," than I see "P."

Weighing a baby and charting that weight does not in itself improve nutritional status. So often in GM programs very little else is done, and so little attention is given to counselling the mother. Weighing and charting is not a magic bullet like immunization. People compare GM with measles immunization, which, it is claimed, had major problems when first introduced, but now is deemed highly effective.

But weighing and charting are comparable to the syringe and needle and not to the measles vaccine. What I see in many countries is use of the syringe and needle without a vaccine, and I learn of efforts to improve the syringe, not to improve the vaccine. The equivalent of the vaccine in GMP is the counselling and other actions that the growth chart is meant to trigger.

So UNICEF and others have spent millions of dollars on the design and distribution of scales and charts, but pitifully little on the vaccine, that is, on the actions that are essential after weighing and charting if the monitoring exercise has even the slimmest chance of preventing or curing growth failure.

My current view is that we need to devote much more time and energy to various actions to promote good growth and development of children and to decide if and when it is appropriate and likely to be useful to have growth charts included among the tools chosen to achieve this objective. The alternative is to select actions and implement programs that promote growth without regular weighing and charting. Using the vaccine analogy, this becomes like deciding, in programs to prevent poliomyelitis, when to use a syringe and needle for injectable inactivated poliovirus vaccine (IPV) and when to use oral poliovirus vaccine (OPV) without the syringe. In either case, the vaccine is much more important than the syringe or other vehicle and, in growth promotion, actions to promote good growth are much more important than the growth chart. These actions deserve more resources than does the chart, and the charting.

In helping to organize this meeting, it was my hope that we would be able to agree on three matters:

- Any GMP programs that concentrate on weighing and charting but do not use the chart to counsel the mother, and for analyses and actions aimed at the causes of poor growth, are exercises in futility.

- Weighing children can be very useful quite apart from GM, for example, in diagnosis, in screening, in nutritional status assessment, in surveillance without GM, and for other purposes.
- There are many ways, other than growth charts, of assessing the well-being of children and the likely barriers to good growth and health for that child; there are ways to analyze these findings, and these can lead to actions that will help promote growth.

The conclusions of the deliberations that took place during the Colloquium are highlighted in the portion that the participants drafted, the "Nyeri Declaration on Growth Promotion for Child Development." This declaration emphasizes that growth promotion is a human right, and the need to consider not just physical growth but cognitive and psychosocial development as well. Further, the declaration describes the possible strategies of growth promotion that may be appropriate, at the individual, community, or higher levels, in different contexts.

My hope now is that this book will help to encourage further discussion on strategies to promote child growth and development and serve to remind all who are devoted to this goal that there are numerous ways to stimulate action to that end.

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We wish to thank the Organizing Committee of this colloquium: Jenny Cervinskaskas, Sabu George, Nancy Gerein, Urban Jonsson, and Michael Latham. The competent assistance of Michael McAdam in the stages leading up to the meeting in Nyeri, and of Sarah Jones, the focal person for organizing efforts in Kenya, demand a special thanks. The assistance of the IDRC regional office in Nairobi was invaluable, in particular that extended by Firoze Manji, Miriam Kinyanjui and Jane Adewa. We are grateful to those who helped type the papers for this book: Agnes Njuguna for her support services during the meeting, and especially to Betty Alce of IDRC who has competently and with great patience handled the tasks of formatting the manuscript for publication. With enthusiasm and competence, Alison Sage handled the on-site editing of the papers in Kenya, whereas Kathy Kealey in Ottawa provided invaluable assistance and production advice that ensured final publication of this project.

The members of the Nyeri Declaration Editorial Committee deserve a word of thanks for their willingness to seclude themselves on the last day of the meeting to work on the draft of the document that was later discussed and became known as the Nyeri Declaration on Growth Promotion for Child Development. They are Carl Taylor, Kraisid Tontisirin, Marta Medina, and David Alnwick.

We are grateful to all of the participants who presented papers and engaged in frank and lively discussions in a constructive manner always keeping the goal of child development in mind. Thanks also to the many individuals who generously agreed to review papers during the meeting. Our appreciation also goes to the rapporteurs for the meeting. A special word of appreciation is due to Cecile De Sweemer-Ba for assistance extended to the Organizing Committee during the meeting.

We remain responsible for the summaries in this book and hope that they reflect accurately both the discussions that took place and the intention of the papers.

*Jenny Cervinskaskas
Sabu George
Nancy Gerein*

This book is dedicated to the memory of the late Professor D.B.J. Jelliffe and his widow, Patrice Jelliffe, in appreciation of their lifelong dedication to the health of communities, and their generous support to students and others working in this field.

The Nyeri Declaration on Growth Promotion for Child Development

The participants at the Colloquium on Growth Promotion for Child Development in Nyeri, Kenya, 12–13 May 1992 recognize that it is morally unacceptable that malnutrition is a major contributing cause in 10 million out of the 15 million deaths of children in the world each year. The World Summit for Children and the International Convention on the Rights of the Child affirmed as a global ethic that the protection, development, and survival of the child is a human right. Nations should give priority to children in the allocation of resources.

The Colloquium recognized that growth monitoring is being implemented in many countries for millions of children. Too often this monitoring has not promoted growth because the weighing and charting has not been followed by appropriate action.

The Colloquium recommends that:

- Growth promotion for child development should use cyclical problem-solving approaches based on assessment, analysis, and action.
- Physical growth is normally a reflection of child development. Cognitive and psychosocial development also need attention. Causal factors of poor growth and development need to be understood for effective action to be taken within local resource constraints.
- All levels of society should support families in their responsibility for promoting child growth and development and should strengthen the capacity and resources of households in providing food security, appropriate care and protection from infection, and other illnesses.
- Communities have responsibility for identifying and analyzing the factors causing poor child growth and development, and mobilizing resources for sustainable action to provide better child care, feeding, and health.

Communities should be empowered to demand support from governmental and nongovernmental agencies. International agencies should facilitate this process.

- Supportive services should work with communities to ensure that resources reach the most needy children. This requires mechanisms to identify populations and subgroups where growth faltering is most prevalent, to define major causes of poor growth, and to mobilize resources and actions.
- National responsibility for growth promotion should include macroanalysis of factors contributing to growth faltering, supportive policies, and a framework for planning and action at all levels.
- These objectives will be achieved if appropriate management information systems and applied research are used to build capacity for improved problem-solving and decision-making at all levels.
- Use of information for growth promotion falls into two general categories:
 - (a) Growth promotion for individual children involves information from, and assessment by, mothers, community volunteers, and service personnel using:
 - Growth monitoring by weighing and charting to reflect the dynamics of individual growth in the early years of life.
 - Occasional weighing without the use of growth charts.
 - Other methods of assessment including traditional practices and measurements other than weighing.
 - (b) Community-based nutrition surveillance using periodic assessment of nutritional status, either by anthropometric or other surveys of populations, to focus on children in greatest need.

History, Principles, and Implementation of GMP

Growth Promotion for Child Development

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Introduction

It is widely agreed that inadequate physical growth and poor development of children are prevalent and important problems worldwide. In most countries, the situation is worse for the poor and the deprived than for the more affluent section of the population. For a long time health workers and others have taken action to attempt to influence better growth and to foster optimum child development. Other than the few who argue that "small is healthy," by far the majority wish to find the means to help families help their children grow well physically, socially, and psychologically. This colloquium is designed to examine current strategies, to review successes and failures, and, most important, to suggest new directions to achieve the objective of improved growth and development for children at risk.

Currently, many different strategies, many different programs, many different actions by international agencies, national governments, individual families, and others are taken to promote good growth and development. But there is one strategy, above others, that both in its name and in its stated objectives focuses very specifically on the growth of children. This is growth monitoring, now better termed *Growth Monitoring and Promotion* (Hendratta 1988). This strategy has become controversial (Anon. 1985) with strong proponents and opponents (Gopalan and Chatterjee 1985; Rohde 1984 and others). The many other actions taken to support or promote growth and development, although very widely practised, are not as visibly advocated as strategies for growth promotion. Because of this, growth monitoring as practised is deserving of attention, but this should not be at the expense of limiting consideration of other actions that foster good child growth and development. Recognition also needs to be given to the fact that good growth is often related to

¹This paper draws heavily on M.C. Latham 1991. Growth monitoring and promotion. In Anthropometric Assessment of Nutritional Status, Wiley-Liss Inc. Chapter 17, pp. 287-299.

other aspects of good child development and that those situations, environments, and actions that promote good child development, also usually help promote optimum physical growth. The two are intertwined. But because physical growth is relatively easy to measure, much more reliance (Stephenson et al. 1983) is placed on physical growth than on other aspects of child development, as a gauge of childhood well-being.

Growth Monitoring and Promotion

For several decades the periodic weighing of infants and children to assess their growth has been advocated and used within health systems. Sometimes measurements other than weight, including especially length or height, arm circumference, and skinfold thickness, are also used either to determine development or assess nutritional status (Latham 1979; Jelliffe 1966). These secular determinations, if periodic, are strictly speaking anthropometric growth monitoring. The term monitoring means literally "to keep watch over" or "to check systematically."

However, the term "growth monitoring" now usually refers to the periodic weighing of children and the plotting of each measurement on a "growth chart" or child health card. The information on the card is meant to influence actions by the health worker making the measurements and the mother or guardian who brings the child to be measured (Latham 1991).

The recording of a child's weight on a growth chart in itself serves no useful purpose, unless accompanied by some action (Latham 1984). This has long been recognized, but in many growth monitoring programs this is about all that is done. Under these circumstances the potential benefits of growth monitoring are not and cannot be achieved. A realization of this led to the use of the term *Growth Monitoring and Promotion* (Hendratta 1988). This is potentially important because the promotion of good growth clearly should be the main objective of regular weighing.

Wherever a growth monitoring and promotion (GMP) program at the local or national level concentrates on weighing and charting, but does not use the chart in a coherent positive manner, then it clearly is an exercise in futility. This is assuming that growth monitoring is being used mainly to influence growth of the individual child. Growth monitoring could be used simply to generate data for purposes of nutritional surveillance, or program evaluation. That is a different matter, and is not the subject of this colloquium.

Growth measurements have been used as a means of judging growth and health of children for many years. In several industrialized countries, well baby clinics included child weighing as a means to judge proper development. Morley et al. (1968), on the basis of work in Nigeria, advocated in the 1960s, the use of growth charts in developing countries, and this can be regarded as the birth of the growth monitoring movement. The view was that "maintaining an adequate rate of growth" was replacing "prevention of malnutrition" as the goal toward which child clinics might direct their work (Anon. 1968). Morley stressed the use of the chart to promote growth and not to cure malnutrition; he advocated the mother, rather than the clinic, hold possession of the chart; and he later stressed that the health worker and the mother should be more interested in growth velocity than in the child's position on the chart. The term "road to health chart" became widely accepted (Morley 1973).

Currently, many different weight charts are in use around the world. Debate exists about which kind of growth chart to use. These are usually based on "reference standards," and unless accepted national standards exist, it is recommended by WHO and others that National Centre for Health Statistics standards be used (Stephenson et al. 1983).

GMP includes sequential weighing and it is used to help caretakers maintain good growth in the individual child. A useful definition (Hendratta 1988) adopted by the Indian Integrated Child Development Service is:

Growth Monitoring and Promotion can be defined as an operational strategy of enabling mothers to visualize growth or lack of growth and to receive specific, relevant and practical guidance in ways in which she, her family and community can act to assure health and continued regular growth in her child. GMP implies a regular and sequential measurement of growth, recognizing it to be the result of overall health, nutrition, environment, psychosocial and development factors in the child.

GMP is based on a strategy aimed at behavioural change and adoption of improved self-help actions within the family and the community in order to promote optimal health. In short, GMP is a communication strategy for making health and nutrition education more individualized, more convincing and more effective.

My current view is that GMP should, where possible, be closely integrated into Primary Health Care (PHC) activities, and it should not usually be a separate program. It should concentrate on maintaining good growth in infants and children, and not, as is often the case, be used mainly for rehabilitating children whose growth is poor. If this is to be the focus, then it is essential that infants enter the program soon after birth because, in general, infants 0–5 months of age who are breastfed have satisfactory growth. GMP is then a preventive not a

curative strategy; it is designed mainly to promote good growth and health, not to deal with malnutrition and ill health. Workers should be obtaining information on how mothers and families are managing to achieve good growth rather than mainly finding the reasons for growth failure. Praise and reinforcement should be an important feature of the program. Although the major emphasis is on maintenance of good growth, which can be viewed as a preemptive strategy, nevertheless, the program should include a strategy for dealing with those hopefully few cases where the program has failed and where children are not doing well and need special attention. This will usually involve some special advice from health workers involving behavioral change aimed to achieve rehabilitation and in some cases will necessitate treatment or referral. Growth monitoring then is viewed as a strategy to empower mothers to maintain good nutritional status in their children and to prevent growth retardation.

In GMP programs, much of the action should consist of positive reinforcement rather than corrective action. As a diagnostic exercise, it should be as much to find out what mothers are doing right as what is going wrong. It is also used to detect early growth faltering, to find the likely reasons for this, and to suggest to mothers corrective actions that are realistic and that they might try. It is likely to be relatively unsuccessful if used mainly to try to "correct" the growth of older children who are moderately or severely stunted, especially if these children are not wasted. In all cases, meaningful involvement of mothers and families should be the heart of a growth monitoring and promotion program. It is a participatory exercise; it involves dialogue and discussion, not lecturing and scolding; and mothers should help in decision-making, for example, about the location, the hours, and the organization of GM sessions. Mothers need also to be consulted about such matters as the need for privacy and confidentiality and whether it is appropriate in their culture to weigh children nude or clothed.

This is a view of the concepts of what good GMP should be, rather than what it usually is in practice in countries in Africa, Asia, and Latin America (Latham 1991). This author continues to see growth monitoring in action that ignores these principles. Too often growth monitoring is used mainly as a weighing exercise and advice is given only to mothers whose children are doing badly. Often, the mothers are scolded publicly and advice is frequently impractical and does not recognize what would be useful to them. Inadequate time is devoted to dialogue, to advice, and to education. In some parts of the world, GMP is regarded by health workers mainly as a tool for diagnosis of malnutrition. In other places, it is used to select children to receive free or subsidized weaning foods. Feeding can be a component of a GMP program but the full potential benefits will not be realized without the level of communication, dialogue, and empowerment of mothers and communities described earlier. At worst, growth monitoring consists of the routine exercise of weighing and weight charting with no

advice given and with no use made of the chart. Those conducting the GMP session may not have time to do anything more than weighing and charting; and they may not have the training or knowledge to use other needed interventions properly. Where this is the case, then GMP is a useless exercise, and one that is wasteful of resources including mothers' time. Elsewhere, there may be societies with cultural prejudices against weighing of young children which may be a reason for not introducing GMP or at least for sensitive efforts to overcome this difficulty.

The differences between growth monitoring on the one hand and nutritional surveillance on the other have been pointed out by Rohde (1984). This view may not be consistent with the current UNICEF approach to nutritional surveillance. Nutritional assessment using growth data for surveillance may, for example, require only small subsamples of the population of the communities involved. In this case, quite large numbers of children can be weighed per day because diagnosis and communication is not an important feature. In addition, surveillance may require precise, accurate measurements done by a highly trained worker with the measurements repeated at long intervals. In contrast, GMP programs hope to enrol all children under a particular age; the groups of children at a weighing session should be relatively small because diagnosis and dialogue are important; the measurements made need not be as precise and can be performed by a person with less education and training (sometimes even by mothers themselves); and children should if possible come for weighing and growth promotion sessions at much shorter intervals. If the main objective of a program is nutritional surveillance and not growth monitoring, then the program should be different.

In a properly run GMP program, most infants should be enrolled as soon after birth as possible. Children seen for the first time in their second or third year of life often will already have evidence of growth failure, and GMP can at this stage do relatively little to improve the situation, especially in stunted older children. Infants under 6 months of age when breastmilk is adequate and breastfeeding is the normal feeding practice usually show good growth. This, therefore, is a period when dialogue is most useful. GMP can provide positive reinforcement, but it can also be a time when dialogue becomes established. This becomes most useful in the months ahead, during the nutritional danger period, which is usually between 6 and 18 months of age. A mother should tell the health worker about what she plans to do, when she intends to introduce other foods, how long she expects to breastfeed, whether she wants to get the infant immunized, and how she will deal with illnesses such as diarrhea and respiratory infections. The worker at the GMP session should now cautiously guide the mother and discuss with her a strategy for maintaining good growth and health in her infant during the danger period, rather than concentrating on the rehabilitation or cure of malnutrition.

If this is to be the heart of the program then it is important that the health worker has a good understanding of existing child raising practices and the local cultural, social, and dietary environment of the community. Without this, the messages may not be relevant, practical, or feasible for mothers to implement and may not even be credible to them. The health worker must also have a minimum of knowledge about the factors most likely to lead to growth faltering. For example, he or she should understand that after about 6 months of age breastfeeding alone often provides inadequate nutrition and needs to be supplemented; that too much supplementation may reduce suckling and lead to insufficient milk; that certain foods are bulky and have low energy density, but that there are ways to increase energy density; that as breastfeeding becomes less important, frequent feeding with other foods is important while breastfeeding should continue for as long as possible; that infections may themselves lead to growth faltering, but that starvation as a treatment for diarrhea and other infections contribute to this; and that breastmilk and other foods should be provided during most illnesses. To discuss this properly, the health worker needs to have enough time with each mother, adequate training, and understanding of health and nutrition beyond charting. Above all, he or she needs to have the right temperament.

An operational rule then might be that the health worker requires adequate time to talk to each mother (at least 5–15 minutes) and needs to have a certain basic knowledge and reasonable communication skills. It is important that he or she knows how to listen and to elicit information from the mother and how to provide positive feedback and encouragement plus appropriate advice. This takes some skill, and some of these skills can be imparted in training. But obviously some individuals are better listeners and communicators than are others.

Another operational rule that follows is that GMP be integrated into Primary Health Care. Many of the messages and advice suggested are an integral part of PHC. Mothers should, in general, not have to attend separate sessions on a different day for treatment of common infections and to have their children immunized, to receive vitamin A or anthelmintics, to get advice about oral rehydration, or to attend for prenatal examination or get family planning advice. In fact, it should be the duty of the GMP staff to ensure that all children attending have been immunized against the six diseases covered in the Expanded Program of Immunization, that mothers know how to use oral rehydration therapy, etc. Growth monitoring and promotion can be a part of PHC or, alternatively, it can encompass PHC activities. Hendrata (1988) has stated that "GM and P can help to shift the emphasis from professionals to parents, from clinics to homes, from dependence to empowerment. An in so doing it can help to build a genuine primary health care system." GMP can serve as an activity that at frequent intervals brings the child into contact with the health services.

A good principle is that advice, nutrition, and health education should be rather specific and aimed at the particular circumstances of each mother and child. The dialogue should give the mother the feeling that she herself is developing a realistic achievable strategy to maintain the good growth and health of her child and in this way she will see the benefits of the time that she has invested in the exercise. The content of the messages should be simple, and must take account of the child in a family situation.

Finally, GMP should be conducted as near as possible to people's homes; at a time convenient to parents; in small enough groups to allow adequate individualized dialogue and short waiting periods; and be conducted in a way mainly to suit parents not health workers. For example, in an urban setting where mothers work away from home, the sessions could be on a Sunday and the health workers have Monday off. Unless some means are provided for combining GMP with simple therapy and other preventive services, attendance may be poor. This might include, for example, deworming, administration of vitamin A, provision of ORT packets, availability of antimalarial drugs, and possibly also simple treatment of common illnesses. In all cases, rural GMP activities based in a small village must be linked with and have back-up from a health centre, dispensary, or clinic. Rohde (1984) and others have stated that food supplements should not be provided at GMP sessions even if the child is faltering, because supplements may have negative consequences for the program. This view is not shared by all those involved in GMP. In the much heralded Tamil Nadu Integrated Nutrition Project (TINP) funded by the World Bank in India, free food supplements are provided and are targeted to the most needy children, and this targeting is based largely on the weight charts.

Under some circumstances, GMP may be conducted not at a health centre, but by visits to peoples's homes. This will often be popular with mothers, and it will result in a wider coverage especially of the most neglected families, but will usually be more expensive, because one fieldworker can cover fewer children per day. Although GMP can act as a catalyst in the strengthening of primary health care activities, it is also true that it is much easier to have GMP as part of a well-functioning PHC system. Therefore, efforts to strengthen and improve primary health care will also make well run GMP a more feasible possibility.

Although growth monitoring is simple in concept, and is a relatively low-cost technology for helping to reduce the extent of malnutrition, it is very seldom done well. It takes good organization, adequate resources, an appropriate existing infrastructure, and careful training and proper supervision of workers. In some geographic locations, it may involve overcoming cultural barriers.

Growth monitoring (and less frequently, growth monitoring and promotion) is being widely practised, and with the blessing and financial assistance of UNICEF and other agencies, the numbers of children included in GM programs has greatly increased in the last 8 years. UNICEF as an advocate claims many successes of growth monitoring in developing countries around the world (Grant 1987).

The success or failure of GM depends on how the information and the chart are used. The weighing and the plotting have to result in action if there is to be a benefit. Those taking action in general are likely to be either the mother (or parents or guardian) of the child or the health worker. Growth monitoring is one among several means of attempting to achieve the desired goal of healthy growth. Are there other ways that are easier, cheaper, and more feasible than GM to promote good health and development in poor societies?

Evaluation of Growth Monitoring and Promotion

Many governments, many funding agencies, and many nutritionists and pediatricians strongly believe that GMP is a very important strategy in the fight against malnutrition. There are also serious critics of growth monitoring who state that its value has not been demonstrated and that it is too costly a project for poor countries, considering the very limited financial resources available for health and nutrition services.

The unfortunate fact is that there have been very few scientific attempts to evaluate growth monitoring and most of these have flaws in their design. There are studies that suggest that illiterate women can be taught to understand growth charts (Pelemeier 1985). In some studies, where growth monitoring appeared to be of value in terms of improved health or nutrition, it was not possible to separate benefits from the growth chart, per se, from benefits resulting from the other interventions introduced as part of the growth monitoring program, activities such as immunizations, oral rehydration therapy, supplementary feeding, treatment of disease, and others (Morley 1973).

A detailed review of GM in India suggests major problems and a few successes, but illustrates that no well-conducted evaluation has been undertaken (Gopalan and Chatterjee 1985). In the case of Indonesia, both the World Bank-funded project covering 225,000 people and designed to examine the impact of community-based GM, and the ever-expanding UPGK (Usaha Perbaikan Gizi Keluarga) program covering a large population using volunteers termed "Kaders," have been described at length (Griffiths 1985). In the former project, it is claimed that based on 600 program households and 400 comparison households, there was

a significant improvement in mothers' nutritional knowledge and practices, and in the nutritional status of the children. Unfortunately, there were many differences between the two groups, and it is not possible to judge how much improvement was due to the major efforts of nutrition communication and behaviour change and what exact role was played by the growth chart as a part of GM.

Studies in Jamaica, in Lesotho, and elsewhere also have problems and produced results that are unconvincing. The book length publication "Use of Growth Charts for Promoting Child Nutrition – A review of Global Experience" by Gopalan and Chatterjee (1985) concludes that the effectiveness of GM has not been proven, but also suggests that good evaluation studies have not been undertaken. In 1985, Rohde stated that the statistical proof of the efficiency of growth monitoring had still not been demonstrated.

The literature to date does not include very many well-controlled, well-designed studies to evaluate the effectiveness of growth monitoring. There are even fewer reports of research that has attempted to evaluate the benefits of the weighing and charting component of growth monitoring, in comparison with the benefits from the nutrition education and primary health care interventions which should also be a part of GMP programs. There are not many studies on the relative time and resources devoted to the weighing part and the other GMP activities. In Zaire, Gerein and Ross (1991) evaluated three child health programs that included growth monitoring. They concluded that the "theoretical gain in health service efficiency by targeting was largely lost" and that the "programs did not exploit the potential of growth monitoring as an educational and motivational tool." They conclude from their study and other recent reports that "the introduction of growth monitoring into future child health programs appears difficult to justify at present."

In contrast, excerpts from a report for the Tamil Nadu Integrated Nutrition Project (TINP) as reported by Berg (1992) describe the great benefits of targeting supplementary feeding on the basis of weighing as a part of its program. In the project, selective supplementary food is provided on the basis of poor growth, as judged by serial weight determinations. The report states that "being weighed, selected, fed and graduated appears to have a profound educational impact on the beneficiaries and on staff." The report states that "TINP demonstrated that growth monitoring can be done in large-scale nutrition projects, provided workers perceive it to be the centrepiece of the project" and that "the project must be able to prove to mothers that regular weighing will promote healthy growth" and "by demonstrating the ways in which such problems can be overcome."

A recent study also in Tamil Nadu, but conducted in collaboration with the Christian Medical College and Hospital in Vellore, and not a part of TINP, has attempted to evaluate the benefits of weighing and charting, separate from PHC and other interventions (George et al. 1992). The research suggests that a package of interventions including nutrition and health education and PHC improves the knowledge of mothers and the growth of young children with or without the use of weighing and growth charts. So the weight chart, even when well used, showed no additional benefits in growth when compared with not using the growth chart in families where other interventions were provided. This study used home-based, not clinic-based GMP, and did not include supplementary feeding.

An editorial in the Lancet (1985) suggests, any system "is only as good as the workers who operate it." Unlike oral rehydration, GM is not a curative approach with quick results and, unlike immunization, it is not a magic bullet requiring little behavioral change. Rather, it is intended as a means by which a simple technology can help people help their children and can in theory empower mothers. The unanswered questions remain: (a) What conditions need to exist for it to be effective? and (b) Can equally good results be obtained at lower cost using similar interventions without frequent weighing?

Conclusions

A review of published data on GMP suggests that it is very seldom being done well. The principles described here as being essential or important are usually ignored. Most GMP is so focused on weighing and charting, and so little on growth promotion, as to raise serious doubts about its use as generally practised. In many instances, the health workers do not appear to have the time to provide the education and other interventions that are essential for the promotion of good growth and development. Often, they lack training, motivation, and supervision. In many cases, GMP workers are not provided the resources to allow them to help the mothers and children attending. The primary health care component is frequently weak or almost nonexistent. No wonder sceptics doubt whether GMP is a strategy worth supporting.

Added to these problems is the fact that despite much reported evaluation of GM programs, practically none of these have evaluated the added benefits resulting from the weighing and the growth charts, rather than the benefits which accrue from the other interventions. Even in the growth monitoring projects reported to be most successful, the actual role of the weighing and the growth chart have not been evaluated. Thus, TINP in India used regular weighing as the centrepiece of the project and feeding targeted to unsatisfactory weight gain in

children as an important intervention. Reports state that nutritional status improved, that relapses into malnutrition were reduced over time, and that the selection of children on the basis of growth was very important in effective nutrition education (Berg 1992). What we do not know is if the selection of young children for special attention had been based on something other than weighing, it would have resulted in equal "success." What would the results have been if the basis of selection had been the weight for age of the child at say 12 months of age, or a mother's perception at each visit that the child was not doing well, or had reported poor appetite, or that the health worker made a judgment on the basis of the history provided by the mother and the appearance of the child, or if arm circumference rather than weight had been used? We do not have the answer to these questions, either for TINP or elsewhere.

The results from the research by George et al. (1992) suggest that in a situation in India where considerable effort is expended to ensure that reasonably good levels of PHC, health and nutrition education, immunizations, deworming, and other interventions are available to rural families, then the addition of weighing provides no further benefits as judged by anthropometry. At the other end of the scale, the Zaire study of Gerein and Ross (1991) and reports from elsewhere would suggest that weighing and charting not accompanied by an adequate level of effective nutrition and health education, or other interventions, is unlikely to produce benefits to child nutrition or health and is not worth doing.

Are there situations between these two extremes where weighing and charting would be very beneficial, because it greatly helped the other interventions, and these other interventions were well implemented? We do not have an answer to this question; certainly not one that would be acceptable to the sceptics. On the other hand, perhaps the advocates of GMP and the critics could agree on a minimum set of circumstances that are deemed essential or near essential for GMP to have any likelihood of success in improving health and nutrition. For example, if the weighing and charting for one mother and child takes less than 10 minutes, perhaps double that time needs to be available for advice, education, and other interventions.

If the health or clinic workers do not have that amount of time, or if the desired interventions are not feasible in a particular setting, then perhaps the weighing and charting is not desirable. Perhaps particular trajectories on the growth chart should be tied to particular counselling, and sets of counselling cards for different situations are important or essential. Perhaps time and resources spent on GMP are not appropriate in communities where levels of immunization against measles or other preventable diseases are under, say, 75%.

Are there ways to identify countries or districts or communities where other ways of screening children for interventions may be easier and more effective than child weighing? Have we adequately (either with or without GM) used the mother's opinion on the health and well-being of her child as a way to select children at risk? Could the child's weight at a particular age, perhaps 6, 9, or 12 months, be the basis for action over the next 12 months, rather than the practice of time-consuming weighing at frequent intervals? Could a measure of poverty, or of mother's education or nutritional or health knowledge provide the basis for selection of children for special attention? Could a Paulo Freire approach, where communities themselves play a major role in assessing both their own problems and suggesting appropriate local actions, be preferable and more effective than GMP imposed on them (Freire 1972; Drummond 1975)? Could such an approach combined with mothers weighing their own children as part of growth promotion be an integral part of community development, as suggested by Morley (1992)?

This Colloquium will provide an opportunity to discuss what is known about growth promotion for child development, and to consider these and many other questions. We may disagree about the means, but all here seek to protect and promote optimum nutrition, health and well-being for the world's children.

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Growth Monitoring and Promotion: A Development Strategy

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The growth monitoring and promotion (GMP) programs were expanded in many countries during the early 70s without having the benefit of a solid body of principles and guidelines for implementation. Policymakers and program managers developed their programs primarily on the basis of their own understanding and vision and learning from each other's experiences.

It is to be expected, therefore, that the understanding of the principles and their functioning varied widely from program to program. This paper examines those principles in the light of recent developments in nutrition strategies with a view to finding the linkages between GMP and the broader strategy of growth promotion.

Basic Principles

Among many definitions of GMP the one adopted by the Integrated Child Development Services, India, is perhaps the most comprehensive. It defines GMP as "an operational strategy of enabling mothers to visualize growth or lack of growth and to receive specific, relevant and practical guidance in ways in which she, her family and community can act to ensure health and continued regular growth in her child."

Three basic principles could be derived from the above definition:

- GMP is a preventive and promotive strategy aimed at action before malnutrition occurs.
- GMP is a behaviour change strategy carried out through effective communication to achieve adequate growth through home and community action.

- GMP deals with the total environment of the growing child, encompassing not only food but health, physical environment, psychosocial development, and intellectual stimulation.

Operational Implications

GMP as a Preventive and Promotive Strategy

Most nutrition programs have suffered from the same curative bias found in health programs in general. Both the providers and the community perceive it to be curative. The attitude has too often been to find the malnourished and try to rehabilitate them, basically by giving them food. This approach, clearly, cannot bring satisfactory results over the long term. Malnourished children are identified frequently in their 3rd, 4th, or even 5th year of life and their rehabilitation is difficult, expensive, and partial at best.

One of the key operational implications of the GMP strategy is the importance to reaching young infants soon after birth, for the following reasons:

- Most children under 6 months will show a rapid growth pattern. This period is, therefore, ideal to give positive reinforcement to mothers and to demonstrate to them the value and feasibility of maintaining good growth in their children.
- Responses to early growth faltering are usually effective, because mothers have more control over the child's environment and more home-based, effective actions are available to overcome growth faltering while the child is still on the breast (e.g., introduction of complementary feeding, increased frequency of feeding).
- Although the *prevalence* of malnutrition is generally highest in older children, above age 2, the *incidence* of growth faltering (the process of *becoming* malnourished) occurs maximally from about 6 months to 2 years. Beyond this age, growth trends are nearer to normal, although attained size may be far below the desired norm. Thus, the promotion of continued good growth and early action in the case of faltering, even before any malnutrition is evident, prevents the development of malnutrition.

GMP as a Behaviour Change Strategy

One fundamental flaw in our communication/education strategy is that it is basically a knowledge dissemination strategy. It is based on a faulty assumption

that dissemination of factual knowledge will in itself bring about changes in practice and behaviour. The best example of this approach in nutrition education is the promotion of the "four food groups" to bring about changes in the diet of the population. The approach has generally failed because no clear behavioural objectives were formulated.

To be effective in its behaviour change impact, a communication exercise should fulfil the following requirements:

- It must be based on sufficient knowledge of the existing behaviour pattern and the reasons behind it.
- The messages must take into account the environment (sociocultural, economic) in which the changes are to take place. This is to guarantee the credibility and relevance of the message and feasibility of the recommended practice.
- It must be action-oriented, dealing primarily with "what to do" and the reasons behind it. It must be presented in a convincing and persuasive way.
- It must be specific and individualized.
- The proof of benefits must be available within a relatively short period.

The GMP strategy has great potential in translating those principles of communication into practice. First, a problem must be identified and recognized. Here is the vital role of *assessment of growth*, to measure and actually *see* the problem. Hence, the importance of weight plotted on a card – the *visualization* of a problem otherwise not seen or even perceived. Here too lies the value of the trend line of growth, rather than the more commonly used nutritional status lines (or colours) – we want to *see* the problem early, before malnutrition is obvious. Second, we must facilitate the mother (and others concerned) to analyze *why* growth is not occurring as expected and desired. This analysis and understanding must precede any effort at advice or action, in order to ensure the mother accepts the logic or reasoning behind the suggested action.

Advice based on an understanding of the problem behind the growth faltering is by its very nature specific and action-oriented: it deals with that particular child, every month. Communication in GMP should, therefore, start with listening to what mothers have to say about the child's health and nutrition situation in the context of the family situation. It is a dialogue between the mother and the "counsellor" in analyzing the possible reasons behind the child's failure to grow. In this process, the mother is empowered to deal more effectively with the problem. Three major groups of issues are relevant to be examined: the household food availability, the child care and feeding practices, and infections.

As part of developing a positive environment to support the individual communication, a demand for "growth" must be created. Basically, this is an effort to market growth intensively as something valuable and desirable for every child. Only if the significance of growth is fully understood and growth is demanded by the community can the individual interaction be more effective. In short, unless the clients *want* our "product," it will never sell. When mothers seek growth, they will anxiously watch the assessment (weighing and plotting to visualize growth) and be open to discuss and take action to achieve the desired goal. Without an understanding of the importance of growth or an appreciation for its overall reflection of child well-being, a mother cannot be expected to mobilize constrained resources of time, money, and effort in an attempt to obtain the product we are promoting – regular healthy growth.

GMP: The Total Child Environment

In analyzing the possible causes for growth faltering, one must examine the areas of food availability, child care, and health/infection. The underlying causes could be in any of those areas. This will lead to action that will go beyond the traditional prescriptive advice.

It may involve action by the mother but, more often, will require the concurrence of her family decision-makers (husband, mother-in-law, etc). Invariably, it will call for some type of resource mobilization, and women seldom control resources. Be it her own time (increased frequency of breastfeeding or other food), family diet (set aside a reasonable portion of food for the child), other family resources (build a latrine, consult a doctor), or even community action (a child care crèche, loan of a garden plot, small credit), action will require collaboration and mutual help.

Hence, the importance of conducting GMP in the community itself where, in small groups, mothers can hear, participate, and understand. Here too is the reason to separate GMP from the widely held expectation of food supplement distribution, an activity that will throttle any chance of meaningful analysis and household or community action. By addressing the total environment of the child, the growth of the child becomes the indicator of the well-being of the family (and, quite logically, the sum total of the growth of the youngest children is a sensitive indicator of the well-being of the community). The mother, family, and community are encouraged and empowered to identify the actions within their control that can give a measurable improvement in the quality of life of the most sensitive and vulnerable member of the family. GMP is, in reality, a development strategy.

Growth Monitoring in Primary Child Health Care in Developing Countries

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Introduction

More than 7 years ago, the Nutrition Foundation of India brought out its publication, "Use of Growth Charts for Promoting Child Nutrition — Review of Global Experience." That publication, although recognizing the merits of growth monitoring in appropriate selected situations, sounded a note of caution against pushing growth monitoring as an universal, essential, component of the child health care package at the primary and domiciliary levels. The enormous expenditure in time (training and service), and money, involved in an operation, which at best could make no more than an indirect contribution to the promotion of child health was pointed out; as was the fact that, given the ground realities, this expenditure could frequently prove to be infructuous and wasteful. We elaborated this view point in subsequent publications of the Foundation.

Our point of view was, of course, not in consonance with the general support that was then being extended to the introduction of growth monitoring on the public health scene, and ran counter to the optimistic reports of enormous "benefits" that growth monitoring was claimed to be conferring on poor children around the world. During the last decade, millions of dollars worth of weighing scales manufactured in Europe have been shipped to Africa and Asia; and millions of hours of work by health personnel in developing countries have been expended on this operation. *With what result?* There are apparently many who have begun to ask this question now. There is, at long last, a genuine desire for an objective and sober reappraisal of the place of growth monitoring in primary child health care.

It may be useful, at the outset, to restate the obvious. It is clearly not (and indeed it cannot be) anybody's case that periodic weighing of children can, by itself, bring about improvement in child health and nutrition. Weighing obviously cannot confer any direct biological benefit. All that can be claimed is that weighing could prove useful in facilitating (and possibly in providing support and

direction to) those measures that could directly and positively contribute to the betterment of the nutritional status of children. In short, growth monitoring (meaning the weighing operation) may be a convenient peg on which to hang other truly essential components of child health care; as we had said in an earlier publication it is no more than a means — indeed not even a means to an end, but a means to a means, namely, nutrition education and intervention.

It is necessary to remind ourselves of this basic fact because, in quite a few reports that have claimed "success" for "growth monitoring," the criterion of that success has been no more than that the workers in some projects, who had been specially trained for the job at considerable expense, were able to record weights accurately and plot them correctly on the chart. All that this shows is that women of the village, with some level of education, *can be successfully trained* to carry out weighing. This is gratifying as far as it goes because even this "first-order" success currently seems to elude a high proportion of village-level workers supposedly trained in growth monitoring. What these reports fail to tell us, however, is whether such success in weighing was necessarily reflected in success in improving child health and nutrition and, more important, whether successful weighing was found to be a necessary and essential prelude to successful child health promotion.

It is possible that in adequately staffed MCH clinics, and in select project situations, where time and resources permit, longitudinal measurements of growth of children could be a useful tool for promotion of child health and nutrition. The issue that needs to be addressed here, however, is whether the injection of growth monitoring for individual children in poor communities around the world, as a universal integral and central feature of public health programs of primary child health and nutrition care (including domiciliary health care) has proved to be a wise and feasible strategy.

In discussing this issue, we do not propose to attempt an exhaustive review of all publications on growth monitoring subsequent to our earlier publication of 1985! The purpose will be served by a critical examination of just a few selected recent publications. We start this discussion with two recent papers, one by Shekar and Latham (1992) and the other by Nancy Gerein (1988). Between them, these papers have attempted to articulate practically all arguments on both sides of the issue. Shekar and Latham present an optimistic picture, justifying weighing as an integral component of child health care, whereas Nancy Gerein raises doubts about the validity of this strategy and asks the question "Is it worthwhile?"

Shekar and Latham, on the basis of analysis of selected data from the Tamil Nadu Integrated Nutrition Project (TINP), have concluded that "growth monitoring (as proxied by regularity of weighing) in TINP, was associated with improved child nutritional status." The authors have been careful to use the word

"associated" in their above conclusion, and the "growth monitoring" they refer to was not just the weighing operation alone but the entire package of services that went with it in TINP. The authors claim that the evidence shows that "the benefits of growth monitoring exist over and above these of supplementary feeding," the evidence for this conclusion apparently being that even those children who did not receive supplements as part of the package also benefited; but even in this latter case, the growth monitoring they refer to was not the isolated weighing operation but included the education and advice components of the package, although not the supplement. The authors point to "the need for further research to find out how much of the benefit is due to growth monitoring (and subsequent feeding) and how much is attributable to the educational strategy." However, they conclude that "for the true proponents of growth monitoring such an exercise may seem of only academic interest." Their interest lies primarily in showing that the *combined package* of growth monitoring works, as has been shown in TINP.

The paper by Shekar and Latham thus fails to come to grips with the crucial question if the weighing operation had been totally left out of the package, leaving all other components in place, would the result have been any different? It may be legitimately argued that if the workers had spent the same amount of time they had spent with each family *without* being called upon to carry out weighing and charting, they could have given an additional 10 minutes to each family at each visit for the purpose of education, advice, and direct help. The result in terms of improvement in child health and nutrition may have been far more gratifying. Where success of the worker is measured by the supervisor, on the basis of the accuracy of the workers weighing and "plottings," it is reasonable to expect that the worker would spend more time and attention to ensure the correctness of the weighing operation rather than on the all important follow-up action, which does not easily lend itself to achievement audit. In fairness to Shekar and Latham, however, it must be stated that they were in no position to provide answers to these crucial questions for the reason that they were only evaluating a set project on the design and components of which they had no control.

A large chunk of the time for training of village-level workers and supervisors in TINP had been devoted to training them in the mechanics of weighing and growth charting (3 months). If this time had been devoted to training, providing information, and imparting skills with respect to the following, the results could have been far more gratifying:

- Practical ways by which diets in poor households could be improved with the existing foods available in the villages and within the reach of the poor (regional and seasonal diet calendars).

- Methods of preparation of nutritious receipts for weaning diets in children in poor households.
- Ongoing developmental programs at the village level and how they could be used for maximal advantage.
- Available opportunities for mothers to obtain vocational training in income-generating occupations.
- How and where family planning services could be obtained.
- How to win the confidence and continued cooperation of the village community.

Also, the country would have been saved the enormous expense incurred in import of weighing scales, their frequent repairs and replacement; on coloured growth charts; and on elaborate record keeping. Indeed, currently, adequate focus on all the essential aspects referred to above is lacking, even in the training of workers engaged in TINP, presumable for the reason that these vital components are crowded out to find time for what is perhaps wrongly perceived as the essential element of the package, namely, the weighing. Training with respect to all the essential elements mentioned above can be successfully imparted within the 3 months now being taken up for training in weighing and charting alone.

A legitimate and truly compelling case for weighing as an essential and indispensable component of the child health care package can arise only if it is clearly demonstrated that in the absence of the weighing and charting operation, it will be impossible to deliver the other components of the package. No paper that has claimed success for growth monitoring has demonstrated this. It cannot be argued seriously that without the benefit of a growth chart the worker will not know what advice to give. After all, more than 85% of children in poor communities in the regions where growth monitoring is now being recommended suffer from undernutrition and growth retardation of varying degrees. The nature and the causes of such undernutrition are fairly uniform and are known to all health workers in a given region. Is it necessary to measure the degree of growth retardation at a given point of time with mathematical precision in each individual case, and at each point of time, to give meaningful advice? Is the advice going to be so rigorously "case specific" like, say, deciding on the dosage of a potent drug for a case suffering from an acute disease, that an elaborate diagnostic exercise must precede the advice? These are not academic questions, certainly, not for developing countries that are struggling to find out how the meagre resources available to them for child health care programs could be optimally deployed with maximal benefit.

Can it be argued seriously that without weighing and without the aid of growth charts mothers cannot be motivated? There are undoubtedly situations in developing countries where workers without access to sophisticated weighing scales have achieved significant improvements in child health and nutrition among poor communities; but, unfortunately, these experiences have not been properly documented.

Indeed, there are several recent studies that have claimed significant reductions in child mortality in poor communities even with minimal intervention. Thus, in recent years there have been quite a few studies designed to test the effect of vitamin A administration on child mortality. In all these studies there were "control groups" that received no vitamin A, little intervention, and certainly no growth monitoring. Even in such "control" groups there was striking mortality reduction! Thus, in the study in Indonesia, although the erstwhile prevailing mortality was around 18, the mortality in the "control" group was just 7.4. This would only show that in extremely depressed communities, significant declines in mortality and improvements in health could be achieved even with minimal intervention in situations where frequent contacts between health workers and poor communities are established for the purpose of baseline studies (Hawthorne effect). Cravioto has pointed this out emphatically. Apparently, even the incidental, but actually "unavoidable," health advice that goes with such contacts in such "baseline exercises" is adequate to bring about significant mortality declines in extremely depressed communities. An added deliberate intervention in the form of a well-designed educational program carried out during such regular visits could have yielded even more gratifying results. This is the message that should go out to developing countries.

Nancy Gerein (1988) has concluded that

taking into account the low sensitivity and specificity of anthropometry to detect risk of dying, inaccuracies in weight measurements, low and non-representative coverage, and the high incidence of growth faltering in young children, the benefits of using growth monitoring as a screening mechanism appear to be few. The main potential appears to be as a catalyst for action on the part of the mothers, community and health service. However, the claims made for growth monitoring as an important element to increase the effectiveness of health care and education, increase utilization of services, and promote participation and empowerment in health care have not been supported by well-designed studies. The supposed potential of growth monitoring will not be realized unless attention is paid to preeminent issues of planning, training, resources, supervision, management, and evaluation in child health services.

Disenchantment with growth monitoring is not just occasioned by reports of poor implementation alone. The more basic cause is the lack of convincing evidence from any of the published reports of the *essentiality* of growth monitoring

in a public health service. That growth monitoring can, in trained hands, be a useful, "catalyst for action" is not denied, but is the "catalyst" a must in all situations?

Experience in National Projects

In TINP, which, although not a national project as such is all the same a large-scale project, growth monitoring was used for selection of children who would qualify for supplementation. This was a somewhat "perverse" use of the growth monitoring tool that had originally been introduced for *early* detection and correction of growth faltering and not for selecting subjects as a part of a policy of brinkmanship. This aspect had been discussed earlier and is, therefore, not elaborated here. It must be said also that inputs of the order that have gone into TINP are most unlikely to be easily replicated in a country-wide scale.

On the other hand, Integrated Child Development Services (ICDS) is a national program that reflects prevailing ground realities more faithfully. An assessment report of the ICDS program in India states that growth charts were "maintained only in 51% of anganwadis; although all anganwadi workers had been trained in growth monitoring, only 46% were found "good" with respect to weighing, 30% with respect to age assessment, 37% with respect to plotting weights, and 32% with respect to interpretation." Tara Gopaldas et al. (1990), on the basis of a careful examination of data covering 3,704 children under 6 years of age in India's ICDS program, found that "almost half the children had never been monitored" and that another 25% of cases were "monitored inadequately." Very few mothers (1%) could interpret growth charts. "Analysis of covariance of the effect of growth monitoring on weight for age and morbidity, controlling for socio-economic status and other program services, showed that growth monitoring did not have an impact on the nutritional health status of children!" Tara Gopaladas also quotes Abel, Director of RUHSA project in India as having concluded that "growth charting or monitoring did not have any additional benefit in improving the health of pre-schoolers covered in the RUHSA project."

What all these reports show is that health workers elaborately trained in growth monitoring and charting often find themselves unable to carry out this operation in a considerable proportion of children in the community. What is far more disturbing is that in a good proportion of cases where growth monitoring has been undertaken, the accuracy of the data was in doubt, implying that, instead of providing correct guidance and direction, they could have actually contributed to misleading workers and mothers. These ground realities cannot and should not be pushed under the carpet. Can a tool, no doubt good in a few hands, but poorly

used and, therefore, potentially misleading in a great many others, be safely injected into a large-scale, public health operation, especially if it is not found to be absolutely essential. This is an important point for consideration.

Conclusion

In the ultimate analysis, the only two major (preventive) "interventions" that can possibly be attempted by child health workers serving poor communities are:

- Advice and education regarding appropriate diets and health practices.
- Supplementary feeding in selected situations where resources are available.

For both these interventions data generated by growth monitoring can no doubt prove useful, but they are not essential. Interactions with the family and information regarding their prevailing dietary and living conditions and health practices, and even a close look at the children and their mothers, could provide leads for action and for deciding on appropriate priorities and identifying the items needing special emphasis. Discarding growth monitoring of individual children in the course of domiciliary visits will give the worker sufficient time to provide such advice in a relaxed manner, without unnecessary distraction.

Quite often, advice and education could be given to groups of mothers rather than to individual mothers in separate households. This approach will not only be less time consuming but will also be advantageous in that it will provide opportunities for mutual reinforcement among participants of the group; the less resourceful and knowledgeable in the group would receive support and encouragement from the relatively more successful and resourceful ones. In such an exercise, growth monitoring of individual children may not be necessary and indeed may not be feasible.

As for supplementary feeding, where resources are limited, it may be wise and prudent to target the supplements to *communities* of children identified by cross sectional anthropometric studies as being the most depressed and needing priority attention. This will be a far more sensible and feasible targeting approach than that of identifying *individual candidates* from within each community on the basis of evidence of extreme and persistent growth retardation, as in the TINP. The latter ("clinical and therapeutic" rather than "public health") approach is an exercise in "nutritional brinkmanship" and is promotion of "child survival" rather than of "child health."

It is gratifying that ICDS has chosen to follow the pragmatic policy of offering supplements to *all* needy children who happen to visit the anganwadi, as a means of promoting regular attendance of mothers instead of resorting to the rigid, unrealistic approach of TINP. After all, supplements at best supply no more than a third of the daily food requirement, and that for only part of the year. An expensive and elaborate selection process for this purpose would not be cost effective. There is no evidence that the overall expense of supplementary feeding *per community* of a hundred or a thousand under-fives in ICDS has been greater than in TINP; if the cost of the elaborate and tedious "selection process" in TINP is also taken into account, the ICDS strategy may turn out to be far less expensive.

During the last few years, vigorous efforts have been mounted to incorporate growth monitoring into the primary child health care systems of developing countries. Entire training programs and work schedules were being moulded and modified to facilitate such incorporation. Instead of identifying and adapting an appropriate technology suited to developing countries, the needs of a "chosen" technology (chosen by "experts" outside the developing countries) were allowed to dictate and distort the entire training and work patterns of health systems of developing countries — a case of "the tail wagging the dog!" The introduction of growth monitoring as an essential part of primary child health care operations in developing countries must have, no doubt, been well intentioned; but now that the limitations of this approach have become manifest, reconsideration and revision of this strategy are called for.

