FOOD AND NUTRITION BULLETIN

Volume 10, number 4, December 1988

The United Nations University

Contents

Food and Nutrition Bulletin, vol. 10, no. 4

The United Nations University
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WHFNB-40/UNUP-723
ISBN 92-808-0723-4
ISSN 0379-5721

Printed in Hong Kong

Growth monitoring: A brief literature review of current knowledge

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Growth, a positive change in the size of a growing individual, is a dynamic measure of health, the best available indicator of nutrition status, and the only real measure of nutrition adequacy [1]. Deviations from the expected, or predictable, course of growing are not visible at the earliest stage, and such invisibility is a major barrier to preventing and curing health problems. Growth monitoring has gained popularity in the last two to three decades and has been practised in over 80 countries [2], with perhaps the earliest report from clinic-based activities in Nigeria [3].

The most widely promoted method of growth monitoring is weighing and charting growth, since weight gain is believed to be the most sensitive indicator of growth and is universally applicable [4]. This method is favoured by UNICEF. Among other techniques, measuring arm circumference is claimed to be the easiest and cheapest alternative to weighing [5] and has been recommended for use at the home and village levels whenever regular and frequent weighing is not possible [6].

While most published papers have concentrated mainly on technical details, more important issues such as the objectives, feasibility, and usefulness of growth monitoring and its relevance and effectiveness in promoting child nutrition and health have not been dealt with adequately. Only a few evaluations to examine its functional utility and effectiveness have been made. At the twelfth session of the Subcommittee on Nutrition (SCN), in April 1986 in Tokyo, the Advisory Group on Nutrition (AGN) of the SCN was requested to make a statement with regard to growth-monitoring techniques and uses In its statement of February 1987, the AGN recommended that the SCN investigate the literature to identify background papers on the usefulness of growth monitoring, its utility, and conditions of feasibility in relation to different purposes for which it is used. On the basis of such documents more specific recommendations could then be given to the SCN. The present brief review was prepared as one response to this recommendation.

An international workshop was held in Indonesia in 1984 to promote the exchange of experiences in implementing growth monitoring as a primary health care activity [4]. Gopalan and Chatterjee [6] have critically reviewed global experiences in the use of growth charts, examining the operational problems by referring to published and unpublished reports, consultations, and correspondence. More recently Gopalan again questioned the feasibility of growth monitoring in developing countries [7] and discussed some basic related issues [8]. The state of the art of routine growth-monitoring activities was examined by Griffiths [9], who also discussed the unification of growth monitoring and nutrition education [10, 11]. The application of operations-research approaches, methods, and techniques to address the main obstacles in the implementation of ongoing growth-monitoring activities was described by Teller [12] After an informal consultation at UNICEF headquarters in New York in March 1985, a meeting on growth monitoring was held at the UNICEF regional office for South Central Asia in New Delhi in May 1986.

Yee and Zerfas [13] reviewed selected projects to search for evidence showing the uses and effectiveness of growth monitoring in certain existing nutrition projects. Whether or not growth-monitoring programmes can reduce diarrhoea morbidity, mortality, or severity was the subject of a review by Ashworth and Feachem [14]. Bhan and Ghosh [15] and Ghosh [16], reviewing four UNICEF-sponsored case studies, summarized features of successful growth-monitoring programmes to identify factors contributing to their effectiveness. Hendrata and Rhode [17] looked for commonly encountered pitfalls. Recently an

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This paper was first prepared for the meeting of the Advisory Group on Nutrition of the UN Administrative Committee on Co-ordination's Sub-committee on Nutrition held 7 September 1987, Washington, D C , USA

information packet has been prepared, with articles and summaries on growth monitoring published within the previous five years [18]

Definitions and objectives

There is, unfortunately, no general agreement in the literature on what growth monitoring actually means The term appears to mean different things to different people, and varied definitions can be found [13] While some imply that growth monitoring is watching over and evaluating a child's growth pattern [1, 10, 19], others emphasize actions to be taken after such monitoring [4, 20–22] Consequently, the term is considered by some to be inadequate and even misleading, and the terms "growth promotion" and "growth monitoring and promotion" have been suggested [12, 22] Obviously, clarifying understanding is the key issue, not terminology

