

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

Edited by
J. Cervinkas, N.M. Gerein, and Sabu George

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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	
* 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. ** 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."								

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 (Rutishauer 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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