All this is not to deny that growth measurements have an important place in nutrition and health programs. There is undoubtedly a place for *cross sectional* growth measurements to assess the nutritional status of children in different locations and to evaluate the impact of intervention at different points in a given location. There is also a place for growth monitoring (longitudinal growth measurements) in clinics and special situations where facilities, expertise, and financial resources for meaningful growth monitoring exist. What is in doubt, however, is whether the *universal* injection of growth monitoring as an essential ingredient of all primary child health care operations is wise and realistic.

It must also be remembered that in the context of the painful "structural adjustments," which poor countries are now being compelled to undertake because of the dictates of international lending agencies, there are bound to be serious resource crunches that are likely to affect particularly the health and welfare sector. It is important under these circumstances that international agencies and their experts do not promote expensive items of health care that are at best arguable or unproven. Instead, they should help developing countries deploy their meagre resources for health and nutrition improvement in the most optimal ways.

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Evaluation and Policy Change in UNICEF: The Case of GMP

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Introduction

The UNICEF Evaluation Office is an office within UNICEF under the direction of the Deputy Executive Director of Programs. It is charged with the institutional responsibility of conducting global thematic evaluations of a wide range of activities in which UNICEF is involved. A thematic evaluation involves a process of literature review, the drafting of terms of reference for evaluations of activities in selected countries, followed by a process of review of findings leading to policy changes for UNICEF at the global level. In the course of country-by-country evaluations, recommendations specific to programs in those countries can also be made. This paper describes progress so far in the case of a global thematic evaluation of growth monitoring and promotion (GMP), which the Evaluation Office coordinated together with UNICEF's Senior Nutrition Advisor.

In early 1990, the UNICEF Evaluation Office was prompted, at the request of several advisers to members of UNICEF's controlling body, the Executive Board, to make plans to evaluate GMP. The impetus for this suggestion, and for the acceptance of the task by the Evaluation Office, was two-fold. First, UNICEF had been a vocal advocate of widespread application of GMP for 10 years. In the meantime a large consensus thought that, despite many attempts to improve GMP activities, there remained a general failure of GMP to contribute to improved chances of child survival and development. Second, the use of nutrition information systems, with the use of anthropometric measurement as a key component, formed a central part of UNICEF's new nutrition strategy,¹ which was being finalized at the time.

¹ UNICEF. Strategy for improved nutrition of children and women in developing countries. A UNICEF policy review.

The following are key components of the nutrition strategy and the place of nutrition information systems within it. First, it should be recognized that nutritional status is an outcome of many biological and social processes in society linked together in a logical order exemplified by a conceptual framework; and second, that poor people are central actors in taking actions to eliminate malnutrition, not passive beneficiaries. Third, there are three necessary conditions that must be fulfilled if nutritional status is to be improved: household food security, proper care, and good health services and a clean living environment. The achievement of these conditions depends on the availability of human, economic, and organizational resources. These are underlying determinants of nutritional outcome. Fourth, the recognition that availability and control of resources in a society are a product of history, politics, prevailing ideology, and habits.

The purpose of the conceptual framework is to provide a "pair of glasses" through which the problem of nutrition can be viewed; with its adoption, efforts to reduce malnutrition can be analyzed according to the framework. In such an analysis of problems, it is not sufficient to address only one or two of the three areas (although operationally, to have an impact on nutrition, only one or two might be addressed if it were found that there were no problems in one of the areas). These underlying causes in turn are influenced by basic causes, like the nature of formal and nonformal institutions; for example, the quality of the education system or the organization and management of health services. These in turn are influenced by sociopolitical superstructures, the economic structure, and potential resources available in the society. Central to the application of the nutrition strategy is the notion of the triple-A process, by which assessment of the nutrition situation is followed by analysis of the causes of the problem and actions based on available resources (Jonsson 1992).

The use of nutrition information systems for the application of triple-A at household, community, regional, and national levels requires, among other types of assessment, the use of anthropometric data collected at intervals. These data are then used to analyze individual growth velocity at the household level and trends at higher levels. At the household level, this is generally called growth monitoring and promotion (GMP); at the community level the term community-based nutrition surveillance is used; at the regional, national and international levels the term is nutrition surveillance.² It follows also that if this nutrition information is to be used to assess, analyze, and even to take concrete actions, actions that result in the redirection of already existing resources or the creation of new ones, then it is essential that there is agreement on a holistic view of the causes of malnutrition

²For a definition of these terms, among others commonly used in this publication, see the section on "Terms."

and, hence, a conceptual framework of the causes. Because actions need to be taken at different levels of society, household, community, and higher, a desirable goal is broad agreement throughout society on a conceptual framework.

One principle has remained clear throughout the decades. UNICEF must be involved in supporting member states of the UN in finding ways of reducing and eliminating malnutrition among children. It follows that ways must be found to deliver information on trends to decision-makers at all levels of society. The most important are household and community levels, for it is here that the control of most resources available to society lies. Most attention should, therefore, be paid to developing information systems for households and communities if social goals such as those set at the 1990 World Summit for Children are to be reached.

Methods for Country-Level Fieldwork

In keeping with UNICEF's decentralized structure, the evaluations were only to be carried out in countries where participation in the exercise was requested at the country level. Efforts were made, in keeping with the global nature of the exercise, to include countries from all over the world but with an emphasis on Africa because emphasis on assistance to Africa is a UNICEF policy. The following countries took part: China, Ecuador, Indonesia, Malawi, Thailand, Zambia, and Zaire. Benin and Iran also took an independent part in the exercise using the same terms of reference as they felt the evaluation methodology would result in useful recommendations for the improvement of their activities.

According to UNICEF evaluation policy, the activities in each country were carried out with a minimum of assistance from technicians outside the country, while making sure that the work in each country was comparable with each other. Rapid anthropological assessment procedures³ were to form the core of the assessment methods, as the budget for the exercise was small given the scale of the enterprise. These technologies were judged to be suitable for the task at hand.

Furthermore, the Evaluation Office wanted to promote the wider use of the procedures in UNICEF and the exercise could, therefore, be used to build capacities to use the procedures in each country. It was decided not to attempt to make a quantitative estimate of the impact of GMP on levels of malnutrition and mortality, in part because there were not enough resources available to do so, but also to see to what extent the RAP method could obtain enough information for

³ Scrimshaw, S. and Hurtado, E. 1987. Rapid assessment procedures for nutrition and primary health care. Anthropological Approaches to Improving Programme Effectiveness. UNU, Tokyo/UNICEF/UCLA Latin American Centre.

investigators to reach a consensus on likely impact. The Evaluation Office wanted to experiment with and demonstrate the extent to which rapid anthropological procedures could be applied to evaluation without resort to specially trained anthropologists. The test would be the extent to which the results of the evaluations would be seen as credible enough to elicit changes in programs and policies both at national and at international levels.

Terms of reference were drawn up for adoption by each country. The main hypothesis to be tested in each case was that GMP was a useful activity if, and only if, it provides information that is used for assessment and analysis of the causes of growth faltering followed by affordable actions appropriate for each of these causes. This should be true at the individual, household, and district levels. The main way in which the assessment would be done would be through discussions with the focus groups and in-depth interviews. Draft guides for in-depth interviews and guides for focus-group discussions were, therefore, drawn up. Supporting information was to be provided through observation of GMP in action for which there was also a guide. There was also a draft quantitative survey form. The survey's purpose was mainly to determine coverage of the GMP activity within the surveyed communities. Last, there was a rough guide for the analysis of use of resources to implement GMP whose aim was to stimulate discussion about the cost of putting GMP into the household, both to the caretakers of children and to the implementing agencies.

It is important to make a clear distinction between the purpose of growth monitoring and that of community nutritional surveillance. The purpose of the former is to stimulate actions on the use of resources mainly at the household level and to maintain good growth in individual children. The latter's main purpose is to stimulate actions on the use of resources at the community level. Similarly, national nutrition surveillance should stimulate actions on the use of resources controlled at the national level.

Different tasks were to be carried out by the evaluators at national, regional and district, and community and household levels.

- *At the national level:* there was a review of documents and interviews to establish. First, the history of GMP programming, including past and present political will behind GMP and experiences in going to scale with pilot projects and experiences in the modifications made to programs. Second, understanding by mothers and growth monitors of growth curves and the intended use of GMP as an operational strategy for primary health care. Third, the future prospects for GMP in national development plans. Fourth, a review of training materials and schedules for those carrying out GMP activities at the national, subnational, and village levels, including a

determination of how these materials were developed was also carried out. Fifth, an identification of efforts made or plans to use GM data at national level to advocate review and revision of economic policy and to feed back analyzed data to the periphery.

- *At the subnational level:* interviews with people involved with GMP (sub-national level government workers, members of nongovernmental organizations (NGOs) etc.) to see what actions had been taken to improve nutritional status because of information derived from GMP; identification of subnational level constraints.
- *At the village level:* interviews with growth monitors to identify the amount of training they had received, their level of knowledge of nutrition processes, how they were supervised, their GMP workload, and their perceptions of the constraints to improving GMP processes; identification of local-level costs of GMP activities; interviews with women in focus groups and, based on the results of these discussions, conversations with individual women, and interviews with men individually or in groups to find out their views on the usefulness of GMP, to find out how much they understood about growth charts, and to assess their understanding of the causes of malnutrition; observations of GMP in action; and, finally, a survey of a sample of about hundred women.

The in-country evaluation team was to choose the sites for work, making sure that each investigated area included both a site where it was thought that GMP was being carried out well, and another site where it was not working well, in the judgment of the national steering committee for the exercise. Evaluations were typically overseen by a steering committee made up of senior government officials from the ministries setting up GMP activities, researchers from local institutions, and UNICEF officials from the country. Fieldwork was carried out by the researchers on the steering committees, together with senior colleagues and with the help of more junior partners, normally from a spread of various government services. A typical team was made up of about 20 people. One person from the UNICEF New York Evaluation Office, or a consultant (appointed by them), oversaw the orientation and training phase and helped with the final analysis and writeup of the report. This ensured comparison between countries. Typically, the design in each country included investigations in areas where it was thought that GMP was implemented reasonably well and in areas where it was, by local standards, operating badly. This contrast would allow the investigators to contrast good areas with bad areas and investigate the reasons for difference and the possibilities of improving the quality of GMP in the poorer areas.

Table 1 gives an overview of the scope of the fieldwork in the different countries. (The reader should note that each country evaluation differs slightly from the original terms of reference.) Some final reports from the fieldwork chose to report the details of the quantitative surveys in different areas, usually when there was a significant variation in the practise of GMP by area (for example, in Thailand) other countries chose to amalgamate their reporting if there was little variation between areas (for example in Zambia). The extra detail is reflected Tables 2 and 3.

Findings and Process of Review in UNICEF

Fieldwork and analysis of results in each country was carried out over a period of a year and a half (1990–1991). In each country, there was a process of review by the steering committees to take note of findings and the proposed recommendations. This paper does not present the conclusions and recommendations on a country-by-country basis. These can be found in the country evaluation reports. In the interests of brevity, this paper presents a summary only of the actions reported to have been stimulated by the assessment and analysis of anthropometric data at household and community levels (Table 2) and the constraints to those actions identified (Table 3). The information used to identify actions and constraints comes mainly from the focus-group discussions and in-depth interviews carried out during the fieldwork.

When all the country evaluations had been completed, a process of review was carried out under the auspices of UNICEF's Evaluation Office and the Nutrition Section. A meeting was called 7–9 May 1992 of UNICEF advisers, external advisers, and experts who had taken part in the country evaluations to deliberate, based on the findings of the evaluations, and bearing in mind personal experience, UNICEF policy for support to nutrition information systems at the household and community levels. The aim was to take the first steps toward devising a new policy.

During the meeting a set of lessons learned were agreed upon:

- The resources needed for growth monitoring to be useful as a way of accelerating triple-A processes are, in many instances, greater than those available; although most countries can point to instances where GMP works in small areas this is not the case in most large national programs. The financial, organizational and human resources that determined the success of small-scale programs have usually not been available when small-scale successes have been expanded.

Table 1. Background information on countries studied.

Country	Start of GMP	Geographic scope of GMP	Scope of field work	Under-five mortality rates	Per-capita GNP US\$	National estimates of malnutrition % <2 s.d. ht/age WHO	Measles coverage 1990* or 1991
China	Early 80s	Limited to about 50 counties.	6 counties in Shanxi province: 2 model counties, 2 applied research, 2 extension counties. Qualitative survey: 992 mothers with children < 3 years randomly selected. Observations: GMP sessions with 99 children. Focus group discussions: 25 with mothers, 7 with grandmothers, 6 with village doctors. In-depth interviews with government officials, 158.	43	330	50% MOPH estimate for rural areas (children <59 months).	95
Ecuador	1960-70	National program, clinic-based; coverage of nat. health care system is about 30% of the population. Some areas comm-based with help of NGOs.	6 different areas investigated, rural-Indian highlands, rural non-Indian highlands, urban-marginal highlands, rural coast, urban-marginal coast, small coastal city; 3 locations per area. Quantitative survey; 45 mothers per location, total 810. Focus groups; with mothers, 1 per community, total 18. Observation: 1 per community, total 18 GMP sessions. In-depth interviews; with nurses aides and promoters, 37; with provincial and national officials, 7.	85	1120	50% (children 0-59 m). Source: DANS study 1986.	61*
Indonesia	Mid-70s, now around a quarter million locations	Almost national, community-based.	4 provinces; one district within each province; 3 subdistricts one good, one medium and one poor GMP in estimation of province admin. village selected in each subdistrict. Total 12 villages. Quantitative survey; 408 randomly selected mothers with 1033 kids. Weighing sessions observed: 12. Focus group discussions, with mothers, 12; village leaders, 12; cadres 12. In-depth interviews at sub-district level: health centre staff, family planning supervisors, women's organization reps. In-depth interviews at provincial level: government officials, technical health staff of provincial and regency health office; women's organization (PKK).	100	440	Not known. 50% <2 SD weight-for-age. 1987 SUSENA	78
Malawi	Clinic-based started around 1973. Community-based started in '87.	Many focused areas, now about 1400 clinic-based and 1,300 community-based.	6 community-based GMP areas and 3 clinic-based sessions. Quantitative survey: about 100 mothers with children < 5 in each community for a total of 1009 randomly selected. Observation: one session in each location, with total 90 children. Focus group discussions: total of 27 were held with 3 groups, mothers or fathers with kids <5 and village leaders. In-depth interviews: 5 mothers and 5 fathers from each focus group discussion and 21 monitors, 15 volunteer monitors and 6 health workers. At district level, 14 health officials and 13 development and extension workers.	258	170	about 50-60% (children <59 months).	78
Thailand	Started in mid-70s. Now national in scope with over 60,000 locations.	National, community-based.	Stratified sample of 4 "good" GMP villages and 4 "bad" GMP villages and 4 villages in central province with high proportions of migrants. Mothers interviewed, quantitative survey. "Good" villages, 136; "Poor" villages, 166; Central province, 129. In-depth interviews with village health workers, 36. Focus group discussions with mothers of well nourished kids, 12. Focus group discussions with mothers of malnourished kids, 12. In-depth interviews with key health personnel. In-depth interviews with mothers, 9.	35	1000	20-25 (children 3-36 m's) Source: 1987 DHS	79
Zaire	Started in 60s. National guidelines produced in 1987.	About 30% of the population has access.	Sites in 4 regions, 2 with long experience with GMP, one of the situation in Zaire and one with new GMP activities. In each region, 3 areas, one with good, one medium, and one bad GMP area — a total of 12 sites. Quantitative survey: 421 mothers with kids <3, about 30 per village. Observation: 14 sessions with 138 children. Focus group discussions: total of 28, one with mothers and one with fathers in each zone. In-depth interviews: 5-10 mothers who participated in each focus group, monitors, health centre nurses, zonal health administrators, central level officials.	132	170	Not known	31*
Zambia	Small scale in 60s. Became national in early 70s in health centres. Community-based in some locations since late 70s.	National via health centres of which there are over 800. Also in some communities.	12 districts were chosen, 6 urban and 6 rural. Villages or communities were chosen at random as were health centres where GMP sessions were observed. Quantitative survey: 200 mothers randomly selected per province for a total of 1009 mothers. Observation: 14 GMP sessions with a total of 140 observations. Focus group discussions: a total of 39 discussions were held with 3 types of groups, fathers of children <5; mothers with children <5; village leaders. In-depth interviews with 10 mothers in each community, 36 monitors and health workers, 11 district health officials.	125	290	54% (children 6-60 months) CSO 1990.	76*

Table 2. Actions at Household and Community Levels

Community and district level conceptualization of the nutrition problem and actions based on assessment and analysis.							
Individual level actions based on assessment and analysis				Conceptualization of nutrition problem at community level	Assessment	Analysis	Action
Country	Household food security (HFS)	Care	Health care and the environment				
China	Not regarded as a problem in Shanxi province	Weaning starts earlier and mothers eat more during pregnancy.	GM associated with health care but no actions reported based on analysis of growth curves.	Training and orientation limited to health sector personnel; cascade training system used leading to dilution of content at lower levels. No conceptual framework. No triple-A at village level.		See need for processed weaning food as a time saver in the "Extension" area.	
Ecuador	No mention in either national or focused programs.	In nat. prog. percent of mothers who said they followed advice in: nursing, 40; stimulation, 12; feeding 61; psycho-motor dev. 2. In focused progs. the same figures were nursing, 72; stimulation, 74; feeding, 73; psycho-motor development 27.	Actions taken by health personnel based on clinical exam of which GM forms a part. Care-takers are passive onlookers (national prog). In focused areas, building latrines. Children are referred to the health care services.	Community discussion and problem solving seems to be a main focus of the focused programs but not of the national programs.	In focused areas community chart is produced as basis for analysis.	Community chart forms basis for analysis.	In the focused areas, building water tanks, latrines, instituting child development centres. Burying garbage.
Indonesia	HFS not addressed	General advice on care given but mothers did not report behaviour modification. Availability of "Griffith's"-type counselling aids limited and not used properly when available.	Difficult to ascribe actions taken due to analysis of growth curves. Access to a package of interventions in association with GM greatly increased in the late 1980s.	Generally, there are no GM inspired triple-A processes at community level. No conceptual framework.	Data are compiled at provincial level.	None reported	None reported.
Malawi	In some areas free food is distributed at GM sessions.	3/4 of mothers said they put care advice into action when they had the resources. Recent publication of "Nutrition Facts for Malawian Families" aims to strengthen possibility for translating advice into action.	Curative care is available at clinic-based GMP. About half of the caretakers said they put health advice into action. Caretakers seek advice from friends, consult medical services and traditional healers. Latrine construction.	Generally, there are no GM inspired triple-A processes at community level.			Well protection. Some instances of inspiration to build latrines and rubbish pits.
Thailand	Food stamps given to mothers of malnourished children. Distribution of cooked food at GM sessions common.	General advice on care given, as well as focused advice for malnourished children.	Village health volunteers have medicines and power of referral to health centre.	No conceptual framework. Decisions are taken based on GM data at provincial and district level but not at village level.	Data compiled for subdistrict planning committee.	Used as a general planning tool by district and provincial planners.	District budgets for coupons determined at district level based on GMP data.
Zaire	HFS not addressed.	None reported.	Doubtful that GM modifies actions already being taken.	No system to take decisions based on community analysis of data from GM sessions. No training in conceptualization.	None reported	None reported	None reported
Zambia	Free food distributed to children with faltering growth. Free food supplemented by community purchased food on some occasions.	Advice about child feeding tends to be followed when it is noticed that children are sick or not growing well.	Immunization runs concurrently. Some mothers state this is their reasons for attending GM sessions.	No system to take decisions based on community analysis of data from GM sessions. No training conceptualization.	Data is compiled at provincial level and trends analyzed.	Amount of food to distribute determined.	Free food is dispatched from province to health centres. Some community nutrition gardens started as well as cooking demonstrations. Some income-generation activities spurred.

Table 3. Constraints to actions at household and community levels identified during focus group discussions and in-depth interviews.

Individual level constraints to actions				Community and district level constraints to triple-A based on GM data	National level triple-A based GM data
Country	Household food security	Care	Health care and the environment		
China	Not regarded as a problem.	Lack of time for mothers to carry out advice especially during harvest time. Lack of knowledge in preparation of energy dense weaning foods. Nutrition education too general. Lack of variety in weaning foods.	Health education messages given by village "doctors" too theoretical. Lack of practical advice on household hygiene behaviour.	Not carried out at village or district level.	Not carried out at national level.
Ecuador	Not reported.	In the national program only advice of a general nature is given.	National program: health workers do not share analysis with mothers and often behave in an unpleasant manner.	No link to district level. In national program no link to community assessment.	Not carried out at national level.
Indonesia	Not addressed	Nutrition education simplistic and prescriptive. Mothers lack time to carry out advice. Availability of "Griffith's"-type counselling aids limited and not used properly when available.		No triple-A at village level. At province level links between compilation of data and use to influence decision is weak. Some types of assessment recommended in program plans are not done. Orientation limited to health sector.	Too much data sent to national level for analysis. Interpretation problems due to variable coverage by area and over time and because of seasonality issues. Problems with communication of analysis to decision-makers.
Malawi	Lack of HFS is a major drawback to taking actions based on GM inspired triple-A.	Emphasis on 3 food groups. No knowledge of energy dense weaning food. Some mothers have problems following advice due to lack of money, time and food.	No mention of health actions directly linked to analysis of growth velocity.	Community leaders need more training and organization to be able to link data with decisions.	Not carried out at national level.
Thailand	Lack of knowledge and information on occupational activities. Shortage of food coupons common in "poor" and central areas. Value of food stamps too low to contribute to HFS.	Lack of time. Older generation of caretakers have deleterious caring habits.	Better access needed to more sophisticated service than that offered by VHVs.	No community level triple-A based on GM found. Child health not a priority focus in provincial and district level discussion. Little involvement of village development committees. Lack of conceptual training. Coverage is not universal. Emphasis on compiling data and sending to central level.	Interpretation problems due to variable coverage by area and over time and because of seasonality issues. Analysis and action by decision-makers seems much less frequent than provision of data from assessment. Coverage problem seems to have had effect of leading national decision-makers to believe there is less malnutrition than there really is.
Zaire	No apparent linkage.	Often not possible to follow advice of health workers due to expense or lack of availability of goods.	Clinic services generally weak.	Not done at community or district level.	Not carried out at national level.
Zambia	Free food distribution is erratic and quantities distributed not sufficient to make households secure.	Often not possible to follow advice of health workers due to expense or lack of availability of goods. Lack of time cited.	Lack of linkage between GM and actions taken by mother. No physical exam carried out during GM session or referral of sick children.	Not carried out at community level. At district and provincial level data is only used to determine quantity of free food to distribute. Interpretation problems similar to those at national level.	Interpretation problems due to variable coverage by area and over time and because of seasonality issues. Analysis and action by decision-makers seems much less frequent than provision of data from assessment. A third of health centres do not report to national level and sheer volume of data overwhelms central analysis unit.

- Assistance to communities to establish growth-monitoring activities should be driven by demand to monitor growth. Demand can only be created by a process of dialogue around locally relevant information. Such information can be obtained from both qualitative and quantitative procedures. Demand for the monitoring of growth cannot happen unless existing information is communicated. It is likely that demand for the monitoring of growth cannot be created unless, as part of the process of dialogue, a conceptualization of the causes of malnutrition emerges in a household or a community.
- GMP can increase the utilization of available social services, but should no longer be promoted as an "entry point" to improve the health system or other sectors.
- Existing, poorly done GMP programs not only waste resources, but they have a large opportunity cost and can be used as a palliative or alibi for not doing other nutrition-related activities.
- Management of growth promotion involves several approaches. They all include the three necessary steps of assessment, analysis, and action (the triple-A process). They also require different levels of resources and so each particular context calls for different methods. The promotion of growth for child development is a very important activity most particularly in areas where growth faltering is prevalent.
- The primary constraint to good GMP in most country programs is the inability to analyze, because of a lack of understanding of problems, and a lack of ability to take action because of a poor organizational capacity and existing power structures in household and community levels.
- GMP can be an important tool of empowerment when the context allows good implementation.
- General debate on the question of whether GMP does or does not work in a given situation tends to lead to debates with no useful outcome. Debate should focus on the extent to which GMP in a given situation enhances triple-A processes and, if not, how can such processes be enhanced under the local circumstances.
- Processes of analysis of GM data should not ideally be done under the auspices of the health sector. This tends to bias analysis of factors causing malnutrition toward health-related problems, without proper consideration of underlying constraints, particularly household food security and more basic causes.

Frameworks for Growth Assessment and Promotion

Understanding the Problem

Good practice requires good theory. In many countries, GMP has had an abundance of political will and resources – unlike many other areas of child health where lack of political will is blamed for poor implementation. In an attempt to clarify some of the concepts around GMP, the presentations in this section described the various frameworks used by people to conceptualize child growth and development and problems of nutrition, as well as the frameworks for policies and strategies to promote child growth and development.

A fundamental problem in growth promotion is the lack of consensus between governments and academics that the major issue in child nutrition is growth failure, rather than malnutrition, which includes the micronutrient deficiencies. There is also little consensus on the causes of poor nutrition, although this meeting appeared to accept the idea that at least three elements are necessary for good nutrition: household food security, health care, and child care. The evolution of more adequate theories of child growth and development is reviewed in the paper by Taylor and Mercer, reflecting a synthesis of many factors that influence the care of the child in the home. Although noting that much better scientific information is now available on growth and development, participants deplored the fact that much misinformation about the causes of malnutrition has been spread by universities and their graduates. The prime message from 40 years ago that children need more protein in their diet to grow properly remains uncorrected in many areas. Newer messages about the importance of dietary energy and adequate child care seem not to have been as well transmitted to date.

In addition to understanding the underlying reasons for poor growth, it was emphasized that the first step in the process of growth promotion is to have a reasonably exact understanding of the problem. Subjective measures often lead to a false understanding of the problem, although growth (weight) is an objective measure that is useful in getting this right understanding. "Growth" has been useful in Tanzania for setting objectives with the community, and growth monitoring has been better than other interventions to encourage community understanding of the reasons for poor health and nutrition. When resources to

measure growth directly are lacking, alternative indicators are useful such as those that reflect the key determinants of growth: disease, environmental conditions, household food security, dietary intake, child care, and health services.

Newer concepts and practices have been developed partly by analyzing successes in practice. The example of immunization was used to show how global goal-setting was made an ethical issue; the success of advocacy for global coverage set the basis for invoking accountability at the highest levels. National policy decisions to eliminate a problem follow once the idea of accountability is accepted. If there is agreement that growth is an ethical issue, a right of children, then what we are concerned about is the management of children's growth (and development, because growth is intimately related to development). There are different methods and approaches to managing growth, and we are starting to understand more about what those are. This statement brought about the observation that our language is indicative of a hierarchical/"them vs us" stance, the word "management" is used to describe institutional and government behaviour, and the word "coping" to describe household behaviour. Why not the reverse?

The Need for Dialogue with Communities

The meeting agreed that theory and practice must include traditional perceptions of children's growth and development, and must understand the way in which households use resources, both internal and external, to bring about growth and development. De Sweemer-Ba's paper shows the necessity for professionals to respect traditional, proven strategies for survival without overestimating their effectiveness. A balanced approach is required, a greater recognition of the need to merge traditional and professional ideas of growth and development. The triple-A (assessment, analysis, action) approach, as described in the paper by Jonsson, can be useful for this process because all societies use it in analyzing and solving problems. The paper stresses that the role of development assistance is to strengthen those triple-A processes that contribute most to improved nutrition.

The presentation of Jonsson's paper resulted in a discussion of the experience of some participants who had worked in communities that seemed to have a very weak ability to assess and analyze their problems accurately and required extensive inputs over a long period to understand the problems. An example of the difference in problem perception between local people and professionals in northern India was cited, where the people thought it was normal

for children to have frequent bouts of diarrhea. This was changed gradually through a dialogue with the community, and oral rehydration therapy (ORT) was used effectively to reduce deaths from diarrhea.

Some participants said that the community is often very accepting of what it is told by professionals. Others disagreed, stressing that real change requires much respectful dialogue and negotiation with the community to include both indigenous and professional knowledge in taking actions to promote growth. Although people all recognize the concept of "child development" (if not growth) and have their indigenous ideas about what is a "thriving" child, and the reasons for not thriving, there is frequently no consensus about this within traditional cultures and poor urban areas. It was noted that this is not surprising; no cultures are static, all are in transition, facing new challenges and new obstacles.

A problem resulting from the process of dialogue with communities is that expectations are built up, that communities expect to have their disease burden lessened, and the health system fails them by not being able to assist them to reduce disease. The functioning of the health system, or its nonfunctioning in many parts of the world, formed a significant part of the discussions.

Local Perceptions about Growth and Development

The paper by Harrison shows that, although the use of weight to measure children's growth has deep historical roots in the West, this tradition does not pertain in many other societies. There is a need to examine critically local ways of judging changes in body size and shape, and to find out whether they are really related to nutritional status. Similarly, it is important to understand local beliefs about the existence of and reasons for illness.

Traditional methods of monitoring growth in Africa include putting bands of cloth around various parts of the body, such as the neck, waist and arm. These can serve two purposes: first, the band may contain a talisman to ward off evil, second, it indicates to the mother that growth is occurring when it becomes tight and must be extended. Unfortunately, nurses have been known to discourage this practice and insist that it be removed before the child is weighed. Some tribes do not see "weight" as a means of measuring growth, and may even see "too much" weight gain as unhealthy. "Appetite" is frequently mentioned by mothers as a means to describe their child's health, and research shows they are quite accurate in assessing appetite. These perceptions should not be ignored but sought out and accommodated by professionals who wish to encourage children's growth. It was one participant's perception that in North America a judgment is made of growth

or health on the basis of the fatness of the face, whereas in Africa, the size of the limbs is more important. In such a circumstance, would arm circumference measurement be more congruent with traditional systems of monitoring growth?

The technology and process of GMP, and its fit with community perceptions, is important to understand. Growth monitoring makes intuitive sense in some cultures and is congruent with other measures used to assess children. In other cultures, it is threatening, e.g., Egypt, India. The technology can help, or it can hinder, depending on the context. One reason for the community's difficulty in appreciating growth monitoring is the long time lags between weighing and intervention and outcomes, unlike ORT where the benefit is more immediate. Another misperception arises because growth monitoring is most often done in clinics, leading people to see it as an intervention in itself. In such a case, the promotion of growth monitoring may do more harm than good. Additionally, the weighing process may stigmatize a mother, for she may be blamed for her child's poor growth, even though she has little support from the family or community for child care. On the other side, women may have their own objectives for attending a GM session; weighing of the child may be less important than the opportunity to take a rest from heavy workloads and to discuss with other women new information and issues of interest.

Developing Strategies for Child Growth and Development

The beginning of this section noted that it is possible to reach consensus on the conceptual framework of the causes of poor nutrition. The greater difficulty lies in the values placed by different people on just which level in the framework one chooses to use to develop interventions, i.e., where and how in the framework. The paper by Bergevin and Mohamed shows how analysis and interventions can differ widely by emphasizing the various dimensions in an intersectoral approach to growth promotion and health policy. It notes the difference between the rationale that would be used by medical, social, and agricultural workers to devise interventions.

The adequacy of the medical rationale was challenged by a participant's experience from Thailand where much research in the 70s was devoted to medical reasons for malnutrition and strategies applied through the health service system. This proved relatively ineffective. When planners were eventually convinced that malnutrition was a symptom of poverty, a poverty alleviation plan was developed, focusing on areas with the worst nutritional status and using a multisectoral approach combined with community mobilization. Results were impressive in nutritional and other indicators. Other participants felt that the problem of household food security, especially in Africa, needed more attention, including

underlying problems of access to land, especially for women, demographic growth, outmigration of young men, AIDS, the insufficiency of subsistence farming, and so on. Food bias within households was argued to be equally important.

The key role of research in providing scientific evidence for health and nutrition policy formulation was described in the paper by Bergevin and Mohamed. It demonstrated the preponderance of weaker types of research design in studies of growth monitoring and promotion, and the corresponding paucity of well-executed studies with rigorous designs. The discussions around this point reiterated the importance of merging community and professional points of view. The most forgotten element in research is the community, i.e., community as the researchers, not the researched. The new direction for research in UNICEF is to build capacity in communities to carry out their own applied research – a strategy for doing this is community-based sentinel surveillance. One participant noted that to balance the emphasis on identifying obstacles to program impact at the community level, there should be corresponding research on the change agents, such as ministries, UNICEF, the World Bank, which can help or hinder development.

Growth monitoring and promotion involves parents, children, and health care providers, at the very least. It is important to strive for a clear concept and shared vision, for children need to grow in ways that are optimal for their health, while meeting the expectations of their community for a growing child. The various frameworks can meet in a common ground through growth monitoring, which can be used to fulfil different needs in different people. For health providers, it gives satisfying "scientific" information on who needs resources and how effective interventions have been. The mother obtains new information and her competence as a care-taker is validated. Most important, if information from GMP is viewed as a management information system having a wide impact, the community, the bureaucracy at various levels, and the politicians can learn to use it as a tool to develop strategies and policy for child growth and development.

Policies are normative statements, while strategies describe how to do something. Growth promotion for child development requires clear definition of policies and strategies to reach those that are in most need. A national policy on growth promotion should not be limited to the health sector, as is often the case. Much of the variance of growth can be attributed to determinants of health which lie outside of the jurisdiction of the health system, calling for an approach to action for growth promotion that is broad and multisectoral. Thus policies for growth promotion need to find support in food and nutrition policies, economic and employment policies, and education and other social policies, as well as health policies. In implementing these policies, there is a need to coordinate them

closely, and exploit all opportunities for synergistic integration with making integration into a fetish. (There is a belief that since integration is good, more integration is better!)

Through the work of various groups, such as agencies of the United Nations and international professional bodies, it has been shown that by formulating policies at international level on child rights and growth promotion, national policies too can be inspired. In seeking ways to influence policy, it would be a grave mistake to court only the powers that are, rather than helping to create new powers which are more favourable to children's growth. In pre-revolutionary Benin, Mali and South Africa, grass-roots marginalized groups were able to define problems and solutions differently, waken public opinion, and influence the policy-makers to make fundamental power changes.

Where governments are sympathetic to new policies, a coalition of politicians, bureaucrats and technocrats is needed to work together to implement change. It was emphasized that there is no value in having good policies unless they represent political commitment, which is expressed by assigning the best people to do the job, committing resources (including money which can be allocated flexibly) and giving sufficient autonomy to the program.

It is important that we learn at global and national levels from past experiences in efforts to promote wellbeing. Here one could examine the successes and failures in areas such as the Expanded Program of Immunization (EPI), Oral Rehydration Therapy (ORT), Iodine Deficiency Disorders (IDD) and comprehensive primary health care (PHC). Did policies get formulated? How and why? What were the supporting organizational arrangements? Who was involved in the process? How was advocacy, training, implementation and evaluation done? What was the experience in policy formulation involving collaboration between sectors? What were major obstacles? Were communities empowered? What was the role of NGOs, religious, and other societal forces?

The meeting felt that policy analysis and reformulation is needed at this time particularly at national and subnational levels to make sure that communities and families are given access to the necessary resources for growth promotion and development. There is a growing consensus that health policy development should be undertaken within a systematic, broad approach, based on societal goals for human development, political commitment to these goals, sound scientific evidence, resource availability, and social considerations.

While policies are based on more than research, the meeting recognized that the contribution of research to the policy-making process was generally painfully little. Much nutrition research has focused on influencing strategies.

This is partially due to the difficulty of policy research, partially due to the fact that research is determined by configurations of vested interests and political forces, as well as by knowledge paradigms, which shift only slowly. Research can and should be reoriented to be more applicable to local situations. This needs the involvement of those who will apply the research, for example, workers and/or communities.

A large part of nutrition research results are not communicated broadly, especially to politicians, the policy-makers (who do not read professional journals, or proceedings such as these). In spite of this failing, an increased emphasis on research was felt to be appropriate, especially in Africa, where the economic crisis has allowed external actors such as the IMF to determine broad social and economic policies, undermining internal policy-making. One participant noted that while many policies and strategies are inappropriate, so is much research. A high-level unit to plan research, bringing together researchers, policy-makers and health managers is needed to do national level priority-setting for research. Currently, most Ministries of Health are not capable of making policy, or of incorporating the multi-sectoral elements which should be part of health policy. Essential National Health Research (ENHR) is an effort to harness national resources for essential health research, so as to arrive at policies and strategies that are responsive to local problems. The meeting was very supportive of this and similar efforts and hoped that the ENHR priorities would always include topics relevant to growth promotion policies and strategies.

Conceptual Analysis of GMP

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A Process Perspective

The nutritional status of children is an outcome of a complex interaction of factors in the household, community, and society at large. Decisions on how to use available resources at any level of society may influence and determine the nutritional outcome. A few decisions are made with the aim of improving the nutritional status of children, but most decisions affecting children's nutritional status (negatively or positively) are made without such an aim. All decisions are based on *information*. This information can be of scientific, ethical, or metaphysical (e.g., traditional beliefs) character. The information may be more or less explicit; it may vary from conventional wisdom to detailed, explicit data.

Decisions are also most often part of an iterative process of "learning by doing." People's coping and survival strategies are good examples of such iterative processes. In the face of a frequent, changing environment and resource-base, households develop new innovative strategies to cope. Community efforts, using community resources, follow a similar pattern. After an initial assessment of the situation and an analysis of the causes of the problem, an action plan is agreed upon, taking available resources into consideration. The impact of the actions taken is observed and lessons are learned for improved analysis and actions in the next round. Communities are not homogeneous, which means that several decision-making processes take place at the same time, using different resources. These processes are, however, most often interdependent, reflecting the particular social stratification of the community.

Independent of the level of society, these iterative decision-making processes are characterized by the same logic. They all include three major components: assessment of the situation, analysis of the causes of the problem, and actions to solve the problem, based on an analysis of the availability and control of resources. After action has been taken the impact is reviewed, i.e., a reassessment is made, followed by an improved analysis for better actions, etc. This phenomenon has been called a *triple-A process* and is illustrated in Fig. 1.

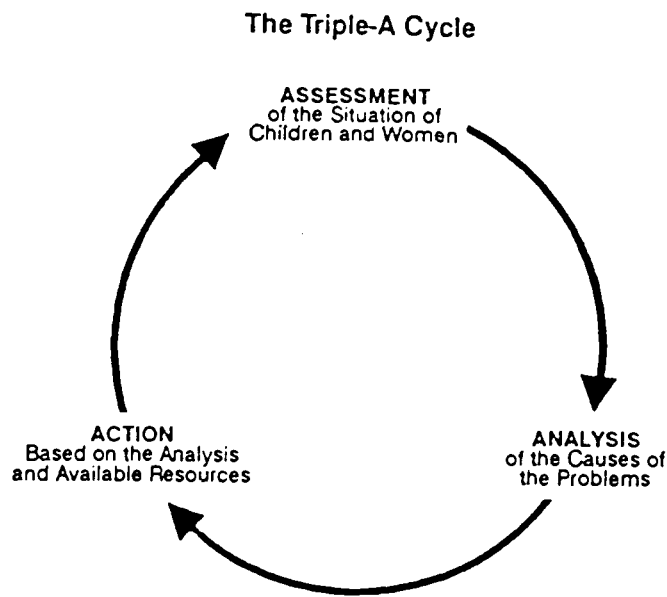


Fig. 1

The Triple-A Approach

The recognition, understanding, and reinforcement of existing triple-A processes at various levels of society is the thrust of the triple-A approach. Development assistance should strengthen and accelerate those triple-A processes that contribute most to improved nutrition. "Reflection in action," "self-evaluation," and "adaptive programming" are all based on similar approaches. However, the triple-A approach places more emphasis on the role of information. Information is the "fuel" of the triple-A process, and is required to move from assessment to analysis, from analysis to action, and from action to reassessment.

It is useful to examine in greater detail the various components of a triple-A process. Nine consecutive steps can be identified:

- 1a. Information for assessment
- 1b. Assessment/reassessment
- 1c. Information from assessment
- 2a. Information for analysis
- 2b. Analysis
- 2c. Information from analysis
- 3a. Information for action
- 3b. Action
- 3c. Information from action

One, single weak link in this chain of events can break the triple-A process. The evaluation of nutrition information systems should aim at identifying the weakest links in the chain and suggest ways to strengthen these.

Nutrition Information Systems

Triple-A decision-making processes operate at different levels of society:

- International level
- National level
- Provincial/regional/district level
- Community/village level
- Household level
- Individual level

Nutrition information systems can be developed at any level to improve decisions for actions to reduce the problem of malnutrition, i.e., to strengthen those triple-A processes that contribute most to improve nutrition. Depending on the level of society, they have been given different names.

- Global nutrition monitoring
- National nutritional surveillance
- Provincial/regional/district nutritional surveillance
- Community/village nutritional surveillance
- Growth monitoring and promotion (GMP)

Each level commands certain human, economic, and organizational resources. The objective of a nutrition information system at any level should be to improve decisions on how best to use resources for improved nutrition. In program terms this means that a "new" triple-A process is established, emerging at the action stage of the cycle, to influence all steps in existing triple-A processes that dominate present decisions. In the "new" triple-A process, assessment, analysis, and action again are featured, and can be described as another cycle within the original triple-A cycle.

The long-term objective of a nutrition information system should, therefore, be to enhance gradually the existing triple-A processes through improved assessment and analysis and greater flow and use of information for improved actions. This objective is fulfilled when the "new" triple-A process has been completely internalized and when there is only one improved process. Very few, if any, nutrition information systems have reached this stage.

This analysis shows the importance of the identification and understanding of *existing* triple-A processes that have led to the current situation. Part of the existing assessment and analysis might be wrong or inadequate. Actions might be driven by misinformation. The development of any new nutrition information system must, therefore, address the provision of more valid information, as well as the curbing of misinformation. It is, therefore, important to identify which decisions are taken that influence nutritional status and the information/misinformation used for these decisions (decision-audit), as well as decisions that could be taken with more information available.

The Need for a Conceptual Framework

Neither assessment nor analysis are made in a "vacuum." First, "you find what you look for" (Kuhn 1970). If one does not look for the prevalence of exclusive breastfeeding or feeding frequency, one most likely will not "find" them, i.e., they are not assessed nor are inadequacies analyzed. We all have preconceived ideas about the nature of the problem of malnutrition. The first step in efforts to improve assessment and, in particular, analysis, is to make these ideas explicit, i.e., design a *conceptual framework*, indicating the causes of malnutrition. It is obvious that if there is no agreement on the causes of the problem, there will be difficulties in agreeing on priority actions to solve it. UNICEF has proposed such a framework that identifies causes at immediate, underlying, and basic levels (Fig. 2). This framework contains the causative factors and their relationships that exist in *all* situations. It identifies disease and inadequate dietary intake as the immediate causes of malnutrition; household food security, adequate care of children and women, and access to health services, together with a healthy environment as the three necessary conditions for adequate dietary intake and health; and how the fulfilment of these three conditions are dependent on the availability and control of resources.

In a particular context, for example, a community, the conceptual framework can be made much more detailed. The original framework guides us in what to look for initially. With new information the framework can be sharpened. This helps in focusing data and information collection. This process of interaction between the conceptual framework and assessment/analysis is usually easiest at the household-level. It is in this perspective that growth monitoring and promotion should be seen as a potentially powerful instrument in improving household-level, triple-A processes for improved child nutrition.

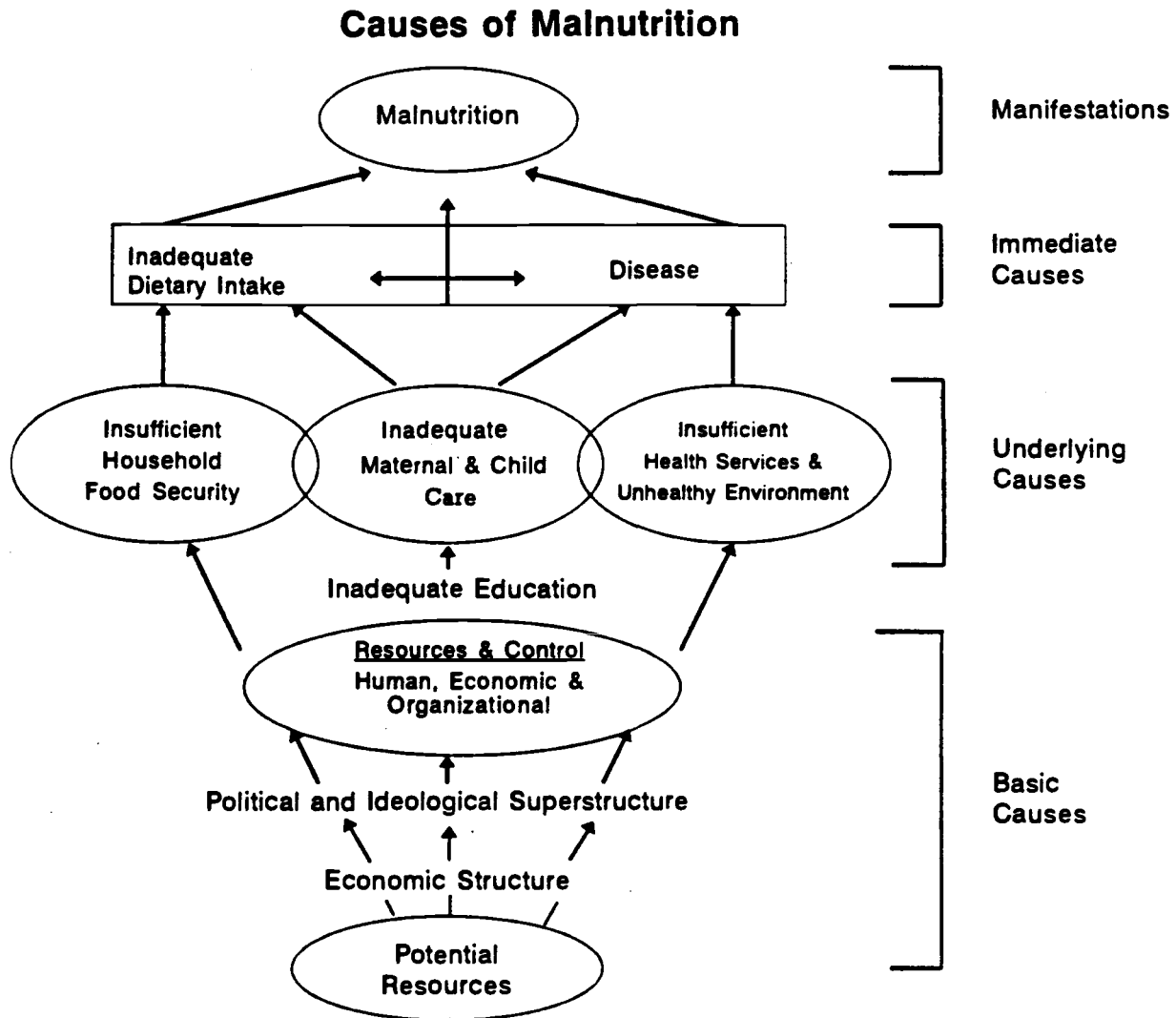


Fig. 2

Growth Monitoring and Promotion

As mentioned, resource-poor households exercise dynamic coping strategies. The survival and development of children are, no doubt, included among the many goals for livelihood optimization. Knowledge, perceptions, and attitudes of the members of the household, together with the availability and control of household resources, will determine how these goals are prioritized and achieved.

The child caretaker, most often the mother, is engaged in daily decisions about what to do to ensure the well-being of her child. Whenever the child falls sick she makes her own assessment and analysis, based on her ideas about possible causes of the illness. Most often she takes some actions based on her understanding of the causes and then waits for the result. If the child does not improve, she may decide that a medically trained person is required. The health worker makes his/her assessment and analysis and suggests a particular set of actions. The impact of these new actions is observed some time later, reflecting the triple-A nature of these processes.

The basic idea of GMP is that *growth* of the child is a good indicator of the well-being, including nutritional status, of the child. As growth is easy to measure by weighing the child periodically, the nutritional status of the child can be made visible to the mother. When the weight of the child is plotted on a growth chart, this visibility is enhanced and can be used for easy identification of growth faltering. With this more valid and precise information, a mother could be empowered to use her resources better for the well-being of her child.

GMP is, therefore, an "artificial" triple-A process introduced to improve those triple-A processes already operating at household level or to initiate new ones. GMP can help to make the processes more focused and efficient in improving child nutrition. An ideal GMP process can be described as follows:

- 1a. Information for assessment: Growth of children chosen for measurement.
- 1b. Assessment: Weight is measured periodically.
- 1c. Information from assessment: Weight is plotted on a growth chart.
- 2a. Information for growth analysis: Information on the growth chart (kept by the caretaker); additional information the care-taker may have about the child during the previous period.
- 2b. Analysis: The child caretaker (assisted by a health worker) identifies deviations from normal growth and tries to analyze the causes of growth faltering. Resource-relevant actions are identified (counselling).
- 2c. Information from analysis: The result of the analysis is understood and accepted to a varying degree by the caretaker, internalized, and communicated to other household members and actors.

- 3a. Information for action: The information is received and understood to a varying degree by members of the household, who decide on actions (the political economy of nutrition at household level).
- 3b. Action: Actions are taken by the child caretaker and other actors.
- 3c. Information from action: The child caretaker provides an opportunity for weighing the child again after a period of time.
- 4. Reassessment: The child's weight is measured again and compared with the previous weight, etc.

The UNICEF evaluation of GMP in seven countries (reported in the previous section of this publication) attempted to test the following hypothesis: "GMP works, if, and only if, it contributes to strengthening the household-level capabilities to assess the nutrition-problem, analyze the causes of the problem, and to design resource-relevant actions." The nine steps above, therefore, present nine key issues in the evaluation. If one of the steps is weak, the whole triple-A process is weak and the GMP-effort does not work well.