There is considerable confusion about the basic objectives of growth monitoring [8], and lack of understanding of what growth monitoring is meant to do in specific situations can lead to faulty implementation [17] Weighing is not growth monitoring and is of little if any value by itself [1, 23] Measurement without action is pointless and a waste of time and effort, and growth monitoring is not an intervention per se [13] Where the concepts underlying growth monitoring are not understood and there is no feasible operational strategy, it is not surprising that in many projects all that is left in practice is a superficial ritual of weighing and charting, or growth monitoring is used only as a strategy to help implement other interventions, such as supplementary feedings, more efficiently This approach has been strongly criticized on practical, economic, and even psychological grounds [6–8, 23] An important question, however, is whether growth monitoring unconnected to feeding programmes can be sustained and reach poor families on a continuous basis in countries that do not have strong traditions of social discipline and community work [24]

Since normal growth slows down long before overt malnutrition is apparent, Morley [25] defined the objective of growth monitoring as preventing growth retardation through *timely* and *early* detection of faltering growth Gopalan [8] asserted that promoting growth monitoring as an integral part of preventive and promotive health care can be justified only if the objective is to prevent growth retardation Therefore, using growth monitoring as a screening procedure for a rehabilitation and relief programme, as is done in many current projects (e g the Tamil Nadu Integrated Nutrition Project [TNINP] in India), is moving away from the real objective This is in line with the conclusions that the underlying purpose of growth monitoring is to prevent malnutrition, not to rehabilitate its victims [26], and that it should be used to detect problems *before* nutritional status is seriously jeopardized [9].

A different view, however, was taken by Mukarji "If the focus is on a nutritional strategy that emphasizes curative or rehabilitative aspects, then there is a place for [growth monitoring] Should there be a definite shift to preventive and promotive aspects in nutrition programmes, then the strategy would be to emphasize better antenatal and under 2 year child care with a strong health and nutritional education [component]" [27] In a nutrition programme in Thailand, growth monitoring was used to "eradicate all cases of 3rd degree PEM in under-fives and to decrease the prevalence of 2nd degree PEM" [28]

The emphasis on growth rather than nutritional status, however, is a key operational communication strategy [17, 29], and it has been recommended· "To provide health care for children, move away from the immediate objective of prevention of malnutrition and monitor *adequate* growth" [30] The monitoring of weight gain oriented toward health promotion is not only more cost-effective than the screening of nutritional status oriented toward treatment and rehabilitation but also more acceptable to both mothers and health workers as it provides more opportunities to observe changes or improvements in nutritional status [12]

Effectiveness

Available data do not give enough indication of the effectiveness of growth monitoring, and studies to demonstrate the usefulness and benefits of such programmes in a community are needed for advocacy purposes Recent reviews have concluded that many growth-promotion activities are poorly conducted and have discouraging results [31, 32] In spite of widespread enthusiasm and support, the general feeling is that growth-monitoring programmes have yielded few benefits, and they are often described as failures [17] However, the reports have shown how a greater focus on growth-promotion strategies and their implications for programme operations can turn these programmes into successes

Many nutrition and health programme planners in the developing nations consider that growth monitoring is not living up to its potential for contributing to child survival and development [12] The procedure has been held to be too complex, costly, and time-consuming to be effective in large-scale programmes [33]. The experience of the Rural Unit for Health and Social Affairs (RUHSA) project in India is that appropriate target groups of more vulnerable populations can be identified by other, more general socio-

economic factors, baseline surveys, and different procedures; thus individual growth monitoring becomes less relevant and may be unnecessary in a comprehensive primary health care programme [27]. Similarly, it has been suggested that community monitoring of childhood nutrition is more relevant and far more important than individual growth monitoring in the context of community-based nutrition programmes, and that cross-sectional surveys are of greater use than growth charts for this purpose [34].

Growth-monitoring programmes have been seen as providing a new focus on the nutritional problems of children in developing countries and as having the potential, if conducted on the right lines and with appropriate simple technology, to provide the means to upgrade nutrition from its position of relative unimportance in the health system [7]. The primary issue of the UNICEF conference on growth monitoring in New Delhi was that it was not working because it had not been tried properly [35]. It has been suggested, however, that there have been successes along with the mistakes and that even some of the less successful programmes have shown the potential of growth monitoring to support child survival [9]. The success of growth monitoring using weighing and growth charting in some small-scale projects with dedicated leadership and supervision has been taken as evidence that its full potential and impact is yet to be realized in most places [15].

Growth monitoring has been advocated worldwide as one of the key elements of child-survival and primary health care strategies [36] and as an excellent tool for assessing the growth and development of a child in order to detect the earliest changes and bring about appropriate responses to ensure that growth continues uninterrupted [15]

Reviewing seven projects for evidence of the uses and effectiveness of growth monitoring, Yee and Zerfas [13] found they all claimed that the technique was useful, but little information was given on how the benefits were measured, and actual data to back up the claims were frequently missing. Generally, the prevalence of malnutrition was reduced in programmes that incorporated growth monitoring, however, the relative contribution of growth monitoring to this reduction cannot be determined easily.

Few studies have been specifically designed to isolate the effect of growth monitoring on health outcomes by comparing programme villages or individuals with true controls [24]. Given the energy with which it is being promoted, there have still been far too few evaluations of the effects of programmes on health outcome. The most useful estimates for programme planning are those from quasi-experimental evaluations of similar programmes operating in comparable circumstances. Until a body of such results has been built up, there is little basis for a universal statement one way or the other on the effectiveness of growth monitoring. Potential comparison groups may be hard to find, however, as it is already so widely practised.

Growth monitoring and nutritional status

The role of growth monitoring in bringing about a remarkable improvement in nutritional status in the RUHSA project was said to be minimal [34], although it also was stated that the project was unsuccessful in implementing regular growth monitoring using growth charts.

Gopalan and Chatterjee noted, "As yet and from available reports there is no evidence that weighing and growth charting operations being promoted at great cost in some countries have in fact resulted in improvements in health and nutritional status of the children being weighed" [6]. This was found to be especially true for large-scale projects One study found that, although growth monitoring of individual children was not successful because of the community attitude to weighing and the logistical problems in the health care delivery system, there were significant changes in health-status indicators during the period of service, with even some improvement in nutritional status, without any significant contribution from growth monitoring [27].

To present and analyse evidence that growth-monitoring programmes confer measurable benefits on the children for whom growth charts are kept, Ashworth and Feachem [14] reviewed the impact of growth monitoring on the reduction of diarrhoea morbidity and mortality or severity either by improving the nutritional status of infants and young children or by increasing their contact with primary health care services. They examined projects in Indonesia [37], Thailand [38], Jamaica [39, 40], Ghana and Lesotho [41], and Malawi [42]. A comparison of clinic-based and village-based weighing programmes in Indonesia revealed that the two were comparable in improving child nutrition [37]. Children participating in the programmes appeared to parallel the Harvard growth standard once they had passed the age of 12 months. The two studies from Jamaica showed a similar reduction in mortality, yet in only one of them [40] was there a reduction in the prevalence of malnutrition. In Malawi some improvement in nutritional status was found, as judged by a reduction in the percentage of participants with less than 80% weight for age [42]. However, other services were also provided and their contributions to the improvement have to be taken into account.

According to Yee and Zerfas [22], the evaluation of the functional utility of growth monitoring by Ashworth and Feachem [14] tended to view the relationship between growth monitoring and the pro-

grammes' results in a direct linear manner without assessing whether or not crucial intermediary steps were taken Yee and Zerfas, reviewing selected projects in India, Ecuador, the Dominican Republic, Tanzania, and Thailand, found that it was difficult to interpret the results because of a usual lack of adequate baseline controls but that in general the prevalence of malnutrition (usually defined as a weight for age under 75% of the reference standard) was reduced over time.

Growth monitoring and mortality

In view of the present emphasis on child survival, Yee and Zerfas [13] regarded as a key issue the question of whether adding growth monitoring and associated actions to a project contributes to reducing mortality, but they could find no project adequately addressing this question. There is evidence that the prevalence of undernutrition can be reduced in programmes incorporating growth monitoring (e.g., the TNINP in India, the USAID-funded primary health care project in Thailand, and the JNSP project in Iringa, Tanzania) There is far less evidence that mortality has been reduced [25, 40] In the absence of any systematic studies, the contention that adding growth monitoring to a programme will decrease mortality remains to be proved.