It is well known that the "promotion" part of the GMP is most often weak or even nonexistent. It is often said that more and qualitatively better counselling is required (involving steps 2b and 2c). It is, however, important to move beyond these general statements into a more detailed analysis of these steps. The key issue is probably to understand correctly what is required by the caretaker to become "empowered" by GMP information. What knowledge is required by a mother, for example, to be able to internalize and use GMP information to strengthen and accelerate those triple-A processes she is already involved in to secure the well-being of her child? What is required of her to "accept" new actions based on this new, for her sometimes "artificial," growth information? The completed UNICEF evaluation of GMP programs in seven countries provides some new answers to these questions.

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Challenge of Policy Formulation for Growth Promotion

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Introduction

Policy formulation for growth promotion is an essential element of health policy development in every country but is of particular significance in developing countries where malnutrition in children under 5 years is highly prevalent. The aim of any health policy should be to improve health status of the population, thus contributing to human development. The Alma-Ata Declaration and the Human Development Report 1990 reaffirm health as a basic human right (WHO 1978; UNDP 1990). Likewise, the Convention of the Rights of the Child, presented at the World's Children Summit, identified growth as a fundamental right of every child (UNICEF 1990).

In the past, policy formulation in health has been approached with a narrow view and dealt with in an unorganized manner. There is a growing consensus that health policy development should be undertaken using a systemic approach based on societal values and goals for human development, political commitment to these goals, sound scientific evidence, resource availability, and cultural acceptability.

As we will discuss in detail later, health policies cannot be formulated in an isolated manner; they are influenced by various sectors in society and should be linked to the broad development strategy of the country, the resources made available for human development (instead of defence and other spending) and to policies in other key areas such as status of women, population policies, education, and agriculture to name a few.

A Conceptual Framework for the Health System

A conceptual framework for the health system is presented in Fig. 1. The health service organization evolves within an external environment. A determining factor in this environment is the political system and the political commitment to human development. Cultural and societal values will shape the health goals to be achieved.

The health service organization is but one of the determinants of health and generally accounts for only a small proportion of the improvement of the health status of a population. However, it can play a key role by stimulating intersectoral action and may, therefore, impact on other more powerful health determinants listed in the figure.

In an ideal setting, the health service organization contributes to the improvement of health status by collaborating with communities and individuals through a process of primary health care with referrals as needed to secondary and tertiary care levels. Although it is desirable that it be guided by policies based on scientific research, this is most often not the case. Well-trained and motivated human resources should be its most important input. Another fundamental input is an adequate level of financing.

The management information system (MIS) should monitor the impact of the health service organization on health status and its environment (including other health determinants), track progress of outputs (PHC programs, intersectoral action, secondary and tertiary care), and inputs (staffing, expenditures and revenues, supplies and drugs). It should, therefore, include indicators and targets for health status, health determinants and health services.

Policy Development for Health

As a first step toward health policy development, societies need to reach decisions regarding human development targets, i.e., improvement in education level and life expectancy, reduction in infant and under-five mortality, and in prevalence of malnutrition. The importance of political commitment to these targets cannot be overemphasized.

The next step in this process should be an exercise in priority setting. The burden of disease is assessed overall and then for each specific condition (health problem, disease entity) by combining severity and frequency.

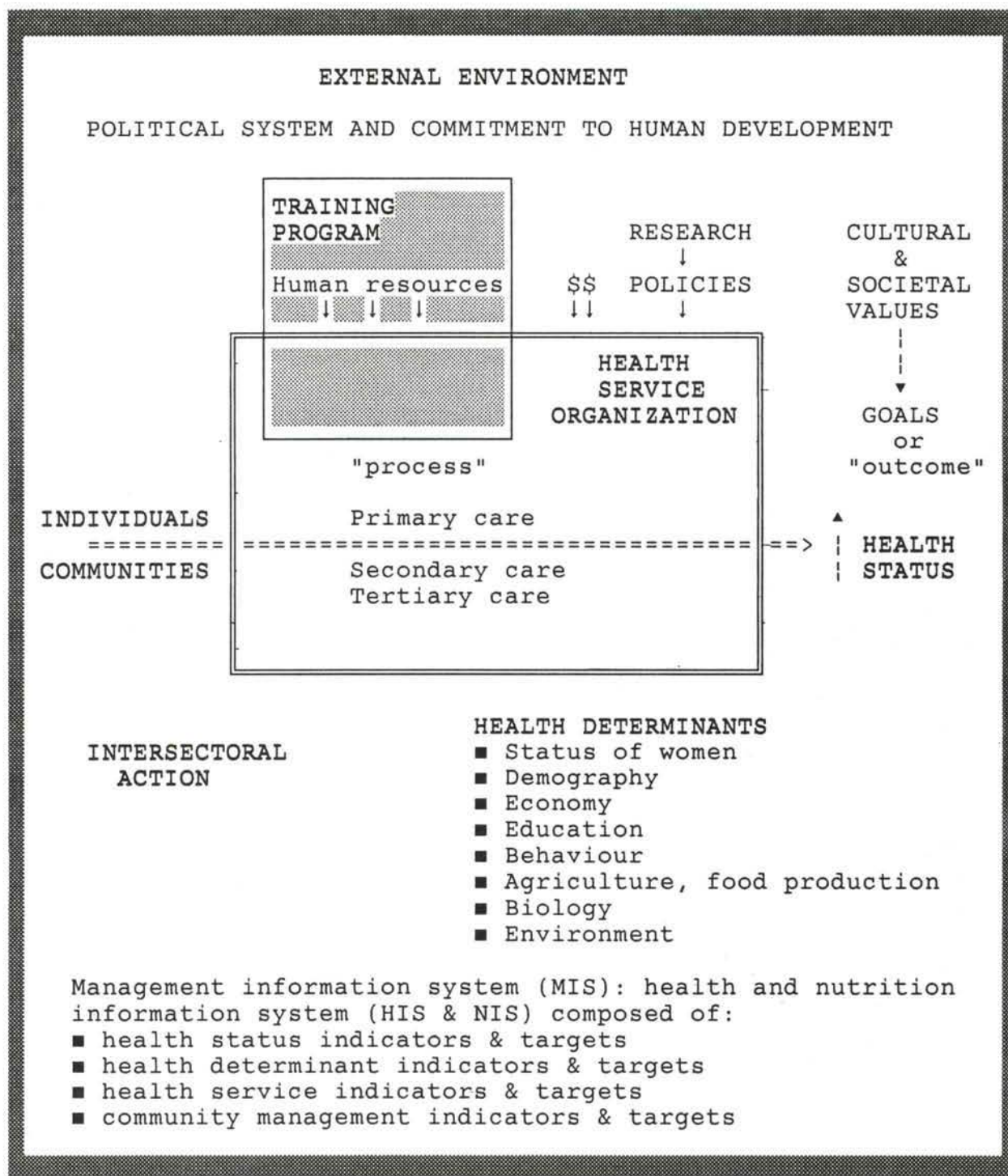


Fig. 1. Conceptual framework for the health system.

The *efficacy* of the intervention for each health problem should be evaluated under optimal conditions (laboratory or controlled environment); the *effectiveness*, or practical efficacy, should then be tested under real life field conditions.

Next, both the proportionate and marginal costs of the intervention are measured. Proportionate costs reflect the proportion of all health expenditures attributable to this specific intervention, whereas marginal costs indicate the additional costs incurred when adding this intervention to an already functioning health system. Opportunity costs (such as time of mothers, cost of travel to health facility, etc.) caused by the use of the intervention should also be taken into account, although they are often more difficult to measure.

Combining effectiveness and cost information will lead to an assessment of cost-effectiveness (for example, case of malnutrition averted per dollar invested for a particular growth promotion intervention), a key tool for comparing the "performance" of different interventions. In this regard, Jamison and Mosley are leading an interesting initiative on the part of the World Bank. They have recently published an article entitled: Disease Control Priorities in Developing Countries, Health Policy Responses to Epidemiological Change (Jamison and Mosley 1991).

Costs have not always been measured systematically for growth promotion interventions. UNICEF has only recently taken an interest in obtaining realistic assessments of its financial contribution and that of ministries of health to growth promotion activities. However, this quantitative approach is not sufficient. Interventions should be culturally, socially, and politically acceptable and must involve communities throughout the decision-making process. Although this may initially lead to a different ranking of priorities by communities and health professionals, the communication between these two parties will result in a more comprehensive understanding of the health problems and to effective decision-making.

When integrating interventions into health programs, it is important to take into account their interrelationships. One should then study the various strategic options (program alternatives) and the optimal timing before finalizing the program work plan. Traditionally, policy formulation is envisioned at the global and national levels (i.e., ministries of health, UNICEF, WHO). Yet, adaptations of these policies, specific policy formulation, and health planning should occur at every level of the health system. At the national level, the Health Policy and Planning Unit of the Ministry of Health should be responsible for carrying out strategic planning; identifying national health objectives; and developing a general

healthy public policy package, policies for the health services, and specific intersectoral health policies. It must also provide national guidelines for primary health care programs.

Repeating the planning cycle at the district level, district health management teams (DHMTs) should elaborate health profiles (community diagnoses) and develop action plans in collaboration with other sectors and district authorities, to ensure an integrated approach to health development and the required political commitment.

Operations are carried at the subdistrict or health centre level and at the community level. These levels are key to ensure both community mobilization and quality delivery of services, yet they have not received sufficient attention except perhaps in the Americas. The Pan American Health Organization has done a considerable amount of work on these levels which are referred to as Local Health Systems (Sistemas Locales de Salud or SILOS) (PAHO 1989). The planning cycle should involve community leaders in local health policy development and in ensuring that health receives the priority it deserves.

As mentioned earlier, the health service organization must be supported by a strong management information system (MIS). Information collected at one level must be used for planning at that level before it is passed on to a higher level. Likewise, higher levels must report on information aggregated from lower levels to provide comparative performances between similar units of the system.

Each level should be linked with the next level up and down with an appropriate amount of "bottom-up" and "top-down" planning respectively. The various levels of policy development and planning process are presented in Fig. 2 in order of importance, emphasizing the key roles of the family, community, and health centre levels. Decision-making must be decentralized with equity and must be effective so that each level is accountable and has the ability to manage both human and financial resources.

This planning process may appear idealistic, but it is essential if one wants to maximize community involvement, effectiveness, and efficiency.

Research and Scientific Evidence for Sound Policy Formulation

There is considerable debate about the effectiveness of growth monitoring in improving child growth. This is in good part due to the lack of properly executed studies with rigorous designs. Policy should be based on solid scientific evidence of the effectiveness of the interventions proposed.

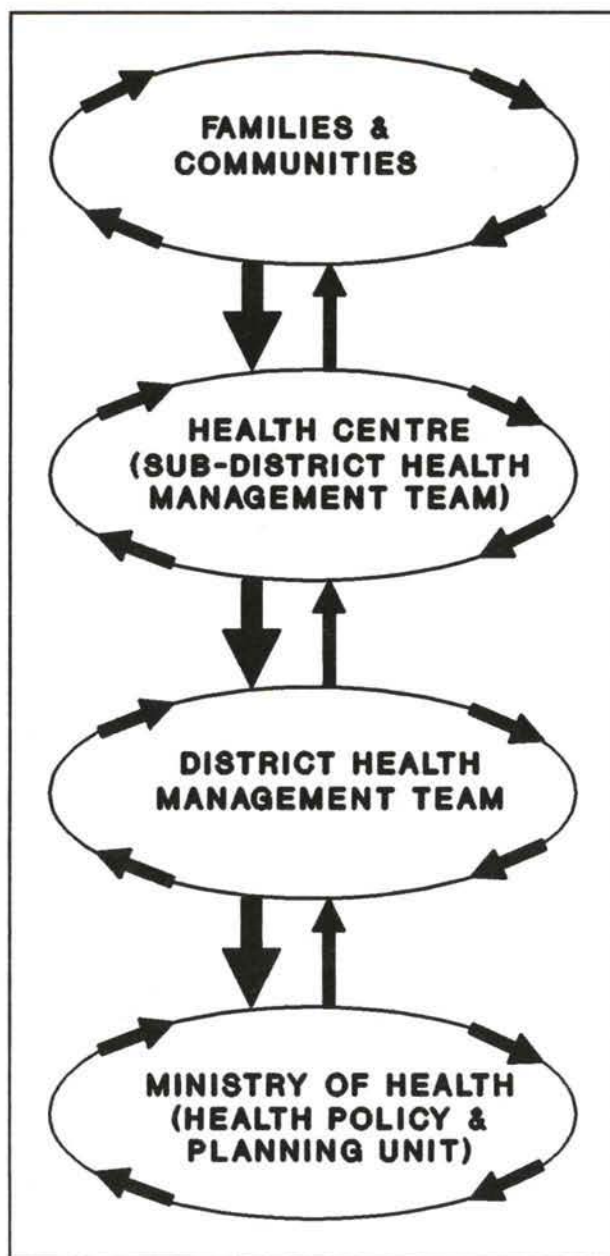


Fig. 2. Policy development and planning process for health. The planning cycle (with its priority setting) should occur at every level of the health system, each arrow in the cycle representing one of its four stages: observation, deduction, decision, and action. There should be an appropriate mix of "bottom-up" and "top-down" planning (as indicated by vertical arrows) together with a strong management information system.

Different *types of design* will provide different levels of strength of evidence, from "speculative" to "firm." These are in increasing order of strength of evidence:

- Case reports
- Case series, case studies of programs or projects
- Ecological studies (comparisons of aggregate risk)
- Cross-sectional surveys
- Case-control studies
- Cohort studies
- Randomized clinical and randomized community controlled trials (RCTs)

However, the type of design is not a substitute for the quality of the design and the rigor of execution. A poorly designed and executed randomized controlled trial may be worth less than a case report!

The quality of evidence on the effectiveness of interventions can be assessed by the following grades (Spitzer 1979):

- I Evidence obtained from at least one properly randomized controlled trial.
- II-1 Evidence obtained from well designed cohort or case-control analytic studies, preferably from more than one centre or research group.
- II-2 Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the result of the introduction of penicillin in the 1940s) could also be regarded as this type of evidence.
- III Opinions of respected authorities, based on clinical experience, descriptive studies, or report of expert committees.

This attempt at quantifying the evidence has proven invaluable in making rational decisions in the allocation of scarce resources.

Let us take a familiar, yet controversial example of a global intervention that could perhaps have benefited from more rigorous scientific assessment before wide-scale implementation: that of oral rehydration therapy using oral rehydration solution (ORS) packages versus cereal-based oral rehydration therapy (ORT). As part of a strategy to decrease mortality from diarrheal diseases, UNICEF promoted the utilization of ORS premade packages. It was only several years later that evidence concerning the equal or superior efficacy of home-prepared, cereal-based ORT came to light. Cereal-based ORT would appear to have

greater effectiveness than ORS from packages: availability at the time of the diarrheal episode is not an issue because almost every household has cereal and some salt; the prepared diluted "porridge" is very close to traditional remedies in many societies (e.g., "atmit" in Ethiopia) and would appear to be much more acceptable by mothers. It is also less expensive as it does not require manufacturing or an extensive distribution network.

Although the promotion of ORS packages has saved countless lives, a small fraction of the investment could have been used to examine the most cost-effective strategies in different situations; this would have probably led to significant cost savings and slightly improved child survival in many countries.

Recognizing the importance of research, UNICEF and other international agencies have been gradually increasing their share of budget for research and development (R&D), as has been recommended by the Commission of Health Research for Development (Commission of Health Research for Development 1990).

Evidence for Effectiveness of GMP

Some confusion persists as to what are the interventions in growth monitoring. Growth monitoring can be seen as having three main functions:

- As an educational tool for mothers.
- As a screening tool to identify those children at risk for malnutrition.
- As a tool for nutritional surveillance (for example, as part of an early warning system for famine).

In the first, growth monitoring is an intervention. In the second and third, it is not an intervention in itself but is part of a management information system; it, therefore, cannot be evaluated without its accompanying growth promotion intervention. The debate about the effectiveness of GMP is in part due to this confusion. It is also due to the paucity of properly designed epidemiological studies to evaluate the growth promotion interventions.

This is particularly important as the field of growth monitoring and promotion is an extremely complex subject with numerous confounding factors. Furthermore, the presence of strong effect modifiers such as literacy may explain positive and negative results in better- and less-educated populations, respectively.

As is often the case for the introduction of new technologies in health, growth monitoring and promotion programs were probably introduced on a large scale in many countries without sufficient prior field testing.

We will not review here the scientific evidence concerning the effectiveness of GMP as this has been done by Ruel (Ruel, in press) and in other papers presented at this Colloquium. Most of the papers on the subject are in the form of project or program evaluations or cross-sectional surveys (quality of evidence II-2 or III). We are aware of only one cohort study (quality of evidence II-1) (Briend and Bari 1989) and one randomized, community-controlled trial (quality of evidence I) (George et al. 1992), but randomization was partial and involved only six pairs of communities. It should be noted that the scope and success of some large programs, such as that of Tanzania (Ljungqvist 1992), probably represent quality of evidence II-2.

Furthermore, most of the research has focused on evaluating growth monitoring activities, with very little emphasis on growth promotion interventions. The other issues that need to be addressed, assuming that one had an effective intervention in the first place, are:

- Was it given in sufficient quantity (duration or frequency of mothers' participation)?
- Was it delivered to a sufficient proportion of the target population? (Overall PHC coverage and percentage of those attending receiving meaningful intervention.)

Evidence presented by Gerein (Gerein 1991) would suggest that these are often problem areas. In such situations, one would run the risk of committing a type-II error (i.e., assuming no effect of intervention when an effect actually exists). Last, many researchers conduct hypothesis testing when in fact the lack of declared a priori hypothesis and the design limitations would suggest restricting oneself to hypothesis generating. It is, therefore, not surprising to see the degree of confusion concerning the effectiveness of growth monitoring and promotion.

Having accepted the premise that potential growth promotion interventions should be scientifically tested before they are implemented on a wide scale, we should, by the same logic, test current growth promotion interventions before abandoning them.

The foregoing comments urge strongly for an increase in research and development (R&D) funding for growth monitoring and promotion and in particular for other carefully executed randomized trials. Randomized trials are the standard design by which we evaluate new drugs; should we not, therefore, use the same criteria for growth promotion interventions?

Management and Implementation

Policies that are not implemented are useless. Formulated policies should, therefore, be carried through to the implementation stage. Accordingly, there is a need for dynamic management of the programs to ensure operations of high quality.

The motivating of personnel should be one of the prime concerns of health managers. Supervision not only increases motivation of staff but is also required for quality assurance. Likewise, in-service training can be a powerful motivating factor and can lead to much improved performance if it is applied and carried out in the context of the work setting.

As health professionals, we often do not make full use of the available body of knowledge in the field of management. The service industry relies more and more on strategies for continuous quality improvement (CQI), on process control (variance control), and operations research and can be an example for health services.

Intersectoral Growth Promotion Policies

As mentioned earlier, the commitment of government is crucial to the success of any health care intervention. Government leaders must be motivated to act on and be accountable for human development. Governments, under the guidance of their ministries of health, need to decide on an optimal growth promotion policy package based on the cost-effectiveness and appropriateness of individual interventions, well integrated into existing programs.

As health professionals, we need to be constantly reminded that most of the improvement in the growth of children can be attributed to health determinants other than health services. It is, therefore, paramount that a national policy for growth promotion not be limited to the health services, as is often the case. We will present here some other key areas of intervention. The list is meant to be illustrative but not exhaustive.

Economic, Employment-Generating, Equity-Producing, and Poverty-Alleviating Policies

The relationship between poor growth and poverty is evident to all; it bears a direct relationship through food security and is linked indirectly through the higher frequency and severity of infectious diseases. Policies that will address these issues could potentially have a major impact on the growth of children.

Education

We have noted earlier the potency of literacy as an effect modifier for growth promotion interventions. Just as in other aspects of health status, the education of girls is one of the most powerful health determinants. Another important aspect of intersectoral collaboration is the development of specific health and nutrition curricula in schools and for literacy programs. The role of nonformal education of adults through the media, extension services, and health services should not be underestimated. Child-to-child programs can also play an important role in growth promotion.

The Status of Women

The status of women affects child growth through a multiplicity of causal pathways: a woman's high workload and caloric expenditure during pregnancy may lead to insufficient weight gain and subsequent low birth weight; when she is not pregnant, this same workload may prevent her from having sufficient time for child feeding. Her economic situation may not allow her to provide sufficient food. In many countries, men eat first, thus preventing the mother from giving priority to the growing child. Policies improving the status of women, i.e., those that ensure gender equity, can have a beneficial impact on growth promotion.

Population Policies/Family Planning Programs

The impact of child spacing and family size on growth promotion is well known and need not be discussed further. Among other things, it influences the care of children already born and a woman's health, employment, and economic opportunities.

Agricultural and Environmental Policies

Agricultural policies impact directly on food security and on employment, especially of the rural poor. Food security is an important determinant of growth in children in many developing countries. Agricultural policies should include at least the following:

- Land tenure and agrarian reforms
- Market type and pricing policies
- Farm input systems (i.e., improved seeds, tools, and traction, credit)
- Postharvest systems (storage, distribution, marketing)

In his paper, "A Policy Agenda for Famine Prevention in Africa," Joachim Von Braun demonstrates the importance of the lack of the foregoing policies, above and beyond the effects of droughts (Von Braun 1991).

Food aid can be life-saving in a famine situation but it may have a detrimental effect on local agriculture through loss of revenue by depressing food prices. Food aid programs should be implemented judiciously and their effects monitored closely.

Water and Sanitation Policies

Although one rarely thinks of water and sanitation policies as having an effect on growth promotion, these can improve growth through a decrease in infectious diseases in children and by saving considerable time for mothers who would then be better able to care for their children.

Health Service Policies

We have assumed universal adoption of Primary Health Care. In practice, however, curative services in urban areas still get a large share of health resources. Redirected health service policies could lead to better infection control, family planning and health and nutrition education thus improving growth.

Healthy Public Policies

Healthy public policies deserve our attention. As an example, smoking is on the rapid increase in developing countries. It has a powerful deleterious effect on birth weight. Tobacco farming displaces other more nutritious crops. Finally, parental smoking predisposes to acute respiratory infections in children, thus contributing to reduced growth. Curbing tobacco production and smoking through an integrated approach including a ban on advertising and introducing taxation could lead to small but important improvements in growth.

Conclusion

We have barely begun our work on policy formulation for growth promotion. Much scientific research needs to be done to understand better the role of growth monitoring in the implementation of growth promotion programs and the cost-effectiveness of various growth promotion strategies. Ministries of health, funding agencies, and other organizations need to increase their share of budgets allocated to research and development.

We must convince our political leaders of the fundamental right of every child to growth and hold them accountable for results. Our approach to growth promotion must be broad, integrated, and intersectoral. It should not be limited to interventions in the health services, as has been the case in the past. In particular, our approach should focus on educating girls and empowering women.

Can international agencies, national governments, health workers, and communities rise to the challenge of tackling growth promotion in a comprehensive manner?

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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; Pinstup-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 Pinstup-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; Pinstrip-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 Pinstруп-Andersen 1990) is the development of price stabilization and early warning systems, which usually require use of buffer stocks and price controls (Pinstруп-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 iodination 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 nutrition. 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 iodination 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 nurture. 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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Individual, Family, and Community Perspectives on Growth Promotion

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Introduction

Of the various components of the so-called child survival and development revolution, the most difficult to implement and sustain in many countries, and the least convincing in terms of documented, positive effects on child health, has been growth monitoring and promotion (GMP). Monitoring of body weight can provide an early warning sign that all is not well during periods of life when rapid gain in weight is normal and failure to gain is a sensitive reflection of poor health or nutrition (i.e., infancy and early childhood, pregnancy). Not an intervention in itself, the process is rather one of identification of the child at risk and, theoretically, provision of a starting point for education of mothers and families both for the child at risk and for the child who is growing well.

Long used in clinical pediatric practice in Europe and North America, growth monitoring has been incorporated into primary health care systems and preventive health care systems in developing countries with uneven success. Evaluations of the impact of GMP programs in various countries have been undertaken and reviewed (Ashworth and Feachem, 1986; Yee and Zerfas 1987; Lotfi 1988), with the overall conclusion that impact on child mortality has not been demonstrated and that improvements in nutritional status, although sometimes found associated with well-managed GMP programs, are difficult to attribute to this aspect of preventive care, independent of other associated factors.

Given the cost and difficulty of mounting and maintaining GMP programs, the lack of concrete demonstration of positive effects on child health and mortality has given rise to thoughtful questioning of the role of GMP and the wisdom of expending scarce resources on this particular set of activities (Anon. 1985; Nabarro and Chinnock 1988).

The serial measuring of weight, recording and interpreting the weights in terms of adequacy of growth as an indication of overall health and nutrition, and the utilization of that information as a basis for educational or other intervention, is conceptually and logistically complex. Like all primary health care activities, effectiveness depends on its correct use (i.e., accurately carried out and appropriately acted upon) by both health care workers and families. It is not surprising, therefore, that advocates of the potential benefits of GMP have turned their attention to devising complete and clear guidelines for implementation of GMP programs, including follow-on nutrition education (cf. Rohde et al. 1979; Jelliffe and Jelliffe 1990).

The literature contains accounts of whether or not mothers in given environments were able to pass tests of understanding of the growth chart (e.g., Forsyth 1982). When results were negative or understanding limited, it was assumed that the teaching method(s) must have been inadequate. A great deal of attention has also been focused on refinements of growth charts for greater ease of recording and reading, and for cultural appropriateness (Griffiths 1987, 1988; Jelliffe and Jelliffe 1990). Attention has also been paid to problems of coverage and attendance at GMP activities. Both of these factors (understanding of the meaning of the information recorded, and motivation to bring a child repeatedly to be weighed) depend upon effective interface and dialogue of the program with local concepts of child rearing, parenting, health promotion, and disease prevention. Nevertheless, little serious attention has been paid to assessment of this interface.

Brownlee (1990) has recently provided a very useful review of published (or at least accessible) reports relevant to this topic; there is very little. One may attribute the lack of information to the fact that medical anthropologists like other biomedical scholars have paid more attention in general to perceptions of disease than of health, and there has been more study of traditional curative practices than of perceptions and behaviours related to health maintenance and promotion.

This paper will attempt to explore the cultural roots of growth monitoring and the symbolic value that it serves for biomedical practitioners; to survey the sparse existing literature on cultural differences and similarities in preferences for particular body size, shape, or growth patterns; to summarize information on perceptions of weighing children; and to place the context of body weight within the larger perspective of perceptions of healthy child development.

Weighing and Measuring to Promote Health: The Cultural Roots of the Practice

Anthropometry (the measurement of the human body) developed as a tool of early physical anthropologists in 18th- and early 19th-century Europe, building on the detailed descriptive traditions of earlier anatomists whose work also underlaid the development of modern medicine over the time period. The motivation for devising precise instrumentation and reproducible methodology for measuring lengths, widths, circumferences, and volumes of various components of the body related to the intellectual preoccupation of the time with taxonomic concerns relating to understanding the phylogeny of human racial groupings.

Weighing in 18th-century Europe was largely confined to the role it enjoys in many contemporary cultures, namely the weighing of commodities in the marketplace for purposes of establishing market value. The descriptive tools of anthropometry were applied over time in a wide variety of populations, primarily in terms of describing and documenting differences among populations in adult body size and shape. (Most populations studied were smaller as adults than the average European of today, likely giving rise or at least reinforcement to the "bigger is better" notion, which so fascinates modern scientists). Measuring body weight was added to the descriptive repertoire somewhat later when anthropometric measures began to be utilized to study human growth.

The study of human growth, so far as it is documented, began with longitudinal documentation of the increments in height of a few individual children in the 1700s in Europe. Descriptions of child health of the same period utilized qualitative descriptors of malnutrition, such as "weak," "sickly," "small," "lean," and do not contain mention of quantization of growth or growth deficits. The Swedish physician Nicholas Rosen von Rosenstein, writing during this period, published the first compendium of pediatrics, "The Diseases of Children, and their Remedies" (Rosen von Rosenstein 1771). This treatise, which earned Dr Rosen his place as the "father of pediatrics," contains no specific mention of body weight, although it gives detailed attention to nourishment of the infant and refers to "thriving" throughout.

The beginnings of description of individual persons in terms of body weight in European literature are not clear, but the concept of weight as a descriptor seems to be very old. Certainly, before weighing of either adults or children was routine, we find descriptions of large individuals in terms of the number of stones (a unit of weight) they were estimated to equal. The specialty of pediatrics developed further recognizing that children are different from adults primarily in that they are in a process of growth, development, and differentiation. Early in the 20th century, the knowledge of nutrition expanded, vitamins were discovered,

and the sensitivity of growth to nutritional deficits began to be appreciated. Concepts of preventive health care and public health policy evolved in parallel to the specialty of pediatrics, in a social and cultural milieu in which literacy, numeracy, and accurate description were highly valued.

Growing out of these traditions, European and later North American pediatricians, human biologists, physical anthropologists, and nutritionists have elaborated very rich databases and methods for handling, reducing, describing, and applying data on the growth of large numbers of supposedly healthy, normal children to diagnose the individual child or the population whose growth is compromised. The amount of data available not only on weight and length/height but of multiple other body dimensions in samples of children in widely differing environments is vast indeed (Eveleth and Tanner 1976).

As pediatric practice developed, it incorporated weighing and measuring from the descriptive, natural science tradition in which Western medicine had its roots. Not surprisingly, the concept of growth and development measured as changes in body weight made intuitive sense to the lay public in the same societies. The weighing and measuring of the infant in the clinic or doctor's office, the recording of that information on a rather complex and mysterious chart, and the discussion of the results with the parent or caretaker, became a fundamental ritual of child care. Not only did the ritual demonstrate the doctor's knowledge and seriousness of purpose in relation to the individual child (highly valued in societies that prize individuality) but also served as an entry point, a common meeting ground of intellect, for the health care provider to begin discussion with the parent about how the child was doing and what was needed to maintain or improve his/her growth.

The cultural compatibility of the idea of weighing children is well demonstrated in the adoption of birth weight as a major lay descriptor of newborn children, after routine weighing of newborns after delivery became established. Birth announcements, whether formal or informal in North American and European cultures, almost invariably include a mention of the birth weight (and, in recent times, sometimes length), and if weight is not mentioned, it is routinely inquired after.

The transfer of the ritual of serial weighing, recording, and interpreting of body weight data on children to health care systems in quite different cultural contexts has met with differential reactions. Sometimes the process has been perceived by some observers as a successful focus for child health activities; sometimes the process simply seems a waste of time; in other settings the ritual aspects of the process have been adopted but the follow-up is elusive — perhaps because unless body weight makes intuitive sense to the mother in terms of her

child's health it will not serve the purpose of initiating dialogue about the child's health and the parent's care-giving practices, as it has so effectively done in the West.

Perceptions of Body Size, Shape, and Growth Patterns

Growth monitoring and promotion programs are being promoted vigorously and are taking place on a wide scale, but in the near-absence of information on people's expectations and perceptions of child size and growth in particular cultural settings. Peltó (1987, p.155), in a review of cultural issues in maternal and child health and nutrition, makes the point that "...this lack of knowledge is not trivial; parental expectations and interpretations undoubtedly affect child-rearing behaviour, including health seeking activities and feeding practices."

Because the effectiveness of GMP programs depends in large part on a sustained behavioral response on the part of parents or other caretakers, understanding local perceptions of child size and growth would seem to be essential for effective communication between health care workers and their clientele.

Preference for Newborn Size

Preference for size at birth has received some attention in the literature, primarily because birth weight is a sensitive index of maternal health and nutrition and low birth weight a well-documented and potent predictor of perinatal mortality. The data are somewhat scanty, but it is clear that preference for small newborns, if they are otherwise healthy, is common to many cultures. It is not surprising to find that many populations have developed an appreciation of the undesirability of a too-large fetus. The risk of infant mortality in relation to birth weight is U-shaped, with increased risk over a wide range of smallness and a more threshold-shaped risk at high birth weights.

Maternal risk, however, is much greater from a large fetus than a small one. Although low birth weights are many times more common and place an infant at great risk, they do not generally cause immediate risk of death to the mother. Too-large fetuses, however, pose the risk of difficult or obstructed labour and potential maternal death or severe morbidity in the absence of modern obstetrical care.

Preference for small newborns has been noted in passing in a variety of cultures, including the Philippines (Cruz 1970); Latin America (Wellin 1955; Gonzalez and Behar 1966); India (Katona-Apte 1977; Nichter and Nichter 1983);

and East Africa (Trant 1954). Jimenez and Newton (1979) conducted a cross-cultural survey of patterns of work and activity during pregnancy in 202 traditional societies in the Human Relations Area Files. The most common single pattern was continuation of usual activities and duties until the onset of labour; Asian women tended to have the most modification and suspension of duties both late in pregnancy and postpartum, whereas Middle Eastern and Russian women had the least. They also note, as did Ford (1945) much earlier, a common belief in "daily exercise to keep the woman strong, the fetus small and the labour brief."

Nichter and Nichter (1983) explored preferences of women for newborn size and associated behaviours and beliefs in two rural areas of South India. They confirmed a preference for smaller babies, which had been noted by others in India. In addition to considerations of ease of delivery, they found that large, "bloated" babies were regarded as weak and unhealthy, whereas compact, muscular infants were regarded as strong and vital. Thus, women wished for a small baby not only for their own ease in labour and delivery, but also for the baby's strength and health.

In addition, they found that the practice of eating less (or at least of not consciously eating more) during pregnancy, although common, was not perceived as deliberately aimed at producing a small baby. On the contrary, the local view was that the fetus should have enough room to develop normally. Because the fetus was perceived to share the same space in the mother's body as food, feces, urine, and air (gas from gas-producing foods), it was important not to overfill with food so that the "baby space" would be protected.

Certainly, small babies are not uniformly preferred. In the U.S., common experience is that mothers take pride in having delivered a large newborn even if it was at the cost of a Caesarean section delivery. One could argue that this bias is a reflection of the availability of modern obstetrical care and the relative maternal safety of producing a newborn that meets or exceeds cultural expectations for size.

Older Children and Preferred Growth Patterns

In the U.S., common experience is that parents exhibit concern if their child is felt to be delayed in either physical growth or developmental achievements. Developmental acceleration is usually seen as desirable and there are major culturally-sanctioned efforts to prevent delays and to encourage early development. Although the society is in general quite negative in its attitudes toward obesity, there is evidence that a "fat is healthy" notion persists in relation to young children. Bryant (1978) studied perceptions of baby size in a multiethnic

sample of mothers in Florida, and found that most mothers chose from a sample of caricatures the most desirable baby shape as one somewhat fatter than the one they selected as most like their own child.

Our own work with mothers of very fat 6-month-old infants (Graver 1988) showed that even when the child's pediatrician and/or other significant adults had showed concern about an infant's fatness and the child was in excess of the 97th percentile on all indices of weight and adiposity, more than 50% of mothers did not perceive their child to be overweight. Common descriptions, often given with obvious pride, particularly in the case of boys, was that the child was "chunky," "a hunk," "all boy," and "solid."

Norms that become internalized in the cultural context sometimes give a positive value to smallness, leanness, or slow growth. Margaret Mead (1977) noted that endemic malnutrition influences cultural perceptions of normal size and of appropriate childhood behaviour. Short stature; delayed achievement of developmental milestones, such as walking and talking; and depressed levels of physical activity become normative in populations in which a large proportion of children are afflicted with malnutrition over several generations. Chavez and Martinez (1979) reported that when a cohort of children in a malnourished community were provided with nutritional supplements from prenatal life through early childhood, their active and lively demeanour as toddlers posed challenges to a community whose child-care practices were geared toward malnourished children. Several died in household accidents as a result.

Some years ago, the author had the experience of spending several days discussing child nutrition with a group of Liberian health care administrators. Initial discussions about infant feeding and weaning practices in their country brought agreement that after breast milk, there were three possible food items that could form the basis for a toddler's diet: rice, banana, or cassava. There was clear and unanimous agreement among them that rice was the least desirable choice and should be discouraged.

Because this conclusion went counter to nutritional considerations, it was clear that further exploration of their thinking was essential. Discussion resulted in the articulation of two reasons for their choice, both based on *recognition* that rice would produce faster growth in a child than would a diet of cassava or banana. The first was a belief that not only do physical and mental development in childhood proceed out of the same pool of resources, they are achieved at the expense of one another. A child who grew too fast ran the risk of being stupid, an outcome no parent would choose. The second was a fear that the child who grew too fast would become top-heavy, with a body too heavy for his legs, and

would, therefore, be late in learning to walk. Because the end of the postpartum sex taboo was linked to the child's first steps, delayed walking was seen as undesirable.

American anthropologists Nichter and Nichter (1986) have written about their experiences in raising their young son while doing fieldwork in South India. They found that their baby was not regarded as either pretty or healthy, at least in part because he was large by local standards. When comparing his development with that of his local age-mates, they became aware of the perception that too-rapid development was undesirable because it indicated that the individual was "using up" his allotted life span too quickly and would, therefore, die young.

Perceptions of Weighing and Measuring

The notion of measuring a human being's body weight is variably sense-making and acceptable in different cultures. Where weights and scales are principally used to assess the quantity of items for pricing in the market, there may be resistance to the notion of weighing children because of the unpleasant connotation that they might be being evaluated for sale. Measurement of length, while less common in GMP programs, may be a threat in communities in which human beings are not routinely measured traditionally except for the purpose of constructing their coffins.

In many developing countries, attention is beginning to be paid in a highly visible way to problems of chronic disease, obesity, diabetes, and heart disease among the urban and more affluent portions of the population. Slimming clinics, diet books and columns, and street-corner scales to evaluate one's weight for a small fee have become commonplace in many cities.

At the same time, value is placed on chubbiness in babies. In a recent ethnographic study of infant feeding patterns, which we conducted in a low-income neighbourhood in metropolitan Cairo, Egypt, several mothers expressed the conflict they felt over supplementing their breast milk with formulas and other milks. They felt that optimal growth would be reflected in relative fatness and would require supplemental milk but recognized the increased danger of diarrheal illness with supplements in their environment. One mother stated that she was continuing to breastfeed her baby girl exclusively because her husband "doesn't want her to be ill with diarrhea, even though this way she will never be fatty." (Harrison et al., forthcoming).

The role of the "evil eye," common throughout much of the Middle East, South Asia, and Latin America, is important in community and family perceptions of weighing programs, or at least to their degree of comfort with them. In South

India, it has been pointed out that one should not call attention to the attainment of developmental milestones, because having a child exceptional in any way invites evil eye and thus ill health (Nichter and Nichter 1983). Our own work with traditional birth attendants and mothers in rural Egypt (Ritenbaugh et al. 1989) showed that even among women who had no basic objection to the idea or process of weighing a newborn infant, there was a reluctance to expose oneself to the possibility that an announcement of the weight of the baby, or a description of his/her health, might be made in the presence of nonfamily members.

Those mothers and birth attendants who articulated the reasons for their objections uniformly mentioned the risk of evil eye. In addition, many expressed the view that weighing a child implied a lack of gratitude to God for the gift of the child, because the child's characteristics were being evaluated.

In India, a combination of belief in evil eye and resistance to the market-mentality associated with weighing have been reported. An Indian delegate to a 1985 meeting on growth monitoring reported that:

There is...the concept of the "evil eye" where weighing a well child is detrimental to its health. This belief is very prevalent ...though attitudes are slowly changing.... Other mothers believe that weighing is only for sale of goods/produce such as rice, meat, vegetables, etc. Mothers do not want to "sell their children." Thus, a certain prejudice in the community to weighing, especially healthy children, exists and needs to be adequately tackled (Foundation for Indonesian Welfare, 1985:66-67).

The dehumanizing aspect of weighing of children as would be done with goods in a market has been repeatedly reported; mothers may also feel uncomfortable undressing children for fear of cold or because they believe the weighing equipment may be unsanitary (Nutrition Communication Project 1989, p. 29).

Perceptions of Child Development

Physical growth and body size are important only as markers for health, nutritional status, and development. Parents in every culture strive to have healthy children and to provide them with appropriate care and socialization and take pleasure in their development. Parents and mothers, in particular, are liable to have their own competency as adults judged at least in part by how well their children do in locally relevant terms. Different milestones and indicators are utilized in different cultures, but all parents have some concrete ideas of how to assess their child's development.

Understanding traditional indicators of physical growth and of development, and integrating some of these into GMP programs, may be key to utilizing GMP programs in the way they work so well in the West, i.e., to initiate discussion of how the child is doing and why. None of the guides to GMP programs that the author was able to locate, in spite of very great detail in "how to" advice and guidelines, suggested beginning the encounter by asking the mother *how she feels the child is developing, and how she knows*.

A noteworthy exception to the lack of relevant data on this topic is the very interesting study in rural central Ghana by Lovel et al. (1984) on mothers' perceptions of growth and indicators for assessment. The 150 mothers attending well-child clinics were interviewed in detail on this subject, and a wealth of information was obtained that is directly relevant to improving the local GMP program.

In response to the question about how mothers know when their child is growing well, a variety of criteria were mentioned including (from highest to lowest prevalence): a good appetite, fatness/thinness, expressions of mood (smiling, interactive, content); activity level; appropriate timing of developmental milestones, including tooth eruption, crawling, sitting, walking, and learning new things); health (frequency of illnesses, sleeping well); heaviness or lightness on lifting; weight gain or loss appreciated as the way the child feels when carried; appearance of skin; and outgrowing clothing. Weight, although a component of this multivariate evaluation of thriving, is only one and likely not the most important component. Traditional anthropometric-type measures included bead-strings put around the waist, wrists, and legs of a newborn that need to be modified or changed as the child grows. "One mother explained that by the time the child had reached the age of five months, the bead-strings around the waist should have been changed or adjusted five times" (Lovel et al. 1985, pp. 1-3).

A less-detailed investigation in India (Anderson 1986) focused only on indicators of physical growth and found that more than half of mothers correctly perceived their children's nutritional status as measured by weight-for-age, even without weighing. They mentioned noting that the child is getting heavier to lift, waist-strings getting tighter and outgrowing clothing. The author is aware of no published accounts of GMP programs that have incorporated traditional indicators of thriving and used weighing as an adjunct to, rather than a replacement of, traditional methods of developmental assessment.

Studies that have identified maternal or household correlates of better nutritional status among children have generally resulted in clusters of attributes or maternal behaviours that are identifiable as "good parenting" in local terms (see, for example, Dettwyler's (1986) study in Mali). In other words, children

thriving in terms of nutritional status tend to belong to parents who are perceived as successful parents in their own culture. This would tend to argue that the underlying signals by which parents know their children are thriving are more or less part of the same cluster of health and development, which is tapped by knowing the weight of the child relative to that of a population of healthy children.

Conclusions

Growth monitoring and promotion programs are being widely implemented and are the subject of some of controversy as to their acceptability, effectiveness, and cost. Not an intervention in themselves, they seek to utilize serial weighing of children to identify children at risk of developing malnutrition and as the basis of health and nutrition education. The process involved in attending the clinic for the purposes of weighing, weighing the infant, charting the data, and interpreting the information and utilizing it in educational interactions with the mother or caretaker are complex, abstract, and not easily communicated except where body weight is an accepted and intuitively sense-making part of the culture.

The child-weighing ritual is firmly institutionalized in well child care in North America and Europe, and grew out of medical and intellectual traditions that not only made it acceptable but allowed it to serve important symbolic functions and to provide an entry point for health education. In other parts of the world, the ritualistic aspects of child-weighing have been transplanted into low-technology, primary health care systems; the extent to which the information they generate is sought after by parents and is useful to them varies greatly and very likely depends on the degree to which body size and weight are intuitive measures of good growth in the particular cultural context.

Rather than focusing exclusively on improving the content of education and information in the context of GMP programs, it would be useful to disentangle conceptually the assessment function (identification of risk) from the educational functions of GMP programs. Body weight as an assessment tool for malnutrition has undoubted value, and if focused on very young infants and children rather than older children with the highest prevalence of attained malnutrition, may serve as a very effective early warning system for targeting health care interventions.

On a population basis, this function might be served as well or better by cross-sectional surveys than by longitudinal monitoring. For growth *promotion*, on the other hand, the real issue may be to find and utilize the indicators of child health, thriving, and development, which are used locally by parents and families. Weighing may (or may not) be a useful addition to these measures and will surely

make more sense used in conjunction with them. Most important, the function that baby-weighing has served in European and North American well child care, that of providing a basis for parent education, may be served much more efficiently by building on traditional indicators, particularly when they do reflect good growth and health.

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Culture and Growth Promotion

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Cultures are a shared perception of reality and ideals. These include proven strategies of collective survival based on intricate pragmatic and symbolic regulation of access to and use of resources, principally for basic needs. The basic needs themselves are defined differently by different cultures based on the great variety of ecologies in which they developed and the opportunities and threats these represent. But all cultures that have survived, ipso facto have had to develop strategies for reproduction of their population as well as production and consumption of food that fitted well with the then prevailing environment.

Food shortage, whether actual or simply feared has been a historical reality for most traditional communities. It is, therefore, one of the forces that has shaped their perceptions and preferred strategies. However, many rural areas that are experiencing environmental degradation by deforestation, desertification, and wind and water erosion are now facing, sometimes for the first time, a chronic lack of food security. In addition, urban slum areas, almost totally dependent on crumbling formal and informal economies, with no direct access to food or food production are facing the same threat, without being able to resort to most traditional strategies.

Food, Status, and Culture

Lack of food security in most cultures has left a legacy of austerity, fasting, etc., as training for bad times, also of obligatory sharing at least with the extended family, friends, associates. Paradoxically, these strategies that aim for egalitarian or even equitable access to food are counterbalanced in many communities by concentrating food resources through a cascade system that generally works through men, in general those of noble character or chiefs. At times of shortage, this may help to ensure that these bearers of the community's identity have the basic minimum or even more. This tradition seems also to ensure that within each stratum there is reasonable equity of access, but between the strata there is gross inequality. Women and children in particular do not get equitable shares of food.

This is not due to conscious neglect or discrimination. Indeed, we need to understand better how food is perceived and used to build community hierarchies. These are defined by age, sex, class, or caste. We need to study how access to food signifies power or powerlessness of individuals, but also, paradoxically, cohesion and solidarity.

This is probably true to a greater or lesser extent in all cultures. Everywhere "big men" is just another way of saying "elite," "small people" for the poor. They are not just figurative, they are anthropometric terms, which in most communities can be detected with the naked eye. The "weaker sex" is also supposed to be smaller than their men.

Each culture whether traditional or not uses food as a powerful tool in the children's education about who they are and who they relate to. Food dictates who can impose what discipline, what self-discipline, and whether restraint or self-affirmation is expected from them. Situations without direct access to food can be used for character-building and this is a regular feature in societies that value austerity. For example, Haal Pulaar, Fulani, as well as Diola boys, are sent out with the herds for days on end and have to learn to get by without regular meals, hunting and gathering where possible. These very same cultures value psychomotor and physical development of their children; but, because certain moral values take precedence, they may not see it as the parents' sole or even predominant responsibility to promote physical growth through nutrition. The family concern shows both in other forms of nurturing and in their reaction to clinical malnutrition (wasting and oedema). Traditional cultures, such as the Fulani, Fon, and Yoruba have developed a number of measures they firmly believe will prevent failure to thrive: herbal teas, purges, special baths, massages, charms, sometimes fasts or periods of sexual abstinence (especially but not exclusively postpartum) of either or both parents.

Wasting and oedema of a young child are cause for great alarm and are understood as a major threat to survival. But tradition assigns them to be due to adultery or poisoning by sexual contact between his/her parents, or some other taboo transgression or curse. Rarely, if ever, do traditional explanations and cures give any indication that these life threatening conditions have nutritional causes.

Proportionate stunting often seems to be barely alarming, unless it is extreme and persistent. People are used to agemates of very different heights and in most communities it seems to lead to play and learning groups by psychomotor development and height, rather than age. Small 8 or 9 year olds wait to go to school until they are thought to be "big" enough.

Traditional measures to prevent failure to thrive — traditional cures and specialists who focus on growth failure — should be studied and, as far as possible, accommodated or integrated, without unnecessarily overestimating their effectiveness. In fact, the proof of the pudding is in the eating. Where moderate and severe malnutrition is frequent, the traditional culture does not or at least can no longer achieve its aim.

Research should look into the traditional paradigms and practices of child rearing, by whom and how they are applied and with what results. It should seek to understand malnutrition and its causes from the community's perspective. In this way it will be able to root action in the community and its culture; or where that seems not readily possible, patiently to develop dialogue with the community to reach a common understanding.

Growth promotion can only be attractive where minimal food security exists and when people value optimal growth for all. It is perceived as useful where there is a clear conceptual link between growth, psychomotor and intellectual development, and quality and quantity nutrition. I would submit that in most present day traditional rural cultures and urban cultures of poverty these conceptual preconditions do not generally exist. As mentioned before, nutrition is at the core of cultural identity, and in steeply hierarchical, poor communities, it is one of the major symbols and direct expressions of power and status.

Food Security First

In the past, these must have been good communal survival strategies or else these cultures would have died with their communities. What is our message to them, these people? We must remember many suffer threat of total starvation as severe as ever before. Should we not together listen to them and with them struggle for food security first, and only as improvement occurs, aim at growth promotion and improved nutrition for all, especially the women and children? Lack of food security is an increasingly common urban phenomenon in the developing world. Food patterns in urban areas have strayed far away from the traditional ones and often reflect the whims of the market and a total misunderstanding of nutritional value and relative cost for the same value. Lower middle class with adequate per capita food expenditure per day can be helped to improve their diets and those of their children; but what about the poor with less than USD 0.50 per day per person for food? Are we not tiring them unnecessarily with growth promotion or nutrition advice? Should we not rather address the policies that keep them in this state? Or find ways to achieve more equitable access to income? I recognize these are "political" solutions, but politics as well as policies are about access to resources. Growth promotion policies make no sense and can even be oppressive where there is no policy for food security.

Questions to Ask

But when basic food security is in sight or assured, how do we root our dialogue on growth promotion and equity in access to food, in each culture? The moral values and their hierarchies specific to each culture and ecology will continue to underpin the community's actions long after objective conditions of food security have changed. How can food become the ultimate treasure, maybe even sacrament, to be shared according to need rather than status? How can growth be promoted so that a stronger community is built resting on the strength of the many rather than the few?