Growth monitoring and the use of primary health care

Growth-monitoring programmes have been shown to increase the use of primary health care services. Village-based programmes in Haiti, for instance, have been found to lead to such an increase, which can be expected to reduce diarrhoea mortality and morbidity or severity [14] Data from Jamaica suggest that growth monitoring had an impact on diarrhoea mortality through the increased use of curative services. Rohde [23] argued forcefully that regular growth monitoring can increase the demand for primary health care services, pointing out that it is the only recurring activity that brings mothers and children into frequent and predictable contact with health services. At the village level, he says, it has become the basis of primary health care in a number of countries such as Indonesia and Haiti. In ICDS programmes, growth monitoring is an integral part of primary health care. [15]. It has been suggested that weighing has created a forum through which other primary health care activities are being conducted and that their availability in turn has made the weighing programmes more attractive to mothers [26]. Thus, a much-needed breakthrough in problems related to primary health care is provided.

Growth monitoring and nutrition education

Data from Thailand has indicated that growth monitoring per se was ineffective in changing nutritional status but that it was effective when combined with nutrition education [38].

An examination of the strengths and weaknesses of traditional growth-monitoring and nutrition-education programmes shows that the two are ideally suited to be complementary, according to Griffiths [11]. Growth monitoring makes it possible to give advice appropriate to the individual child's needs at the time it is needed. Thus nutrition education can be made more effective by making it more specific, action-oriented, individualized, and relevant It will differ from traditional nutrition education in being tailored to the specific child's needs. In Hanover, Jamaica, project workers felt that growth monitoring itself was an intervention, as mothers learned so much about the relationship between diet and health by watching their children's growth patterns that this alone led to dietary improvements that substantially reduced malnutrition and mortality [9]. In the TNINP, growth charts serve as an educational tool, as most mothers can interpret the trends of the growth lines and seem to be able to relate a downward trend with an illness, especially diarrhoea [16]. Sinha [43] believed that growth charts can be practical and powerful in teaching mothers how to protect children from malnutrition and foster better nutrition through simple messages and discussions.

Hendrata [26], on the other hand, believed that, while growth monitoring was effective in Indonesia in expanding programme coverage to 30,000 villages in less than five years, its effectiveness in changing mothers' behaviour and the nutritional status of children remained unclear The RUHSA experience [27, 34] suggests that growth charts have limited use as an educational tool in nutrition education. Moreover, education should be considered a preventive or promotive strategy and not a treatment prescribed at the point of diagnosing faltering growth. It also should be targeted to both men and women in the entire community and not only to mothers whose children show faltering growth Educating mothers directly about appropriate, practical ways of rearing and feeding children appeared to be far more effective than using that time to teach them the significance of weight measurements and growth charts. Gopalan and Chatterjee [6] concluded that, despite some enthusiastic claims (although these may be true in a few instances), the evidence that growth charts at present contribute significantly towards educating mothers is not convincing. While experience in many countries indicates that most mothers can readily distinguish the significance of a gain or loss in the weight of their

child from one weighing to the next, results obtained in Papua New Guinea suggest that this generalization may be too optimistic [44].

In response to the need for improved growth-monitoring techniques, a "bubble" chart has recently been developed by Griffiths [45] with World Bank collaboration, to replace standard charts, which were found to be hard both for health workers to plot and for mothers to understand. The new chart has been tested successfully in several countries [46].

Growth monitoring and nutrition surveillance

A very common error, which can be traced in the literature, is a confusion between growth monitoring and nutrition assessment/surveillance. Although to many programme managers the two activities may appear similar, as is evident from this review, they are in fact different strategies based on totally different concepts, operations, and purposes. To make the distinction easier, the main differences have been summarized elsewhere [1, 22, 23, 47] Some of these differences are as follows: The main strategy of growth monitoring is the preservation of normal growth, while that of nutrition surveillance is the detection of undernutrition. In growth monitoring, therefore, action is based on weight changes of individual children, and in nutrition surveillance it is concentrated on the nutritional status of groups of children. The major approach in growth monitoring is educational and motivational, while in surveillance it is diagnostic and interventional. In growth monitoring, the response to early detected growth faltering is early home intervention based on local knowledge until growth is resumed. In nutrition surveillance, on the other hand, the response can be nutritional rehabilitation, often with supplements continuing until good nutrition is established in the community. Growth monitoring emphasizes the maintenance of good nutrition for individuals and should cover all infants in a community. Nutrition surveillance emphasizes the detection of malnutrition using representative samples of children Finally, the weight cards used in growth monitoring should be simple, emphasizing growth, while those used in nutrition surveillance must be precise, with emphasis on nutritional status.