How can we help create a popular nutritional physiology that does not desacralize food, but while respecting its value in identity and in community bonding, in ecological bonding (as a totem, a covenant, health promotion, and cure) gives due respect to the needs of women, children, and the aged and any marginalized groups?

How can we help to create the forces in each community that will strive for a chance for each child to fulfil its full potential in growth and development, while bringing to fruition its own culture in each child? These are the questions begging to be answered in all efforts to promote the development of the world's children.

Research, Evaluation, and Case Studies

The presentations in this section served to review the available scientific evidence for the effectiveness of GMP, stimulated discussion on the current practice of GMP, and led to recommendations on strategies to promote the growth and development of children. It was pointed out that growth monitoring came to be accepted as a strategy for improving child health mainly on the basis of pilot and demonstration studies done in the late 60s and early 70s.

GMP within Different Settings

Evaluation studies of growth monitoring within the routine health service setting, or as Kielmann puts it, "in the real situation" are lacking. In his paper, Kielmann advocates the need for this type of study, before judgments are made about the ultimate usefulness of growth monitoring. He proposes a model to assess the potential feasibility and usefulness of GMP within a given health service structure. The model describes a number of essential components that must be present if GMP is to be successfully implemented. These components include, among others, a functional infrastructure for GMP activities, available and functioning equipment (e.g., scales, weight charts), adequate numbers of trained personnel to carry out GMP functions, and an overall management system to ensure quality control.

In reporting the findings from an assessment of health services in more than 100 health facilities in eight countries over the past 12 years, Kielmann's sobering conclusion is that GMP, in the routine health service setting, falls short of achieving the expected results. He stresses that it is not the strategy that is at fault, but rather the means and methods of implementation. Too often, the prevailing conditions just do not support good-quality GMP. The importance of initiating new programs with a well-trained staff and aiming for an acceptable level of service delivery right from the beginning was highlighted. To establish programs of poor quality and later try to improve them was considered wasteful and unlikely to be successful. GMP should not be seen as a tool to improve an ailing health system.

This conclusion finds support also in the papers by Gerein, Gacoki, and Ettyang et al. Deficiencies in one or more of the essential components outlined in Kielmann's assessment model occurred in all of these studies. A consistent finding was that once a child was identified as being at risk, action was not taken. Gerein and Kielmann raise a troubling suggestion: that the addition of GM to a health program may risk wasting precious resources and detract from the already marginal health care services by taking up time and resources that could be more effectively employed in other activities.

The paper by Gerein describes the actual conduct of GMP activities using an observational tool similar to one which supervisors would use. Most striking was the speed with which health workers dealt with clients, up to 120 children in a few hours. Questioning and physical examination were cursory, interaction with the mothers was minimal, and actions were limited to brief, standardized directives to the mother. The evident failings of this individualized, clinical approach led some of the colloquium participants to ask whether any type of screening would be useful in areas of high-density illness such as described in Zaire. At the very least, the criteria for the selection of "at-risk" children must be set so that the number of children identified for individual intervention is feasible for the health service to deal with. It was felt by some, however, that the issue is better approached not as a clinical problem of individuals, but as a public health problem requiring interventions at a community or higher level to benefit the worst-off.

The case study from Ecuador, where the differences between the government and GMP nutrition programs are contrasted, reveals some of the same problems. Both programs had weaknesses in training, supervision, and evaluation. However, the study points to the need to pay attention also to the institutional context in which GMP is implemented. In the government program, GMP was carried out through a network of health units, whereas the NGOs implemented community-based GMP activities. A higher degree of community participation was evident in the NGO programs; the mothers more often became involved in the analysis of growth data and discussions of possible follow-up actions. In some of these communities, the GMP activities led to community-level actions aimed at improving family welfare, such as income-generating projects and water supply and sanitation projects. Similarly, the studies in Kenya conclude that clinic-based GMP is not useful and that GMP has to be moved to the community. An advantage of this as noted by one participant is that fathers, who control much of the household resources, can then be involved in analyzing the information and devising solutions.

In their paper, George et al. present the findings of a longitudinal GMP study conducted in southern Indian villages. This paper provides causal evidence that, if well done, GMP can improve the growth of young children. One participant raised the point that the observed improvement in health could be considered as relatively meagre, in view of the high level of inputs received by the intervention villages. This concern was refuted by George who pointed out that a change in the means of weight/age and stature/age Z-scores of 0.3 is significant functionally. Also, there was a 50% decrease in the incidence of severe stunting and underweight in younger children by about 50% within 2 years in the intervention villages.

One of the striking findings of this paper is that the growth variance was more affected by seasonality than health service factors, even with the relatively high inputs from the health system. A similar observation had been made in Narangwal and was used to predict morbidity and to take action for those at-risk by providing food supplements in the hungry season. This led several participants to note that more study is needed on the factors that cause the seasonality of growth and how their effects can be overcome, especially if a food supplementation program is not on offer.

George's oral presentation focused on a different question than was discussed in the paper. This was: "Does GM (i.e., weighing and charting), if done well, result in better growth of children than nutrition education without GM but with identical contact time between village health workers and mothers?" This question has never before been assessed by a well-designed prospective study. George presented evidence that GM did not result in better growth of children (when compared to children in villages where GM was not done). This was true even when GM was done under the best possible conditions – at home, in the context of a functioning PHC system, and with mothers who had learned to interpret growth curves accurately and take necessary actions. George's presentation showed that when PHC and educational and horticultural activities are done well, GM adds little, if anything to nutrition outcomes.

This study from India illustrated that it was possible to do GMP well, precisely because there was a functioning PHC system. The question remains whether or not the addition of GM in contexts where the PHC system is weak can confer the benefits of improved growth.

In the discussion of these presentations, it was pointed out that the factors that undermine GMP efforts also operate to weaken other efforts at improving family and community health. One of the first and most important steps in improving any GMP program must be to render the health care system functional, ensuring that all the components that are needed for GMP to function are indeed

in place. Transferring GMP to a community base and the development of village committees and training of community volunteers needs a functioning health system to initiate and support the activities. If the health system is to play a major role in growth promotion, it too will need attention: the provision of adequate financial and human resources, the setting of objectives and priorities, the monitoring of achievements, and capacity-building in management. As well as monitoring progress in achieving objectives, there is a need to reassess objectives, which may change as interventions are implemented.

Is Growth Monitoring Universally Applicable?

The issue of whether or not GM is universally applicable was touched on in a number of the presentations. In the study by George et al., one of the barriers to establishing a GMP program in India was the local resistance to weighing of children. Indeed, enormous effort was exerted to overcome the prevailing cultural prejudices and to get the mothers to accept, and become personally involved in, the GMP activities introduced by the research team.

A similar cultural attitude to weighing in a part of Africa was described by a participant. In contrast to these examples, the positive achievements of GM in Indonesia were noted in terms of the creation of a "growth culture" in the population, i.e., a "demand for" children's growth. Information about weight is used successfully to reinforce that demand.

The assumption in Morley and Meegan's study among the Masai is that weighing and the visualization of growth is the crucial missing step toward stimulating analysis and enabling necessary actions for improved growth. Some participants felt that this assumption still needs to be established. This study tested a simple weighing device that allows participation by the mothers. However, the modified Morley-WHO chart used by the device is difficult to interpret. As interpretation is simpler with bubble charts, it was suggested that Morley could consider improvising a bubble chart version for his device.

In a discussion of weighing and charting, Morley said that it took him 12 years to recognize that even some doctors and nurses are unable to plot charts. Gerein noted that in most clinics in the Zaire study the weighing and plotting activities were done very accurately but the interpretation by health workers was frequently incorrect. Weighing was a routine ritual conducted at the clinic; only in one instance was the community involved in obtaining and analyzing information about weight. However, because the ability of these communities to analyze weighing information was very weak, it was questioned whether screening by

weighing at the community level would have been useful. The need to develop methodologies to do community-level analysis and problem-solving about nutrition was emphasized.

In Indonesia over the past 15 years, where GMP is accepted as a keystone in the national strategy to reduce childhood malnutrition, roughly 300,000 weighing posts (set up as a component of the Integrated Health and Family Planning Program) have been established in over 80,000 villages. The integrated posts are called "Posyandus." In the assessment of GMP implementation reported in the paper by Satoto, problems in implementing good-quality GMP were pinpointed in all assessment sites. The analysis and discussion of individual problems of children was largely neglected, as was advocacy for action on these problems. Nonetheless, mothers claimed that the Posyandu was beneficial for their children, and the weighing itself is seen as an important part of the services offered and is often demanded by the mothers. The Posyandu is seen as an important forum to permit women to gather, offering opportunities for nonformal or "loose counselling" to occur between mothers and health workers. Indeed, most mothers were found to have a good grasp of nutrition messages and related gaining weight to other indicators of good health. They reported that they had gained this knowledge from the integrated program offered through the Posyandus.

The success of the institutionalization of Posyandus in Indonesia resulted in many other activities being added to GMP, such as immunization. Although increased immunization coverage was thus achieved, it was found that the presence of doctors and nurses has resulted in an undermining of the confidence of the volunteers who carry out GMP activities. An evaluation by UNICEF also noted that because the Posyandus were primarily attached to the formal health sector, rather than to any other government department, little attention has been paid to household food security.

Latham and Shekar claim in their paper that GM is indeed successful in the Tamil Nadu Integrated Nutrition Program (TINP), a large government program in India. This was challenged by one participant who cited Gopalan's paper, which disputes the authors' claim of successful GMP in TINP. Shekar's own ethnographic work done in the model TINP block concluded that growth charts in all probability were not being used for nutrition education.

The case studies from Tamil Nadu, and Indonesia, and the paper from Thailand (included in section "Action, Research Needs, and Policy") illustrate the challenges of implementing GMP programs on a large scale. It was noted that it is reasonably easy to make small-scale and pilot programs work well, but to extend them successfully to the national level and to institutionalize them, requires considerable planning, identification of key allies, and articulation by the

community of its need for such an effort. One participant stressed that these examples of successful GMP programs in Indonesia and Thailand must also be seen in a wider context. It is important to note that both countries have had many years of expanding economies and policies for redistributing wealth, a condition that does not exist in many other Asian countries.

The discussions following these presentations led the participants to agree unanimously that a universal prescriptive strategy of GMP is not possible or desirable. In fact, several participants said that the existing poorly executed GMP programs have become an alibi for not doing anything else to improve the growth of children. Three broad types of growth promotion approaches were ultimately suggested, which are outlined in the Nyeri Declaration. The consensus was that different methods of growth promotion may be appropriate, depending upon the particular context. The methods chosen can then be used to encourage actions that bring about the reallocation of resources at the community and household levels. The challenge then is to identify necessary local strategies to promote the growth of children and to share these experiences with other communities, regions, and countries to motivate similar efforts to improve growth.

Growth Monitoring and Promotion in the Health Services Setting

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Standing for the first letter of UNICEF's by now famous and widely propagated strategy for improving child health and child survival "GOBI," growth monitoring (GM) is one of four major interventions making up this strategy, others being oral rehydration, breastfeeding, and immunization. The rationale for having it included was provided by the results from several observations and controlled pilot and demonstration studies in the late 60s and early 70s, notably David Morley's original work in Nigeria (Morley 1968), the Narangwal group in Punjab (Taylor et al. 1978), and others (Shekar and Latham 1992).

In all of these well-controlled, and mostly pilot or demonstration projects, growth faltering was detected through regular weight monitoring and health personnel were then able to institute corrective action with apparently highly beneficial results in terms of improved child nutrition and reduced child deaths. Since then, weighing of preschoolers has practically become a routine in most MCH clinics the world over.

A considerable amount of resources, not to speak of health workers' time, are put into growth monitoring efforts. It seems necessary, therefore, that evaluations of other than pilot and demonstration projects, namely of growth monitoring programs in the "real" situation, i.e., the government health facilities are done. In fact, in some locations these have been carried out and with differing results (Gerein 1992), raising questions about the ultimate usefulness of growth monitoring (Ruel et al. 1992).

Decidedly, more evaluations are needed before a more definitive judgment may be made. Such evaluations should address both impact as well as process, i.e., measure whether children subjected to GM are doing better and whether all the required inputs, activities, and actions necessary to implement the process are indeed taking place. Recently, one such evaluation, in a well-controlled experiment in Tamil Nadu, showed that GM had no influence on growth, even though GM was not limited to the "monitoring" but included other aspects of growth promotion advocated by the proponents of GM (George et al. 1992).

Indeed, before one advocates adding GM activities to any program, one has to be reasonably sure that prevailing conditions merit its implementation and that the service infrastructure will support having yet another branch "grafted" on it. Failing to do so will risk wasting precious resources with at best no results and at worst negative results. I have come to believe that in many, perhaps most situations, instituting GM has resulted precisely in the latter. To assess the potential feasibility and usefulness of GM within a given health services structure, a conceptual model was developed as shown in Fig. 1.

Fig. 1. Model for assessing institutional capacity for growth monitoring.

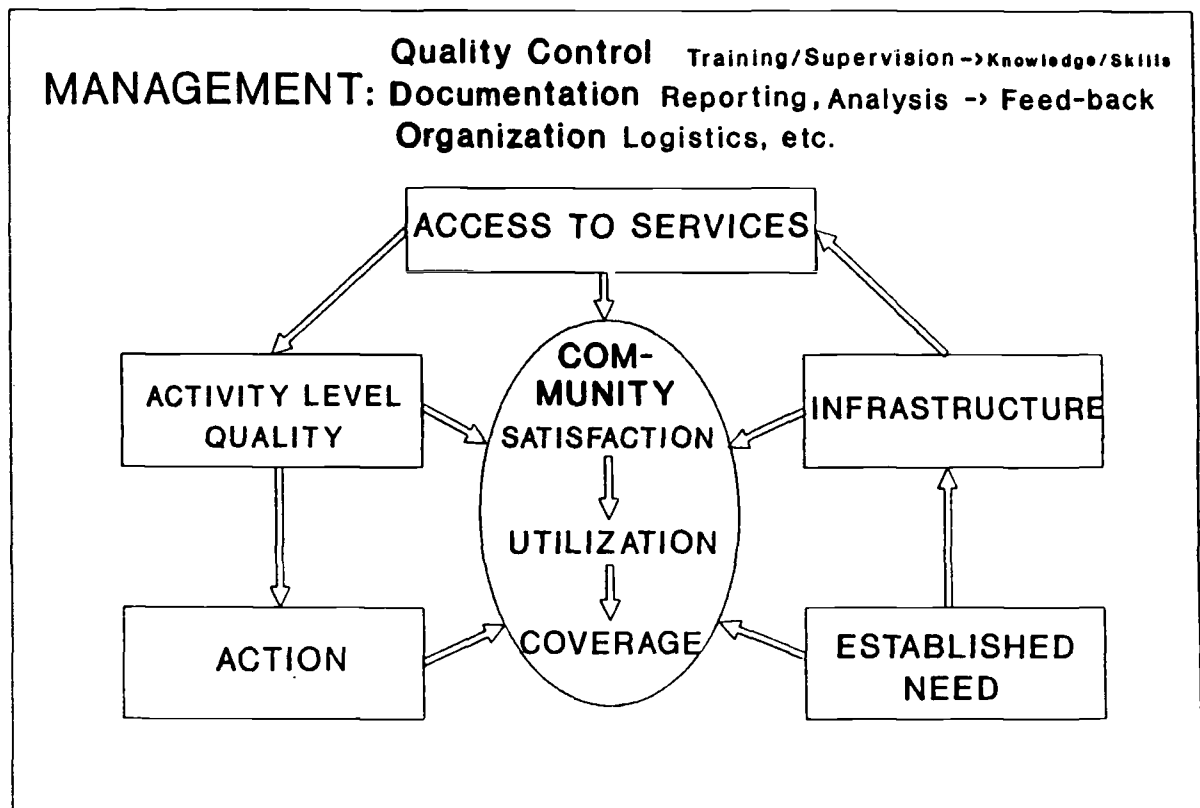


Fig. 1

The Model

The model assumes:

- That there is an *established need* for GM; i.e., GM should be instituted if there is a suspicion or proof to suggest that a considerable proportion of children fail to gain weight compatible with healthy development and is based on the assumption that early detection of growth faltering will permit corrective action.
- That implementation of a GMP will require an *infrastructure* consisting minimally of:
 - (a) A physical setting where GM may be carried out that can sustain a group of clients waiting for the service, with respect to relative comfort and essential utilities
 - (b) Availability and functioning of the necessary instruments (growth monitoring tools), and
 - (c) Adequate number of personnel trained to carry out all functions of GM, namely determining the nutritional status, recording it, interpreting it, and taking action.
- That these functioning infrastructural units are distributed so that the majority of the community has ready *access to services*. That services are affordable, that opening hours are convenient, and that there are no social barriers.
- That the number of (GM) activities carried out at each of these service stations, i.e., the *activity level*, suffices potentially to cover all eligible children within the required monitoring interval, and that the *quality* of the GM process is such that the results are indeed valid.
- That immediate *action* takes place for those children identified to be at risk according to preset criteria, either in terms of special or more attention.
- That the *community* accepts and is satisfied with the services and, hence, utilizes the program to an extent that will allow effective *coverage* of the target population.

- That a *management* system is in place and functioning that will implement and maintain *quality control* measures, such as ongoing supportive supervision and training, *documentation* in terms of upkeep and processing of recorded information, and will ensure day-to-day *organization* and running of the services.

All of these components of the growth monitoring system are inter-dependent, i.e., the state of one influences all others. Only if all of them are in place and are functioning can GM be carried out effectively and, hence, make sense.

Evaluation

Over the past 12 years, the author evaluated about the same number of programs, mostly in African countries, and in the course of these evaluations came into contact with over 200 health workers in charge of carrying out child health care and GM services. Health staff ranged from the community health worker (CHW), the nursing auxiliary to the graduate nurse and medical assistant. Usually, overall evaluation of primary health care services was the focus. Examination of specifically GM programs was not an objective or carried out. In all of these projects or government services, GM was part of the routinely provided package of MCH services; in none was GM the only or special program being offered. Results presented here cover 100 health care facilities in eight countries and close to 180 health workers. With one exception, Pakistan, where the health facilities were preselected, inclusion of facilities followed random sampling from among all belonging to a chosen project or lying within a given administrative boundary.

Data available do not allow examination of all components of the model. For those for which we do have information, a few selected indicators will need to serve as proxy. However, it is assumed that these adequately reflect the status and if found to be deficient, others are most likely deficient as well. The methodology of assessing these indicators has recently been described (Kielmann et al. 1991).

Indicators

Specific indicators looked at were:

- Integrity of *infrastructure*, as measured by the availability and/or functioning of the required instruments/tools (i.e., scale or hanging balance, height measuring instrument, growth charts).

- *Quality* of the GM process, as measured by presence of the required knowledge and skills on behalf of the health worker (i.e. the abilities to weigh within the smallest gradation on the scale or balance, to determine height to within ± 1.5 cm, to plot, to interpret correctly).
- *Management*, as indicated by availability and functioning of an in-service training and supervision process (i.e., ongoing quality control).
- Potential *coverage* of the target population as measured by the utilization rate of health services by the preschool child population.

In three locations, East Uganda, West Uganda, and Yemen, we also looked into whether any action had taken place, if and when children were identified as being at high risk. (Projects and programs are listed in the Appendix.)

Table 1. Availability of essential components of growth monitoring in selected health services of various countries (1978-1991).

Selected Health Facilities			Indicators		
Location and year	Institution	No. of facilities	Integrity of tools	Coverage	
				Training and supervision	(visits/ch/year)*
Egypt, 1978	government	25	84%	0%	0.2
Cameroon, 1982	project	7	80%	60%	n.e. ^x
S. Sudan, 1982	project	17	24%	0%	n.e. ^x
E. Uganda, 1985	mixed**	6	88%	13%	0.3
Pakistan, 1988	government	2	100%	0%	0.1
West Uganda, 1989	government	20	60%	39%	0.5
Mali, 1991	mixed***	4	75%	0%	0.4
Tanzania, 1991	mixed***	8	38%	50%	1.3
Yemen, 1991	project	12	67%	64%	0.8
All		101	63%	24%	0.5

*average number of visits per preschool child per year to the health facility for all services

**including one mission hospital

***governmental and project facilities

^x n.e. = not examined

Results

Results are largely disappointing as can be seen from Tables 1 and 2. To our knowledge in only one of the locations, West Uganda, findings led to a major reorientation of services (Kipp et al. 1991). As shown in Table 1, availability and integrity of the necessary infrastructure varied considerably from one location to the next. Facilities in S. Sudan and Tanzania clearly did not have the equipment to support GM, others, notably from the projects in Cameroon, in Pakistan, east Uganda and Egypt, were relatively well endowed. Overall, almost three-quarters of the health facilities had the necessary infrastructure.

In-service training and supervision, essential for maintaining quality performance, was nonexistent in 66 of the 100 facilities and, with the exception of the project in Cameroon, was carried out to only a limited extent in the remaining

Table 2. Levels of ability related to growth monitoring in health facilities of various countries (1978–1991).

Health facilities (n=100)		Health workers are able to perform:							
Location and year	no. of indiv.	weighing		taking height		plotting		interpreting	
		no.	percent	no.	percent	no.	percent	no.	percent
Egypt, 1978	25	0	0	0	0	0	0	0	0
Cameroon, 1982	7	5	71	n.e.*		6	86	6	86
S. Sudan, 1982	29	15	52	n.e.		8	28	n.e.	
E. Uganda, 1985	17	8	47	6	35	7	41	7	41
Pakistan, 1988	6	2	33	1	17	1	17	2	33
W. Uganda, 1989	53	17	32	15	28	11	21	11	21
Mali, 1991	6	4	67	3	50	n.e.		n.e.	
Tanzania, 1991	16	5	31	5	31	n.e.		n.e.	
Yemen, 1991	20	10	50	8	40	7	35	7	35
All locations	179	66	37	38	27	40	25	33	26

*n.e. = not examined

34. The average number of visits to the health facility per preschool child per year at 0.5 (range 0.1 – 1.3) hardly suffices to bring about any "meaningful" coverage, even though in the Egyptian setting the potential coverage, i.e., the proportion of the population that lived within 5 km of a health facility was 95%. In Mali, it was 35%, in Southern Sudan and Yemen less than 20%. No determination on the potential coverage was done in the two other locations. Even though client satisfaction was not being measured in any of the locations, the extremely low utilization rates encountered perhaps reflect its level closely.

Only 37% of all health workers could weigh correctly, even fewer could take the height, plot, or interpret the results. The largest deficits were found in Egypt where none of 25 nurses could weigh, take height, plot, or interpret the results or results given to them (Table 2). Such findings are especially sobering when one considers that obtaining 100% on the knowledge and skills tests administered should be the rule rather than the exception.

Lastly, in none of the facilities of the three locations (East Uganda, West Uganda, and Yemen) where we had looked into follow-up measures had any action been taken when a child was identified as being at risk.

Judging from the outcome of the four process variables we looked at, only in the project in Cameroon was the system able to support and use fruitfully the GM process. In this project, providing primary health care, including oral rehydration, control of acute respiratory tract infections, antenatal/postnatal care, and environmental hygiene through routine home visiting by CHWs was the focus of activities. Admittedly, we would have also needed information on preschoolers' utilization rate of the offered GM services and, ideally, on their nutritional status as compared to that of children without access to the GM services, i.e., on program impact, before that latter program may be called a success. However, these were not examined at the time. In all other locations, we may assume that GM activities, if anything, detracted from the already very marginal health care services by taking up time and resources that could have been employed more effectively with other activities.

Both the sample and results do have some major limitations. Selected health facilities were restricted to rural areas only, hence, say nothing about urban services, where GM may indeed be functioning better. Also our sample of facilities is not homogeneous as both health service projects of specific donor agencies as well as routine government services were being looked into, nor was information on all of the (above) four indicators being collected in all of the sites. Inclusion of project locations, however, would tend to bias results "positively" i.e., the real, or i.e. governmental, situation is if anything worse. In general, and based on personal impressions from additional evaluations in which no formal recordings

of findings were made, but the same methodology was followed, I tend to believe that the findings reflect the rule rather than the exception. If so, they point out major weaknesses inherent both in the conceptualization and in the execution of the GMP that urgently need addressing.

Conclusions

Because GM has been shown in a sufficiently large number of demonstration or pilot projects to be effective in identifying children at risk, most recently Iringa (9), thus enabling health care workers or mothers to provide them with appropriate and effective interventions, it is not the methodology that is at fault but the means and methods of implementation. In the Tamil Nadu situation, even though GM activities seem not to have been hampered by any of the problems enumerated, they still did not exert any discernible effect on the children's nutritional situation (Ljungvist 1992). This is difficult to understand, but it might well be because the primary health care system in place had already achieved the maximum benefit possible under the given constraints of caste, endemic disease prevalence, and of seasonal variations in food security.

Our results indicate that GM is not generally applicable. The reasons why in so many, probably most, routine health care settings GM falls far short of achieving expected results are multifactorial and differ from one situation to the other. They may include the "obvious" problems of poor process implementation, as demonstrated above, but may lie also with GM not being applicable to the specific situation at hand, as seems to have been the case in the Tamil Nadu study. Hence, it appears to be imperative that, for each location, a precise situational analysis has to be carried out and problems specific to the given setting be identified either before GM is added or after it has been implemented.

Approaches to making GM work, where indeed GM is indicated, similarly must be multifactorial, and will decidedly not lie with unifocal approaches such as developing newer or simpler gadgets or giving growth monitoring a different name without changing the underlying problems.

As long as any one of the essential components that make up primary health services are lacking or nonfunctional, GM will not work within that (health) sector. The first and most important step, therefore, is to render the (primary) health care system functional.

Even if GM were to be taken out of the formal health sector, as has been variously suggested, and brought to and made the responsibility of the community, all components that are essential for it to now function within the given

community, i.e., equipment, trained labour, accuracy of work, etc., would similarly have to be in place and operative. If this is not the case, GM will not work there either!

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Appendix

Programs and projects evaluated in chronological order.

Egypt 1978	Routine government health facilities (health centres and health units) in Assiut, Fayoum, and Dakahlaia governorates, before implementation of the Strengthening Rural Health Services Project, Ministry of Health.
Cameroon 1982	Primary Health Care Services in North West Province (Bamenda). A pilot project funded by the Deutsche Gesellschaft fuer Technische Zusammenarbeit in collaboration with the Ministry of Health (cyclostyled report).
S. Sudan 1982	Primary Health Care Services for the Southern Sudan. A demonstration project funded by the Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ) in collaboration with the Ministry of Health (cyclostyled report).
E. Uganda 1985	Routine government services and one mission hospital in Masaka district as part of an AMREF-funded pilot project for the development of a Rapid Data Collection Methodology.
Pakistan 1988	Routine government health services in two district health facilities, Thatta district, Sindh province, assessed as part of field reconnaissance in conjunction with Aga Khan University, Karachi.
W. Uganda 1989	Assessment of governmental health services in Bundibugyo and Kabarole districts, West Uganda, before the implementation of a German-funded primary health services support project (cyclostyled report, summary results published).
Mali: 1991	Evaluation of the project: "Soins de Santé Primaires dans le Cercle de Bandiagara." Mixed (GTZ) project and nonproject (governmental) primary health care services (cyclostyled report).
Tanzania: 1991	Evaluation of the project: "Familiengesundheitsdienste, Tanzania." Mixed 1991 (GTZ) project and nonproject (governmental) primary health care services (cyclostyled report).
Yemen: 1991	Evaluation of the (GTZ) project: "Primary Health Care Services Project Services Project (PHCSP)," in and around Amran, North Yemen (cyclostyled report).

When Research Does Not Shape Programming: GMP in Zaire

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Research Results From Three Health Programs In Zaire

Growth monitoring is promoted as a means to improve the effectiveness of the health system in preventing and treating malnutrition in young children. One of the most common uses of growth monitoring is as a screening tool. It is supposed to stimulate health workers to collect the information they need to assess a child's health and nutrition status, analyze the cause of any problem, and take action based on the analysis (UNICEF 1991). This practice is based on the principle that screening should be done when detection of disease will lead to appropriate treatment and this is known to be more effective when implemented early (Friedman 1974). How well does growth monitoring fulfil this principle? This paper will show how, in three programs in Zaire, screening through growth monitoring was not proven to be useful in detecting children at serious risk of malnutrition. More important, growth monitoring did not assist in, and may even have detracted from, the development of appropriate prevention and treatment programs.

Three child health programs in Zaire were studied to assess the contribution of growth monitoring to the programs. None of the programs used growth monitoring as a means to educate mothers or to promote community participation in health and nutrition care, for nutritional surveillance, or for program management, evaluation, and development. It was, however, used by all the programs for screening children; its effectiveness as a screening tool to stimulate analysis and action by the health workers was investigated by this study. The effect of the child health program on mothers' knowledge and practices was also studied in one area. The benefits of growth monitoring and promotion activities were compared to their costs to mothers and to the health programs. The study design and methods have been described in detail elsewhere (Gerein 1988).

Program Areas

The programs studied were in three health zones in Zaire, named for their main towns of Boga, Kasongo, and Katana. The Boga health zone in north eastern Zaire is small, with about 20,000 people living in an area of 2400 km². The town of Boga has slightly over 1000 inhabitants, and more than half the population lives in small villages of 500 people or less. It is an upland savannah area of fertile soil from which two crops a year are harvested. Bananas, cassava, and sweet potatoes are the staple foods, available all year round, whereas beans and groundnuts are in short supply between January and March. The two main tribes in the area are the Wangiti, who are mainly agriculturalists, and the Wahema, who are agropastoralists. The Wahema are politically and economically dominant, and a strict cultural separation is maintained. There is a clear division of labour between the sexes, with women having the heavier workload. Women are required to give all the produce or earnings to their husbands. Farming production methods are primitive, with no inputs except manual labour. Wangiti women work in the fields from shortly after dawn to early afternoon when they begin domestic tasks. Wahema women are responsible for storing and churning milk, selling the butter, and cleaning the cattle pen and for preparing the meals, in which the milk, butter, and blood of cattle play an important part.

The Kasongo health zone covers an area of 14,750 km². and had a population of 195,000 in 1980. The main town of Kasongo has 30,000 inhabitants, and the rest of the population lives in 10 villages of between 2000–5000 people or in smaller villages. The economy is partially self-supporting in food, growing bananas, cassava, beans, and groundnuts. Rice and cotton are exported on a large scale. Since the 1970s there has been increasing monetization of the economy, and people are forced to sell more and more of their food crops to meet cash expenses. Over 90% of the women work in agriculture, spending about 6 hours a day in the fields. Children are left at home from about one year of age in the care of grandparents or other children.

Katana is a rural area in south eastern Zaire, with a population of 210,000 in an area of 1200 km², making it the most densely populated rural area of Zaire. The mountainous terrain is fertile but subject to erosion. About half the land is devoted to food crops and the other half to industrial plantations and commercial crops. Unlike the other zones, a sizeable proportion of the population has farms that are too small to provide an adequate food supply for a family. The area is industrialized and wages are among the lowest in Zaire.

Health Services

Expatriate organizations finance and manage the health services and contribute relatively sophisticated resources in terms of medical services, research, and administration, especially in Kasongo and Katana. The health service focus in Kasongo is on organizing rural health services on a self-sufficient and comprehensive basis. Three major features include the participation of communities in the management of health centres, financing of the system through fees, and the development of the capacity of all levels of health personnel. This last feature is done through the use of algorithms that detail the process for preventive and curative consultations by the health centre nurses, and through systematic monthly supervision by the five physicians to the 19 health centres. However, the child health sessions did not fully benefit from these systems. The algorithm developed for the management of growth faltering had proven too complex to use. Supervision "rarely" included the child health sessions, perhaps once out of 50 annual visits, because some physicians thought they were working reasonably well, whereas others, conversely, did not believe in the usefulness of the child health program as currently organized (Melotte 1987). Involvement of the village committees in the child health sessions was largely limited to advertising the date of the next session and encouraging parents to attend.

The Kasongo health service is headed by a pediatrician with a special interest in child development. The health activities are complemented by the presence in the area of a large number of development organizations, including the Anti-Malnutrition Committee, which has been meeting for the past 20 years. Consisting of representatives from organizations involved in health, water supply, agricultural and livestock improvement, pisciculture, prevention of soil erosion, and food processing, it acts as an information and collaborative network for agencies in the area.

An experienced nurse-supervisor is assigned to supervise the health centres full-time, and in 1986, had spent 6 months working on the child health sessions. Village health committees are involved to varying extends in health centre work and have contributed to the child health program by providing a shelter from the sun for waiting women, assisting with the transport of vaccine, and such like.

In Boga, the one physician manages the hospital as well as the zone health service. The program is new, having started a 2-year training program for nurses only in 1986. The two nurses who conduct the child health sessions had received instruction in the training and management of village health workers (VHWs). They supervise 19 VHWs with whom they have a monthly meeting to discuss their

activities and problems. The physician usually briefly attends the meetings with VHWs, but has not seen the child health sessions. The nurses at the health centres are not involved with the child health sessions or the VHWs.

The child health sessions in Boga are conducted by a supervisor with 2 year's of nursing training and a VHW who has between 4 and 10 years of schooling and 2–4 weeks of training, respectively. The sessions in Kasongo and Katana are conducted by a nurse with 4 years' of training, assisted by 2–4 auxiliaries who have been given in-service training by the health centre nurses.

Accuracy of Screening by Growth Monitoring

The health workers were observed as they weighed and examined children and advised the mothers. They did not appear to pay much attention to the presence of the researchers after the first few minutes, although the research may have had an affect on their behaviour, it could not be quantified.

In general the weighing and recording of weight of children was done well. The weight was read accurately from the scale in 97% of 426 observations, and the weight was recorded accurately in 94% of cases. The most common mistake was to misrepresent the age of the child on the chart by forgetting to leave a blank space if the child had not attended a session. Age was recorded accurately in 89% of observations. Because the people doing these tasks had only 5–10 years of schooling and a brief training program from the health service, it appears that most communities would be capable, with some ongoing help, of weighing children and keeping a record on growth charts.

The numbers of children attending the sessions who had faltering growth were substantial. This is all the more striking in that it is probable that the children who were most at risk of malnutrition were the least likely to appear for weighing (Gopalan and Chatterjee 1985). The community survey in Boga demonstrated that the most at-risk children, as defined by the mother's education and socioeconomic level, attended the sessions the least often. The survey also found five children with kwashiorkor who had never attended the child health program; conversely, the child health program had never recorded a case of kwashiorkor.

The next step after weighing and recording is to interpret the child's weight trend and, if indicated, obtain further information by examining the child and questioning the mother about its health. The researcher assessed the child's status in the same way that the program had taught its health workers to do so that the care they gave could be measured against the program's own system for managing children. Anthropometric information, i.e., weight loss, inadequate weight gain, or

a weight below the lowest reference curve, was supposed to be the signal to the health worker to question the mother and examine the child to try to find out the cause and seriousness of the child's problem.

On average, only two-thirds of mothers of children with growth faltering were asked whether their child had been ill, the primary question to ask as illness is known to be a major cause of growth faltering. Other questions and procedures carried out on children with growth faltering are shown in Table 1.

A substantial number of children with growth faltering, as shown in Table 2, received no diagnostic procedure. The reasons for this were not clear. Workers did appear to recognize inadequate weight gain as well as weight loss, because 21% of children with inadequate weight gain did not receive a diagnostic procedure, compared to 15% with clear weight loss, a difference of only 6%. The

Table 1. History and examination of at-risk children.								
Procedure	Children with procedure carried out							
	Boga		Kasongo		Katana		Total	
	No.	%	No.	%	No.	%	No.	%
1. Has child had fever since last session?	n.a.*	n.a.	n.a.	n.a.	76/105	72	n.a.	n.a.
2. Has child has diarrhea since last session?	n.a.	n.a.	n.a.	n.a.	57/105	54	n.a.	n.a.
3. Has child been ill since last session?	44/75	59	26/43	60	60/105	57	146/223**	65
4. Was child treated for illness?	22/44	50	6/26	23	24/60	40	52/130	40
5. Eyes checked for anemia	3	4	35	49	81	48	119	37
6. Spleen palpated for enlargement	1	1	2	3	60	38	63	20
7. Feet examined for edema	0	0	0	0	12	7	12	4
8. Is child eating well?	24	29	22	31	71	42	117	36
9. Has child started solid food?	0/16	0	4/15	27	1/26	4	5/57	9
10. Are you (mother) pregnant?	2	2	11	15	57	34	70	22
Total Children	83		71		169		323	
* n.a. Not applicable. This means that the program did not offer the particular service.								
** The numerator in item 3 combines the figures for the question about fever in the Katana program with the question about illness in the other two programs.								
Note: A lack of weight gain should be the stimulus that prompts the nurse to ask whether a child has been ill. Therefore, the numbers and percentages given for the first three questions about illness applied only to children who had not gained sufficient weight. The question about the treatment of illness applied only to the children who had been identified as being ill. The question about starting solid food was only applicable to 3-6 month olds. The other questions apply to all at-risk children, i.e., those who had not gained sufficient weight and were ill.								

Table 2. Number and percentage* of children receiving at least one diagnostic procedure, by weight direction.								
Weight Direction	Boga		Kasongo		Katana		All Children	
	No.	%	No.	%	No.	%	No.	%
Weight loss	23/33	70	18/23	78	58/61	95	99/117	85
Inadequate gain	27/42	64	14/20	70	43/44	98	84/106	79
	X ² = 0.006		X ² = 0.007		X ² = 0.003		X ² _{MH} =0.007	
	n.s.		n.s.		n.s.		n.s.	
Subtotal (Growth faltering)	50/75	66	32/43	74	101/105	96	182/223	82
Weight gain	14/58	24	33/49	67	154/162	95	201/269	75
Total children	64/133**	48	65/92	71	255/267	96	384/492	72
	x ² _{1,2} =22.0		x ² _{1,2} =.26		x ² _{1,2} =.36		x ² _{1,2} (MH)=10.7	
	p<.001		n.s.		n.s.		p<0.005	
* Percentage refers to the number of children in that category of weight change.								
** Weight direction was not recorded for all children in Boga.								

reasons likely had more to do with the pressure of having to deal with large numbers of children in a session, which caused workers unintentionally to misclassify children.

The numbers attending sessions were substantial. In Boga, there were, on average, between 42 and 77 mothers and children to be seen by the nurse for counselling. In Kasongo, the numbers varied between 25 and 94 per worker and, in Katana, there were 66–118 per worker.

Children were considered "at risk" if their weight performance was unsatisfactory or they were ill at the time of the session. This system resulted in the classification of 65% of the children attending as "at-risk," 45% because of poor weight performance, and 20% because they were currently ill.

How important was it to detect the 45% of children with growth faltering? Were they at serious risk of severe malnutrition and death? These questions cannot be answered definitively because studies of the association between anthropometric status and mortality have not detailed the cause of death and it is not possible to determine what percentage of the deaths identified by screening could have been prevented by a feasible intervention and what percentage of the nonidentified deaths were similarly preventable (Mosley 1985).

However, some indication can be obtained from these observations, which showed that of the 520 children weighed, 36 children, or 6%, were classified as having prolonged growth faltering. These were children who had experienced growth faltering for more than 2 months if they were less than 12 months old, or for more than 3 months if between 12 and 35 months of age. Thus, it could be said that 94% of children at the sessions were undergoing a transient episode of risk, from which they would apparently recover in the next month or two. Most of this risk was due to illness in the recent past — 57% of all mothers said the child had been ill or was still sick.

These 36 children, representing 6% of all children attending the health sessions, would be in special need of high-quality care. However, the care they received was only slightly more intensive than that provided for the children with transient growth faltering. On interview, most of the health workers stated that they concentrated on the child's weight performance as the last weighing and did not look back over the chart for a long-term pattern. In other words, they did not recognize the danger from accumulated months of growth faltering. Several of the more experienced nurses reported that they found the growth chart useful, to see if the child had recovered sufficiently from illness to begin gaining weight again.

Interventions as a Result of Screening

The care given to at-risk children is shown in Table 3. There was a different pattern of advice given to mothers of at-risk children, reflecting the different training of the workers, the services available in the program, and the emphasis given to child health sessions by the program managers.

In Boga, the mothers were most often given advice about feeding children. In Kasongo, they were frequently referred to the health centre, and in Katana, the workers used a combination of referral and advice about illness and feeding. An admonishment to feed the child especially well was given to 31–52% of these mothers and details about foods to offer the child were given most often in Boga (27%) and least often in Kasongo (10%). Emphasis on increased frequency of feeding was also mentioned most often in Boga (27%) and not at all in Kasongo. Other types of comment, such as advice about anorexia, feeding specific quantities of food, starting solid food, or encouraging the use of family planning, were rare.

The treatment of children who were ill at the time of session showed a similar pattern. In Boga, mothers of ill children were given advice about feeding, in Kasongo, they were referred to the health centre, and the Katana program responded with a mixture of counselling and referral. The nutritional advice did not stress the importance of extra food after the child had regained its appetite.

The health workers recognized that mothers would find this advice difficult to follow. A mother could take time out from her work during the acute stage of a child's illness but not once the child was recovering.

The health workers did focus their counselling on at-risk children. Overall, 57% of mothers were given some information, ranging from 64% of at-risk children to 46% of well children. At-risk children were significantly more likely than well children to be given advice in all three programs.

The care given to children in Katana was more extensive than in the other programs, in spite of having larger numbers of children to deal with. History-taking and examination and counselling and referral were more thorough and

Table 3. Advice given/remarks made to mothers of at-risk children.

	Boga		Kasongo		Katana		Total	
	No.	%	No.	%	No.	%	No.	%
1. Attendance of child is irregular	10	12	7	10	42	25	59	18
2. Weight direction of child is not good	36	43	16	23	121	72	173	54
3. Thanks/congratulates mother	3	4	8	11	18	11	29	9
4. How to treat child's illness *	2/55	4	1/46	2	33/211	30	36/211	17
5. Feed child "well" (unspecified). **	43	52	26	37	52	31	121	37
6. Give child specific food	22	27	7	10	39	23	68	21
7. Feed child three or more time a day	22	27	0	0	30	18	52	16
8. Give a specific amount of food.	0	0	1	1	6	4	7	2
9. Start solid food	0	0	0	0	2	7	2	0.6
10. How to encourage an anorexic child to eat.	2	2	1	1	1	0.6	4	1
11. Consider using family planning	0	0	1	1	1	0.6	2	0.6
12. Bring child to nutrition program	n.a.	n.a.	0	0	14	8	14	4
13. Bring child to health centre	1	1	30	42	57	34	88	27
Total Children	83		71		169		323	
<p>* The percentage applies to those who said their child had been ill but was not treated or was not better. The designation "n.a." means that these program did not offer the service.</p> <p>** This was a general admonition to the mother to give the children "lots of food" or to "feed the child well," without any specific details. All the mothers to whom the worker cited specific foods were also in the category of "feed well."</p>								

detailed. Much of this could be attributed to the sustained attention the program had received from management. The health workers in Katana had been instructed to ask specific questions about illness, to examine the child's eyes and spleen, and to record this information in a specific place on the growth chart. They also had simple written guidelines for the management of growth faltering. The other programs had not provided such explicit instructions, either written or oral, to their health personnel, and the child health programs had not been supervised methodically.

The mothers spent between 2 and 6 hours for travel and attendance at the sessions to receive 10 minutes of group health education, a few minutes of consultation with a health worker, and, if necessary, immunization for the child. The time given to mothers and at-risk children for consultation with the health worker is shown in Table 4. The consultation included reading the growth chart, examining the child and questioning and advising the mother. In Boga, immunizations were also given, and in Kasongo and Katana, the child's weight was plotted on the chart. It is striking how quickly children were dealt with, even those with serious problems. The longest time taken for any child was 5 minutes; 59% of children with growth faltering were accorded less than 2 minutes of individual attention from the health worker.

Costs of Growth Monitoring

The financial costs of growth monitoring (excluding land, buildings, and furniture) were calculated for the programs after interviewing health workers and managers. The cost of the health workers' time was calculated on the basis of the time they spent conducting the sessions, including weighing, counselling and group health education, travel to and from the sessions, and preparing supplies and writing reports. Staff also carried out other activities during the child health sessions, such as immunizations in mobile clinics, antenatal care in Kasongo, and

Table 4. Number and percentage of children receiving at least a 2-minute consultation.								
Category	Boga		Kasongo		Katana		Total	
	No.	%	No.	%	No.	%	No.	%
Well children	2/13	15	3/25	12	18/44	41	23/82	28
At-risk children	4/23	17	11/33	33	43/84	51	58/140	41
Total	6/36	17	14/58	24	61/128	48	81/222	36
	$X^2=0.002$		$X^2=2.5$		$X^2=0.9$		$X^2(MH)=2.9$	
	$P > 0.5$		$P > 0.1$		$P > 0.1$		$P > 0.05$	

dispensing a few medicines in Boga. These activities took between 15 minutes and an hour, approximately, in the sessions observed, but it was not possible to calculate the time for them separately because it varied between programs and between static and mobile sessions. Scales were estimated to last between 5 and 10 years; the costs of the scales were divided evenly over each year for 5 years, rather than amortizing them.

Table 5 shows the costs of the program per child under 5, per child-visit, and per child-year. The costs of the Boga program were considerably higher than the other programs, although if a motorcycle were substituted for the Land-Rover (needed to transport student nurses), costs could be reduced by about 40% to about £.40 per child, similar to the Kasongo costs. The Katana program covered over half of its costs by charging mothers an annual fee. The Kasongo program estimated the cost of immunization, to them, at £.70 per child in 1986 (vaccines were provided by donors), making the costs of the child health sessions appear to be between £.20 and £.80 per child, comparable to the programs reported from Indonesia and India, which also included drugs (Berg 1987).

Table 5. Estimated costs of growth monitoring activities in the three-child health program, per child under 5, and per child visit, 1986 (in Pounds Sterling).*			
Items	Boga	Kasongo	Katana
Staff	448	2286	4430
Transport	2299	568	313
Materials	177	287	15**
Scales	72	76	76
Receipts from charts, registration	498	812	2667
Total net costs	2499	2405	2167
No. of children under 5 registered	3762	10,146	34,340
No. of child visits	27,590	73,855	175,562
Cost per child registered	0.66	0.24	0.06
Cost per child visit	0.09	0.03	0.012
* As of 1992 £1 = USD 1.60			
** The costs of growth charts are not included, as full costs were paid for by the mothers.			

Mothers' Learning

When mothers were asked how they knew if their children were growing well, they answered that they relied on behavioural signals mainly: appetite (mentioned by 71%), lack of illness (55%), weight gain (33%), good humour (20%). Only 5% mentioned that they used the growth chart, even though there was widespread understanding of the purpose and interpretation of the chart. Growth charts had been used by the health service for the past 7 years, and were kept by the mothers rather than at the health centres. However, the charts were never a subject for group health education, nor did the health workers make any connection between the behavioural signals used by mothers and the evidence of the chart.

The purposes of the growth chart were understood by the mothers interviewed to be recording the child's weight (55%), recording immunizations (33%), and to know the child's health (33%). Table 6 shows that when mothers were asked to point to the mark on the chart that indicated their own child's last weight, 51% were able to do so and to state correctly whether the child had grown satisfactorily or not at the last weighing. When they were asked to interpret three sample charts, with weight lines indicating satisfactory weight gain, inadequate gain, and weight loss, 50% were able to interpret correctly two of the three sample charts. It is interesting to note that 32% of mothers who had never attended the sessions, and thus had no chart, were able to interpret correctly two of the three sample charts. However, attendance at child health sessions was significantly associated with correct interpretation of the growth charts even when the mother's educational level, the most strongly associated variable, was controlled for.

Illiteracy is not an absolute barrier to understanding charts: 20% of mothers who had no schooling were able to answer the questions concerning chart interpretation. Although health workers claimed that illiterate mothers were

Table 6. Mothers' knowledge of growth charts.				
Knowledge about charts	Nonattendees		Attendees	
	No.	%	No.	%
Knowledge of purposes of growth chart (2-3 correct answers)	7/105	7	198/442	44
Correct interpretation of own child's chart	n.a.	n.a.	224/442	51
Correct interpretation of 2 of 3 sample charts	34/105	32	238/442	54

Table 7. Mothers' knowledge and practices re feeding of young children.				
Knowledge and practices	Nonattendees		Attendees	
	No.	%	No.	%
Response to child's lack of growth (3—4 correct answers)	44/105	42	293/442	66
Response to anorexia (1—3 correct answers)	80/105	76	346/442	78
Introduction of all solid foods before 9 months	55/105	52	244/442	55
Mothers' beliefs re feeding four times a day for children 1—2 yrs.	38/105	36	143/442	32
Index children eating three or more meals on previous day	37/53	70	221/281	79
High-quality food eaten on previous day	16/53	30	101/281	36

unable to understand the chart, it was noted during the child health sessions that about half of the mothers of at risk children were briefly shown their child's chart by the health worker. These results show that mothers took some interest in being able to interpret the growth charts, and that a much larger percentage of women would likely be able to understand the charts if the program made a consistent effort to educate them. Sixty percent of mothers reported that their partners asked to see the charts on their return from a health session.

Interest in weighing is considerable. A survey in nine health zones around Kinshasa of 3590 mothers found that 64% of mothers named weighing and vaccinations as the main reasons for attending child health sessions. The third most important reason was learning new information, mentioned by 52% (CEPLANUT 1986).

Mothers were asked six questions (Table 7) to ascertain their knowledge and practices with regard to the feeding of young children, as taught in the child health sessions. The easiest question for them to answer concerned their response when a child was not growing well. They had obviously remembered from the child health sessions the variety of foods recommended, which they said represented a change from the more restricted traditional diets for children. They also answered a further question on knowledge, which was how many times a day a child of 1—2 years of age should eat. The ability to give correct answers to these questions on knowledge of child feeding was strongly related to mothers' education and to attendance at child health sessions, even after education was controlled for.

Reported feeding practices were, by contrast, most affected by the mother's tribe, and not by her education level and attendance at child health sessions. Mothers were asked four questions concerning their practices: what they did for a

child with anorexia, what foods they fed a 9-month-old child, how often their child of 12–23 months of age had eaten on the day previous to the survey, and the quality of the food eaten.

The influence of tribal affiliation on food habits was understandable, in the light of the local economy and the food available to mothers, and the strong role of cultural norms in food habits (Nations 1985). There were two tribes in the area, one that mainly relied on subsistence agriculture for their livelihood, and the other an agropastoral group, whose diet largely consisted of the milk, butter, blood, and meat of their cattle. The individual counselling and group health education at the sessions did not take these differences into account. The health workers emphasized that mothers should give beans, cassava leaves, groundnuts, and other such agricultural products to young children, products that would mostly have to be bought by mothers of the cattle-raising tribe.

Although anorexia was a frequent complaint of mothers at the child health sessions, the health workers did not address this problem either individually or in group health education. Nor did they discuss the question of postillness feeding, in spite of the large amount of illness in the children attending. Discussions with the mothers to elicit their ideas on feeding, based on the different food resources of the two tribes, did not occur.

The last three questions that mothers answered concerned their knowledge of the causes of diarrhea, what they did when their child had diarrhea, and their ability to make oral rehydration solution. Three-quarters of mothers could name at least one correct cause of diarrhea, but only 13% of mothers could correctly describe how to make an oral rehydration solution from sugar and salt or from the packaged powder.

In the four group health education sessions observed on this subject, the nurse discussed the causes of diarrhea at some length, but devoted only a few minutes to telling the mothers how to make a rehydration solution. No demonstrations were given. The VHWs who helped at the child health sessions had been taught during their initial 2-week training how to mix a solution from sugar and salt, or from packaged ORS, but they had never taught it to mothers and had forgotten the procedure. The nurse and VHWs revealed that they did not really believe that the rehydration solution was more effective than the traditional "teas" given to children, and they also knew that sugar was expensive and difficult to find. The program had never taught them alternatives such as rice or cassava-based solutions.

In spite of the relatively poor quality of the health education, it is clear that the topics most frequently taught in the child health sessions had been well learned by mothers, especially by those with higher attendance rates. The educational level of the mothers strongly influenced their ability to answer most questions correctly, although attendance rate still had an effect after controlling for education and other confounding factors. The main exception was child feeding practices, which were most strongly influenced by tribal affiliation.

Discussion

Growth Monitoring for Screening At-Risk Children

Growth monitoring has been advocated as a way to increase the efficiency of health services through the targeting of services to individuals. Information on the child's weight trend combined with skilled questioning and examination should accurately identify children at increased risk of subsequent morbidity and mortality.

Whether the inclusion of weight information is critical to this process is far from clear. In this study, the health workers did not select one-third of the children with growth faltering for an intervention, in spite of having accurate weight information available. Much of the growth faltering was due to recent illness, information that can be obtained simply by questioning the mother and does not require weighing. Most important, the proportion of children who were classified as at risk at the health sessions was so high that the theoretical gain in efficiency was lost by the considerable time required for the weighing and charting procedures. Most children attending were under 3 years of age and appeared to experience the frequent morbidity pattern usual to this age-group in developing countries (Rutishauser 1974; Van Lerberghe 1987; Chen and Chaudhury 1980). Screening is not usually carried out when conditions are known to be widespread, such as iron-deficiency anemia in pregnant women; treatment is given to all women attending antenatal services.

The impact of screening also depends on the frequency, regularity, and representativeness of screening (Lilienfeld 1980). The frequency of attendance of children under 3 years of age who were registered in the program was reasonably high in two of the program areas. However, the phenomenon of an inverse relationship between need and use of services was evident in this study: the community survey in Boga showed that children attending the sessions were self-selected for being less at-risk than nonattenders. All of these factors considerably reduced the utility of growth monitoring for screening purposes.

Another utility claimed for screening by growth monitoring is based on the interest of mothers and families in knowing the weight of their own children. This study showed that mothers did make an effort to understand the growth charts, although they relied mainly on behavioural signals to assess their children's health. This interest was not powerful enough to influence mothers with the most at-risk children to attend child health sessions as frequently as other mothers. No studies have been reported that show growth monitoring motivates mothers to attend more frequently (Gerein 1988).

There are two main alternatives to screening by growth monitoring in these program areas. One would be to consider that all children under 3 years of age are at risk, if not this month, then in the near future, of growth faltering for various reasons. Interventions would then be aimed at mothers and young children as a group, complemented by individual medical treatment of ill children. The other alternative would be to use a less time and labour-intensive method of screening, which was at least as accurate. In this area, the health workers were familiar with the local population and knew the families likely to have children at most risk of serious malnutrition. The time saved from mass weighing could be used to make home visits to those families, who do not often come to the health services.

Growth Monitoring for Design of Interventions

Growth monitoring was used by health workers along with other diagnostic information to decide on interventions, but the interpretation of the weight trend did not lead to correct action in one-third of cases of growth faltering. Counselling of the mothers, with some notable exceptions, had most of the deficiencies described in the literature (standardized, nonspecific, directive, inadequate with regard to the care of ill children) (Gopalan and Chatterjee 1985; Reid 1984; Alnwick 1985). The written guidelines available to health workers on what to do in the case of growth faltering were nonexistent, unusable, or inadequate. At least one study has shown that the growth chart was not a significant motivator for mothers to conform to advice (Reid 1984).

The separation of preventive from curative care meant that ill children, who made up a large proportion of children with growth faltering at the sessions, could not be treated during the sessions. They were referred for curative care, thereby reducing the likelihood of their receiving treatment. The availability of immunizations and antenatal care at the sessions was convenient for mothers, although one study in Bangladesh has shown that the inclusion of growth monitoring in health programs did not lead to greater utilization of primary health care interventions (Karim et al. 1991).

Even though communities in two of the programs were involved in the management of their health centres, the child health activities had been planned and organized by the health service without direct consultation of mothers and communities as to what activities they wanted to have in the program and how they wanted them organized. The programs had little contact with other development organizations. Community participation was essentially defined as obtaining inputs from the community for the goals of the health service and increasing the use of the health service, rather than as increasing people's control or even their collaboration with the health service.

This had two main consequences. First, the program had to manage very large numbers of children with few qualified staff, and this affected the quality of treatment and counselling. It restricted coverage, as health workers had no time to seek out high-risk children who did not attend the sessions. Nor did they have time to actively follow up malnourished or very ill children seen at the sessions. There was little possibility to widen the scope of activities beyond the curative and preventive health services already offered. This led to the second main effect, that some of the more complex underlying reasons for malnutrition could not be dealt with satisfactorily. Without the community's understanding of the issues involved and their willingness to participate in remedial actions, a substantial improvement in the quality of the services offered at the sessions was beyond the resources of the health service, not to mention the possibility of wider health-promoting activities.

The interventions in these programs were quite limited and often of poor quality. This could be partly attributed to a belief by some managers that the health service could not be effective in improving nutrition. One program manager had carried out research that indicated that malnutrition resulting from infectious illness could be reversed by treating the illness and perhaps urging the parents to give more intensive feeding for a limited time-period. In contrast, malnutrition, which was chronic and had long-term social causes such as very poor or neglectful parents, was beyond the capacity of the health service to deal with effectively (Melotte 1987). Another manager felt that as most malnutrition in the area was due to poverty, the answers were to be found in agricultural and economic improvements rather than health education (Malengreau 1987, 1988). If these beliefs were transmitted to health workers during their training and supervision, they would, accordingly, be less interested in and capable of undertaking any independent analyses of their own or any aggressive interventions, especially those that were outside the usual range of the health services.

Growth Monitoring on Health and Nutrition Programs

Growth monitoring profoundly affects the design of programs that aim to deal with child health. It seems to put a straitjacket on the thinking that goes into nutrition problems especially. The resulting characteristics of the care provided, its quality, efficacy, and appropriateness, have an important effect on people's decision-making about the use of health services (Heggenhougen 1991). Growth monitoring as commonly practiced, as described in the three programs, adversely affects the attitudes and behaviours of health personnel, the appropriateness of health education and communication with users, and the organization of health care.

A number of evaluations of programs using growth monitoring have found that there has been an imbalance in the amount of resources put into acquiring weighing scales and charts and training health workers to weigh and chart, compared with the amount of resources allocated to the programmatic response to growth faltering (Gopalan and Chatterjee 1985). To train health workers to deal competently with nutrition problems can be complex and costly, and may require preliminary local research, and this type of training is more easily lost when budgets must inevitably be trimmed. Because accurate screening is considered a basic element before interventions can be effectively provided, and because training in weighing and plotting can be imparted quickly, it is tempting to retain this part of the training program and hope that the health workers' basic training will enable them to deal with the rest. This absolves the trainers from dealing with the inadequacies of the workers' basic training in nutrition and the managers from developing programmatic responses to malnutrition beyond the level of the individual worker.

Even if training requirements were adequately dealt with, the problems of effective service provision are only 15% related to training, and 85% related to operational considerations, such as logistics, communications, personnel policies, supervision, and financial and administrative regulations, etc. These latter elements present continuing challenges, some of which may be beyond the capacity of local managers to resolve. In the area of nutrition, which may require efforts to coordinate health services with other local services, the requirements become even more complex. Donors and program managers put much of their hope and effort into the training of health workers, rather than into the other fundamental elements that affect the quality of health service delivery.

The seeming simplicity of growth monitoring is part of its attraction. For policymakers and program managers, who are continuously grappling with severely limited resources and looking for "sellable" programs that are attractive for politicians, growth monitoring strongly favours an emphasis on the production of

anthropometric information, rather than on the use of the information to devise and evaluate effective interventions. The presence of weight information, rather than encouraging deeper analysis, gives the comforting illusion that the information required for action and measurement of the effectiveness of that action is available.

This illusion stifles evaluation and research by program managers and policy-makers and stifles the questioning and curiosity of health workers about health and nutrition problems. Such superficial analysis and program response is well illustrated by the difficulty that Boga mothers had feeding young children even three times a day. More mothers (33%) knew that eating more than three times a day was desirable for children 1–2 years of age than were able to carry it out (19%). The health workers recognized this difficulty and thus did not advise mothers to feed their child more frequently. But they did not work with mothers or the village as a whole to devise any other response to this problem, seeing it as a problem to be solved by the individual mother. Growth monitoring seems to maintain a rigid focus on the immediate causes of growth faltering in the individual, such as inadequate dietary intake and illness, rather than on underlying and common factors, like household poverty, unsanitary environments, and inadequate child care (UNICEF 1991).

Doing growth monitoring in the context of health sessions, where illness is treated in an individual and nutrition problems are also treated in an individual, encourages the health system to emphasize the role of the individual mother in child health and nutrition. This is logical in view of her primary role as care-giver, but not useful in view of the existing stresses on her time and energy, and her relative powerlessness and lack of access to resources in these societies. Fathers, who control resources in the family, and village males, who control village economic and political life, are not exposed by the program to information about and analysis of nutrition and health problems and are not asked to assist in their resolution. The special role played by the extended family or the neighbours is not brought into the therapy. This emphasis on the individual child and mother is maintained even though the reasons for and solutions to growth faltering may be common to the great majority of the children.

Having growth monitoring in the context of health programs also encourages the attitude that the detection of nutrition problems in young children leads to effective action, just as the detection of pneumonia leads to effective action, such as the prescription of an antibiotic. No questions are asked and no measurements are made of the effectiveness of either intervention. Using an algorithm to diagnose and treat an individual child may be logical in pneumonia, but is not so helpful for nutrition problems where causes and solutions lie outside the purview of the simple prescription of drugs and advice. Yet when it is obvious

that a child's nutrition status is not improving, in spite of faithful weighing and prescriptive education by the health worker, it is understandable that the health worker tends to become discouraged and to withdraw from the problem in favour of more rewarding curative work.

Many studies show the great importance of the health worker's perceived attitude in people's assessment of care and their health seeking behaviour (Heggenhougen 1991). For health personnel doing growth monitoring, the time required to deal with so many individuals precludes all but a superficial analysis of problems at the individual level and a standardized, repetitive response. The result is a didactic rather than an interactive approach in which the mother's knowledge and creativity are tapped in an effort to find solutions. The hasty provision of an inadequate answer and brisk dismissal leaves the mother with the perception of a health worker who does not know, or care, about her child's problems.

Growth monitoring provides seemingly neat answers for health workers who are dealing with large numbers of children in time-pressured situations. However, the answers do not respond well to many of the varied situations faced by parents of young children. The evaluation of a program in Thailand found that mothers thought suggested actions by village health volunteers to be simplistic and prescriptive and impossible to implement (Ministry of Public Health, Thailand 1991). The simple technological response leaves the mother to find a more comprehensive answer to why the child has a problem and how to treat it, which may involve using alternative health care systems. This finding from Thailand is striking in that this perception is held of village volunteers. It has been suggested that effective treatment and compliance with treatment depends on the quality of the "therapeutic alliance", the interaction between providers and users of health care. The strength of the alliance depends on the degree to which a social and cultural gap exists between patient and provider; there should be little such gap between village volunteers and mothers. It may be that the symbols used in growth monitoring, and the character of the treatment process itself, mitigate against acceptance of the treatment (Heggenhougen 1991).

How then has "growth monitoring and promotion" become such a popular phrase, implying that growth promotion requires growth monitoring? Why do health planners propose to funders programs called "growth monitoring and nutrition", when they would not think of proposing a program called, for example, "X-rays and tuberculosis control" or "blood testing and malaria." What is the attraction of growth monitoring over blood-testing, or over X-rays? Used in the same way as these for screening, growth monitoring should not have a life of its own but should be, when screening is necessary, a minor part of larger activities to improve health and nutrition. The attraction perhaps lies more in the perception

of literate people, who are also trained to seek scientific measurements of disease, that growth monitoring information is a valid measure of pathology and health, satisfying to care-givers as a means of validating their diagnostic acuity. Growth charts can act to stimulate them to undertake various actions; perhaps there is an unconscious belief that the mother will also be so stimulated. The danger of growth monitoring is that its information provides the illusion of effective action, while the sociocultural, economic, and political factors that are the determinants of health in primary health care philosophy are ignored. Growth monitoring only too easily substitutes for growth promotion.

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Successful Growth Monitoring in South Indian Villages

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The use of growth charts was pioneered by Morley (1968), with the Ilesha weight card in 1959. The original objectives of the growth charts were to motivate the health care worker, who would in turn encourage the mother to provide better child care to avoid faltering of growth. The regular monitoring of weight also enabled the worker to screen for children at risk of malnutrition. In 1961, the Joint FAO/WHO Committee on Nutrition (WHO 1961) recommended the use of growth charts. Currently, about 300 different charts are being used in over 80 countries (Jelliffe 1990). The term growth monitoring and promotion (GMP) was later adopted, and UNICEF included it in its Child Survival Strategy called GOBI (Grant 1983) growth monitoring (GM), oral rehydration, breastfeeding, and immunization. The use of GMP has become controversial in recent years (Anon 1985; Taylor 1988). UNICEF's Executive Director, Jim Grant, claims that if the early signs of growth faltering could be made visible to the mother and she were made aware of the special needs of her child, then it would be possible to prevent half, or more, of all child malnutrition in the developing world using existing family resources (Grant 1985).

The appropriateness of GMP to identify children at risk of malnutrition in poor societies, where most growth faltering occurs, is being challenged (Gopalan and Chatterjee 1985). Questions have been raised about the feasibility of GMP in illiterate communities (Gopaldas, et al. 1990) and the ability of village level workers to ascertain causes of growth faltering (Nabarro and Chinnock 1988). The only point on which both sceptics (Gerein 1988) and advocates (Rohde 1990)

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of GMP agree, is that the effectiveness of GMP has not yet been demonstrated. Rohde (1990) comes to the defense of the "failure of GMP" by stating that GMP in fact has never been carried out. The few evaluations (Griffiths and Manoff 1984) of GMP effectiveness have been unconvincing or inconclusive for the following reasons: (a) poor participation by mothers, (b) lack of controls or inadequate controls, (c) lack of measurement of chart comprehension, or (d) no evidence for dose-response. We are unaware of a GMP program that has convincingly demonstrated a real decrease in the incidence of severe malnutrition.

Today an estimated 50 million children in the developing world are being weighed as part of GMP but often with very limited attention to interpretation of the growth and with little interaction with mothers. For this reason alone a demonstration that GMP can be successful and indications of the conditions necessary for its success are of crucial importance. In Southern India, a large, carefully monitored field study has recently been completed in villages where over 60% of the mothers were illiterate. Our objective was to assess the effectiveness of GMP (as measured by changes in mothers' comprehension and children's anthropometry) when conducted within the context of a functioning primary health care (PHC) system.

Subjects and Methods

Study Design

The villages mentioned in this paper constitute a part of a major community intervention trial on the effectiveness of GMP, which involved 4 years of fieldwork in 16 villages. In the major trial, there were 14 villages (12 intervention villages and two control villages called CON-IN villages) within the context of a (preexisting) functioning PHC system and two control villages without PHC (CON-OUT). This research endeavour implemented two kinds of interventions: GMP and no-growth monitoring package (NGM) of interventions in six villages each. The only difference between the GMP and NGM villages was that health and nutrition education was carried out in GMP villages through growth charts. All preschool children in GMP villages were weighed every month by the village nutrition workers. Both the mothers and village nutrition workers (VNWs) in the GMP villages knew how to interpret growth curves and what actions to take to promote good growth and to prevent faltering of growth. In the NGM villages, growth monitoring was not performed by the VNWs and, therefore, neither the mothers nor the VNWs knew how the children were doing with respect to weight of the children. But similar other interventions as in GMP villages were implemented and VNWs spent as much time on nutrition education and counselling as in GMP villages.

The objective of this paper is to demonstrate that GMP was indeed implemented successfully and, therefore, looks at the comparison of the growth outcomes in the six GMP villages and the four control villages. The comparison between the six GMP and six NGM villages will be published in detail elsewhere and reveals the marginal effectiveness of the growth monitoring component (i.e., the added benefit of the use of growth charts over a comparison group NGM, which received all other interventions except growth monitoring and where the VNWs had the same contact time with mothers as in the GMP villages) (George 1992).

Study Population

The study was carried out in 10 villages (a population of approximately 11,000) of the North Arcot District. The six villages with the growth monitoring package of interventions (GMP) and the two control villages (CON-IN), all noncontiguous, were in the K.V. Kuppam Block. The other two control villages (CON-OUT) were in the Arni and Polur Blocks. The Rural Unit for Health and Social Affairs Department (RUHSA) of the Christian Medical College and Hospital, Vellore (CMCH), has been working in the K.V. Kuppam Block for over 12 years providing health services on behalf of the government. The Welcome Research Unit of CMCH has long been following diarrhea morbidity in the CON-OUT villages. The GMP and CON-IN villages were selected from around 80 villages in the Block because they were not participating in the government nutrition program, the Tamil Nadu Integrated Nutrition Project (TINP). The two CON-OUT villages were TINP villages in principle only, due to poor community cooperation. Approximately 80% of children in the GMP and CON-IN villages were enrolled in the child care service program of the existing PHC system and each had been provided with an Under-Five Growth Record, locally known as the Yellow Card. This card was used to record immunizations and not for GMP. Living in the Kavanur village from September 1986 for 4 years, the principal researcher identified study villages, selected workers, organized training, and ensured the quality of services provided and assessments undertaken.

Ethics

This study was approved by the Cornell University Committee on Human Subjects, the CMCH Research Committee, and the Indian Council of Medical Research, New Delhi. Informed consent was obtained from the parents who were free to refuse any of the services offered while receiving the other services they wanted. No family in the GMP villages refused all services, and fewer than 3% of children consistently refused to participate in GMP. For ethical reasons, severely

malnourished (Gomez - 3rd Grade) children (Gomez et al. 1956) in all villages were assured of free nutritional rehabilitation in the pediatric ward and were personally followed by the principal researcher.

Interventions

In the GMP villages the following services were offered free of cost:

- Monthly growth monitoring by the VNW. The growth chart was used to facilitate health and nutrition education of the mothers. Educational films were also shown.
- Immunizations at the village and antenatal services at the peripheral rural clinic.
- Comprehensive curative care by means of a well functioning referral structure, which consisted of weekly peripheral rural clinics, inpatient care as needed at the 60-bed RUHSA hospital and specialty care at the teaching hospital (CMCH in Vellore town).
- Deworming of children aged 1–5 years of age about every 5 months.
- Distribution of vegetable and fruit seeds and saplings twice during the study period.

In contrast, the CON-IN villages received only PHC services (interventions two and three in above), and the CON-OUT only curative care provided weekly by CMCH.

Anthropometry and Assessments of Maternal Comprehension

The implementation of interventions and the assessment of outcomes were conducted by independent workers. Mothers in GMP villages were interviewed between March 1987 and June 1988, before the interventions were introduced, to assess their comprehension of growth charts. In these villages, all mothers of children born between 1 October 1986 and 31 March 1989 were interviewed again between November 1989 and January 1990 by the same interviewer. A household census was followed by a preliminary weighing of children in all 10 villages in April 1987 to ascertain the willingness of the communities to accept weighing. Children were weighed using hanging Salter balances to the nearest 0.1 kg, and stature was measured using a standard measuring board to the nearest mm up to 105 cm. The baseline and final anthropometric measurements were taken in July 1987 and May 1989, respectively, with intermediate assessments carried out at 4-month intervals in the GMP and CON-IN villages. In the CON-OUT villages, children were measured every 8 months because parents objected to more frequent weighing.

Growth Monitoring Intervention

The growth of all children under the age of 5 years was monitored by monthly weighing according to policy enunciated by WHO and Morley (WHO 1978). The Tamil language version of the WHO growth chart was used. One VNW was selected in consultation with the community and local PHC workers for each village. The VNWs were initially trained by health educators for 2 months and for another 6 months by the supervisor and the principle researcher (PR) in their own villages. Five VNWs had completed primary school (4 years) and one had no schooling. The supervisor had 10 years of schooling and had worked as a health aide in the PHC system for 3 years.

The VNWs had responsibilities and remuneration very similar to those in the government nutrition program. The major differences in the present study compared with TINP were that no food was provided to the children as part of the program and that GM and most other services were provided at home rather than in the clinic. This was to ensure maximal coverage and the best possible understanding of the growth charts. Each VNW was in charge of monitoring about 100 under-5 children. She visited about 10 mothers during each 7-hour working day. She spent around half an hour with each mother on at least two child visits made per month. The supervisor visited each village twice a week and independently checked about 20% of the weights every month. Every 4 months, all the growth charts were withdrawn from the mothers to check for accuracy and completeness of the weights plotted. Less than 2% of the weights taken by the VNWs were found to be incorrectly measured or plotted.

The mothers' interpretation of plotted weights were ascertained by the VNW. Good growth was complimented. If growth (as indicated by weight gain) was inadequate, attempts were made to identify reasons for the inadequacy and corrective steps were discussed, and during the next visit the worker would verify that these actions were implemented by the mother. Breastfeeding was encouraged and bottle feeding discouraged. Appropriate medical care for illness (including use of ORS and homemade cereal-based rehydration preparations for diarrhea) was emphasized. Feeding frequency and energy density of weaning foods was stressed. Preparation of locally acceptable weaning foods was demonstrated. The mothers were advised on personal and environmental hygiene, and on avoiding contamination of food and water. The supervisor also visited all children under 6-months of age who were not gaining weight and children under 12 months who were losing weight. If no further improvement was seen the following month, these children were referred to the rural hospital. All older children who did not gain weight for 3 consecutive months were referred to the rural hospital.

Initiation and Coverage of GM

GM was not initiated as planned in July 1987 because many community members were unwilling to allow their children to be weighed. From July 1987 to January 1988 the VNWs visited homes and weighed children with the supervisor. These following months were used to train the VNWs in how to motivate mothers to appreciate the significance of weighing and how to deal with sceptical mothers. At the end of 6 months in January 1988, the supervisor distributed growth charts to all mothers, when over 50% of the charts had at least four weights already plotted. Because of this, from the first month of regular weighing and use of charts (February 1988), most mothers could visualize how their child was growing. The coverage of GM was 80% in the first month; about 9% refused and others were temporarily absent. Within a few months, the GM coverage exceeded 85% and monthly refusal rates fell to 5%. This is the highest coverage that could be achieved taking into account the workers' time constraints and mothers' activities.

Statistical Analysis

Nutritional status was calculated using ANTHRO program from CDC Atlanta. Analysis was done in GMP villages in comparison to both CON-IN and CON-OUT villages to give a true measure of effectiveness of GMP within the context of a functioning PHC system. The statistical significance of changes observed over time between GMP villages and CON villages was based on a one-tailed test. The changes in nutritional status are reported here by dividing observations from children in two age groups according to the child's age at the time: 3–23 months and 24–59 months. Among important reasons for using these age groups were: (a) the intervention was provided for 22 months and, therefore, the comparison of children aged 3–23 months at the baseline and the final round constitute two different groups of children; (b) the cutoff at 24 months seems logical because the NCHS/WHO growth standards have a discontinuity at 24 months (Dibley et al. 1987). Infants under 3 months of age were excluded because some were temporarily absent and prenatal factors have a major influence on their growth.

Weighted least square analyses of variance were done using SYSTAT and SAS. The contribution of the various variance components were estimated by using the "Variance Components Estimation Procedure" (Restricted Maximum Likelihood method) in the SAS program. Weight/age or stature/age Z-score was taken as the dependent variable and the effect GMP vs CON was treated as fixed.

Results

At the baseline assessment, 70% of the mothers stated that the purpose of the yellow card was to record immunizations, another 22% were not aware of the purpose, and only 3.8% knew that it was to record weights of children. When mothers were specifically shown the growth chart on the yellow card and asked what it was for, over 90% did not know, and only 8.8% knew that it was for weighing children. At the final assessment over 85% of the mothers knew that growth charts were for weighing children and that regular weighing enabled them to understand the growth of their children. About 55% of mothers could correctly interpret the complete growth profile of their children and some 64% of mothers could correctly describe each of the following trajectories of growth curves: (a) consistent weight gain, (b) consistent weight loss, and (c) consistent lack of weight gain. Finally, 65% could correctly indicate the trajectory of adequate growth, i.e., a growth curve whose slope is at least parallel to the standard curve. Coverage of mothers at assessment of growth chart comprehension was very high, both for the baseline (98%) and for the final visit (95%).

The distribution of ages of children measured at the baseline and at the final examination were similar. No significant gender differences were observed among the groups. The only exception was the final measurement in CON-OUT villages, where there was a disproportionate number of missed children older than 3 years. The variation of the mean Z-scores of weight/age (wt/age), stature/age (st/age) are primarily within villages; intervillage variances were relatively insignificant; however, these variances were taken into account in the analysis by weighting. For weight/age for younger children, the time within village variance (0.0069) was three times that of the intervillage variance (0.0025). The most significant component of variance was the child within time within village (1.0113). The variance estimates for stature/age were calculated similarly. The major contribution was from the child within time within village. Again intervillage variances were smaller than time within village.

Table 1 shows that the weight/age Z-score distributions shifted substantially more toward higher scores in GMP villages when compared with CON-IN villages particularly in children 3–23 months of age. Corresponding shifts were also observed in the stature/age distribution. The most striking change in the weight/age distribution was in the percent of most severely underweight children (weight/age ≤ -3.5 Z). In the GMP villages, the percentage of severely underweight younger children declined from 7.1% to 3.2%. This contrasts with both control groups where there were increases (see Table 1). Figure 1 reveals that the percentage of severely underweight children in GMP villages decreased in relation to the duration of the intervention.

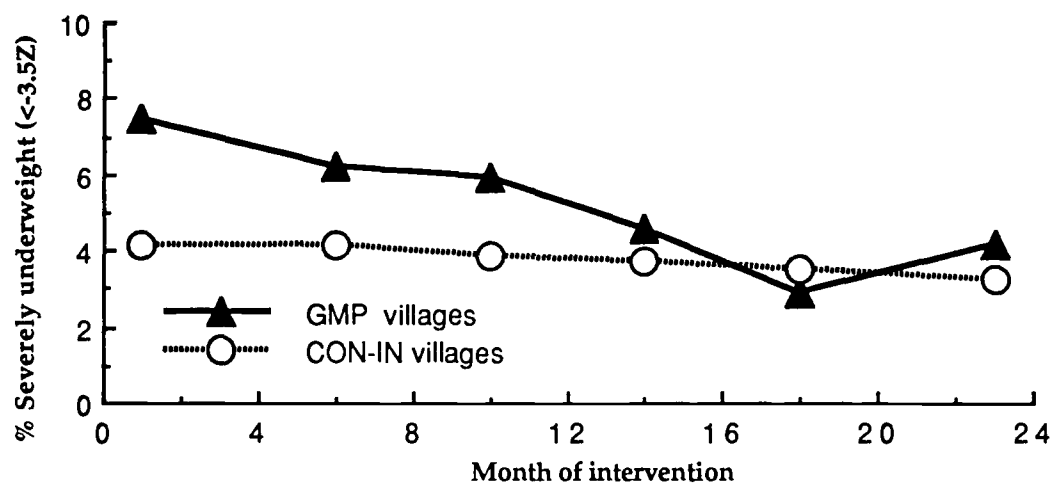


Fig. 1. Percentage of severely underweight children aged 3–59 months in two groups by month of intervention.

Table 1. Distribution (%) of study children by weight-for-age Z-score at baseline and final examinations in three groups.

Time	Baseline (%)						Final (%)					
Age (months)	3 – 23			24 - 59			3 – 23			24 – 59		
Z-score cutoffs	GMP	CON-IN	CON-OUT	GMP	CON-IN	CON-OUT	GMP	CON-IN	CON-OUT	GMP	CON-IN	CON-OUT
Z < -3.5	7.1	1.9	13.9	7.9	5.2	13.5	3.2	8.6	17.3	4.8	0	5
-3.5 ≤ Z < -2.0	56.1	50.0	46.2	63.5	56.5	59.4	52.5	40.0	42.3	61.0	55.7	66.3
-2.0 ≤ Z < -0.5	31.8	37.0	32.3	28.0	34.8	27.1	34.6	48.6	34.6	33.0	40.0	28.8
Z ≥ -0.5	5.1	11.1	7.7	0.6	3.5	0	9.7	2.9	5.8	1.2	4.4	0
Total number	198	54	65	318	115	133	217	70	52	336	115	80

Note: GMP = Growth monitoring and promotion, CON-IN = control village one, CON-OUT = control village two.

Mean Z-scores of weight/age and stature/age (see Tables 2 and 3) indicate improvements in children's weight and stature between 3 and 23 months of age in the GMP villages compared to CON-IN villages ($P=0.03$ for weight/age and $P=0.08$ for stature/age). The proportions of most severely underweight (weight/age ≤ -3.5 Z, see Table 1) and most severely stunted (stature/age ≤ -3.0 Z), children decreased more in GMP than in CON-IN villages (from 0.168 to 0.074 in GMP and from 0.111 to 0.130 in CON-IN). The log odds of most severe cases is significant at $P=0.11$ for weight/age and $P=0.02$ for stature/age. Figure 2 reveals that mean Z-scores gradually increased in GMP villages while in CON-IN villages there were some fluctuations but not much change. Figure 3 indicates that the percentage of most severely underweight children declined in GMP villages over time, whereas there was no decline in CON-IN villages. A similar decline could also be seen among the most severely stunted in the GMP with no relative changes in CON-IN villages. The nutritional status improvements occurred in each of the 6 GMP villages, which were scattered in the Block. There was much less change over time in the older age group (24–59 months). The only difference that could be observed was a decline in the proportion of most wasted children (weight/stature \leq minus Z \geq score) in GMP (from 0.186 to 0.139) with respect to CON-IN (from 0.100 to 0.083) villages ($p=0.18$). The coverage of anthropometric assessments at the intermediate visits were around 84% in the GMP and CON-IN villages and about 65% in the CON-OUT villages.

Table 2. Means and standard deviation (SD) of weight-for-age Z-scores by treatment groups at baseline and final examinations.

Treatment	Baseline		Final	
	Age (months)			
	3 – 23 mean (sd)	24 – 59 mean (sd)	3 – 23 mean (sd)	24 – 59 mean (sd)
GMP*	-2.260 (0.934)	-2.408 (0.755)	-1.971 (0.988)	-2.278 (0.772)
CON-IN	-1.986 (0.991)	-2.180 (0.841)	-2.010 (1.101)	-1.969 (0.724)
CON-OUT	-2.307 (1.085)	-2.563 (0.892)	-2.276 (1.082)	-2.346 (0.689)

* GMP = growth monitoring and promotion, CON-IN = control village one, CON-OUT = control village two.

Table 3. Means and standard deviation (SD) of stature-for-age Z-scores by treatment groups at baseline and final examinations.

Treatment	Baseline		Final	
	Age (months)			
	3 – 23 mean (sd)	24 – 59 mean (sd)	3 – 23 mean (sd)	24 – 59 mean (sd)
GMP*	-1.861 (1.121)	-2.309 (0.991)	-1.458 (1.067)	-2.212 (0.991)
CON-IN	-1.659 (1.158)	-2.131 (1.073)	-1.494 (1.073)	-1.891 (0.913)
CON-OUT	-1.791 (1.195)	-2.350 (1.178)	-1.738 (1.173)	-2.169 (.965)

* GMP = growth monitoring and promotion, CON-IN = control village one, CON-OUT = control village two.

Discussion

There was a dramatic increase in mothers' correct understanding of the purpose of the charts from 8.8% at baseline to over 85% at the final assessment. The comprehension outcomes indicate that even illiterate mothers can be taught to understand the fundamental concepts and use of a chart, including the graph and the slope. They appeared to use this understanding to provide better child care. The reported improvements in comprehension are underestimates because strict criteria were used to assess correct comprehension. For instance, a mother of a 3-year old child was asked to interpret the entire growth curve of about 32 months during which the child was weighed. A mistake on any part of the curve was rated as a wrong answer. Such strict definitions were used to avoid any ambiguity in the interpretation of mothers' responses.

There is considerable scepticism about the ability of illiterate mothers to comprehend charts (Ruel et al. 1990). Morley concedes that little is known about mothers' understanding, despite extensive use of charts (Forsyth 1984). Many previous efforts have failed to gain the necessary understanding of illiterate mothers, probably because of inadequately trained, poorly motivated workers, or limited interaction with mothers. We succeeded because care was taken in training and because of the excellent rapport the VNWs had with the mothers. Workers seemed to be viewed as confidantes of mothers with whom the pains of daily existence were shared, rather than simply as health workers or sources of knowledge.

The baseline anthropometric assessment truly reflected the preexisting levels of childhood malnutrition, being consistent for all 10 villages with the weighing survey done earlier. Malnutrition as judged by anthropometry is very prevalent. Despite the lack of random assignment of treatment to the villages, we infer that the differences observed in the GMP villages were not secular based on the fact that (a) these improvements were confined only to the GMP villages and (b) there was a dose response and the changes in nutritional status were preceded by observed changes in child care practices of the mothers. Furthermore, these improvements in status were observed at all levels of nutritional status in the younger children of GMP villages.

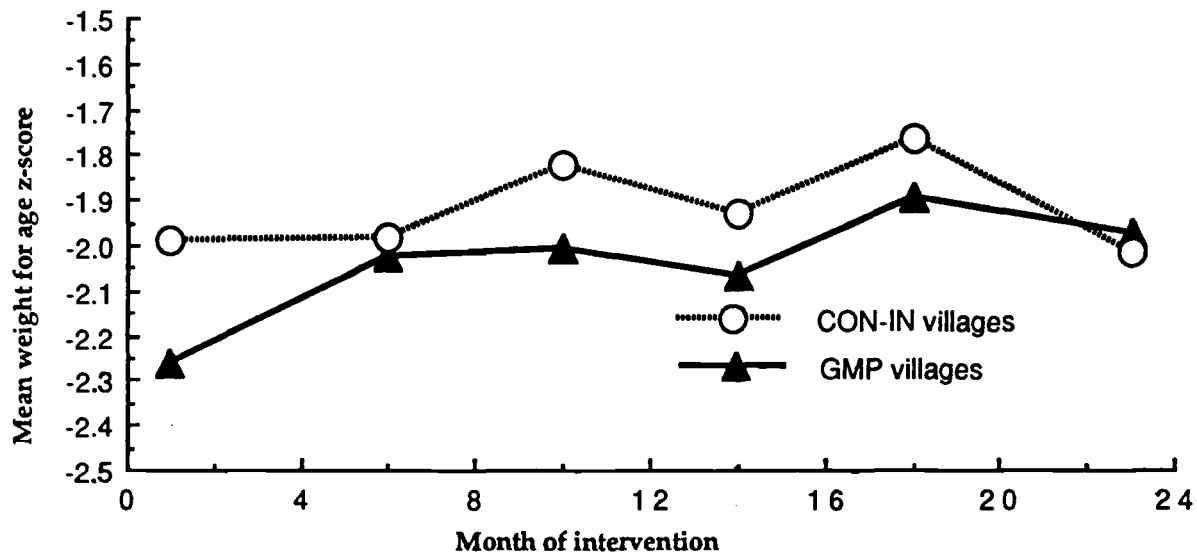


Fig. 2. Mean Z-scores of weight for age in children aged 3–23 months in two groups by month of intervention.

The changes shown in Figures 2 and 3 did not decrease in a linear manner in GMP villages due to seasonal confounding. Such seasonal variations in nutritional status have been reported in other countries (Brown et al. 1982; Nabarro et al. 1988). The consistency of seasonal changes in both GMP and CON-IN villages and the annual cycle observed confirm that the two groups of villages are comparable. Similar seasonal patterns could also be seen in the CON-OUT villages. The highest food intake in this region follows the October groundnut harvest and the November millet harvest. For this reason December assessments tended to show the best weight/age status. Limited food supplies and the highest temperatures (40–45°C) probably contribute to poorer weight/age status during the period from May to July. To avoid confounding by these seasonal influences, the baseline and final assessments were done in the same season (summer).

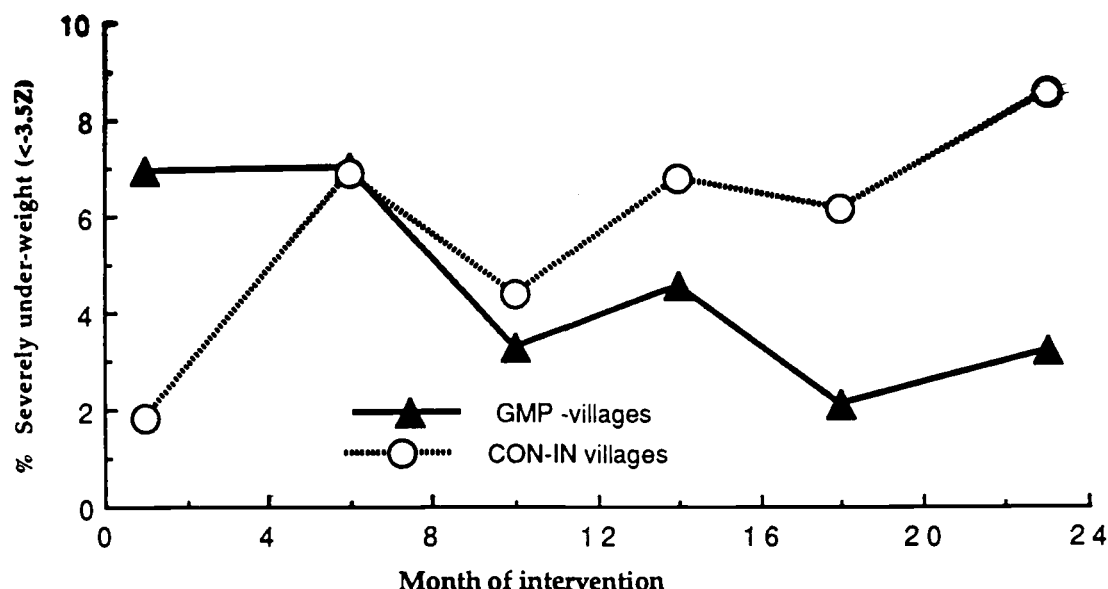


Fig. 3. Percentage of severely underweight children aged 3–23 months in two groups by month of intervention.

The consistent decline in the percentage of severely underweight children (Fig. 3), the gradual improvements in the mean weight/age Z-score (Fig. 2) and the similarity in trends that could be observed in stature/age in the GMP villages, indicate that the GMP interventions are related to a decreasing incidence of severe cases of malnutrition in young children and improvements in overall nutritional status. The fact that in both sets of control villages, spread over three blocks, there was virtually no improvement in nutritional status in young children over the entire study period confirms that the improvements observed in GMP villages were unlikely due to secular changes. The relative lack of improvement in anthropometry of older children is probably because these children were already stunted and wasted at the initiation of the study. Educational efforts initiated after 24 months of age did not appear to bring about significant changes in weight/age or stature/age in these older children. This finding adds emphasis to the view that GM should begin soon after birth (Hendratta and Rohde 1988). Currently, in most large GM programs, children under the age of one year have the lowest coverage.

The improvements in nutritional status were relatively consistent, physiologically plausible, seemed to follow the intensity of interventions (a dose response), and occurred only after the program implementation (temporality). This suggests that the GMP interventions were causally responsible for the observed improvements in the nutritional status. The results presented provide what is probably a very conservative estimate of the magnitude of the nutritional

benefits. This is because the analysis includes all the children in the six GMP villages, a few of which had severe congenital problems and were, therefore, unresponsive to educational interventions. The most extreme case was a girl, born just after the fieldwork was initiated with multiple congenital problems, who at the final round, was barely surviving with stature/age $Z = \text{minus } 7.8$ and weight/age $Z = \text{minus } 6.8$. Further, the initial nutritional status was better at the baseline in the CON-IN villages, and levels of education and socioeconomic status were higher than in the GMP villages. Several severely malnourished children in CON-IN villages benefited from hospital rehabilitation and this influenced results. We were not successful in getting the severely malnourished children in the GMP villages admitted to the pediatric ward of the rural hospital for nutrition rehabilitation because the families (particularly men) did not accept the absence of the mother from home as it meant disruption of household activities and agricultural work.

However, they were persuaded to visit the hospital periodically as outpatients and these children received additional home visits by the VNW, Supervisor and because of ethical obligations, special visits by the principal researcher. Most of the families of severely malnourished children belonging to the CON-IN villages utilized hospital-based rehabilitation because of the better awareness in these villages. Most of the refusals for weighings in the final assessment in the CON-OUT villages belonged to the lowest caste, which being the poorest had the worst nutritional status. Despite this bias it is important to note that the final nutritional status for younger children in CON-OUT villages essentially remained the same relative to the baseline (see Tables 2 and 3).

The improved growth outcome in younger children is attributed primarily to the GMP interventions rather than to the deworming or the horticultural interventions. We were advised by our donors to keep our intervention program as close as to the government model as possible and this included deworming. From the routine stool tests carried out at the rural hospital we knew that the prevalence of hookworm and round worms in children between the ages of 1 and 2 was very low. Only children above the age of one year were dewormed but there were improvements in growth of children between the ages of 3 and 23 months of age, which indicates that the improvements were likely due to the observed changes in childcare practices following the initiation of the educational intervention. The horticultural intervention was initiated a year after the initiation of other interventions. The fact that there was substantial improvement in growth of children even before the implementation of the horticultural intervention indicates that the improvements were likely due mainly to the GMP intervention.

It is necessary to emphasize that the effort involved in undertaking good GMP in these villages is not replicable in government programs in Indian villages because of the cultural attitudes against weighing. Our field team succeeded because they were very patient and persevered with great determination to convince the community about the usefulness of weighing and charting. The principle researcher had originally hoped to complete 12 months of GM in 15 months. However, it took 16 months (from September 1986) of field effort to initiate GM. The primary objective of this research endeavour was to assess the effectiveness of GMP in Indian villages under the best possible field conditions, i.e., doing GMP at house visits in the context of a functioning PHC system. However, this study has external validity in societies where there are no cultural problems associated with weighing and charting as we have shown that even in villages where there is strong prejudice against weighing and charting, good GMP in the context of a PHC system resulted in better growth.

Our experience in the North Arcot District indicates that successful results can be obtained by conducting GMP in a PHC system without food supplements. We think that a well-functioning PHC system may be more effective as well as preferred by the community over distribution of food (Chatterjee 1987). The excellent cooperation received from the community was because of the holistic approach to health care, where many aspects were emphasized: promotive, preventive, curative, and rehabilitative. The VNWs were well motivated, particularly because their referrals were well taken care of. This increased their respect and status and, consequently, their effectiveness in working in each community. Good implementation of GMP in this program seemed to increase food intake of weaning children, to increase the use of homemade rehydration solutions for diarrhea, to improve the utilization of medical care, and to raise the coverage of measles immunization and antenatal services.

It is these activities as part of GMP that probably contributed to the better growth observed. We conclude that GMP can be used to benefit the health and nutritional status of children *if it is feasible to be implemented properly within the context of a functioning PHC system*. Unlike oral rehydration therapy for diarrhea, it is not a curative approach and, unlike immunization, it is not a magic bullet, effective against particular infectious diseases and requiring little behavioral change. Good GMP can assist mothers to take actions to improve the growth and well being of their children over the long term (Latham 1991).

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Evaluation of the Community-Based GMP Program in Embu District, Kenya

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Introduction

The Community-based Child Growth Monitoring Program (CBCGMP) of Kenya was started in 1987 in Embu, one of the six districts of the Eastern Province, as an experimental project. The program was implemented in three locations covering 14 sublocations (i.e., an administrative area, within a location and under an assistant chief). In 1990, the district had a population of 429,741 with a density of 158.3 persons per square kilometre. Population of children under 5 years was 96,203, whereas that of females aged 15–49 was 87,136 (Population Projections for Kenya 1980–2000). According to a survey carried out by the Central Bureau of Statistics (CBS) in 1981/82, 22.3% of all children below the age of 5 years in the district suffered from chronic malnutrition.

UNICEF and the Freedom From Hunger Council of Kenya (KFFHC) assisted in program implementation. UNICEF provided equipment, e.g., scales and stationery, funds for training, and a vehicle for the transport of supervisors to the weighing centres. The community contributed volunteer personnel at the weighing centres, while the Ministry of Health provided nutrition fieldworkers who supervised the weighing centres. UNICEF also assisted in the evaluation of the program and publication of the annual health report to the Ministry of Health in which the CBCGMP was included.

KFFHC also operated the Applied Nutrition Program (ANP) in one of the locations covered by the CBCGMP program. The ANP was multidisciplinary in nature and included the provision of in-kind credit for food production, water, health, and nutrition projects. The ANP focused on the nutritional status of children aged 0–60 months and pregnant and breastfeeding mothers.

The ANP provided personnel to the CBCGMP at the community level in the one location where it operated. It had one nutrition fieldworker and a community-development assistant concerned with supervision and coordination of

the program in the location. The Ministry of Health had one nutrition field worker attached to a rural health training centre in the area who worked in collaboration with the ANP personnel in the field.

The communities provided personnel for growth-monitoring activities. In some centres, through local arrangements made between the mothers and committee members, mothers were expected to pay monthly fees of about two shillings per weighing session. Where a mother could not raise the fee she was allowed to have her child weighed on credit. Funds raised were used to pay the committee members in some centres, purchase stationery, buy soap for washing weighing pants, pay for repair of worn out pants, and pay bus fare to allow committee members to attend meetings and deliver tally sheets to the health centres. In some centres, funds collected were used to buy materials for the construction of weighing shelters. Labour and some of the materials were, however, provided by the community.

Basic Program Components

Apart from weighing and charting, the mothers were counselled both individually and in groups on their children's health at the centres. Weighing sessions were also used as fora for teaching attending mothers lessons on family planning, agriculture, treatment of minor ailments, and general public health. In the ANP area, qualified persons were invited to educate the mothers on topics in which the program did not have the relevant skilled personnel.

Sick children were supposed to be referred by the committee members and nutrition fieldworkers to the facility-based centres (FBCs) as the program did not provide medical treatment at its community-based centres (CBCs). Immunizations were offered by community nurses at three centres located far away from the FBCs. Although the ANP provided food supplements to some households in this area, it placed more emphasis on the household's own food production than on food hand-outs. Through the livestock extension component some households received dairy goats or cows in two sublocations. Food production was encouraged through provision of farm inputs, e.g., bean and finger millet seeds and fertilizers loaned to the mothers in the needy households. The criterion for selection of households to benefit from the inputs was the presence of a malnourished child considered to be nutritionally "at risk."

The CBCGMP centres were simple stations lacking the complex structures characteristic of the FBCs. The location of the centres was determined by the mothers. Where the number of children attending a centre were too many to be managed efficiently, the population would be split into two with mothers

determining the site of the new centre. Mothers also selected their new committee members and the centre acquired its own weighing scale and stationery. The objective of the study was to conduct a process evaluation of the Community-Based Child Growth Monitoring Program in Embu district, Kenya.

Methods

The three locations in Embu District where the study was carried out were selected on the basis of having started the program earlier than the others in the district. From the three locations, nine out of a total of 14 sublocations were randomly selected, with three sublocations coming from each location. All the nine sublocations were mapped and subdivided into units marked by rivers, streams, roads, and/or paths. Three units were randomly picked and all children aged 5–60 months were enumerated.

The names of children who had utilized the program at least once were put into a sampling frame from which 450 children were selected through simple random sampling. Mothers of all the selected children were included in the study and a questionnaire was administered. The names of all the "nonutilizing" children were put into another sampling frame from which some 330 children were randomly picked and their mothers interviewed through a questionnaire.

From each of the nine selected sublocations, one weighing centre was randomly selected and included in the study. The selected centres were visited during a weighing session without the prior knowledge of either the mothers or the committee members. Materials available (e.g., scales, weighing pants, stationery, shelter) were enumerated and their physical condition and frequency of use at the centres recorded. The scales at the centres were assessed against a standard weight for accuracy. Committee members' skills were also assessed by observing their interaction with a total of 77 children. A number between 0 and 10 was randomly selected to identify the first mother in the sample. Then every tenth mother was identified as they entered the centre and one of her children used in the assessment of the committee members' skills. Where a mother had more than one child, the children were ranked in order of their ages and the index child chosen by use of random numbers obtained from an electronic calculator. An assessment was done of the committee member's performance in weighing, recording, and interpretation of results obtained from the 77 children. Later, the committee members were visited at home and interviewed through a questionnaire.