It has been suggested that growth-monitoring data could be used for nutrition assessment. If the two activities are combined, the concern for gathering statistically accurate and reliable data would probably be incompatible with the meaningful exercise of growth monitoring based on effective communication and education [6]. Further, it is likely that the confusion between the two would be increased, unless the purpose, structure, and function of each were clearly defined to ensure their precise applications [22]. It should be noted that growth-monitoring data are not randomly based and may not be accurate enough for the purposes of nutrition surveillance. Srilatha [34] considered that the use of growth-chart data for measuring the proportion of malnourished children in a community is not justified because of problems of representativeness, accuracy, and uniformity. In a comparison to examine the validity of clinic-based nutrition surveillance for estimating the prevalence of undernutrition [48], the prevalence of low weight for age among first-time clinic attenders in Swaziland was found to be very similar to estimates based on a 1983 national nutrition status survey, but the prevalence of underweight among children attending two or more times a year was less than half that of first-time attenders. The investigators concluded that surveillance data, particularly from repeat attenders, will not necessarily provide a valid estimate of nutritional status within the general population or of differences between regions. In a study of trends in malnutrition in five African countries, using clinic data from the Catholic Relief Services food and nutrition programme, the data, although they were from a non-defined and changing sample of children attending the clinics, were found to give plausible descriptions of *trends* in the prevalence of malnutrition when the major bias proxied by coverage was controlled for. However, the actual estimates of prevalence may not accurately reflect population prevalences. This can be verified only by representative sample surveys or census data.

Feasibility conditions for implementation

For growth monitoring to be useful, two basic conditions must be fulfilled: there must be a clear understanding of the objective, and there must be a health infrastructure capable of using the technology effectively. Without these, even with heavy investment, growth-monitoring programmes will fail, Gopalan [8] points out, and actual field conditions in developing countries should be carefully taken into account. He therefore advises supporting and strengthening the development of integrated programmes of maternal and child health care with growth monitoring as a part, rather than promoting growth-monitoring programmes as such in isolation. Rohde [1] suggests that, instead of integrating growth monitoring into primary health care, it would be more appropriate to integrate primary health care into growth monitoring. By making measured growth the criterion of health, we provide an important link in the cycle of primary health

care for young children which has been missing until now. The paramount importance of adequate back-up facilities for growth monitoring, as indeed for all primary health care programmes, has been stressed [50].

For a growth-monitoring programme to be feasible and have the potential to affect nutritional status and/or primary health care contacts, the regular attendance of children is of great importance [14]. Srilatha concluded that monthly weighing was not feasible because of inadequate attendance [34]. In certain programmes, food supplements are used predominantly to encourage attendance It was observed that the number of children coming to a maternal and child health clinic in central Java for regular weighing was extremely small because of other problems, although dried skimmed milk was distributed to those attending [37]. Attempts to improve attendance have so far produced many arguments and conflicting results [6, 23, 51].

Cost issues

A discussion on the effectiveness of any programme would be incomplete without mentioning cost issues, and Yee and Zerfas [13] point out that cost must be considered in a comprehensive way as a factor in the programme's feasibility However, this is another controversial point in the literature reviewed. Griffiths [9, 52] considered the cost of adding growth monitoring to an ongoing programme to be extremely low. The expenditure on growth charts and equipment should be minimal, as both last for many years and can be used by all personnel. What increases the cost of growth monitoring is training and supervision and the indispensable education component. The actual materials needed may be basic, unsophisticated, and inexpensive; the essential equipment for an entire programme in Angola cost no more than US$10,000 [53]. No detailed assessment of the costs of transport, personnel, etc. has been carried out, however.

On the other hand, the cost of maintaining growth charts may be very high compared with that of conducting periodic samplings [34]. And it has been estimated that the initial expenditure for scales alone for a growth-monitoring programme for all of India might be US$21 million [6] Consequently, the estimated cost of some current weighing and growth-charting operations in developing countries constitutes a high proportion of their overall national health budgets. Projections of the costs of operating a growth-monitoring and nutrition-education programme on a national scale similar to an Indonesian pilot project, according to the World Bank [54], indicate that 0.1% of the national budget would be required, which would be a sizeable expenditure for many countries.

It has been claimed that, of all the measurements that can be made on children in developing countries, weighing is the most likely to be useful and its cost-benefit value is very high [30] Others, however, have concluded that the costs for growth monitoring are usually poorly documented and the benefits are difficult to quantify for analysis of cost effectiveness [22].