Results

Mothers' Population Characteristics

Out of the 448 mothers interviewed whose children utilized the CBCGMP, about a third (34.2%) were aged between 25 and 29 years while 12 (2.7%) were below 20 and 10 (2.2%) above 49 years. The majority (83.9%) of mothers were married, 15.0% single, and 1.1% either separated or widowed. Two percent were the head of the household. Most (96.4%) of the mothers were farmers, with only 16 (3.6%) being engaged in other activities as their primary occupations. A vast majority (81.7%) had some formal school education. Sixty-one (13.6%) had not been to school, whereas 21 (4.7%) had attended adult literacy classes but had no formal schooling.

Coverage and Attendance

Out of some 2220 children enumerated from the sampled units, 1638 (73.8%) had utilized the program at least once over the period between March 1987 and May 1991, whereas 582 (26.2%) children in the units had not registered in the program. Coverage in the sublocations ranged from 87.7% to 40.3%. Most (33%) of the children utilizing the program were found in the 13–24 months age group, the proportion declining steadily in older age groups. The lowest proportion (10.3%) of utilizers was in the 5–12 months age group (Table 1).

Table 1. Distribution of children in the program by age group.

Age group (in months)	Attending children	
	Number	Percentage
5–12	46	10.3
13–24	148	33.0
25–36	113	25.2
37–48	87	19.4
49–60	54	12.1
Total	448	100.0

Attendance and coverage were facilitated by the local assistant chiefs within their sublocations who encouraged parents through "barazas" (i.e., public meetings) and home visits to put their children into the program. Committee members and the nutrition fieldworkers also attempted to interest mothers in the

program. Health, social, and financial factors also influenced the attendance of children. The five most common reasons given by the mothers of "utilizing" children for missing weighing sessions, in descending order of frequency, were:

- Sickness of the child,
- Absence of mother from home,
- Sickness of the mother,
- Domestic commitments, and
- Lack of monthly fees.

The five most important reasons given by mothers of "nonutilizing" children for not attending were:

- Sickness of the child,
- Nearness to and use of a FBC providing GMP services,
- Lack of immunization at the CBCs,
- Lack of awareness of the presence of the CBCGMP in the area, and
- Mother's low confidence in the services provided at the CBCs.

Sickness of the child was the principal and the only common reason for both missing weighing sessions and not utilizing the program at all.

Time Expenditure

The study field assistants estimated the distance walked by mothers from their homes to the centres to be 0 to 3.5 km, with an average 0.9 km. Mothers estimated the time taken to walk to the centres to be 20.5 minutes on average. Waiting time before weighing at the centres varied from 0 to 300 minutes, with an average of 28.0 minutes. The average total time taken by the mothers at the weighing centres was 79.6 minutes. When travel time was included, mothers spent on average of 120.7 minutes per attendance in growth monitoring activities.

Mother's Nutritional Knowledge and Program Perspectives

From a test chart given to the 448 mothers interviewed, 331 (73.9%) interpreted a growth curve of a healthy, normally growing child as "good," whereas 33 (7.4%) interpreted it as "poor" growth. Of these 448 mothers, 393 (87.7%) associated a faltering curve with "poor" child growth whereas 26 (5.8%) interpreted it as "good" growth. Out of 426 mothers, 411 (96.5%) associated growth faltering with poor feeding, and 331 (77.7%) related it to disease. More than half (57.6%) of the mothers scored above 65% in a test on nutrition administered to them. The scores attained by the mothers had a weak positive

correlation with their number of years of formal schooling. (corr. +0.2). The 242 (54.6%) mothers who had received lessons at the CBCs performed significantly better than the 201 (45.4%) who had not (Chi-square=51.6 p=0.0084 df=30).

Most (92.2%) of the mothers felt that the program did not interfere with their other essential duties. Out of 444 mothers, 432 (97.3%) believed that their children benefited from the program. Of these, 382 (88.4%) credited the program for keeping them informed of their children's growth. Twenty-six (6.0%) appreciated that they walked shorter distances to CBCs than to FBCs, whereas 23 (5.3%) maintained that their children profited from the nutritional knowledge imparted to the mothers in the program.

Education and Training of Committee Members

Each of the centres was expected to have five committee members charged with the responsibility of weighing children, recording their weights, educating the mothers on child feeding, simple hygiene and treatment of minor ailments, referring needy cases to the FBCs, and making follow-up visits. Nevertheless, only four of the nine centres had five or more committee members. The nine centres included in the study had a total of 40 committee members, 39 of whom were accessible for interview. Of the 39 committee members, 27 (69.2%) and 12 (30.8%) were females and males, respectively. For the purpose of this study, committee members in the program were those members who had provided service in at least one weighing session between January and May 1991.

Table 2. Literacy level, training and period of service by number and percentage of committee members (n=39).

Committee members	With		Without	
	Number	Percentage	Number	Percentage
Formal education	35	89.7	4	10.3
Reading ability	34	87.2	5	12.8
Writing ability	34	87.2	5	12.8
Training	30	76.9	9	23.1
Retraining	0	0.0	39	100.0
Service > 2 years	18	46.2	21	53.8

Most of the committee members had some formal education, could read and write, and had been trained in program service delivery. Although most of the committee members were trained in program service delivery, none of them had been retrained. About a half of the committee members had served in the program for more than 2 years (Table 2). Of the committee members with formal education, only 14 (40.0%) had more than 7 years of schooling. In the previous one year, eight of the nine centres in the study had been visited at least once by a nutrition fieldworker for supervision. No supervision had been done at the centres from the district headquarters over the same period of time.

Data Collection and Utilization

Data collection at the centres was the responsibility of the committee members while mothers kept the growth cards. Data routinely collected included the name of the child, sex, village of origin, and nutritional status based on weight-for-age, which was classified as normal or underweight. No details of diagnosis or intervention were recorded on either the card or the register.

Data collection at the centres was inaccurately done, with errors arising from faulty scales, poor weighing skills, and recording. Of the nine scales in use in the nine centres, only four could consistently make accurate measurements as compared to a scale verified as accurate. Errors in accuracy of the five scales found to be out of working condition ranged from -400 to +50 gms. None of the nine scales had been serviced, but four had at one time been replaced with new ones, two of which were still in good working order. There were, however, no records of their dates of replacement.

About 43% of the children in the nine centres were weighed in heavy clothing, considered to be anything more than a vest and pair of pants. About 36% of the children had their weights read above or below the reader's eye level and 19.5% received correct advice or encouragement.

In all of the centres visited, attendance and monthly fees registers were maintained but none kept records on referrals to FBCs. Registers of children in the program area and those in need of follow-up were kept only in the three centres that were part of the ANP area of operation. In this area, although there was no recorded evidence of follow-up, data on growth monitoring were used to identify children for follow-up and households to receive food supplements, agricultural inputs, and livestock. Although data at the centres were complete, program statistics at the district level were incomplete for four of the nine sublocations.

Discussion

Process of GMP and Performance of Committee Members

From these results it can be concluded that GMP activities were not well carried out in any of the centres. Some scales were inaccurate, which led to inaccurate weight data being collected. Mistakes in reading and recording of weights likely resulted in a similar outcome. The subsequent interpretations based on wrong data collected could have led to inappropriate interventions being recommended for the child. Some children who were not at risk might have been recommended for referral or follow-up, whereas needy ones were left out. There was no recorded information of cases referred to the FBCs in any of the nine centres, although it is most unlikely that there were no cases in need of referral over a period of one year. There were some children in need of follow-up in three of the centres in the ANP area, but no information on whether or not follow-up was done or its nature.

Only a small proportion of mothers received correct interpretations of their child's growth trends from the committee members. The reason was that most committee members put more emphasis on the child's weight being maintained above the 3rd centile line for girls and the 80th centile line for boys on the card rather than on increase of its weight over time. Although velocity of weight gain is more important than status, this interpretation was, in most of the cases, used as the basis of counselling the mothers on the health of their children.

The poor quality of service provision at the centres, in spite of the fact that the vast majority of committee members had been trained, could be blamed on their low levels of formal education, inadequate training, and/or inadequate supervision. Routine program supervision, if properly conducted, should have revealed the deficiencies in service provision and consequently recommended actions to redress some of the problems.

Coverage and Attendance

The low attendance in the 5–12 months age group could be attributed to the fact that some mothers preferred taking their children to the FBCs until they received measles immunization at the age of 9 months. Also, it is in this age group that children are most vulnerable to disease; because the CBCs did not offer medical treatment, mothers likely opted to take their sick children to the FBCs. It is clear that the number of children attending declined after the age of 24 months. About a quarter of all the eligible child population did not utilize the program between March 1987 and May 1992. Although a large proportion of the

mothers felt that the program did not interfere with their essential duties, absence of the mother from home and domestic commitments remained some of the most important reasons for missing weighing sessions.

Dropping out of committee members resulted in some centres having less than five members. Discussions revealed that dropping out of committee members and subsequent closure of some centres, was the result of low or no payments at all for the services they rendered to the program. Some centres had more than five members because of the large number of children attending. The short duration of service of committee members (less than 2 years for half of them) could be attributed to the young age of some centres and to dropping out and consequent replacement of some committee members.

Nutrition Education

Most of the mothers had a good level of nutrition knowledge, evidenced by the finding that 57.6% scored above 65% in a test of nutrition knowledge. The positive, although weak, correlation between the test scores and number of years of formal schooling shows that the schooling may have influenced the mother's nutritional knowledge or her ability to acquire it. The reality that mothers who had received lessons at the CBCs performed significantly better than those who had not could not exclusively be attributed to the efforts of the program. The reason for this is that the mothers might have attained some of the nutritional knowledge from outside the program.

CBCGMP and Other Interventions

The program in the ANP area has acted as a good forum for the introduction of other PHC services, specifically, family planning for the mothers and immunization for children. According to the Embu ANP project document July 1989 – June 1992, in two sublocations in the area covered by the ANP, immunization levels were increased from the district coverage of 74% to 85% through the CBCGMP. These findings agree with those of Jon Rohde who suggested that in Haiti village-based programs led to increased utilization of PHC services (Ashworth and Feacham 1986).

Conclusions and Recommendations

It is clear that the current functioning of the program must be improved to increase its usefulness. The factors limiting proper implementation of the program include lack of personnel training and poor supervision together with shortage of funds necessary for purchasing stationery, transport, and payment of

committee members among other things. With inadequate training or no training at all of some of the committee members, the program is not in a position to meet its intended objectives. The program should, therefore, ensure that the committee members are given adequate initial training and are regularly retrained to maintain and update their knowledge and skills in GMP activities. Mothers should select committee members who have an adequate level of education and motivation.

Close supervision of GMP should be conducted both by the nutrition field workers and from the district headquarters. Through supervision, the areas in which the committee members need to be retrained could be identified. Faulty scales would be detected and repaired and unserviceable ones replaced. Regular supervision could also reveal some other problems unique to the individual centres and those in need of attention from either the community, the supervisor, the district headquarters, or the program implementors. Supervisors need to be provided with means of transport to the centres as some of the weighing sites are far from their working stations and inaccessible by public means.

There was little effort put into both referral and follow-up in this program. Because the committee members could not adequately perform most of the GMP activities, it is not clear that they could also execute these two additional activities. The lack of performance may have been a result of insufficient motivation, due to lack of monthly payments or meagre payments where made. However, even improved motivation would not be able to make up for their fundamental lack in knowledge and skills.

Although service provision was initially supposed to be provided on a voluntary basis, it is important that the Ministry of Health consider giving the committee members a salary. This could be a way of maintaining the involvement of the committee members who expend their time and energy at the expense of their own activities to assist with the program.

The Ministry of Health should also consider introducing treatment for minor child ailments into the program. This would increase attendance of children in the program as fewer cases would need attention at the FBCs. However, because the committee members do not have the ability to absorb training in this area, qualified nurses would have to be used in the weighing sessions to provide the necessary medicine. Like immunization, medical treatment could successfully be incorporated into the CBCGMP with the program still remaining community-based in approach.

Mothers should be relieved of monthly fee contributions by introducing income-generating projects such as rearing of livestock, production of agricultural products, or even operating a "posho" (i.e., corn) mill. Funds generated from the projects would be channelled into GMP activities. The mothers should be made aware that the aim of the donor and implementing agencies was to initiate the program but that the community had the responsibility of sustaining it.

The ANP includes GMP in its multidisciplinary approach to solving nutritional problems of the community. This approach appears preferable to that of undertaking GMP in isolation from other health, agricultural, and economic components. The program should involve the Ministry of Health together with other relevant ministries more actively in child survival and development activities at the community level. This multiministerial approach will, however, require extra resources, better program coordination, and supervision.

Although mothers are interested in the program, the committee members and supervisors charged with the responsibility of its implementation have largely failed. This failure indicates that the program is unlikely to meet its intended objectives. The program can, however, be credited for being a forum for the introduction and expansion of PHC services.

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Growth Monitoring in Rural Kenya: Experiences from a Pilot Project

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Introduction

In most developing countries, the majority of children in rural areas suffer from growth retardation as a result of the synergism between inadequate nutrition and recurrent bouts of infection. Growth monitoring (GM) has been identified as one of the ways in which this vicious circle can be broken (Alderman et al. 1973; Siswanto et al. 1980; Cole-King 1975). The basic strategy relies heavily on the quality of work carried out by the health worker in charge of GM as well as on the full participation of the mother in the recognition of growth faltering. It also relies on the action the two take to correct the situation.

Taylor emphasized the fact that faltering of child growth is the single best general indicator at an early stage of problems in child health and development (Taylor 1982). He pointed out that growth monitoring and promotion (GMP) is an invaluable tool for assisting the health workers and parents to identify children with nutrition and health problems early enough so that timely action may be instituted. Although there seems indeed to be strong evidence supporting his view, close examination of the results from one of the early projects that is commonly being used to demonstrate the beneficial aspects of GMP, showed the real impact of GMP activities on child mortality to have been considerably less than originally claimed (Kielmann 1983). Nonetheless, based on our own experience, we do consider GMP be an extremely valuable adjunct to child care that, if properly applied under suitable conditions, will identify the child at risk and permit early intervention (Kielmann et al. 1983).

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Growth monitoring has been introduced into many health service programs throughout the world during the past 15 years, despite some doubts of its applicability to other than pilot and demonstration zones. Failure in field implementation has been frequent, especially when programs were undertaken at national levels (Kielmann 1992). To date, results of the few evaluations undertaken show that identification of problems and constraints unique to each local situation will greatly enhance the intended impact of GMP. Emphasis is also being put on the need to make clear distinctions between growth monitoring of individual children and population based growth surveillance. In view of this, it is evident that the need for process evaluations of ongoing GMP programs is paramount. The results of such evaluations will provide planners with information on which to base their judgment on the operational performance of existing programs. In addition, the main administrative and logistic barriers, which are so often at the root of program failure, may be identified and changed.

Unfortunately, the unique potential of GMP has as yet not been fully realized. One of the main reasons for this has been the belief that GMP is simple and, therefore, it must be easy. Contrary to this view, evidence from countries that have implemented GMP programs shows that providing weighing scales and growth charts is not enough. Both the backing of the health services and the participation of the community and, especially, the mother are necessary if GMP is to make a positive contribution to the development of the health and nutrition of preschool children. This crucial point has been emphasized by Hendrata and Rohde (1988) who state that GMP should find the organizational means that will ensure that "the worker interacts with small groups of mothers, that they find participation attractive, easy and not time consuming and most of all rewarding."

There is still little information on the advances made by GMP programs in countries of the African region. Despite this, major commitments have already been made to implement programs as part of the "child survival revolution," and national programs are underway in countries such as Botswana, Lesotho, Kenya, Swaziland, Tanzania, Zaire, Zambia, and Zimbabwe, not to speak of western and northern Africa. Evidence shows that for GMP the greatest constraint in moving from successful pilot projects to these large scale national programs has been a lack of flexibility in both adapting general principles of GMP to specific local conditions and also implementing the GMP as one of many other activities carried out in health facilities without involving the community. It has similarly been shown that GM may fail to achieve beneficial effects in areas with low maternal literacy (Gopaldas et al. 1985). Although longitudinal situation analyses will help establish the impact, if any, of GMP on health and nutrition, it is important at this point to monitor the more immediate problems likely to occur during implementation (Taylor 1982; Lakhani et al. 1984; Grant 1985; Yee and Zeffass 1987; Hendrata et al. 1988).

Study Setting

In 1985, the Ministry of Health of Kenya, with the assistance of UNICEF, set up a number of growth monitoring/growth promotion centres, initially on a pilot basis, in nine districts of Kenya. The objective for this program was to demonstrate the effectiveness of GMP in the identification of children at risk and in making them accessible to early intervention. All children below the age of 36 months were to be weighed regularly according to the following scheme: 0 – 12 months, once every month; 13 – 36 months, once every other month. Given the quite considerable outlays in terms of finance, labour, and time, it seemed important to evaluate its potential effectiveness by examining to what extent all necessary prerequisites for successful GMP were indeed in place.

For this purpose, one of the nine pilot districts, Kakamega, was arbitrarily chosen for investigation because the principal investigator of the evaluation came from the same area, was familiar with the social and cultural environment, and spoke the local language. Within the district, Vihiga division was randomly selected from among 10 divisions. All four health facilities within the division were included for investigation. In all of these, growth monitoring had been implemented in October/November of 1985 and was carried out as a special activity in parallel with routine health care delivery. Close to 36,700 preschool children, i.e., approximately 22,840 below the age of 36 months, formed the target population for MCH and GMP services of these health facilities. Because the scope of evaluation included both GMP activities at the health facility as well as community acceptance of and participation in GMP, a total of 300 households, located around these four health facilities, were selected for in-depth examination through random cluster sampling, provided they had at least one child below the age of 36 months. Where more than one child below 3 years of age was present in the household, one was chosen as index child through random selection.

Evaluation of GMP services was carried out between January and March 1987, i.e., 26 months after program start-up. Detailed results have been published elsewhere (Ettyang 1988).

Method of Evaluation

The methodology of evaluation followed a conceptual model developed earlier (Kielmann 1992), according to which health services are examined as to their potential capacity to support implementation of growth monitoring adequately. According to the model, a functional program requires minimally all of the following conditions to be met:

- There is an *established need* for GMP, i.e., GMP should be instituted if there is a suspicion or proof to suggest that a considerable proportion of children fail to gain weight compatible with healthy development. A program is set up on the assumption that early detection of growth faltering will permit corrective action.
- Successful implementation of a GMP program requires an essential *infrastructure* consisting minimally of:
 - (a) a physical setting where GMP may be carried out which is comfortable and has essential utilities for the clients;
 - (b) growth monitoring tools, such as accurate scales and growth charts; and
 - (c) adequate personnel trained to carry out all functions of GMP, namely determining the nutritional status of children, recording it, interpreting it, and taking action.
- Functional infrastructural units that are distributed so that the majority of the community has ready *access to services*. Services should be affordable, opening hours convenient, and there should be no social barriers to using the services.
- The number of GMP activities carried out at each of these service stations, i.e., the *activity level*, suffices to cover all eligible children within the required monitoring interval; and the *quality* of the GMP process is such that the results are indeed valid.
- Immediate *action* takes place for those children identified to be at risk according to pre-set criteria, either in terms of special or more attention.
- The *community* accepts and is satisfied with the services, hence utilizes the program to an extent that will allow effective *coverage* of the target population.
- Last, a *management* system is in place and functioning that will implement and maintain *quality control* measures, such as ongoing supportive supervision and training; *documentation*, in terms of upkeep and processing of recorded information; and day-to-day *organization* and running of the services.

Results

Service Need Of the 300 randomly selected children, the majority (37%) were between 3 and 12 months of age, almost the same proportion (35%) were between a year and 2 years, and just over one-quarter (28%) were between 2 and 3 years. Table 1 shows their weights and heights. As may be seen the pattern of nutritional deficiencies is comparable to that of other developing countries, with about 4% being wasted and stunted, 23% wasted (but not stunted), 9% stunted (but not wasted), and 65% normal in that they were neither wasted nor stunted. Growth monitoring would definitely seem to be indicated in this child community and, judging from earlier experiences elsewhere (Kielmann et al. 1983), may be expected to bring about significant improvement if properly carried out.

Table 1. Nutritional status of 300 randomly selected children (Vihigo 1987).

Height Z Score	Weight/height		Totals n=300
	Below - 2SD (wasted) n=96	Above - 2SD (normal) n=204	
Below - 2SD (stunted) n=57	3.7%	8.7%	12.4%
Above - 2SD (normal) n=243	23%	64.6%	87.6%

Service Infrastructure, Service Management With respect to the services infrastructure, 7 out of 63 (11%) of health facility staff had been trained in GMP, giving a ratio of trained staff to target population of 1:5242. Even though the four facilities had 10 scales between them, only half were functioning. In none of the four health facilities were any of the required learning and teaching materials related to growth monitoring available in adequate quantities. Two of the four health centres had no child health cards in stock. One had only a limited supply. None of the four centres had data recording forms or visual aids. Referral booklets were available in only two facilities.

Access to GMP Services The average distance that mothers walked to reach a facility was 5.8 km, which required about 70 minutes.

Level and Quality of Activity Within each facility, a daily average of 44 weighings were being carried out, amounting to 25 weighings per (trained) health worker, or 35 weighings per scale per day. The average score obtained on knowledge of the use of growth monitoring information came to 7.5 (15%) out of a potential score of 50. The average score for skill in weighing came to 32 out of 50 (64%).

Action None of the four facilities had made any use of the resultant data, be it for referring children for treatment, advising mothers, or in reporting back to the staff.

Community Satisfaction From among the 300 mothers interviewed, 184 (61%) claimed to be satisfied with the services even though only 68 (23%) could give any explanation of the growth chart. Main reasons for dissatisfaction in descending order of frequency were poor services (24%), lack of drugs (22%), poor accessibility of facilities (16%), bad behaviour on the part of the service providers (14%), long waiting times (12%), and no or incomprehensible advice (11%).

Service Utilization and Coverage Of the 300 children, 74 (25%) had no record whatever of ever having been weighed. The majority of these (47%) were in the 24–36 months age group. Of the 226 who had a record, half had been weighed at least three times, and the same proportion had the first weight taken below 3 months of age. The average number of weighings per child amounted to two, which, incidentally, is corroborated by the total number of children weighed per health worker per day. Given the age distribution of the children, as well as the prescribed weighing schedule, each child should have been weighed 14 times, giving an observed to expected ratio of 0:14. The average number of visits to the health facility for all types of care, including GMP, was five. Adjusting for the age distribution of the children, a total of 3.4 visits per child per year results, for all types of care.

Discussion

Results from the evaluation of this "pilot" project are only slightly more encouraging than those in an earlier investigation, where potential sustainability of growth monitoring in routine governmental and project health services was being examined (Kielmann 1992). In this specific pilot effort almost every single one of our "essential" system components was grossly deficient. Part of these deficiencies were due to poor planning, but most were due to poor management and organization.

Some weaknesses are especially glaring. For instance, why were only seven out of the 63 health workers trained? It should have been quite obvious right from the beginning that this small number could not look after 23,000 children. If each child were to be weighed on average only three times per year, each of the seven health workers would have had to weigh, plot, and interpret the weight of 38 children, and explain the results to the same number of mothers each day of 260 working days per year. As it was, health workers did not manage adequately to look after the 25 children they saw each day, as reflected by the mothers' widespread lack of understanding of what the whole exercise was about, by the fact that no action ever followed identification of children at risk, and by the sizeable proportion, more than one-third, of mothers who expressed dissatisfaction with the services. Had all health workers been trained, a ratio of health worker to preschool children of 1:601, instead of almost 10 times as much, would have resulted. Distribution of services was also poorly planned. To have to walk 70 minutes in case of acute illness may be reasonable, but for a preventive and growth promotive service, it is unrealistic. Why, one asks, were not satellite GMP stations set up and staffed, for instance, by specially trained community health workers, as had successfully been done elsewhere?

Equally striking is the apparent lack of proper program management as manifested by the absence of "essential" material such as growth-monitoring cards, service records, and educational materials. Although the lack of knowledge and skills among the health workers was no different from that found in other locations, and suggests that supervision was nonexistent or, if carried out, largely ineffective, one might have assumed that such would not be the case in a "pilot" project.

In light of the foregoing, it is surprising, and could be embarrassing for the health care providers, that more than 60% of mothers expressed satisfaction with the services, as reflected also in their relatively high rate of participation. At 1.4 weighings per child per year (and more than three visits for all types of care), service utilization, although not fully adequate to have an impact, was decidedly better than one would have expected. The decrease in GMP attendance rate with increase in age, suggests though, that mothers came primarily for other than GM services, notably immunization.

The findings suggest that the community was moderately interested in GMP services, despite the rather formidable obstacles of poor access and even poorer services. They also point to considerable breach of trust vis-à-vis the communities entrusted to them, on the part of those organizing and running the services. As so often, the communities' needs remained unmet, and their efforts largely unrewarded.

Whether 1.4 weighings per child per year in that age bracket (0 – 36 months) would have been sufficient to bring about an improvement in their nutritional situation, is difficult to assess. The average number of weighings amounted to only 14% of the prescribed schedule. However, the "prescribed" schedule adopted in that program seems unrealistic to begin with. According to our experience, an average of three weighings per child per year, i.e., four in the first year, three in the second, and two in the third should fully suffice aside from being far more feasible both from the mothers' as well as health care providers' points of view (Taylor et al. 1978).

Last, the question of whether GMP can be done through regular health services even when resources were adequate for assessment and action, is yet to be resolved. It is quite clear that if resources for action are not readily available, GMP is tantamount to measurement alone, and this is not the best use of everyone's time and effort.

Conclusions and Recommendations

Assuming that our experience is not unique, that it represents more the norm than the exception, and we do have some evidence to that effect from our earlier investigations (Kielmann 1992), several conclusions and recommendations may be made.

First, it seems that the community is indeed interested and willing to support and sustain efforts promising better health for their children. We have evidence to that effect from this and other studies (Taylor et al. 1978). Second, it seems to be equally clear that in the majority of cases where it has been looked into, it is the health care provider, who tends to default (Kielmann 1992). Third, international organizations (multilateral, bilateral, and NGOs) bear a large proportion of the blame for program failure by (a) uncritically advocating programs, such as GMP, without specifying, ensuring and monitoring the presence of minimal system requirements; (b) providing unrealistic program recommendations, such as in this case, the excessive frequency of weighings; (c) not evaluating enough; and (d) delaying or avoiding making recommendations on necessary corrective actions. It remains to be seen whether GMP services, when run by the community itself as has recently been advocated, will be more successful.

If GMP is to succeed within the routine services structure, a situational analysis would first need to be done to assess whether the existing system can accommodate additional activities. If not, as in the case of our "pilot" effort, the necessary conditions will have to be created. Next, a growth monitoring schedule

needs to be worked out that allows the majority of mothers to adhere to it, yet is able to detect growth faltering early enough to permit intervention in the majority of children at risk. Once established, the GMP process needs to be subjected to ongoing quality control measures by instituting supervision and in-service training. Last, and most important, provisions must be made so that children identified as at risk are indeed treated.

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Community-Based Growth Monitoring

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This paper presents growth monitoring as part of the process of enabling the child, family, and community to comprehend and interpret measurements. For too long, growth monitoring has been the "property" of health workers. In the future, it should "belong" to the community and be one of a number of health measurements that will extend the family and community's understanding of numbers and their visual presentation in graphic form.

Growth monitoring was introduced as a routine weighing and plotting of the weight of all children attending under fives clinics in Ilesha, Nigeria, in 1959. It was "imposed" by a pediatrician (Morley 1973) who found that because the chart was relatively simple, the junior staff in the clinic over time came to understand how both to plot the weight chart and its meaning. However, any attempt to explain the meaning of the growth curve to the mother or her family failed. This is not surprising as graphic representations and the use of graph paper were not used in the primary schools of most developing countries. Since then, it has become apparent to one of the authors, from his teaching experience in London, that even a proportion of doctors have a similar difficulty in both plotting a chart and interpreting its meaning. This experience is confirmed by other studies (Forsyth 1984; Gopalan and Chatterjee 1985).

Primary School Education and Health

Research in over 70 developing countries during the last 15 years has revealed the association between primary school education, particularly of the mother, and better health outcomes. In families reared by a mother who attended primary school, the infant mortality rate, state of nutrition, and spacing of children are all better than in those families where the mother did not go to school. The education of the father contributes but is less important (Caldwell 1979). Multifactorial analyses have shown that even when allowance is made for other factors, particularly the socioeconomic status of the family, the relationship still

stands. There is excellent evidence that maternal education even within the same socioeconomic class will reduce infant mortality. One such study in Kenya suggested that 86% of the decline in the infant mortality in that country over the preceding 20 years appears to be explained by the rise in female education (Morley 1991).

Health planners and workers in the developing world have still not accepted these findings. If primary school education is so essential, then it must be a priority for health workers to work together with teachers and others concerned with primary education. An example is the successful Child-to-Child Program. As child growth is of such universal interest, it is perhaps in this field that input from the health workers can play a part in educating both families and children in weighing and the interpretation of a growth curve.

TALC Direct Recording Scale

The results of weighing children are usually presented in a graphic form, unintelligible to most mothers and difficult for many health workers to interpret. This study suggests that the Teaching Aids At Low Cost (TALC) Direct Recording Scale will allow growth monitoring to be undertaken even by illiterate mothers in the community. Mothers involved in the use of these scales come to understand the need for weighing their children and can interpret the meaning of the growth curve.

In most systems of growth monitoring, the weight is read off a dial. There is relatively little movement of the child when it is placed on the scale pan, or suspended below a hanging scale. The mother only observes a swing on the needle of a dial. A figure in kilograms is read off this dial by the health worker, and the next point on the growth curve of the child plotted. This is quite incomprehensible to the average semi-literate or even most literate mothers. It is unlikely to be understood either by the father and other older family members who are responsible for most family decisions.

The TALC Direct Recording Scales have a spring that stretches one cm/kg of applied weight, and is visible to the mother. The upper end is attached to, say, a hook in the house or to the branch of a tree. As the spring stretches, the mother herself can plot her child's growth by placing the point of a pen through a hole in the pointer at the top of the spring (see Figure 1). The mother's active participation means that she is more likely to understand that the spring should stretch further each month and that each dot should be higher up the chart. Because weighing can be unhurried and is done in or near the home, the child is less likely to be upset. Decision-making members of the family, including the

Dial Scale



Scales kept in the clinic.

Mother is confused. No obvious relationship between movement of pointer on dial, the plotted growth curve, and her child's weight gain.

No involvement of family decision-makers in discussing changes in the child's diet. Children often cry and this makes talking with mothers difficult.

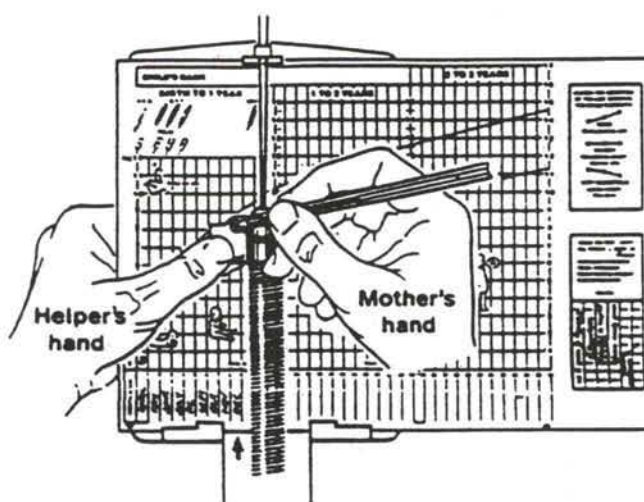
Late detection of low birth weight babies.

Lost productivity while carrying infant to clinic, irregular attendance in farming season.

Weighing can absorb much of a health worker's time.

Health workers make many errors in plotting growth curve.

TALC Direct Recording Scales



These robust, low-cost but accurate scales are kept and used in the community.

The mother enjoys and is proud to be involved. She sees the spring lengthen each month as the child grows. As she sees the dots *she* makes each month, she understands the meaning of a growth curve even if illiterate.

Weighing at home allows discussion by family decision-makers. Child cries less often. Weighing is done at time and place convenient to mother.

Babies can be weighed at birth even if born in remote villages.

No time lost travelling to clinics. Mothers who never attended clinics may be reached at home.

Health workers are free to spend time on other aspects of primary health care. They can be encouraged to visit homes.

Errors in plotting less likely.

Fig. 1. Comparison between Dial Scales and the TALC Direct Recording Scales.

father and grandmother, are more likely to be involved too. The community health worker has to see that the chart is correctly placed so that the mother will put the dot in the right month column, to steady the pointer, and to encourage and guide the family discussion.

The scales are made of ultraviolet-resistant, unbreakable plastic. Their strength can be demonstrated by throwing them onto a concrete floor and jumping on them. One batch of 10 springs was stretched 50,000 times mechanically, and the greatest variation was only 0.4 mm. A possible disadvantage is that the scale can only be used with A4 charts (30 x 20 cm) on which the kilogram lines are a cm apart. Thirty TALC charts are supplied with each scale. The scales cost less than half the cost of existing scales, and the price will probably fall even more with greater volume production. There is also the potential for manufacture in developing countries, although the springs will probably have to be imported. So far, experience with these scales has been limited, but two examples are mentioned in the following. A comparison of the relative advantages of the two kinds of scales is shown in Figure 1.

Initial Studies

Two initial, small-scale studies were undertaken (Morley 1991). One of us, visiting Zaire, asked about an infant born 3 months previously. She looked small and did not seem to have much energy. "As I had a set of scales with me I helped the father hang these on a tree and weigh his child. He was concerned when he saw the weight was well below the lower line. Since there was no clinic in the vicinity, I impressed on him the importance of more frequent breastfeeding and regular weighing. Several weeks later when I returned I found the baby had gained weight well and was now above the line." The father had not needed reminding, nor did he need help with the weighing or the interpretation. Some months later the village had regular weighing sessions, held by the parents themselves. The mothers had decided it was not worth trudging all the way to the clinic just for weighing, and they only went to the nurse when there were special problems.

A medical student arranged an elective in a district hospital in Ghana and he attempted a small study comparing the TALC scales (38 mothers) with standard dial scales (41 mothers). Those using the TALC scales were divided into groups of eight or 10, with a leader who undertook a training course and kept the scales. Before the introduction of the TALC scales, a questionnaire, including specimen charts illustrating satisfactory and unsatisfactory growth, was completed with all the mothers, and this was done again after one month and after 6 months. After one month, 90%, and after 6 months 100% of the mothers using TALC scales

seemed to understand what a growth curve meant. For those mothers using the dial scales, the number of mothers attending remained constant but individual participation varied, and the proportions understanding growth curves varied between 25–50%. The Ghanaian colleagues found that the mothers enjoyed and were proud of being involved in weighing their children. Other members of the family had become involved and, during the weighing process at home, few of the children cried. As the scales were left in the community, birth weights were recorded. The mothers seemed to understand the meaning of the growth curve and it appeared likely that growth monitoring could soon become a "demand led" program in this area.

Growth Monitoring of Maasai Children

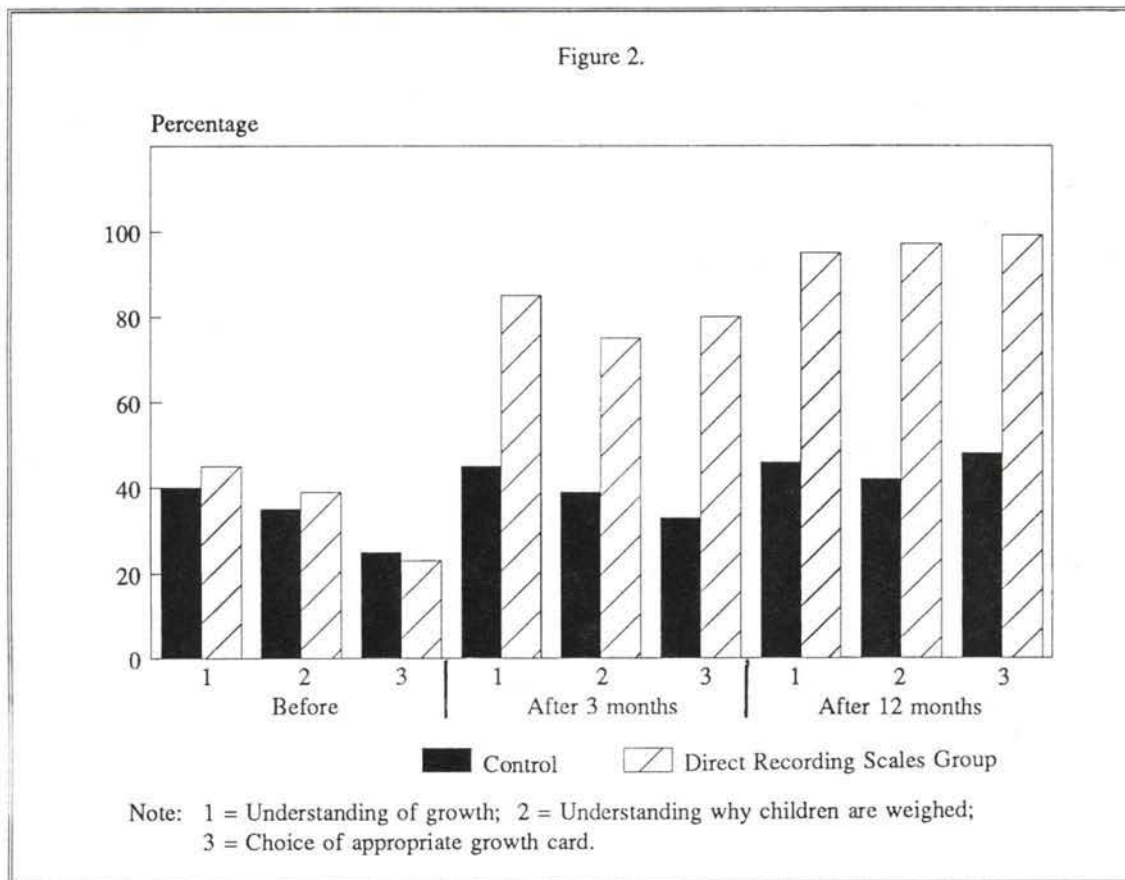
The success of these two initial studies encouraged a larger study that involved 138 mothers from a pastoral, mainly nomadic, Maasai population, dispersed over the Kenya/Tanzania border. All mothers had at least two children under five, were illiterate and had a mean age of 29. In this area, the infant mortality rate is 186 per 1000 live births. The ICROSS rural health team has been monitoring the weight of the children here since 1983 and has found 23% of under 5-year old children are below the lower line on the weight chart, that is, below the third centile for girls using the international WHO figures.

The 138 mothers were divided into two groups, matched for maternal age, number of children, remoteness from fixed health care facilities, and maternal understanding of growth at the outset of the study. The great advantage of research in tribal groups such as the Maasai is the extraordinary homogeneity of child spacing, diet, parity, and living conditions. There was minimal communication between the two groups, which were about 100 km apart. A control group (n=82) continued to have their children weighed by a visiting mobile medical team using the standard dial scales. The experimental group of mothers weighed their own children with the direct recording scales and were organized into homestead groups.

Results of Maasai Study

The findings of this study are represented in Fig. 2. All mothers in the experimental group using the direct recording scales showed an increased understanding by the three indicators; i.e., understanding of growth, understanding why children are weighed, and choice of appropriate growth card.

Fig. 2. Mothers' understanding using direct recording scales or standard dial scales.



The average score for the understanding of growth and the growth monitoring process in the direct recording scales group increased by 51%, whereas the score for the control group varied by only 7% during the 12-month study. A rise of the same proportion occurred in the responses to why the children were being weighed. The percentage of mothers in a group that could correctly choose a growth card showing adequate growth increased in the direct recording scales group by 75%, compared to the control group which increased slightly by 24%. For all three indicators, the majority of the rise in the direct recording scales group occurred after only 3 months of use. It was observed that any slow learners were taught by other mothers in their weighing groups.

Conclusion

Up to the present time, growth monitoring has been largely conducted by health workers. The TALC direct recording scale may make it possible to involve the community in monitoring the growth of their own children. Perhaps more

important, this scale may allow an understanding of weighing and graphic representation to be understood by whole families. In further studies, it is hoped that improvements in understanding of weighing and the growth curve by the father and other members of the family can be achieved. In this way, the growth monitoring of children may influence community development by bringing a greater understanding of measurements to the family and community.

This paper attempts to place growth monitoring in an educational context. Unfortunately, up to the present, almost all discussions and meetings on growth monitoring have largely involved health workers. Some of the problems that arise in growth monitoring are of an educational nature. Perhaps in further conferences more emphasis can be placed on involving those concerned with primary education. In this way, the comprehension of growth monitoring and other measurements suggested here, are likely to become part of primary education and community development. One step has been taken in this direction with the attempts being made in some settings to incorporate health content into the primary school curriculum (*Health into Mathematics 1991*).

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Tamil Nadu Integrated Nutrition Project (TINP), India

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One of the most heralded growth monitoring and promotion (GMP) projects in the world is that conducted in the State of Tamil Nadu in India, known as the TINP. This project has received funding over many years from the World Bank. Continued funding indicates that the World Bank and its consultants view TINP as being highly successful.

The Tamil Nadu Integrated Nutrition Project (TINP) provides integrated health and nutritional services to nearly a million children in rural south India through village-based community nutrition centres. It is among the few successful, large-scale development projects that has relied heavily on growth monitoring. Growth monitoring has been used as the integrating strategy for providing a range of services including short-term selective supplementary feeding, oral rehydration therapy, immunization, nutrition counselling, deworming, and prophylaxis against vitamin A deficiency.

Children enrolled in community nutrition centres are weighed monthly by field-level community nutrition workers (CNWs). Weighing is conducted at the centre for all children present on the 3 days earmarked for weighing. Children who do not attend on any of the 3 days are followed-up and weighed in their homes.

Mothers of all children are given nutrition education. Children who falter growth or those that are seriously malnourished are selected for 90 days of supplementary feeding at the centre. Workers are encouraged to spend much of their time in following up such children at home to counsel mothers, helping them to understand and analyze the reasons for growth faltering, and suggesting feasible solutions/actions. Mothers are encouraged to start implementing these solutions at home to improve the growth of the child. Children who gain at least 500 grams over the 90 days of feeding and individualized counselling are "graduated" out of

supplementary feeding. Children who fail to "graduate" by these criteria after 90 days continue feeding at the centre, and are also referred to the multipurpose health worker for check-ups.

TINP has been described briefly here to illustrate a weighing program where analysis of weights is the basis for an important action which is selected feeding of children. In TINP, the main assessment is weighing. An important analysis is judging whether secular weight gains are satisfactory or unsatisfactory, and one of the important outcomes is selected feeding for 90 days, after which reassessment is done.

A question that needs to be asked is whether there is a role for supplementary feeding or not, in each GMP program. Then, if there is to be supplementary feeding, should it be universal or selective? In Tamil Nadu, some would argue that universal feeding would be better, or that seasonal feeding might be preferable, or that targeting be based on factors other than growth faltering. Another consideration when supplementary feeding is a chosen action, is whether feeding should be done at home or in a centre.

Finally, it is sometimes claimed that TINP has been useful:

- In influencing community participation,
- In serving as an integrating strategy,
- As a tool for nutritional surveillance,
- As a screening tool, and
- As a source of information for program management.

I believe that TINP has been used for screening and for program management. In the other three areas the role of TINP is less clear (Shekar and Latham 1992).

Note: This paper is based largely on the article in the reference.

Reference

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GMP Implementation in Indonesia: Does Behaviour Change Take Place?

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The joint FAO/WHO Expert Committee on Nutrition recommended nearly 30 years ago that the weights of individual infants and preschool children should be recorded on a chart. This recommendation was followed by the work of David Morley and his colleagues in Africa (Morley 1968). Since the 1980s, growth monitoring and promotion (GMP) has become one of the most important characteristics of primary health care in many of the developing countries.

In Indonesia, GMP emerged as a national strategy from the results of the assessment of the Applied Nutrition program carried out by Sayogyo in 1973, which concluded that changing behaviour, mainly of mothers, should be the means by which good nutrition among young children could best be achieved. Starting from small-scale programs in various places, a more concise program, called the Family Nutrition Improvement program (Usaha Perbaikan Gizi Keluarga—UPGK) was developed in which growth monitoring is the core activity. The objective of UPGK is clearly stated as:

- Nationwide coverage and the full participation of all families,
- Encouraging behaviour that promotes good growth, and, ultimately,
- Improving nutritional status of all children under 5 years of age.

Major expansion of this approach was a focus of the third, Five-Year Development Plan (REPELITA 3) between 1979–1984. By 1984, over 40,000 villages were carrying out UPGK. This massive expansion was made possible through political commitment at all levels; broad-based intersectoral organization; and a massive voluntary force at village level, backed up by the local women's organization (PKK) (Hill et al. 1983). A second expansion started in 1984, when UPGK was integrated into the Integrated Health and Family Planning program, which was conducted in the community through integrated posts (Department of Health, Indonesia 1986). In addition to GMP, this program includes provides four other activities, i. e., immunization, MCH, family planning, and control of

diarrheal diseases, which are intended to increase child survival and development as advocated by UNICEF (Posyandu 1986). There are now about 300,000 Posyandu in the country.

Berman (1988) and Basta (1989) found that at various levels of comprehension, most people in Indonesia understood and accepted the idea of GMP. Most recently, Scrimshaw et al. (1990) commented that the whole concept and structure of the integrated post is sound, if properly implemented. Hill et al. (1983) suggested earlier that the strengths of the program were also its weaknesses. The rapid expansion of the program precluded full coverage within the program areas, and lowered the quality of services. This assumption was confirmed later by Berman (1988), Fuhr (1988), Basta (1989), Junadi (1989), Ruel (1989), Scrimshaw et al. (1990), and other experts, who also stated that to meet the objectives of GMP, the quality of the activity should be improved in various ways.

Based on their experiences of implementing GMP in some developing countries, the triple-A approach was launched by UNICEF. This approach posits that all GMP activity provides information that can be used for assessment and analysis of the cause of growth faltering; this analysis can then be followed by affordable and appropriate actions at individual, household, community, and district levels.

As part of a worldwide effort sponsored by UNICEF, an assessment of GMP implementation was conducted in Indonesia to discover to what extent the hypothetical definition of GMP is implemented, with a view to maintaining, improving, and expanding the program. Rapid assessment procedure (RAP) as described by Scrimshaw and Hurtado (1987) was used in the assessment. All Posyandu in 12 villages in four different provinces were selected as the site of the assessment. In-depth interviews and focus-group discussions were conducted with 60 mothers, 62 voluntary community workers from the Posyandu (called kaders), and health and family planning officials at all levels. Observations were made at all 49 Posyandu in the selected villages, and structured interviews were carried out with 1,033 mothers in a random cluster survey.

Based on the results of the assessment, this paper reviews whether the intermediate objective of the program, in terms of change of behaviour (aimed at good or better growth and nutrition) takes place, particularly at the level of the individual mother as child caretaker, her family, and the community. Behavioural change happens as a result of communication. Therefore, Posyandu should function as a centre for communication, where kaders and mothers gather together weighing the children and plotting their growth chart. There the kaders should counsel individual mothers and take part in all the other related activities

that could provide a means of communication between them. Information from the weighing should lead both kaders and mothers to understand the status of growth of each child, to recognize growth faltering if it occurs, and to consider together the appropriate actions to overcome faltering. Three prerequisites for successful programs are reviewed in this paper and are: the mothers should use the Posyandu, the mothers and the kaders should communicate successfully with each other, and everyone should understand the growth message that healthy children gain weight.

Access and Use of Posyandu

Apart from their individual degree of understanding of growth, all mothers claimed that the Posyandu was beneficial for their children. The benefit varied from "just meet friends," to "get immunization and medicine," "to keep the child healthy." The above claims were all supported by kaders and community leaders. Although Nabarro and Chinnock (1988) commented that such activities are no more than a "formal weighing ritual," it seems true, as Hendrata (1986) has pointed out, that the gathering acts as a forum. This "...forces mothers to be in contact every month," either with each other or with the kader and health personnel. When the mothers were asked "...why should you weigh your child if you only come for the gathering...?" the answers were very interesting, for example, "I cannot imagine a Posyandu without weighing...." This supports the opinion of Basta (1989) that "...Posyandu (or GMP) is a name, and it becomes the message by itself...." It has become a symbol of nutrition, health, and anything else mothers perceived.

All community leaders and most mothers, supported by all officials in various levels, claimed that Posyandu improved the health status of the children in the villages. They were also convinced that the children who came to Posyandu more regularly had better health than those who did not come or came irregularly. They also said success or failure of Posyandu was related to other activities in the community such as agriculture or cooperatives. In a good community, where other activities work, Posyandus tend to be successful.

All mothers in the survey knew where the Posyandu in the village was. Over 90% stated that the Posyandu was easy to reach, and about 69% remembered what day and date the next Posyandu session would be organized. About 40% of all the target groups attended Posyandu regularly (4–6 times per 6 months), the younger the age of child, the more education the mothers had or the richer the family, the more likely that the child would be brought to Posyandu regularly. Tables 1, 2, and 3 show the distribution of attendance among the mothers over the 6 months preceding the interview.

Table 1. Frequency of Posyandu attendance by age group (%).

	<u>Age of child in years</u>					All ages combined
	0.5–1	1–2	2–3	3–4	4–5	
Never	14	22	32	49	60	30
1 – 3 times	34	33	31	26	21	31
4 – 6 times	52	45	37	25	19	39
Total (n)	100 (232)	100 (315)	100 (241)	100 (161)	100 (84)	100 (1033)

Table 2. Frequency of Posyandu attendance by level of education of mothers (%).

	<u>Years of mother's education</u>		
	None	0–5	>5
Never	46	34	22
1 – 3 times	36	28	31
4 – 6 times	18	38	47
Total (n)	100 (156)	100 (360)	100 (517)

Table 3. Frequency of attendance by family socioeconomic status (SES) (%).*

	<u>SES</u>			
	Poor	Medium	Rich	Combined
Never	32	42	30	30
1 – 3 times	32	27	25	31
4 – 6 times	36	41	45	39
Total (n)	100 (372)	100 (464)	100 (197)	100 (1033)

*SES is as classified by the village headman.

Communication Process

In theory, Posyandu sessions were organized in a "five-table system." Children were registered (Table 1), weighed (Table 2), the result plotted on the growth chart (Kartu Menuju Sehat-KMS) (Table 3), counselling took place based on the plotting (Table 4), and various services were mobilized (Table 5). It was observed in all assessment sites, however, that the system did not work well. Mothers spent an average 9.6 minutes for the whole process, and out of this time, 2.1 minutes was for individual counselling, which in most cases was given by a health/family planning supervisor instead of the by the kader as designed in the program. The counselling did not cover analysis of the possible causes of growth faltering when it occurred or possible ways to utilize family resources to eliminate the problems. However, after being served, most mothers stayed at the post and did other things, such as discussing their children's health and, in particular, whether or not they gained weight. This could be seen as a "loose" counselling. The kader, on most occasions, joined in the activities as well.

After the session, no meetings between kader and community leaders were organized to conclude the activities and analyze the growth status of the children, the causes of problems and the possible actions to utilize the community resources. Hence, follow-up activities, like identifying the 60% of target age group children who do not regularly attend GMP sessions, or planning follow-up visits to families with children whose growth is faltering, are not perceived by kaders to be important and, on most occasions, did not take place. However, community leaders played various roles in the process, and the more active the community leaders, the more mothers joined the session, and the better the quality of the session.

Most kaders had less than 6 years of primary education and had received 1–3 days initial training before service followed by some shorter refresher training sessions. The educational flipchart provided for counselling was limited to a set of messages about what mothers should do, instead of equipping the kader to analyze the possible causes of growth faltering before proposing any action. Aside from the limited time available for counselling and the number of children attending the sessions, the lack of preparation for improving a kader's competence explained why good "structured" counselling did not take place.

The situation worsened after UPGK was integrated into Posyandu because kaders were involved in many more activities. The presence of health/family planning officials was also found to reduce a kader's confidence to perform counselling.

Message of Growth

Growth as an abstract concept was formulated and concretized in the key message "A Healthy Child Gains Weight Every Month" ("*anak sehat bertambah umur bertambah berat*"), in a sense that the words "healthy," "gaining," "months," are already familiar. Other messages, including nonnutritional ones were related to the key message.

During free conversations and discussions, mothers suggested various descriptions of the (physical) attributes of an ideal child. The word "attractive" ("*menyenangkan*"), active ("*lincah*"), "well nourished" ("*montok*"), heavy ("*berat*"), tall ("*jangkung*"), smart ("*pandai*"), and other common terms were used. Almost everybody was able to repeat the key message correctly. Terms like gaining ("*naik berat badan*") or not gaining ("*tidak naik*"), growing ("*tumbuh*") or not growing ("*tidak tumbuh*"), healthy ("*sehat*"), nutrition ("*gizi*"), breastmilk, food ("*makanan*"), give more food or give better foods. All these program achievement indicators and many other terms used in the program were mentioned very frequently by all of the mothers. In further conversations and discussions, most mothers were able to relate gaining weight to other common indicators of good health that they already knew.

The growth charts (Kartu Menuju Sehat-KMS) were found in adequate quantities at all Posyandu visited. The extensive use of the card was very impressive. After being filled out and plotted by kaders in the Posyandu, the KMS were carried home by mothers. In the Posyandu before they went home, it was very common to see mothers discussing their children's KMS. When mothers were asked about the chart, results showed that both mothers and community leaders understood that an increasing growth curve on the KMS card is "good" and that a stationary or down curving line is "bad." However, only about half of interviewed mothers could identify correctly whether a child was growing well or not on two standard growth cards presented to them during the survey (Table 4).

Table 4. Correct interpretation by mothers of the KMS according to attendance at Posyandu (%).

	<u>Attendance at Posyandu</u>		
	Never	1-3 times	4-6 times
Correct answer for increasing slope	35	48	59
Correct answer for decreasing slope	31	45	57

Discussion

Some mothers attended the GMP session. Their children were weighed and the weights were plotted onto KMS. Individual counselling did not take place properly as planned. Other activities were integrated into the session and mothers tended to join them all.

Although "structured" communication did not take place as planned, most mothers had a good grasp of the nutrition messages and reported that they had gained this knowledge from the UPGK program. They claimed that their increased knowledge had enabled them to provide better food for their children. They also believed that joining Posyandu, getting information from the kader and the health/family planning workers, and sharing experiences with other mothers during the sessions one way or another improved their children's health.

It could be argued that, in the narrowest sense, activities such as identifying growth faltering, plotting the findings on a growth chart, analyzing and discussing the causes of any problems individually, and finally advocating that mothers, families, and communities take action on these problems, were largely not happening in Indonesia. However, in a wider sense, the Posyandu, with its nutrition and communication components was observed to implement GMP, at least at all visited sites. Informal, nonstructured communication between the kaders and mothers and among mothers themselves either during or after the sessions assumes the role of the biggest communication process within the program. Any exchange of information, and any alteration of attitudes and practice happens in a very nonstructured way. In other words, conceptual understanding of the causes of growth faltering and counselling happened in an unplanned and nonstructured fashion.

Due to design limitation, the assessment failed to prove whether or not any change in knowledge led to an improvement of attitudes and practices among mothers and the community as whole; or even, whether there was better feeding, care, and environment for better growth of the children.

Whatever its level of success or failure may be, GMP is now implemented in almost all communities in Indonesia. To judge the program as good or bad will not be a fruitful exercise. Instead, we should concentrate on ways to improve it, and if we consider GMP as a communication process then the following two approaches can be discussed.

Professionalization of the Process

If professionalization of the process is selected, all components of the GMP as a communication process should be made more professional. Kaders could be given extra training to improve their skills as communicators and, whenever possible, a more professional health communicator can be also considered, for example, a midwife.

More professional educational tools, including manuals and flipcharts could be developed to help the communicator to analyze the causes of growth faltering and to find ways to help mothers, family, and community to solve their problems. A better setting for the Posyandu could be considered to provide facilities for each child's case to be assessed and analyzed and the mother given advice, in an individual setting and in a convenient way, bearing in mind time, place, privacy.

This approach is a "modern" approach that needs a lot of resources, in terms of money and personnel. It might also stifle the current success of the program.

Demedicalization of the Process

In demedicalization of the process, all components of GMP could be improved to provide better and easier ways within their cultural references for mothers and the community to make use of it and to adopt ideas and take action to keep their children in good growth patterns.

As a priority, the growth message should be brought closer to the concepts the mothers and community already have. "Gaining weight for what...?" will be the key question to be answered in this effort. The answer should come out of local understanding of the local concept of growth.

The setting of the Posyandu and all its components could be broadened to facilitate communication between kader and mothers, and particularly among mothers and other community members. Weighing and plotting can be done wherever and whenever possible. Counselling could be carried out anywhere and at whatever time was suitable. It does not need to be in the same place or at the same time as weighing and plotting, etc.

This approach requires a certain degree of "freedom" from health and nutrition system dependency. It becomes more of a community (social) movement, which empowers family and community to solve their own nutrition problems.

Neither approach is the "recipe-type" answer that will solve all the problems of the GMP program and make it able to facilitate and empower family and community to solve their nutrition problems. However, local decisions, based on local assessment and analysis of the available and potential resources, should be the best way of improving the quality of GMP.

Summary

In Indonesia, GMP as a national strategy for reducing child malnutrition started in 1973 and, after being integrated into a more comprehensive system of Posyandu, it now covers roughly 300,000 posts in 80,000 villages over the country. An assessment was conducted to examine the achievement of the program in identifying growth faltering, analyzing the causes of the problem, and helping family and community to solve it. Various aspects were covered, and this paper reviews the implementation of GMP through Posyandu as a communication process.

The structured communication process as prescribed by the program did not take place as planned. However, change of knowledge among mothers on the concept of growth and actions to be taken to maintain it were observed. This was assumed to take place in a "looser" communication process within and outside the GMP session.

Based on these findings, as far as improvement of the implementation of GMP as a communication process is concerned, two approaches to improve the process are proposed, i.e., professionalization or demedicalization of the process. The decision whether to choose one or a combination of both approaches should be taken locally.

Management of growth promotion involves several approaches. They all include the three necessary steps of assessment, analysis, and action (the triple-A process). They also require different levels of resources, and so each particular context calls for different methods. The promotion of growth for child development is a very important activity, most particularly in areas where growth faltering is prevalent.

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GMP Programs in Ecuador

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During the period November 1990 to March 1991, UNICEF carried out an evaluation of growth monitoring and promotion (GMP) programs in Ecuador with the purpose of looking at current GMP efforts and how GMP was affecting triple-A processes. Many aspects were evaluated in this period; this paper will concentrate on the analysis of community-based GMP programs (focused programs) and clinic-based GMP programs (national program) as they have been implemented in Ecuador, and the main lessons learned from this experience.

Growth monitoring has been carried out in Ecuador since the mid 1960s. Two years after the formation of the Ministry of Health (MOH) 1967, growth charts were introduced into the country. In 1983, a growth chart developed in Ecuador was field tested and its use generalized in 1986.

Currently, there are two institutional contexts in which GMP programs are implemented:

- National program – the MOH Growth Monitoring and Development program, with national coverage and implemented through the network of government health units.
- Focused programs – these GMP programs are based in the community and are implemented by different types of institutions and nongovernmental organizations (NGOs), sometimes in agreement with the MOH.

Infant Mortality and Malnutrition

Although infant mortality has been reduced in the last 20 years, it is still high and currently estimated to be 61 per thousand live births. A high prevalence of malnutrition exists. The National Health and Nutrition Diagnosis (DANS study 1986) performed by the National Development Commission (CONADE) and MOH estimates that 49.4% of children below 5 years of age suffer from chronic

malnutrition (low height for age), 4% from acute malnutrition (low weight for height), and 37.5% from global (low weight for age) malnutrition. Prevalence of malnutrition is higher in the lower income groups. A child between 6 and 23 months has the highest probability of being malnourished. In terms of overall access to health services, it was estimated by the MOH in 1990 that around 40% of the population does not have any access to basic health services.

Study Sample

The UNICEF evaluation study was carried out in six different areas of the country representing rural Indian highlands, rural non-Indian highland, urban-marginal highlands, rural coast, urban-marginal coast, and small coastal city (Cotopaxi province, Pichincha province, city of Quito, Guayas province, city of Guayaquil, Esmeraldas province, respectively). The study covered both national and focused programs. In each area, three communities were selected and a total of 18 communities participated in the study. The methodology used for the evaluation was the rapid assessment procedure (RAP) methodology for Evaluation of Nutrition Programs developed by Scrimshaw and Hurtado.

A total of 810 mothers were surveyed (45 per community), 18 GMP sessions were observed (one per community), 18 focal group discussions with mothers were held (one per community), and in-depth interviews were undertaken with 37 nurse aides and promoters and seven national officials.

Operational and Functional Aspects of GMP Programs

Implementation Methods

In both types of programs, national and focused, weighing and charting are used as the monitoring tools. In the focused programs, this is performed by the mothers under the supervision of a trained community volunteer, whereas in the national program this is performed by the nurse aide, as part of the routine procedures carried out on all children that come to the health unit. The active participation of the mother in the weighing of her children is the first step to an assessment of the child's growth and development.

The national program provides the services in the health units. In the provision of this service, at least two or more personnel are included: the nurse aide who usually does the weighing and the doctor who plots the weight on the growth chart and also provides medical attention.

In focused programs, mothers gather on a regular basis for a weighing session. These sessions are held in places selected by the mothers (usually in the house of the volunteer), each session is followed by a group discussion on the causes of growth faltering and actions needed to be taken. These activities facilitate the sharing of experiences among the women in terms of caring and feeding practices as well as the implementation of activities at the community level. Some actions taken have been the implementation of water and sanitation projects, income-generation activities, and raising of small animals to provide a food supplement (chickens, guinea pigs). Home visits to those failing to gain weight or being classified as malnourished are also carried out.

Community Participation

Focused programs have a very strong community participation component. In most cases, before beginning implementation, contact is made with the organized groups already present in the community and representing different community interests (local council, peasant organizations, religious groups, women's groups) to coordinate efforts and get support for the GMP program. These groups help to make contact with mothers, select volunteers, and, in some cases, help to carry out a community diagnosis.

Usually volunteers are selected by the communities to be trained so that they can be the coordinators of GMP activities within the community and perform health and nutrition education. In communities where a women's group is already functioning, this group supports GMP as one of its projects. Once the program is functioning, these organized groups continue providing support to the mothers attending the weighing sessions and collaborating when needed in the implementation of actions at the community level.

In the national program, community participation is not present. GMP activities are carried out in the clinics, which have very limited outreach programs, and, therefore, does not facilitate the involvement of the community.

Information System

In the national program, the weight information is usually registered in the clinical record, and only occasionally on the growth chart (Carnet de Salud infantil) that is given to the mothers when they come to the unit for the first time. Analysis of this information with the mother is rarely done.

In focused programs, weights are plotted on the growth charts, the community charts and sometimes in a register kept by the volunteers. Analysis of this information is made by the mothers at the time the child is being weighed,

and later analysis takes place with the group involved when the community chart is analyzed. In some cases, this information is transmitted to the local council or to the peasant organizations for further analysis and mobilizing support if necessary.

Supervision and Evaluation

In both programs, supervision and evaluation were found to be a weak point. They are not regular and not specifically focused on GMP. There is a need for ongoing mechanisms that will allow for adjustments in mid-course.

Training of Participants

In the focused programs, mothers and volunteers are trained. The type, content, and duration of training varies according to each program. In the national program, training has been provided for national and provincial levels, but has not yet reached the level of the health clinics.

One of the most important issues in training is to find the best way to provide individual counselling to the mothers as well as the use of appropriate educational material for individual and group education. Thus, training at the local level is essential.

Weighing Technique

In 50% of cases, it was found that a good basic weighing technique is applied as measured by an index developed during the study. The index is based on the following: undressing the child, zeroing the scales, registration of information on the group chart, consulting, and information given to the mother.

Participants' Attitudes and Role

In the national program, it was found that the attitude of the health workers toward mothers tends to be didactic, and not likely to help establish good communication. Sometimes, superior or unpleasant attitudes prevail. Little importance is given to GMP, which is mostly considered a subroutine of the daily clinical activities. In focused programs, sustained by the voluntary personnel from the community, the attitude is more participatory, with more respect and trust given to the mothers.

Other Findings

- Mothers weigh their younger children more frequently. In focused programs, the frequency of weighing of all children is higher than in national programs (2.95 vs 2.04 times in the last 6 months).
- Frequency of weighing starts to decrease after children reach 9 months of age. This coincides with the period of highest prevalence of malnutrition in children.
- Decrease in the frequency of weighing appears much earlier in national programs than in focused ones.
- Frequency of weighing increases as the mother's level of education and quality of housing improves or both.
- In urban zones, children are weighed more than in rural zones (difference is on average 28%).
- Average time spent on each child during a weighing session is 6 minutes.

Conclusions

- There is a need to pay attention to the institutional context in which GMP is implemented. When this context is not supportive to community participation and enhancement of active involvement of the mothers, it is unlikely that GMP will be successful.
- Different approaches to the implementation of GMP activities have implications in terms of adequate coverage. The capacity to generate actions at community and household levels as well as actions that will have an impact on resource allocation at other levels is also affected by the choice made.
- Every effort should be made to reach those most at risk, (children between 9 and 23 months, children of mothers living in poor housing and with low educational levels or both, and especially those in rural areas).
- There is a need to develop better ways of communicating with mothers, such as spending more time with them, improving counselling skills, and communication materials.

- Sharing experiences through joint exercises between the government health units and NGO projects will contribute toward a better quality of program implementation.
- The possibility of linking the weighing activities with income generation has been a significant contribution toward the success of the program.

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Action, Research Needs, and Policy

Action

The Need to Search for Alternatives

Growth monitoring without promotion is of limited use. A global strategy for GMP is not possible. These two statements reflect the consensus that was generated as a result of the presentations and the ensuing discussions. It was recognized that, too often, growth monitoring has not promoted growth because the weighing and charting has not been followed by actions, or, when actions have been taken, they have been inappropriate or ineffective. Furthermore, the goal of improved child health would best be served if GMP is looked upon as just one possible strategy within a host of strategies to enhance child health and development. A flexible approach is needed, adapted to the local cultural and political context.

There may be settings where one emphasizes growth promotion without including weighing or charting as a means to assess growth, for example, where there is a resistance to weighing (such as was the case in India), where the resources needed to carry out quality GMP programs are just not available, or where sound, local indicators of health and well-being (other than weight) are used. In introducing GMP, it must be clear to communities that the program is relevant to and can be responsive to their needs. A movement has to be created or present in the community for the promotion of the well-being of children. Poor communities especially may be more interested in daily survival, in eating once a day, than in efforts to introduce GMP. In this case, the challenge is to show communities how GMP relates to their main interests and then to find alliances within the community to promote growth. That is, in spite of our interest in GMP, we should not necessarily start our dialogue or plan a program with growth monitoring.

In those settings where GMP as a strategy to achieve growth promotion has been accepted, there is a need to ensure that one attends not only to the actual weighing and charting but, more important, to the actual process of its use. Action *must* result.

A move toward endorsing growth promotion combined with nutrition surveillance (or another technique for assessing growth) was given support. This was seen to be especially appropriate when the problem of growth faltering is widespread or when the population size is large.

It was clear that growth monitoring requires certain minimal requirements that, if not met, indicate that GMP is not the optimal or preferred strategy to adopt. A question to ask is "to what extent is the form of GMP being used, responding to the goal of growth promotion for child development and improved health?"

The "Triple A" Approach: A Model for Action

It was agreed that the identification and analysis of the factors associated with poor child growth and development was a pressing need, and these steps should always be followed by action. Although a global strategy or prescription for GMP was not seen to be possible, a more process-oriented, cyclical cycle of assessment, analysis, and action was supported as the strategy to pursue for promoting the well-being of children. This cycle has become known as the "triple-A" approach. The need to allocate resources properly between the three "A"s was stressed. Too frequently, most of the resources have been spent only on assessment, with analysis and action neglected.

In the paper on "Growth Monitoring in Health and Nutrition Information Systems: Tanzania" one begins to see how this triple-A strategy could work. The paper tells of the change in growth promotion strategies that have taken place in Tanzania over the years, moving from an initial emphasis on clinic-based growth monitoring to community-based GMP programs. In the community-based approach, GMP becomes a tool that can be used to spark the cycle of community assessment and analysis of problems, leading eventually to actions to overcome these problems. Some suggested that this approach might best be called community-nutrition surveillance. With this approach, community weighings, group assessment and analysis of the problems, and discussions about action alternatives are central.

The paper stresses that the strengthening of health and nutrition information systems is a must. GMP is viewed as a data-generation methodology, in which information collected at the community level is *used* there. Then, it is linked to higher administrative levels.

The paper stresses that health and nutrition information systems are already in place and are being used by many actors (i.e., policymakers, managers, people who have control over larger or smaller amounts of resources). The issue of the usefulness of GM becomes a question of the extent to which GM really is, or could be, an effective part of these information systems.

In Tanzania, it was agreed that the following administrative levels were most important with regard to nutrition-related decision-making: household, village, wards, district, regional, national. The paper describes how information is used by various levels, for decision-making purposes and nutrition surveillance. The possibilities for linking the GMP system with other relevant, community-based management information systems (e.g., vital information, immunization) is also described.

If GM is to be used in community-based programs, there is a need to give further attention to issues related to the collection of the growth measurements (e.g., attendance and coverage, organization of weighing sessions, and accuracy in weighing and in plotting the weight), compilation and interpretation (e.g., compilation of village data, interpretation of growth measurements), and communication and use of information.

Support for GMP

Responsibility for growth promotion must be shared among a variety of partners, on a variety of levels. There is a need to build capacity at all levels (i.e., household, community, and higher) for improved problem-solving and decision-making.

The responsibility of the health system to support growth promotion was emphasized. In a highly medicalized culture that emphasizes curative care and medical fixes to health problems, growth promotion/health promotion may be difficult to pursue and implement. Such a system does not look for ways to encourage existing good practices nor does it encourage health care providers to do outreach or to talk to and listen to mothers. The health care worker waits in health facilities for the sick to arrive, performs quick physical examinations, and then prescribes. This mind-set and pattern of care does not fit well with GMP. Ways must be found to change this overall attitude, and this will require changes in health-planning budgets and the allocation of resources to support outreach work, within a flexible timeframe to accommodate the schedules of busy people's lives.

One must look toward the household as an important locus for growth promotion, because it is within the household that many of the resources for child development are found. People can become involved in assessment, analysis, and action. To do this, a commitment to enhancing the capacity of people in communities to carry out their own research is required. The development and testing of a methodology to do community-level problem-solving is needed.

It was cautioned, however, that the community-based focus should not take the form of "blaming the victim," leaving households to rely only on their own resources. Support to households needs to be garnered from a variety of sources, including the community, learning institutions, and governmental and nongovernmental agencies. Household resources need to be complemented by the provision of essential services, not just in health but in many sectors. Dialogue and the fostering of mutual respect between communities and professionals is also a necessity. Too often, professionals have pushed ideas forward, thinking that they had the solution to problems. When the "solution" did not work out, they had a tendency to throw the responsibility for failure back onto the community and thereby avoid their own accountability. A polarization between the "professional route" and "community responsibility" is unproductive; the respective responsibility and contribution of each must be known and merged, and mechanisms for doing just that have to be developed.

In working at the community level, academic and agency naivety may need to be challenged. Too often the community is seen as a homogenous population, with its power structures and diversity under-recognized. There are sections of the population that indeed do not share a concern for child development; we need to talk about the mobilization of our allies in the community who also value growth and development. This implies struggle — the involvement and empowerment of some, the disempowerment of others.

A Community-Based Learning Process

In the paper on "Growth Promotion in Primary Health Care" a process is described for incremental learning that applies general principles and approaches to local conditions, to reach out to communities and with health and nutrition problems. The process depends on dialogue and partnership between local communities and the health system, and emphasizes the need for training and extension of local processes and learning.

It is suggested that standardized methods can be used to assess and define local health and nutrition problems. Once the three or four most common priority problems are identified, causal factors should be identified. Then, standardized packages of interventions can be introduced, worked out in accordance with local

conditions. The need for systematic surveillance of the health and nutrition situation is stressed, directed to prompt actions to correct any problems encountered.

The learning process may be best developed in designated longitudinal, area-based study sites (LABSS), jointly controlled by community decision-makers, health officials, and a committed academic institution. The LABSS can provide the framework to base an extension process to the whole region.

Research Needs

Although time did not permit an extensive discussion regarding research needs related to growth promotion, the following list indicates some areas that participants felt needed further study.

- The determination of causal factors of growth faltering in various regions to plan appropriate interventions and evaluate them.
- The identification and implementation of different strategies and interventions for growth promotion in different societies, comparing their impact on growth and their cost-effectiveness (including the opportunity cost to families). This includes randomized clinical trial (RCTs) to test GMP interventions.
- The determination of training needs to enable local communities, and health (or other development) workers, to undertake action research on local health and nutrition problems.
- Baseline data collection is needed in many communities regarding prevalence of malnutrition. This is important both for understanding the health and nutritional status of children and for evaluating the impact of growth promotion programs. Baseline nutritional assessment should, therefore, be part of any growth promotion program and every district health profile.
- Research on community involvement in and acceptance of growth promotion programs. To what extent are programs imposed by outsiders? How can communities be motivated to be concerned about equity of coverage and outcome?

- The development and testing of methods and techniques to undertake a community-based analysis of the local mix of factors contributing to growth faltering or poor development or both. In this regard, the future development and fieldtesting of rapid assessment methodologies used for a range of applications related to health and nutrition research should be undertaken more systematically (e.g., for causal analysis, infant and child feeding habits).
- The evaluation of growth promotion interventions carried out in sectors other than health.
- Research on the cost-effectiveness (including the opportunity cost to families) of growth promotion programs.
- Traditional perceptions held by child caretakers and their communities regarding growth and development need to be more widely studied; for example, how are growth and development locally defined?
- Research describing the existing health services, programs, and their information systems. Improving information flow, utilization of information and communication between various actors involved in GMP at all levels of society are needed. This health research is essential to ensure successful implementation of growth promotion programs as would be the case for any new program.
- The design of appropriate growth promotion strategies for urban areas.
- Development of valid and reliable measurements of the comprehension of growth charts by workers, volunteers, and mothers.
- To develop improved means of communications of information on growth promotion in communities with low educational levels.
- To understand the interrelationships between research and policy development and implementation for GMP in different societies.
- To assess quantity and quality of participation of the families and communities and the distribution of resources. How can communities be involved in participatory research?
- Development of portable bathroom balances that can accurately weigh children when mothers are holding them.

- Research into the commitment of local and national governments and into the issue of sustainability of programs.
- The development of methods and tools to measure and assess child care and nurturing.
- Research into management information systems for optimal monitoring of programs.
- Regular, scientific evaluation of programs using sound methodologies.

Needless to say, researchers should make every effort possible to maximize the likelihood of their research results being translated into action.

Policy

Policies are normative statements, whereas strategies describe how to do something. Growth promotion for child development requires clear definition of policies and strategies to reach those that are in most need. A national policy on growth promotion should not be limited to the health sector, as is often the case. Much of the variance of growth can be attributed to determinants of health that lie outside of the jurisdiction of the health system, calling for an approach to action for growth promotion that is broad and multisectoral. Thus, policies for growth promotion need to find support in food and nutrition, economic, employment, education, and other social policies, as well as health policies. In implementing these policies, there is a need to coordinate them closely and to exploit all opportunities for synergistic integration without making integration into a fetish. (There is a belief that since integration is good, more integration is better!)

Through the work of various groups, such as agencies of the United Nations and international professional bodies, it has been shown that by formulating policies at international level on child rights and growth promotion, national policies too can be inspired. In seeking ways to influence policy, it would be a grave mistake to court only the powers that are, rather than helping to create new powers that are more favourable to children's growth. In prerevolutionary Benin, Mali, and South Africa, grass-roots marginalized groups were able to define problems and solutions differently, waken public opinion, and influence the policy-makers to make fundamental power changes.

Where governments are sympathetic to new policies, a coalition of politicians, bureaucrats, and technocrats is needed to work together to implement change. It was emphasized that there is no value in having good policies unless they represent political commitment, which is expressed by assigning the best people to do the job, committing resources (including money that can be allocated flexibly), and giving sufficient autonomy to the program.

It is important that we learn at global and national levels from past experiences in efforts to promote well-being. Here one could examine the successes, and the failures, in areas such as the expanded program of immunization (EPI), oral rehydration therapy (ORT), iodine deficiency disorders (IDD) and comprehensive primary health care (PHC). Did policies get formulated? How and why? What were the supporting organizational arrangements? Who was involved in the process? How were advocacy, training, implementation, and evaluation done? What was the experience in policy formulation involving collaboration between sectors? What were major obstacles? Were communities empowered? What was the role of NGOs, religious, and other societal forces?

At the meeting it was felt that policy analysis and reformulation is needed particularly at national and subnational levels to ensure that communities and families are given access to the necessary resources for growth promotion and development. The need to involve a range of actors, including for example, NGOs and academics, into the policymaking process, was emphasized.

There is a growing consensus that health policy development should be undertaken within a systematic, broad approach, based on societal goals for human development, political commitment to these goals, sound scientific evidence, resource availability, and social considerations.

Although policies are based on more than research, the meeting recognized that the contribution of research to the policymaking process was generally painfully little. Much nutrition research has focused on influencing strategies. This is partially because of the difficulty of policy research, partially because research is determined by configurations of vested interests and political forces, as well as by knowledge paradigms, which shift only slowly. Research can and should be reoriented to be more applicable to local situations. This needs the involvement of those who will apply the research, for example, workers or communities, or both.

A large part of nutrition research results are not communicated broadly, especially to politicians and the policymakers (who do not read professional journals, or proceedings such as these). In spite of this failing, an increased emphasis on research was felt to be appropriate, especially in Africa, where the economic crisis has allowed external actors such as the IMF to determine broad social and economic policies, undermining internal policymaking. One participant noted that, although many policies and strategies are inappropriate, so is much research. A high-level unit to plan research, bringing together researchers, policymakers, and health managers is needed to do national level priority-setting for research. Currently, most ministries of health are not capable of making policy, or of incorporating the multisectoral elements that should be part of health policy. Essential National Health Research (ENHR) is an effort to harness national resources for essential health research to arrive at policies and strategies that are responsive to local problems. The meeting was very supportive of this and similar efforts and hoped that the ENHR priorities would always include topics relevant to growth promotion policies and strategies.

Nutrition Improvements in Thailand: National Policies and Strategies

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Over the last few decades, many nations and concerned international agencies have been working to improve the nutritional status of vulnerable population groups, especially young children. The 60s brought with it the decade of the applied nutrition program (ANP) wherein various sectors had their own programs to promote nutrition. In the 70s, there was a call for multisectoral integrated efforts to alleviate malnutrition. Since 1980, and continuing to today, community-based interventions emphasizing community participation form the basis for many local and national programs.

During this period, strategies for the implementation of effective nutrition intervention programs have been sought. These strategies have stressed not only the feasibility of implementation and short-term outcomes, but also efforts to promote sustainable nutrition programs.

Currently, nutrition intervention programs in Thailand are implemented both as vertical programs within a single line ministry (sectoral intervention) and as integrated programs involving several sectors and agencies (multisectoral approach). Although there is no rule as to which strategy should be used in what situations, the sectoral approach works best when the problem is relatively serious, such as high prevalence of moderate and severe malnutrition. Immediate actions are necessary to prevent death and help ensure child survival. Medium- to long-term programs generally involve more intersectoral and horizontal approaches. Sectoral implementation of nutrition intervention varies, with involvement most frequently from the health and the social welfare agencies.

A multisectoral approach comes into consideration when the multifaceted causes (e.g., biological, sociocultural) of malnutrition are being targeted for change. Integrated efforts for tackling such underlying causes are theoretically the most effective strategy. In reality, however, such efforts are very difficult to implement and a "top-down" approach is still overwhelmingly used. Unless,

however, the community is involved in all intervention program stages (problem identification, intervention planning, implementation, monitoring, evaluation), the multisectoral implementation is unlikely to succeed.

National Food and Nutrition Programs

Until the mid 70s, Thailand's nutrition program was one component of the nation's health plan. Thereafter, the National Food and Nutrition Plan (FNP) was, for the first time, included as a separate entity in the Fourth National Economic and Social Development Plan (NESDP) (1977–81). The most significant accomplishment of this plan was the creation of a strong awareness about major nutritional problems among the public and private sectors at all levels. This led to strong political commitments in terms of the country's nutrition policies.

A multisectoral approach was adopted and implemented by four main ministries: Health, Agriculture, Education, and Interior (community development department). However, early on the nutrition program was not fully implemented because of a lack of inter- and intrasectoral collaboration. Further, there was no change in program planning and the budget allocation structures to support multi-sectoral efforts. There was also very little participation by the community. Consequently, many of the activities did not achieve their set objectives, such as, centrally produced supplementary food, and nutrition rehabilitation in rural villages. When the national nutrition surveillance data first became available at the end of 1982, there was a strikingly high prevalence of PEM (51%) among preschool children. Overall, nutrition programs employed during the Fourth NESDP were only stopgap measures to relieve the most severe form of malnutrition. Systematically planned, long-term solutions were perceived as necessary for sustained improvement of the population's nutritional status.

The Fifth NESDP (1982–86) continued to include the FNP. However, the concept and planning approach changed, because malnutrition was recognized as a manifestation of poverty and ignorance. Two important national policies, rural poverty eradication and primary health care (PHC), were adopted at the Fifth NESDP. Both policies have nutrition concerns as a main component. The nutrition policy was rooted in one broader government policy of poverty alleviation and rural development (an approach known as the "Poverty Alleviation Plan" or PAP). Health for All by the Year 2000 strengthened and accelerated the implementation of the successful community-based nutrition programs. This was an important turning point in the nation's developmental approach, which formerly focused attention on overall economic growth and its trickle-down effects on rural development.

The rural poverty alleviation policy aimed to integrate and coordinate activities in rural development at central and local levels. The policy focused on identifying poverty areas needing urgent attention, which then served as the target areas for implementation agencies. There was also a striking organizational change for rural development. One national committee was created to replace several separate sectoral developmental committees, which was in charge of planning and executing development policies for infrastructural development from the central to village levels.

During the Fifth NESDP, the nutrition situation of infants and preschool children improved dramatically. Severe PEM was practically eliminated and only a small percentage of moderate PEM remained (Table 1). Weighing by simple beam balance and use of growth charts by the village-based health volunteers and communicators (VHVs and VHCs, trained under the PHC strategy) and mothers were found to be feasible and useful for problem identification and growth assessment. Simple technology for village-level processing of supplementary food was promoted to overcome the disrupted distribution of centrally produced supplementary food. Village self-financing schemes were also attempted with some success.

Table 1. Percentage prevalence of protein energy malnutrition (PEM) in preschool children (wt/age), Thailand.

Year	No. of children	Nutritional status (%)			
		Normal PEM	Mild PEM	Mod. PEM	Severe
1982	1,000,000	49.21	35.66	13.00	2.13
1983	1,270,393	64.77	28.53	5.90	0.80
1984	1,590,830	70.67	24.85	4.20	0.27
1985	1,620,518	71.55	24.35	3.90	0.21
1986	2,277,908	74.91	21.84	3.12	0.13
1987	2,351,521	77.11	20.53	2.30	0.06
1988	2,435,129	78.85	19.51	1.60	0.02
1989	2,539,407	79.14	19.72	1.14	0.01

*Source: Division of Nutrition, Ministry of Public Health as reported in Tontisirin, K. and Kirananda, T. 1990. Public policy and implementation strategies for alleviation of malnutrition and poverty in Thailand. A paper presented at the meeting on the Financing of Social Services during the 1980s and Policy Options for Next Decade. Florence, UNICEF Office, 1-3 March 1990.

During this period the concept of "having an improved quality of life" was introduced to replace that of "having good health." The quality of life (QL) concept was translated into actions via the "basic minimum needs" (BMN) approach and was implemented as a pilot trial in 1983. The measurement of BMN is based on eight categories of indicators (or QL indicators). These indicators were used for problem identification and setting the goals for development by the community leaders and local level public personnel.

Eight Groups of BMN or QL Indicators

- *Adequate food and nutrition.* This includes nutrition surveillance from birth to 5 years; school feeding; pregnancy care, and services.
- *Proper housing and environment.* This includes housing that lasts at least 5 years, hygienic housing and environment; owning a hygienic latrine, and access to adequate, clean drinking water all year round.
- *Adequate basic health and education services.* This includes full vaccination with BCG, DTP, OPV and measles for infants under one year; primary education for all children; vaccination with BCG, DT, and typhoid vaccine for primary school children; literacy for 14–50 year old citizens; monthly education and information in health care, occupations, etc. for the family; and adequate antenatal care and services.
- *Security and safety of life and property.*
- *Efficiency in food production by the family.* Includes growing alternative crops or soil protection crops; utilization of fertilizers to increase the yields, pest prevention and control in plants; prevention and control of diseases of animals; use of proper genetic plants and animals.
- *Family planning.* Not more than two children per family are recommended and adequate family planning services are to be provided.
- *People's participation in community development.* This includes promotion of the family as a member of self-help groups; involving the village in self-development, and care of public property; care and promotion of culture; preservation of natural resources; active participation in voting; encouraging village committees to plan and implement projects.

- *Spiritual or ethical development.* This includes being cooperative and helpful in the village; family members involved in religious practice once a month; neither gambling nor addiction to alcohol, etc., by family members; and modest living and expenditures.

In the Sixth NESDP (1987–91), similar strategies were continued and the basic minimum needs approach was adopted nationwide to strengthen the integration of sectoral efforts. The rural development plan (RDP) of the Sixth NESDP continued to utilize the PAP approach with emphasis on improvement of the quality of life of the all rural people so that they would be capable of self-help and able to adapt to the changing economic environment. The BMN approach resulted in both a better integration among the ministries involved, i.e., the ministries of agriculture, education, interior and public health, and in a more active community participation in development.

To select poverty areas in need of urgent attention, the following classification of villages into three levels of development has been used:

- Backward or poor areas where people are facing four or five problems such as: transportation difficulties; owning no agricultural land; low agricultural productivity or low income; poor health; inadequate, clean drinking water; and ignorance in quality of life improvement. There are 5787 villages in this category requiring intensive government support as in the PAP.
- Intermediate areas where people are facing one to three of the problems mentioned above: 35,514 villages in this group require government input.
- Advanced areas where people are economically better off and have economic potential, facing few of the problems mentioned above. These 11,621 villages will be encouraged to work with the private sector.

In all areas, BMN or QL indicators will continue to be used for problem identification and goal setting for development. Improvement of planning processes at all levels will also continue. Management of information and data concerning rural development continues to be strengthened at the provincial, departmental, and national levels for planning, coordination, and evaluation.

By 1989, more than 580,000 VHCs and 62,000 VHVs were trained, covering almost 100% of rural Thai villages. As a result of this approach, nutrition improvements continued, and the most recent nutritional surveillance report showed that the prevalence of severe malnutrition is almost nil, and moderate malnutrition has reduced sharply (see Table 1).

Conclusions

This case study of the Thailand effort to alleviate malnutrition has shown encouraging results. The entire period of this endeavour required 10–15 years as 5–6 years or even longer was needed to create awareness and a strong political commitment. The subsequent implementation period of 5–9 years was essential for the consolidation of political support, effective managerial structures and functioning for efficient coordination and integration of development activities, establishing detailed operations for each activity based on research and experience, and stimulating active community participation.

In the past, during the first three NESDPs, the solution of nutrition problems relied only on the health sector for treatment and prevention. The first attempts to coordinate efforts among the ministries of agriculture, interior, education and public health were not so successful during the Fourth NESDP, 1977–81. However, nutrition surveillance (growth monitoring) and mortality data of preschool children that were made available to the public resulted in the creation of awareness and subsequently political commitment.

Since 1982, malnutrition has been considered as a symptom of poverty and ignorance, and the poverty alleviation plan targeted the areas with the highest concentration of poverty. This holistic approach was implemented through a restructuring of the managerial process of the National Rural Development Committee down to the provincial, district, Tambon, and village level. Nutrition activities, primary health care, nutritious food production, and other basic social services were integrated in the target villages under PAP. The BMN or quality of life indicators had also been developed and used for problem identification and goal setting for development and evaluation. People or community participation has been an essential part of the development process.

It would seem that explicit policies for food and nutrition, either as a self-contained policy or a component of broader development policies, strengthens and facilitates nutrition improvement efforts. It must also be concluded that a high degree of political stability and commitment, economic growth, and organizational structures are favourable factors for successful, large-scale nutrition programs. Although recognizing that each country has its own special conditions and circumstances, the results of Thailand's experiences during the last decade are significant and need to be tested further in other developing countries. These experiences have shown that significant progress is possible in nutrition improvement.

Growth Monitoring in Health and Nutrition Information Systems: Tanzania

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The current debate regarding the usefulness of growth monitoring programs seems to be more a confusion of assumptions and concepts rather than a matter of real issues. Just as in the case of any other data-generation methodology, it is impossible to state whether growth monitoring is "good" or "bad" without describing the context in which it is used and the purpose for which it is applied.

The health and nutrition conditions of a population are the result of many complex and interacting processes at different levels in society. Some of these processes are directly and consciously linked to efforts to improve health and nutrition conditions, e.g., home care of children or maternal child health (MCH) services. Others are not, but may still have profound implications for these conditions, e.g., structural adjustment policies and developments in agricultural technology.

In all of these processes there are key actors: policymakers, managers, people who control different resources. What they all have in common is that they are following a certain procedure of assessment, analysis, action, reassessment, reanalysis, continued/modified action, and so on, i.e., a process known as the triple-A cycle (UNICEF 1990).

Access to information plays a critical part in all decision-making and management processes. Sometimes the key actors may rely upon formal, explicit information systems but, most often, informal assessments of what they see, hear, feel, and read guide their decisions. The issue of the usefulness of growth monitoring thus becomes a question of the extent to which growth monitoring really is or could be an effective part of such management information systems.

Therefore, is growth monitoring already in use? By whom? Does the GM information effectively guide the decision-maker? If not, are there ways to improve the usefulness of GM information through changing the way the system is set up and operates? Are there other, more time- and cost-effective methods to provide the same (or better) information?

If growth monitoring is not currently applied, would the introduction of GM systems improve overall performance of health and nutrition management systems? Again, are there any better alternatives?

Anthropometric Measures

Anthropometric measurements have for a long time been accepted as one of the most valid and convenient ways to assess nutritional status in a population – particularly of young children. Interpretation of anthropometric measurements in children have to be related to the expected growth of the child, hence what you assess is really the deviation compared to an "optimal" growth pattern.

Growth monitoring is a time series of anthropometric measurements (normally weight) and is introduced to establish a more precise picture of the actual growth trajectory of the individual child. It provides a basis for analyzing the factors that may have influenced the child's nutritional status negatively or positively. The point is that "nutritional status assessments" and "growth monitoring" are really very closely related, and both essentially measure growth performance in children.

Anthropometric measurements for nutritional status assessments were introduced in Tanzania during the 1950s and used quite extensively in surveys carried out by the Nutrition Unit in the Ministry of Health during the 1960s for the purpose of establishing the prevalence of protein–energy malnutrition (PEM) among children in the country (Malefuleura 1979). The Tanzania Food and Nutrition Center (TFNC) was established in 1973 and continued and intensified these efforts to map out the problems of malnutrition.

The nutritional surveys carried out during these years had the very important effect of firmly establishing that malnutrition was a major problem among Tanzania children. The survey results also demonstrated many contradictions to the "common understanding" of the causes to malnutrition. Many of the high-producing agricultural and economically developed areas showed higher levels of malnutrition than more backward, food-deficit areas (Ljungqvist 1981).

It became clear that something had to be done to alleviate the problem of malnutrition in young children, and it also became evident that new concepts and approaches needed to be developed. Measurement of children's growth performance was suggested as a useful tool in these endeavours. The technique of using children's weight plotted on a growth chart was developed and quickly introduced into the newly established MCH services system.

GM in MCH Services

General MCH services in all health institutions in Tanzania were introduced in the mid 1970s. Growth monitoring was made one of the key elements of these services. The idea was that GM should serve the dual purpose of promoting a better understanding among parents (mothers) about the relationship between child feeding and child growth and, at the same time, provide information to health managers at district, regional, and national levels regarding the prevalence of malnutrition (measured as underweight), in various locations at different times of the year.

A growth chart to be used in Tanzanian clinics was developed, together with a series of tally and reporting forms to facilitate monthly compilation and reporting of the data from the weighing sessions. All clinics were equipped with weighing scales and MCH aides were taught how to organize weighing sessions, how to plot the weights on the chart, and how to compile and report the results. They were also taught how to explain the growth chart to the mothers and provide advice according to growth problems identified.

The clinic-based GM system was often linked to food aid handouts, which served as an important incentive to mothers to attend the weighing sessions. Because of unreliable supplies and distribution problems with food aid and the many different policies applied in establishing criteria for rations, these food handouts tended to frustrate and disappoint the mothers more often than providing real motivation and support. Such practices have now more or less totally disappeared from the MCH clinics.

After more than 15 years of experience with clinic-based GM, it is generally accepted that neither the "growth promotion" nor the "nutrition surveillance" objectives of the system have been achieved. There are many reasons for this, some of them similar to what is recently being reported from GM evaluations from other countries (Pearson 1992), and some more specifically related to implementation problems in Tanzania.

Ineffective Use of GM Information

The major problem with regard to the growth promotion aspects of the system was that growth monitoring information was never made part of any useful decision-making process: none of the direct actors were given a chance to explore how the information could effectively be used. Those who designed the system or supervised it never made sufficient effort to address this obvious, basic issue. Weighing sessions were thus normally conducted under very congested conditions

with hundreds of mothers and children waiting, many of them tired and ill and eagerly waiting to receive treatments or other specific services. Besides being pressed for time, very few of the MCH aides had the knowledge to interpret (properly) growth patterns or the skills to communicate with the mothers effectively to use the growth measurements for careful analysis and understanding of relationships between growth, feeding, and control of disease. Generally, they resort to "standard" and typically inappropriate advice on balanced diet or scold the mother for being lazy, stupid, and a poor caretaker in general.

The actual outcome of the GM surveillance component, i.e., reporting and use of the information at higher administrative levels, is possibly even more disconcerting. There are very few examples of any of the data, painstakingly compiled and reported for over 15 years, ever having been used for any meaningful analysis or action. First, the management of the data itself was never well designed, leading to long delays in reporting. Second, there was never any clear idea on *how* the information should be used. MCH coordinators at different administrative levels thus dutifully compiled the reports and forwarded them to their supervisors, but neither they nor the supervisors knew what conclusions to make or what kind of decisions were needed to affect problems indicated by the reports.

The shortcomings of the clinic-based GM system as summarized above have been identified and reported through formal and informal assessments throughout the last 15 years of implementation, but very little has been done to address the problems identified. As a result, valuable time for mothers, MCH aides, and other PHC workers has been wasted and children suffer directly and indirectly!

GM in the Iringa Nutrition Program

The Iringa Nutrition Program was planned and prepared during 1982–83 and implementation started during the first half of 1984 in the pilot area of about a quarter of the villages in Iringa Region in Tanzania. The program provided an opportunity to operationalize and to apply the National Food and Nutrition Policy that had been completed in 1980 under the coordination of the Tanzania Food and Nutrition Center, TFNC (TFNC 1980). The policy clearly spelled out that nutritional status has to be viewed as an *outcome* of many interlinked and complex processes at different levels in society. Control of malnutrition consequently requires an integrated and multisectoral approach, where the actors should come together and analyze the situation, defining the specific factors operating and the role of each sector and actor in controlling these factors.

In recognition that malnutrition is caused by processes at different levels of society, operationalization of the policy for the purpose of the Iringa program required methods to be developed to enable actors at different levels to assess, analyze, and design actions at their respective level of decision-making. The "triple-A cycle" approach to nutrition programming was coined and developed (UNICEF/WHO 1983).

In the triple-A approach to nutrition programming, access to reliable information about the nutrition problem in an area is crucial not only for an initial analysis of the problem, but also to enable the "management structure" to reassess and evaluate the effectiveness of various actions taken so that further improvements can be made. In the Iringa context, as well as in most parts of rural Tanzania, it was agreed that the following administrative levels were most important with regard to "nutrition-related decision-making": household, village, (ward, division),¹ district, region, and national.

Nutrition Information Systems

The *first* step in the final planning of the Iringa program was to consider and develop "nutrition information systems" for the defined levels of decision-making (Ljungqvist 1988). Most effort went into defining such systems at household and village levels, due to the paramount importance of the resources at these levels in determining appropriate care and feeding of the children in a rural Tanzania context.

Mothers and other caretakers in Tanzania use informal nutrition information systems in assessing the everyday development of their children and in many cases their system seems to work reasonably well as judged by the fact that many children actually grow well under the prevailing circumstances. It was clear, however, that the mothers seem to be rather isolated in using this information and taking full responsibility for the care of the child. It was agreed that if nutrition information could be more effectively entered into the decision-making system of the *family and extended family unit*, involving particularly the males, then better use of available resources leading to improved nutrition and child survival could be achieved.

¹These two levels were not considered to have any major "resource management functions" but constituted critical "linkages" between the villages and the district. The situation is now changing with the wards being given a stronger coordinating role in the decentralized planning and implementation or rural development.

It was also agreed that the *village unit*, which controls considerable human and productive resources in Tanzania, could play a much more decisive role in supporting the women and the children, if their decision-making systems were more effectively addressing these issues, i.e., that nutrition information was regularly reviewed and made a priority in resource allocations and actions by the village government.

Nutritional status data from the growth monitoring assessments was considered the most appropriate and viable means of strengthening nutrition information systems at community (in this case = village) level, as it was operating at that stage, but it was also agreed that the existing clinic-based system was inappropriate for this purpose. Considerable time was spent discussing with health staff and other extension workers, as well as with village leaders and people, how to generate and compile growth measurements at household and village level for improved nutrition decision-making.

Eventually, it was agreed that a system be established where all children were weighed at least every 3 months and that this weighing could take place either at the clinic or at village weighing sessions. Each child thus had only one growth chart, and this chart was used both for the existing clinic purposes as well as for the household and village nutrition management. The MCH aide closest to the village conducted the clinic-based weighing and she also assisted the village health committee and the village health workers in organizing village weighing sessions on "health days" and to interpret and discuss the results. In this way, confusion and contradictions between the two growth monitoring systems were avoided.

Uses of Growth Information The growth information generated in the community was used for a number of different purposes:

- The results were used as a basis for discussions with individual mothers and caretakers at the time of the weighing (fathers were also encouraged to participate fully).
- Nutrition status data collected in the village were used for public information and education, usually taking place on the "health days."
- The data were compiled and analyzed by the village health committee (both current status and trends were noted) and presented to the village government for decisions about various follow-up actions to be taken. Such actions have included organization of child feeding posts, health/nutrition education, and support to individual families and children.

- Children with severe underweight or faltering weights were visited in their homes by the village health workers who helped the parents to analyze and improve their child care and feeding problems.
- The data, often complemented with comments and information about village actions taken, were reported to the ward and district levels to solicit support in critical areas where the village could not take action themselves, e.g., improved water supply, health services, agriculture inputs, etc.

The growth information generated in and reported by the villages was then compiled and analyzed at ward, division, district, and regional levels and used for continuous planning and implementation of the program. Growth monitoring thus became a core element in the entire program. It helped to direct and focus efforts and resources and to evaluate effectiveness of actions taken. The positive results of the Iringa program clearly demonstrate the feasibility and the effectiveness of the approach (Fig. 1).

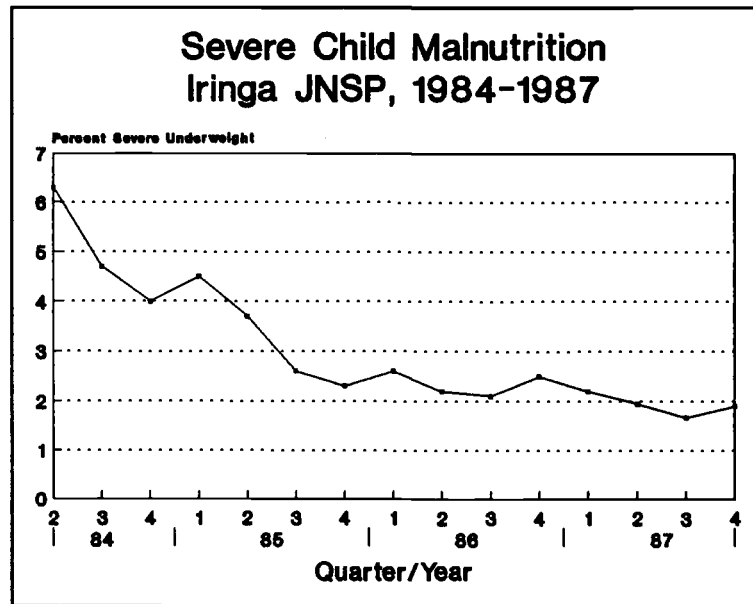


Fig. 1

GM in CSD Programs

Applying the Iringa Experience

The positive experiences from the "Iringa approach" became evident from 1985 and prompted the government and UNICEF to apply the same approach in other area-based programs that were ongoing or being initiated at that time. Similar programs were thus started in Kagera, Shinyanga, and Kilimanjaro regions and the UNICEF-supported, "Basic Services Programs" in Mtwara, Ruvuma, and Morogoro regions were restructured and reprogrammed adopting the same principles.

In Iringa region, the authorities decided to expand the nutrition program to cover the whole region. This was done late in 1987, largely with resources from the region and the districts themselves. In the other regions starting up the program, initial implementation was confined to selected districts and divisions, with the intention of adding additional areas to cover the entire population at a later date.

In 1989, additional funding was secured through UNICEF to expand the program approach to the whole of Zanzibar, and to provide minor support to regions that were able and prepared to start up the program with their own resources. The latter type of limited support was initially (1989–90) given to Mara and Singida regions, which had for some time strongly pressed UNICEF for support and had already pledged considerable local resources for special programs for women and children.

The formal, final evaluation of the Iringa program in 1988 (WHO/UNICEF 1988), and the "mid-term review" of the UNICEF country program 1988–89, which included an assessment of progress in all the regions mentioned (Mushi 1988), brought new convincing evidence of the effectiveness of the approach, by now named Child Survival and Development (CSD) programs. The Tanzanian government began to take a more direct coordinating role, trying to mobilize additional internal as well as external resources to further strengthen and expand CSD actions.

National Coordinating Committee for CSPD Programs

A National Coordinating Committee for Child Survival, Protection and Development NCC/CSPD, (CSPD) programs, was formed under the chairmanship of the Deputy Principal Secretary in the Planning Commission, with secretariat functions shared between the Planning Commission in the President's Office and the ministries responsible for local government and community

development (CSD was changed to CSPD in 1991/92, adding "P" for protection). A large number of ministerial departments are members of the NCC/CSPD together with some important national institutions like the Tanzania Food and Nutrition Center. All the regions in mainland Tanzania are represented on the NCC/CSPD through their regional planning officers. A similar national coordinating committee has also been established in Zanzibar for the purpose of the nutrition-CSPD program started there in 1988.

External agencies are also invited as members of the NCC/CSPD in an effort to mobilize additional external financing of CSPD programs and to harmonize different approaches to community-based social development programs supported by different donors. Of the other donor agencies (besides UNICEF), particularly the World Bank, NORAD and SIDA have shown a keen interest in joining hands to promote and expand the CSPD approach in Tanzania. The World Bank is thus in 1991–92 starting up "district health and nutrition programs" in 10 of the most disadvantaged districts in mainland Tanzania, and NORAD is adopting CSPD elements into their "regional integrated programs" in Rukwa and Kigoma regions. SIDA is, from 1992, providing support through UNICEF to accelerate the program in Mara and to initiate a program in Mwanza region.

Two international NGOs, World Vision and Plan International, are adopting similar approaches in Kahama district and Dar es Salaam region, respectively. Other UN and bilateral agencies and NGOs are linking up with CSPD programs, like the UNDP/UNFPA/WFP/UNICEF program in Shinyanga, or establishing mechanisms for collaboration and sharing experiences.

In the new 1992–96 country program of support to Tanzania, UNICEF is pledging support to start a CSPD program in one additional region, Coast, and to seek funding also for Mbeya region (not yet confirmed). In the current situation (May 1992) 11–12 out of the 20 regions in Mainland Tanzania have started or are preparing to start programs with support from UNICEF (in many cases in collaboration with other external agencies) and in many of the remaining regions and districts, similar program approaches are underway with support from other external agencies and NGOs. The whole of Zanzibar (five regions) is already covered with UNICEF support.

It should be noted that in most of the regions and districts with CSPD programs, program activities are covering only parts of the areas. Iringa region and Hai district in Kilimanjaro are the only ones so far with full coverage. In many of the others, like Mtwara, Ruvuma, Kagera, and Morogoro, the current coverage is around 50% with plans established to reach full coverage by 1993–94. The number of districts (excluding Zanzibar), where programs have started with UNICEF support is summarized in Fig. 2, adding the districts receiving support

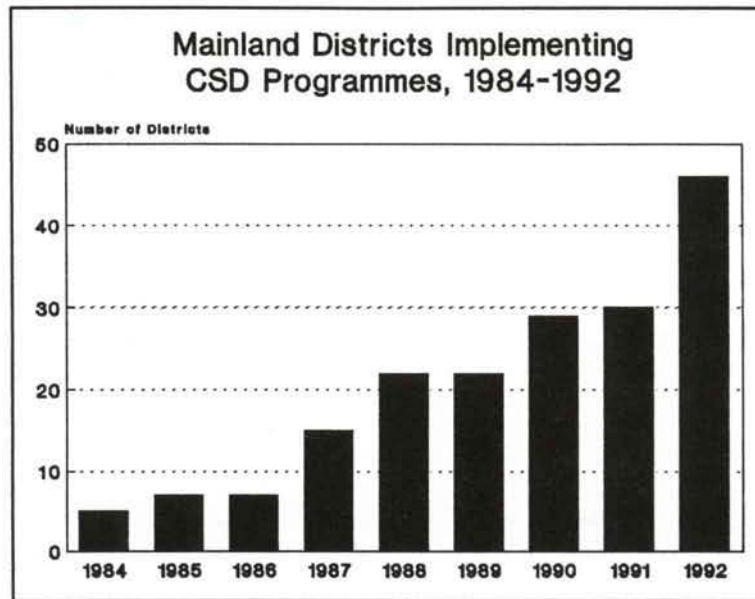


Fig. 2

from other agencies for integrated CSPD program to a total number of 60, i.e., more than half of the districts in mainland Tanzania. The rapid expansion of children participating in community-based CSPD programs is further reflected in the increase of GM information reported every quarter as shown in Fig. 3.

Sustaining the CSPD Approach

The original Iringa Nutrition Program included a large number of different projects and activities (UNICEF/WHO 1983). The total, external cost per child was estimated as USD 16/year, out of which about half had been used for various "start-up" and operational research activities, and about USD 8/child per year would be needed to keep the program going with the same activities receiving similar support.

In the expansion of the program approach, however, originally planned activities receiving the same external inputs (UNICEF/WHO 1988), considerable efforts were made to define which of the components were most crucial for the success of the program and how these activities could be implemented in the most cost-effective manner to establish long-term sustainability of the approach. In all the assessments made, it was clear that activities directed toward improving nutrition and health management at household, village, ward, and district level

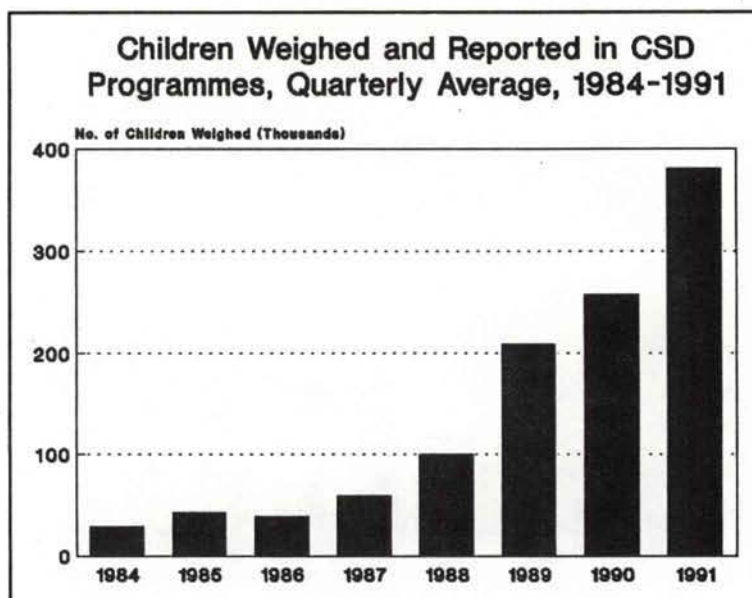


Fig. 3

formed the "core" and had to be considered highest priority in all efforts to improve conditions of children and women. Core elements include advocacy and communications, integrated training, transport support, *and community-based health and nutrition information systems*. With this emphasis on "core elements," the annual cost per child in the Tanzanian CSPD programs is now in the range of USD 2–4. More important than external financial sustainability, however, is to ascertain "indigenous" sustainability, i.e., that people really see the benefits of confirmed weighings, reporting, discussions, and contributions.

Regular reports on growth status are forthcoming from all villages where the program approach has been well understood and adopted, and the "attendance," i.e., proportion of the expected children covered in the reports, is normally above 80%. In the villages, wards, and districts where the program approach among people, leaders, and managers is not well understood or adopted, the coverage is normally lower and varying. With time, however, most of these areas have tended to catch up and started to collect, compile, use, and report growth and immunization information regularly. "Attendance" information and reporting in itself has thus become one of the most important indicators of village-level management efforts and is used at district, region, and national levels to initiate efforts to strengthen the programs.

GM and CSPD

The CSPD program approach with growth monitoring as a key component has become a national strategy, and more and more decision-makers are looking for nutrition information to guide their priorities for action. Growth monitoring information has moved from collecting dust in the corners of the MCH coordinators' office to planning officers' and other functional managers' desks. In one of the new CSPD districts, Manyoni in Singida, the district management team, which is the highest technical committee in the district, has decided to hold regular quarterly meetings with all of their division and ward secretaries to review the village GM reports to set priorities for planning and follow up actions.

Growth monitoring information has also found its way into the Planning Commission. The chairmanship and the secretariat of the NCC/CSPD is housed in offices dealing with macroeconomic planning – the most effective base for intersectoral planning and setting priorities. At first, there was a certain degree of uneasiness in using this type of information in regular planning procedures. However, as the information continues to flow in and the experiences accumulate, it becomes clear that change is indeed possible, and that actions to improve the conditions of women and children deserve and require guidance and support from all relevant offices and actors. The graph below summarizes the progress made in the CSPD program areas up to end of 1991 (Fig.4).

It is clear from Fig. 4 that one of the regions, Mtwara, showed very little progress during the first 3 years of implementation. The actions taken to address the situation in Mtwara is a good example of how national and regional levels of administration can use growth information for CSPD management and coordination.

The Mtwara Initiative

For quite some time, 1987 up to 1990, the GM data from practically the whole of Mtwara CSPD areas showed low and varying attendances and little, if any, improvements of nutritional status. Possible problems were analyzed and a number of explanations were offered, including droughts, floods, general poverty, and poor levels of education. Eventually, it was agreed that the poor staffing situation at district and subdistrict levels in Mtwara had made it difficult to ensure that the concept and the methodologies of the program were fully understood and spread in villages of the region.

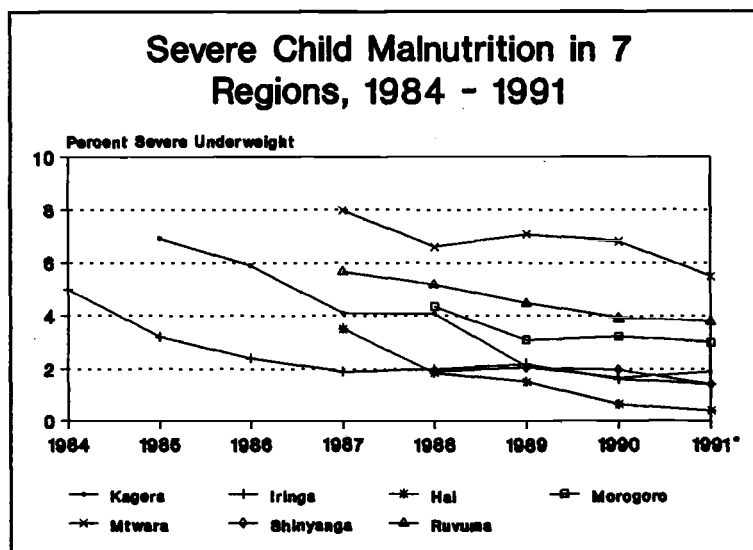


Fig. 4

Mtwara region is a typical "Cinderella" region in Tanzania, where very few competent staff like to be placed. There are, consequently, a large number of vacancies and the staff who are actually in place are often frustrated over the conditions of work. This is a problem that is not easy to address with short-term measures, but the very serious conditions with many villages showing more than 10% severe malnutrition and the region having one of the very highest infant mortality rates in the country, called for immediate action. The National Coordinating Committee, NCC/CSPD, therefore decided to try temporarily to use experienced CSPD implementors from other regions to go to Mtwara and help to explain the program approach to the villagers and to the leaders and the few existing staff, and assist in organizing the program activities, including weighing, registers, and community-based nutrition rehabilitation.

The "Mtwara Initiative" was started early in 1991 with 40 outside "animators" coming to Mtwara and being placed in each of the CSPD program wards for an initial 2 months. When they left, they had managed, in collaboration with existing extension staff, to update all registers, conduct weighing of all children and organize community-based nutrition rehabilitation of more than 17,000 severely malnourished children, where the children were fed three extra meals per day, the food and other arrangements contributed and run by the villages themselves. In addition, they conducted extensive training and public education and left behind a situation where the issues were fully understood and where all villages had organized themselves and established concrete plans to continue to improve the condition of their children.

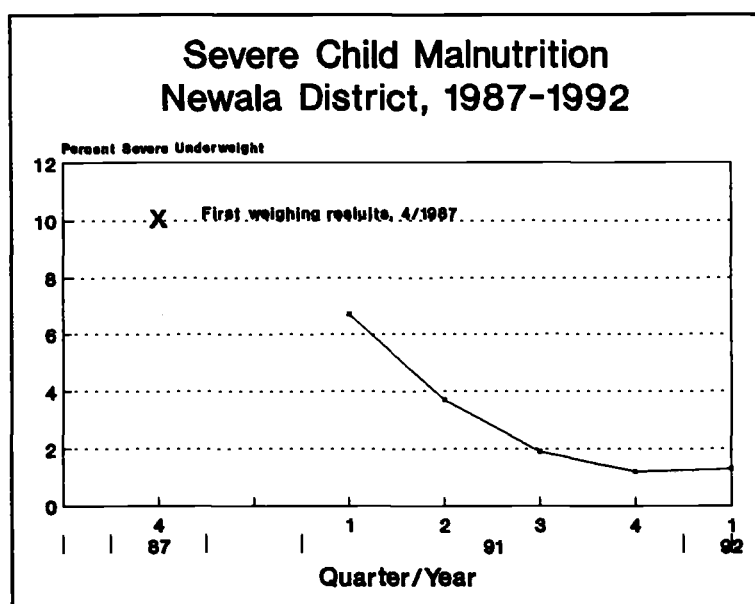


Fig. 5

The external animators came back 2 months later for a-month long follow-up visit to supervise the subsequent quarterly weighing and provide some additional support and guidance. There were many sceptics who predicted that when the external helpers left then the whole effort would collapse, but none of this has happened so far; more and more children are being weighed every quarter and their nutrition status is gradually improving.

The total external costs for this applied example of "horizontal technical cooperation" was very modest. The results were dramatic, given high coverage in national media and recognized and discussed at the highest political and government levels. One of the districts, Newala, changed from being one of the nutritionally worst off CSPD areas to become one of the very best, within one year (Fig. 5).

GM in the National Program of Action for CSPD

Actions for children using community-based GM were given additional push and emphasis through the global campaign started with the UN-organized World Summit for Children held in September 1990. The President of the United Republic of Tanzania, Hon. Ali Hassan Mwinyi, was present at the World Summit, and the National Summit for Children was organized in the National Assembly on

7 June 1991, and in the House of Representatives in Zanzibar on 5 October the same year. Both of these important meetings adopted the global goals for children during the 1990s, with minor changes and additions. The "resolutions" stated the goals and outlined the strategies to be pursued. The "resolutions" also identified the NCC/CSPD to act as the coordinating body in drafting a National Program of Action for Child Survival, Protection and Development, which was to be discussed during the next special session scheduled on the Day of the African Child, 16 June 1992, a date that coincides with the beginning of the annual budget session of the National Assembly.

The challenges of the goals for the children during the 1990s are great in Tanzania, given the economic crisis and deteriorating social services in the last decade. However, the reason for optimism and determination during the national summits and among the national planners was on account of the positive experiences of the CSPD programs, the immunization campaigns, and a number of other specific efforts.

What these efforts all had in common was that they demonstrated that very significant achievements can be made even during difficult economic circumstances, *provided* that people and communities are properly involved in analyzing problems and that they are supported to take actions. Most regions in Tanzania have managed to reach over 80% coverage of all immunization antigens using this approach and practically all CSPD programs have already reached the national goal for reduction of the numbers of severely underweight children to 2%.

The "resolutions" from the national summits clearly spell out that the major strategy for improving the conditions for women and children in Tanzania during the next decade is to pursue an integrated, community-based approach. The emerging National Program of Action is articulating this approach very much according to the experiences gained from the CSPD programs, using nutrition as an entry point and growth monitoring information as one of the key indicators for assessment and analysis and management of the whole process at all levels.

Some Methodological Issues

Although GM has been widely adopted in a large and increasing number of community-based CSPD programs, there are certainly a number of issues that need further and continued attention and improvement. Some of these issues are related to the collection of the growth measurements, others to the compilation and interpretation of the data, and finally to the communication and use of the information. We will also briefly consider the use of the community-based GM

data for nutrition surveillance purposes and look into existing and emerging linkages between the GM systems and other information systems critical for child survival, protection, and development.

Collection of Growth Measurements

Attendance and Coverage It is essential that all children under five in a population participate in a growth monitoring system, both to ascertain their own development as well as to provide reliable estimates for analysis of conditions and trends. There are alternative ways of acquiring data for the latter purpose, e.g., through sampling and sentinel approaches, but such methodologies would hardly be practical at village and ward levels.

To facilitate estimates of attendance rates and follow up individual attendance in the CSPD programs, *village registers* have been introduced. These registers are organized in "10-cell units" according to the current system in Tanzanian villages, and include listing all children under five in the households belonging to each 10-cell unit, and recording all births and deaths, either as they occur or at regular intervals.

The 10-cell leader is expected to be present at village weighing sessions to ensure that all his/her children are weighed. In some of the registers used, the position of the child on the growth chart is actually entered in the register, whereas in others the village health committee has a separate "child monitoring form" for this purpose. The first system was the one introduced in Iringa and some of the other early CSPD programs, whereas the latter is an attempt to link up the child registers with more general civic registers now being tested.

Regular and correct updating of the registers, as well as reporting of births and deaths, have proved to be a problem as evidenced from comparing village reports with other population estimates (census data, etc). As the programs proceed, however, and with continued training, supervision, and support, there is clear evidence that village registers and other record-keeping will gradually improve. Continued promotion and institutionalization of the civic registers is expected to strengthen further the usefulness of village registers to ensure better coverage of the community-based growth monitoring.

There are a number of reasons for low attendance of children at the actual weighing sessions. Most important is the time-consuming way that these sessions often are conducted. Other reasons include temporary out-migration, travels and sicknesses. If the mother or the father or both, do not see any major benefit from participating in the sessions and the village leaders make little effort to explain and encourage them, then there is also low attendance. On the other hand, where

the system is well understood and the information actively used to help to improve the child's condition, then participation is usually very impressive with attendances regularly above 80%.

Organization of Weighing Sessions Most villages are organizing quarterly village health days when all the children under five are weighed and immunization services provided, together with health and nutrition education. The problem is that most villages in Tanzania are very large, on average having 450 under fives and some have more than 1000! Weighing all these children takes considerable time and does not give much opportunity to discuss with parents the problems identified.

Various ways to improve on this situation are now being applied – some villages are arranging several parallel queues for weighing the children and others are encouraging the parents to take the children to clinics before the health days so that their weight can be checked and recorded more quickly. The best approach so far, however, seems to be to conduct the weighing in different subsections of the village during different days. This also gives a better opportunity to update the registers and to discuss with the "neighbourhood group" their children's problems and progress.

Accuracy in Weighing and in Plotting the Weight Despite serious concerns during various stages of program implementation about having village auxiliaries weighing and plotting growth data, this has proved to be a very limited problem in practice. Several controls by external survey teams and evaluators confirm high accuracy. The continued support and guidance from MCH aides and frequent comparisons of village and clinic weighing and plotting (the same growth chart is used) provide ample opportunity to correct any errors made.

Compilation and Interpretation

Compilation of Village Data Compilation of the village weighing data is done by the village health committee (VHC) according to age group (0–1, 1–3, 3–5 years of age) and position on the growth chart ("severe," "moderate," "normal" weight for age). Absolute numbers as well as percentage distribution are given. In the beginning, these calculations posed some problems but, after training and after ensuring that at least one teacher from the village primary school became a member of the VHC, there are few mistakes.

Summarizing these rather extensive data from the different villages at higher administrative levels poses more of a problem – particularly at ward and division levels. The districts have normally more capacity to compile the information and are also more directly concerned about getting the information

correct. The ward and divisional secretaries in general do have less computing skills and less indepth knowledge of the meaning of the data, and consequently make more errors. This situation is addressed through training and introduction of "reporting books" and provision of calculators. Because copies of the village reports are sent directly also to the district CSPD coordinator, any compilation errors introduced at the intermediary levels could be easily corrected.

Interpretation of Growth Measurements Because of the colours of the growth chart and because the emphasis of the growth monitoring system at the beginning was more on "cure" rather than "promotion," there has been a tendency to look more at the *position* on the growth chart rather than the *progress* of the child's growth. The fact that such high numbers of children are found in the "severely underweight" category (red zone on the chart) in the beginning of the CSPD programs also prompts "nutrition rehabilitation efforts" rather than long-term growth promotion as a priority for the village health committees. As the programs proceed and the various actors, including parents, become more familiar with the growth measurements and the charts, it is easier to focus more on growth performance and how to interpret and understand progress of growth in individuals and groups of children.

Community-Based GM

The community-based GM system introduced by the CSPD programs covers, so far, only about 20% of the country, and even within the districts where the programs have started it will take some time before full coverage of all villages is achieved. In the foreseeable future, attendance rates may not be high enough for the information generated to be used for nutrition-surveillance purposes at district and higher levels.

To meet the most immediate needs for nutrition data at national level, a "nutrition module" has been incorporated into the national household survey system. This will provide national-level data with estimates for analyses possible for urban and rural areas and for socioeconomic groups of households. Within the next year, the sample will be increased to provide regional estimates on an annual basis. Larger, less frequent surveys, such as the demographic health survey, include anthropometric measurements and questions concerning factors related to nutrition. For nutrition surveillance information *within* the districts, there are currently renewed efforts to revise the clinic-based GM system as a part of a reorganized health management information system.

Communication and Use of Information

It has already been noted that communication and use of growth monitoring data at *household level* strongly depends on the way the weighing and follow up is organized. The mother or other caretaker needs to understand what is going on and fully participate in interpreting the information and discussing what actions to take.

The most critical thing, however, is to get the father and other influential males involved in this process, because they are usually the ones who control critical resources that determine the conditions of children as well as of women. Communication and use of growth monitoring at *household and community level* in CSPD programs are thus strongly linked to "social mobilization actions" to establish responsibilities, accountability, and awareness (Ljungqvist 1987). The methodologies employed include films, popular theatre and dance groups, village correspondents and newsletters, and advocacy meetings and seminars of different types. Considerable progress has been made and GM has been a factor in promoting awareness of the issues. There is, however, certainly still a long way to go before more equal systems for "sharing the burden," i.e., joint child nutrition management systems, are established.

The use of the GM information at *community level* has largely been for identification of children "at risk" and finding solutions through discussions with parents and 10-cell leaders, community-based nutrition rehabilitation or referral for treatment, or temporary support to individual children and families. The information has also prompted more general actions like organization of child care and feeding posts in the village as well as immunization, environmental sanitation, and health and nutrition education. In many villages, it has facilitated promotion of economic activities for women and agriculture developments and helped to ascertain that families in need, i.e., with malnourished children, are able to benefit from such actions.

Despite considerable success from community actions based on GM information, there is still a tendency for *stereotypical analysis and action*, village health workers, village health committee members, and other key actors tend to follow solutions that have been taught during CSPD training sessions rather than taking a more independent and in-depth look at their own information to find solutions and opportunities that may be more beneficial in their local context. Again, participation of women in this process is normally limited, with the result that the VHC and the village government may organize actions that *add* to women's workload rather than help them. Efforts are now underway with the assistance of trained community-development workers to strengthen facilitation and animation processes with special gender concerns at ward and village level.

Communication and use of GM information at district, region, and national levels have had problems similar to those at village level. The leadership is predominantly male and preoccupied with issues not directly related to problems of women and children. Although the overall development objective in Tanzania from the time of the Arusha Declaration has clearly been for *social development*, this is often seen as a more or less automatic outcome of economic development. Malnutrition has been considered largely a problem of "ignorance," and a shortage of protein-rich foods and health services.

Nutrition information from nutrition surveys and GM systems are slowly but surely changing this situation. Major "paradoxes" between economic/agriculture developments and malnutrition have been and continue to be brought forward, changing concepts and policies. Successes and failures of CSPD programs are becoming political issues, and the goals for the 1990s add further impetus to this process. There is an increasing awareness of the usefulness of and a *demand* for nutrition information at different levels of public administration and development planning. The challenge is now to meet this demand and to facilitate a good understanding and use.

Child Survival, Protection, and Development

Child nutritional status measured as growth performance is a good indicator of overall child "developments" under conditions prevailing in Tanzania. Additional information is, however, needed for more detailed analysis of health, feeding, education, socioeconomic, and other factors and processes affecting children. Some information of this kind is already generated by other formal information systems but may not be available in the analysis of nutrition information for various reasons: population and time frames may not be compatible, reports not available at certain management levels, etc. As a part of the efforts to monitor the goals for the 1990s, mechanisms are now being established to pull these information systems together and to complement and adjust existing systems as required.

For the purpose of community-based management information systems, there were efforts from the beginning to link up the GM system with other relevant data such as child birth and deaths, health (direct causes of child death), and immunization. In the original design of the Iringa program, a system for establishing village "profiles" for malnourished children was tried but turned out to be too cumbersome to apply. It was concluded that most of this information would be "known" in the village simply by knowing who the malnourished children were and did not warrant the trouble of collecting, compiling, and reporting data.

Two new major areas where more formal, community-based information systems could help to improve action and management have, however, emerged. These are pregnancy and early childhood development and education. Weight gain in pregnancy and other risk factors, breast-feeding, early childhood development milestones, school enrolment at age of seven, and learning performance in schools are some of the indicators now tried out. The idea is to establish more explicit and better focused management of child survival, protection and development using a community-based information system (such as GM) as an entry point.

Alternatives

In discussing alternatives to GM we first have to decide if we are interested in promoting child growth as an end in itself *or* if we see growth as a reflection of the overall health and nutrition status of the children (in the first instance) and of the women and the population at large. In the ensuing discussion we have taken the latter approach.

To be meaningful, any analysis of alternatives to GM has to consider options from the point of view of *health and nutrition information systems*. What decisions, at what level, are made or changed based on health and nutrition information? Where can GM make a difference and what other kind of information systems could have similar positive effects on decision-making for improved health and nutrition?

This also means that we have to assess pros and cons of GM and possible alternatives within the context where they are presumed to play a part of the decision-making process. This paper can only consider the situation in mainland Tanzania.

At *household level*, mothers and other child caretakers have informal health and nutrition information systems that guide their actions in their day-to-day care and feeding of the children. Given sufficient time and other resources to allocate to child care, the outcome is usually satisfactory. Tanzania is one of the poorest countries in the world in macroeconomic terms, and the major part of the population has to survive on very marginal economic means. In these harsh conditions most Tanzanian families manage to survive surprisingly well and this is due to the coping strategies that they have developed. These coping strategies are triple-A cycles based on people's intimate knowledge of their environment and use of various information systems that guide them when and how to act.

However, women are normally left with very limited control of the household resources. Even the use of their own time is largely predetermined by the many heavy responsibilities they have to shoulder. One of these responsibilities is the care for the children, which women normally have to do almost exclusively. Again, under normal circumstances, the women manage surprisingly well, but *on a very thin margin*. Any disturbing factors like drought or floods, or family break-ups, or severe illness among the family members tends to tilt this precarious situation off balance and lead to a "high risk situation" where the children and the women themselves are most vulnerable. This high-risk situation is reflected in increased rates of young child and maternal deaths and malnutrition and morbidity.

The introduction of the community-based GM system within the CSPD programs seems to have three major advantages:

- The caretakers have a better understanding of the thin margins upon which they are balancing their own and their children's health and nutrition conditions, and they are thereby encouraged and supported to increase these margins, which make them less vulnerable.
- The growth information has made it easier for the more influential male members of the family to understand the resource implications of child survival and development and provide support, or to put it the other way around, it has made it easier for the women to claim a more equal share of the family resources for herself and the children.
- It makes it easier for the individual family or mother to draw upon the community resources in times of stress, and it makes it easier for the community or government "social welfare" system to decide when and how to intervene in distressed families to safeguard individual mothers and children.

For each of these advantages brought about by community-based GM alternative information systems and indicators could be considered, but it would be difficult to find an alternative that could fill *all* functions.

For the first and possibly the third purpose listed, various other health and nutrition indicators could be considered, e.g., frequency of common and severe diseases, breast-feeding and feeding frequency, pregnancy risk factors, etc. Indicators reflecting the socioeconomic status or specific facilities, like availability of latrines, in the households could also be useful. Indicators reflecting the workload of women might be useful in helping women to claim more family resources.

Note that all the alternative indicators listed relate to factors assumed to *determine* overall health and nutrition status of the children. The relative usefulness of these indicators are thus a function of a correct "situation analysis" (made by whom?) of the conditions of women and children. But this situation may change, and the usefulness of a certain indicator may become more limited as a result. Growth monitoring is more generally dependent on a wide range of possible factors and processes and is thus more generally applicable.

Tapping Informal Information Systems

Are there other more direct ways of tapping into the existing, informal information systems already used by the community members? There are a large number of positive experiences from "rapid appraisal procedures" (RAP), "qualitative methodologies," "community diagnosis," and other similar approaches, which all seem to build upon people's experiences and available information to bring about community actions.

The current view in the CSPD programs in Tanzania is that such methodologies should be explored much more systematically and trials are already underway. However, we rather see them as valuable *complements* to the GM system. It would be difficult for such methodologies to *replace* growth monitoring fully for two major reasons.

First, qualitative information is much more difficult to store and use systematically in comparing and analyzing situations at different times, individual households, and locations. We have already concluded that use of one single indicator, i.e., growth, to assess social conditions and developments at different levels gives enormous advantages in establishing linkages between all important processes that need to take place at different levels to bring about sustainable change in health and nutrition conditions.

Second, qualitative information systems normally rely on *initiatives* to be taken by somebody, and how do you ensure that such initiatives are taken and pursued as and when required? From a management systems point of view it is easier to use a quantitative information system, such as growth monitoring, which defines when more indepth discussions are needed at household or community level. Growth monitoring information then also provides a starting point for such discussions by establishing that certain changes have occurred and need to be understood and subject to action.

The previous discussion about alternatives at household level applies largely also to *village and ward* levels in the Tanzania CSPD program context, and this is a result of the close linkages and interaction between health and nutrition

management systems at different levels. As you proceed away from the households and extended family levels toward higher administrative levels you gradually lose the rich and detailed information about the specific conditions affecting the individual children or women but, instead, you get access to wider perspectives and more technically advanced knowledge that may be necessary for improvements.

The ward level in Tanzania is where a number of extension services are focused, like health (a dispensary), agriculture and livestock, and community development. It is important that these "change agents" are able both to link up to the community-based information systems and, at the same time to use their own, more technically refined data on crop yields, disease factors, and community development factors like participation, leadership, etc.

The MCH aides used to apply the *clinic-based* GM system for identification and counselling individual mothers and children. As described previously, this system does not work well with individual mothers, nor yet in the mobilization of broader household and community resources. Involvement in the community-based GM systems provides much better opportunities.

The question is then whether the clinic-based weighing of children should be discontinued as the CSPD program approach expands. This is in fact already happening – children who do not need any special care are no longer coming to the clinics only for weighing. The children who are brought to the clinic for immunization or illnesses are, however, still weighed. This is seen as an advantage, because immunization provides an opportunity to weigh the young infants more frequently than the quarterly, village health day sessions. It also gives the MCH aide a chance to relate an acute illness to the current overall health and nutrition conditions of the child.

Obviously, other information collected at the dispensaries becomes important as components of ward and village-level health information systems. Many disease factors like diarrhea and respiratory infections are closely related to malnutrition and would serve as good indicators in the absence of GM information. The practice of bringing children with such illnesses to the dispensaries may, however, differ due to seriousness of the conditions, distance, and quality of services offered, etc., and the validity of the data would be limited accordingly.

Village and ward leaders and extension staff also frequently receive less systematic but important information about food shortages, social problems, and other events and conditions appearing in the area. Such information often

prompts them to take action and may be very valuable inputs into health and nutrition analysis, but is difficult to use for more formal and systematic management purposes.

At the *district and regional levels* growth monitoring information from the community-based system is already starting to influence decision-making and planning, although the data in most cases may not have adequate coverage and validity as discussed. The revised health-management information system currently being tested will be more useful in this respect and is expected to serve as a complement to the village reports in the future. The data on immunization coverage are already partly serving such a function.

The only other indicator besides growth data, which could serve equally well as a measure of overall health and nutrition status of the population, is mortality information. There are systems introduced to establish systematic collection of birth and death information from the villages, but it will take a long time before these systems will achieve the coverage and reliability needed for use in health and nutrition management. The best progress observed so far is actually made when these systems are introduced as a part of the community-based CSPD programs.

Disease-related mortality data are at present reported from health institutions with in-patient facilities and district medical officers often make references to such data. Most districts, however, have only very few institutions of this kind, which limits the usefulness of the information.

The only reliable mortality data currently available are from the population census and from special demographic surveys. They provide estimates down to district level and can thus be used primarily at national and regional levels. They also have the disadvantage of being conducted very infrequently (census every tenth year) and with long delays for data processing. They do, however, serve as important "benchmarks" to establish long-term trends and to compare and assess the validity of growth information. Incidentally, the latest child mortality estimates derived from the 1988 population census show a close relationship with community-based growth data collected at the start of the CSPD programs in the various districts.

It should be noted, finally, that the great advantage of GM information as a component of health and nutrition information systems at different administrative levels in Tanzania is probably related to the current high prevalence of growth retardation in the country. Severe malnutrition is typically found in 4 – 6% of the children under five and total underweight, i.e., weight below 80% of the Harvard standard, is affecting about half of the children. This makes it possible to identify

significant numbers of children and households affected in practically all population groups and to establish differences and trends. If the situation (hopefully!) improves over the next decade, it will be necessary to reassess the usefulness of growth information and consider alternatives afresh.

Conclusions

Child growth is a concept that is easily understood by everyone in society. It is seen as a necessary process in human development, and evidence of growth retardation would raise serious concern in wide circles, but clearly most among those close to the child.

Severe and moderate underweight among children under five is very widespread in Tanzania as a result of diseases and inadequate food intake. This makes GM in children a potentially very useful component of health and nutrition-management information systems. The key issue in applying GM is, however, to define (a) *the management system* concerned with child health and nutrition, and (b) *how growth information should be used* to strengthen the management process within these systems.

Growth assessments for health and nutrition-management information purposes if pursued only at the level of the individual mother-and-child (GMP) and at higher levels of sectoral or multisectoral health and nutrition information systems (nutrition surveillance) seem to lead to limited success. This paper argues that the main reason for this is that it leaves out other management systems where growth information could make the most significant differences!

The individual mother has very little resource control, and any close analysis is likely to show that she is already doing as much as she can to manage those meagre resources to support health and nutrition developments in her children while attending to other, equally crucial, chores at the same time. If she received information showing that her child, despite her efforts, is growing poorly, she is able to make only very limited adjustments in her resource allocations (mainly time use) and actions. Instead, it is likely that she will feel even more marginalized and frustrated being told that she is failing and that nobody else seems interested to help, except possibly an MCH aide providing advice, which often is inappropriate.

Instead, growth information needs to be better introduced into the management systems that are able to interact directly with the efforts of the mother and provide critical additional food, care, and health services. These systems include *the household*, where the father normally controls the dominant

resources, *the extended family/neighbourhood units, the community at large, and the government extension services and NGOs*. These management systems (with the exception of the household) do not have a close day-to-day contact with the individual child and, therefore, have problems in providing timely and appropriate support as required. Access to growth information would greatly facilitate this process and, at the same time, help to establish their responsibilities and accountability with regard to ascertaining the children's right to good health and nutrition.

The development of a National Food and Nutrition Policy in Tanzania and the operationalization of this policy (initially within the Iringa Nutrition Program), facilitated the emergence of a more comprehensive "community mobilization, participation, and management" approach to growth promotion. The results of this approach in terms of community participation and reduced rates of severe and moderate underweight have been highly encouraging, and efforts gradually to expand these CSPD programs and to improve further upon effectiveness and efficiency has been going on in Tanzania during the last 7 years.

Eighteen out of the 25 regions in mainland Tanzania and Zanzibar have now started community-based CSPD programs, and the government expects that by the middle of the next century, most if not all districts would have initiated such programs. The CSPD program approach, with growth assessment as a core component, forms a major part of the social development strategies for the country as reflected in the "resolutions" from the national summits for children and the draft National Plan of Action for CSPD.

Alternative types of information to strengthen health and nutrition management at different administrative levels need to be regularly reviewed. However, it is concluded that, currently, it would be difficult to find indicators other than growth assessment that strengthen the performance of the individual systems and, *more important*, facilitate interaction and harmonization of efforts at different levels and within different sectors. This is crucial to bring about the much needed improvements in the health and nutrition of the children in Tanzania. The aim is to ensure that the president and the mother mean the same thing when they talk about *development*; growth information and, indeed, the growth chart, are becoming very helpful in this respect.

Growth Promotion in Primary Health Care

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A worldwide movement for primary health care (PHC) has been promoted by WHO and UNICEF since the 1978 World Conference was held on that subject. Primary health care provides the infrastructure that makes any child survival and development activity successful and sustainable. PHC includes all activities at the interface between the health system and local communities.

PHC depends on dialogue and partnership between the two. In this paper, some basic principles and components of PHC are defined. Ideas are presented on how growth promotion for child development fits into the process of PHC development. An approach is described to resolve one of the greatest problems in growth promotion efforts. Excellent projects for growth promotion have been developed in all parts of the world. It has been thoroughly demonstrated that growth promotion works. When efforts have been made to implement these procedures in national programs, however, the results have usually been disappointing. One of the greatest challenges in reducing malnutrition is to learn how to extend successful local projects to mass implementation or "go to scale." A process is described in this paper for sequential and incremental learning that applies general principles to local conditions to reach out to families in a community-based learning process. We are now at the point where we can say that this process works even though the specific programs that emerge in various countries will be quite different.

The following process for developing PHC has evolved as a synthesis of experience from many projects and countries. The original listing of PHC components grew out of the pioneering primary health care project at Ting Hsien (Dingxian, China) developed 60 years ago by Drs John Grant and C.C. Chen (Seipp 1963).¹ These components should not necessarily be considered sequential steps but activities that can be worked out in joint decision-making through

¹Seipp, C. 1963. Health care for the community - selected papers of Dr John B Grant. Baltimore, Johns Hopkins University Press.

dialogue between communities and organized services. Several components can be carried out at the same time or in varying order depending on which activities prove to be the best entry points in terms of local acceptance and priorities.

PHC Components

Equal Access to Care

The first requirement is that some unit of established services should take responsibility for each defined unit of population. This is necessary if equity is a major objective of care. It is inevitable that the poor and most needy will slip through the cracks of any system that depends on people finding their own way through the intricacies of health and nutrition care systems.

Community Organization and Mobilization

Communities within the designated population should be mobilized to set up the two components needed for community participation: some form of committee organization of local decision-makers who are representative of all the people, including the poor, and an appropriate number of volunteer community health workers who may be volunteers or supported by the community even though their supervisors will be on salary from the health services. It should be noted that the participation in GMP of 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.

Joint Data Collection/Analysis

The learning process should start with registration of all households and simple data gathering about problems and priorities. Surveys of nutritional status (using whatever indicators are locally appropriate) should include all children. This should be done jointly by health workers and the community and should be a major learning experience for both as part of community empowerment.

Data and general information about the community should be jointly analyzed by community decision-makers and health workers. Among the most important lessons that will emerge is information about the localization of problems among certain families and sections of the community. One of the main reasons for involving health workers from outside the community is to focus attention on equitable distribution. Once local problems have been identified, it is difficult for leaders who are concerned about maintaining their credibility in the community simply to ignore a problem and channel benefits only to their friends

and supporters. This may well happen if only input and output indicators, such as the percentage of children attending weighing sessions are used, rather than outcome indicators such as the numbers of malnourished children and their distribution in the community. If the health system has set standards and targets with measurable indicators that communities are expected to meet, the only way in which community leaders can achieve those norms is by solving the problems of the poor and most needy among whom all problems tend to be concentrated.

Agreement on Local Solutions

Analysis of the causal factors responsible for priority health and nutrition problems will lead directly to discussion of possible interventions in a continuing dialogue between health workers and the community. As standard packages of interventions are worked out in accordance with local conditions, this analysis can form the basis for decisions about who will provide resources and who will take responsibility for action.

Action

Implementation should start with training everyone in the new roles that are defined. It is necessary to reallocate roles among established health professionals, although it may be difficult, because they usually resist strenuously any change in their sense of identity and insist on their own standards of quality. The relationship between the health system and community is usually fragile and time is needed to build mutual trust. It is especially important that each person should be able to fulfil their obligations and no one should assume an excessive load, regardless of good intentions. It has been repeatedly demonstrated that community health workers have remarkable capability, if their responsibilities are added incrementally and with appropriate intermittent training and consistent supportive supervision. Especially useful in developing capability is alternate periods of didactic training and practical field experience with accreditation by competency-based evaluation.

Surveillance

One of the most important stages in an ongoing learning process is to set up systematic surveillance for streamlined health and nutrition indicators. Long-term sustainability and success depends on this process because it is the framework on which incremental improvement of services can be built. No program should be expected to function effectively as originally designed. Surveillance provides a mechanism for compromise between the community and the health services in scheduling of priorities as they change. It is much more than that, however, for it establishes a process for feedback; a means of correcting

difficulties encountered in cultural acceptability and access, whether geographical, economic or social; a way of ensuring that when problems are found, something will be done to correct them; a tangible framework for self-financing and self-reliance, because communities can make decisions about what their money is used for; a way of evaluating what works and testing new ideas for improvement; a communication channel for behaviour change.

Finally, and most important, it is a practical and mutually acceptable means of ensuring equity in reaching the poor. Such approaches can provide reports that really mean something because they are action-oriented. The data are practical and can be used to justify changes in policy, regulations, and allocation of resources. A cyclic process of evaluation and change can develop a momentum of its own.

Nutrition surveillance as part of community-based primary health care is particularly important because it represents the main component of the D in CSDR (the Child Survival and Development Revolution being promoted by UNICEF). Increasing experience suggests that it is more important to measure all children at least once or twice a year than to measure only part of the population every month. Even if 70 – 80% of children are measured every month, the malnourished are most likely to be among those who are not included. As community awareness increases, families can take more responsibility for their own nutrition surveillance; but the health system should continue to take the initiative in reaching those who are most needy with universal GMP.

Adapting Solutions for Self-Reliance

Action should follow promptly when surveillance finds a problem. The health services should develop the orientation that rather than creating a sense of dependence their major responsibility should be to empower people to solve their own problems. This may require considerable role redefinition for specific functions. The analysis stage in a community-based, triple-A process (assessment, analysis, and action) should define the three or four most common and important problems in a particular area. Local training can then include standardized approaches for implementing locally relevant solutions.

This may for example be prompt oral rehydration in the home with cereal-based ORT for diarrhea. It may involve training or support in breastfeeding or preparation of supplementary weaning foods that are digestible, provided frequently, and without too much bulk. A wide range of changes may be needed in the home environment and sanitation. For poor families, the community may find ways of providing food security.

Collaboration

Field collaboration is needed between community decision-makers, health officials, and academic specialists with expertise in health systems research. Obviously, the process outlined above is too complex for the average community and health centre staff to accomplish on their own. It is possible, however, to develop a learning process to implement interventions appropriate for a region. Working together in field studies, they can determine the causal factors responsible for the local mix of nutrition and health problems. They can agree on priorities and a sequencing of approaches that suits local culture and perceived needs. The most cost-effective and acceptable interventions can be defined and standardized to meet these priority needs.

The causal factors responsible for the most common health and nutrition problems tend to be fairly typical in certain regions, although they may vary greatly between regions. A balancing of responsibility between communities and the health system can determine costs and roles in sharing resources, training, supervision, and general management. This is not a one-time effort but needs to be a continuous process, so that as changes in nutritional and health status occur, effort is shifted to the next priority and to any new problems that have been identified.

Longitudinal, Area-Based Community Study Sites

Experience in many countries shows that this learning process can be developed best in designated Longitudinal, Area-Based Study Sites (LABSS) jointly controlled by three types of participants: community decision-makers, health officials, and a committed academic institution. It will have a data-base and facilities to conduct field studies of priority problems rapidly. A research team of investigators can study problems as they emerge in a series of Area-Based Community Studies (ABCS). A LABSS can also serve as a training facility for health and nutrition professionals. Most important is that it can provide a framework for an extension process to a whole region.

People can be brought in groups for periods of work in the experimental area to learn how they can adapt procedures to their own situations. Definable clusters of problems can be identified that can be corrected by systematic packages of interventions. Community-based options developed and demonstrated in the LABSS can provide a learning process to facilitate the work of health centres and other sectoral services for extension to their own network of communities. The process is incremental but not necessarily slow. Although

functioning mainly at the local level, it can fit naturally with national surveillance to facilitate the adjustment of nutrition policy and food security. Several such centres can function as a network for mutual stimulation and support.

A learning process is described that can be used to determine local patterns of care that will vary even though the methods used to define them can be standardized. Using such approaches, there are now an increasing number of countries that are effectively improving child growth and development rather than concentrating only on child survival.

A lack of a common definition of terms has often been a problem when discussing growth monitoring and promotion, nutrition monitoring, and nutrition surveillance. The following list was used at the UNICEF meeting on "the Evaluation of GMP programs," held in Nairobi, Kenya, 7-9 May 1992.

- ***Anthropometric data*** Data derived from measurement of the body; this can include measurement of mass, length, volume, and circumference; it can also be expressed as ratios, for example, length-for-age or weight-for-height. The method and criteria for anthropometric data should always be specified.
- ***Assessment of anthropometric data*** The objectives for gathering anthropometric data should always be specified, particularly whether the data are to be used at individual, community, or national levels. Analysis of the causes of growth faltering, at any level of analysis, should lead to affordable actions appropriate for each of the defined causes. The purpose of monitoring of the individual is to assess growth velocity so that if growth faltering is detected, affordable actions can then be devised. Monitoring of the community should include nutritional status and be carried out on population-based data, either of all children or of a sample.
- ***Growth monitoring and promotion (GMP)*** An operational strategy that enables mothers or other guardians to visualize growth or lack of growth and to receive specific, relevant, and practical guidance about ways they can act to ensure health and continued regular growth in the child. Growth monitoring and promotion may include regular and sequential measurement of health, nutrition, environment, social, psychic, and development factors in the child. It should promote behavioural changes and adoption of improved self-help actions within the family. GMP is a communication strategy to make health and nutrition education more individualized, more convincing, and more effective.

- ***Individual level assessment and analysis of anthropometric data*** This is another term for GMP whose aim is to promote actions to promote growth.
- ***Community (or village) level assessment and analysis of anthropometric data*** An activity in which the nutritional status of a community is assessed and analyzed. The term makes no assumptions on what sort of anthropometric data are used or the frequency of collection or on whether the entire population is assessed or only a sample.
- ***District level or other administrative unit (such as a province or region) of assessment of anthropometric data.*** Any activity in which the nutritional status of a district is assessed and analyzed. The term makes no assumptions on what sort of anthropometric data is used or the frequency with which it is collected, or on whether the entire population, or a sample, is assessed.
- ***National level of assessment of anthropometric data*** Any activity in which the nutritional status of the nation is assessed and analyzed. The term makes no assumption on whether it is the entire population that is assessed or a sample.
- ***Nutrition monitoring*** The measurement of changes over time in the nutritional status of a population or a specific group of individuals. Monitoring requires repeated comparable assessments of nutritional status at regular intervals. This is what is being carried out, for example, in the Iringa nutrition program. Another name for these activities is *community-based nutrition surveillance*, although that term also implies looking at other factors that affect nutrition as well as anthropometric data.
- ***Nutritional surveillance*** The process of watching over nutrition to make decisions that will lead to improvements in nutrition in populations. Nutrition surveillance methods provide regular information, drawing data from the most available sources, including surveys and administrative data. Ad hoc investigations can also be included in nutritional surveillance activities. This activity is most often carried out at national levels by special units set up for this task.
- ***Action*** Used in conjunction with assessment and analysis, the term refers to any chain of events that results in the reallocation of resources or activities, be they human resources (such as peoples' time) or financial resources, at the individual, community, district, or national levels.

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