Conclusions

Many countries have implemented growth monitoring in various combinations with other nutritional and health care services. However, from this brief review it is evident that considerable confusion exists on its major objectives. This is because, apart from monitoring the growth of a child, the technique and the information obtained on the charts (and sometimes the charts themselves) can be used for many diverse purposes—for example, to evaluate the effectiveness of other nutritional intervention programmes on children's health, to elect the beneficiaries for dietary-supplementation programmes, to estimate prevalence rates of malnutrition and underweight in nutrition-surveillance programmes, to follow up the efficacy of treatment of sick or malnourished children, to trace children not attending or not returning to health centres for immunization, and so on.

Apart from being a longitudinal record of weight changes, the cards can be used to register a child's health or family history: birth weight, weaning time, diarrhoea episodes, dose and date of vitamin A capsules or iodized oil injection received, and the like It is therefore not surprising to find that in many growth-monitoring programmes, weighing and growth charts are mainly used for these purposes, obscuring the major objective and thus reducing the programmes' effectiveness.

Individual counseling is an important part of any growth-monitoring programme. When combined with appropriate responses for individual children, growth monitoring can no doubt improve nutritional status. Benefits as part of primary health care services are evident through increasing contact and attendance, decreasing the prevalence of malnutrition, and establishing better nutritional practice for child rearing Even very poor families may have some resources available that can be redirected towards the health of their children if opportunities provided by growth monitoring for face-to-face nutrition education are taken.

Small-scale programmes have repeatedly proved successful, showing the inherent benefits of growth monitoring. What therefore happens in large-scale programmes is improper implementation, with little or virtually no emphasis on the main objectives. It is evident from the literature that not only the mere

contact but the frequency and quality of social interactions between health workers and mothers are the important issues on which much of the outcome depends. The potential of growth monitoring for maintaining good nutrition and health in the most vulnerable group of the community can be realized only if techniques and understanding are directed to the issue of proper implemention of the main objectives

Acknowledgement

I gratefully acknowledge the support of the ACC/SCN, and in particular of Dr. John B. Mason, its Secretary.

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Breast-feeding and AIDS

L. Å. Hanson

Mode of perinatal transfer of HIV-1

With the spread of the human immune virus 1 (HIV-1), it is becoming increasingly common for pregnant women to be infected (table 1). As a result of perinatal transmission, the number of infected offspring is consequently also increasing. Three possible routes of perinatal transmission have been considered

In most instances the infection is presumably transmitted in utero. This conclusion is supported by a short incubation time after birth in some cases [1], a high incidence of hepatosplenomegaly and low birth weight [2], and the presence of foetopathy in children with acquired immune deficiency syndrome (AIDS) and AIDS-related complex (ARC) [1]. The dysmorphic features suggest exposure to the virus in the first trimester of pregnancy [1]. Isolation of HIV-1 from a 20-week foetus [3], detection of HIV-1 in cord blood [1, 4] or within 24 hours of birth [5], and demonstration of the virus in infants delivered by caesarean section [6] are also taken as evidence. A second possible route of transmission is the contact of the neonate with infected blood from the mother at delivery

Finally, consideration is being given to the possibility that breast milk can transfer HIV-1. The virus has been isolated from the cell-free clear middle layer from centrifuged milk from three seropositive mothers [7]. The cells in the milk could not be cultured for the virus because of bacterial contamination. The possible role of antibodies present in milk for infectivity of the virus or for its detection has not been studied. The capacity of the virus to infect by way of the intestinal tract, reaching its receptors on T4 cells, is not clear. However, about 15% of the many intra-epithelial lymphocytes in the gut mucosa are T4 cells.

It should be noted that human milk contains significant numbers of leukocytes. They reach a maximum three to four days after the onset of lactation, with from 500,000 to 10 million cells per millilitre By four to six weeks after parturition, they are present at less than 100,000 per millilitre. The number of lymphocytes declines sharply within two to three days postpartum, whereas the number of macrophages declines less and remains at detectable levels. With increasing milk volumes they continue to be present [8]. It is likely but not yet demonstrated that such milk cells may be infected with HIV-1.

TABLE 1 HIV-1 antibody-positive pregnant women, 1986–1987 (percentages)

Kenya	2
Malawi	2
Zaire	8
Zambia	12
Uganda	14
New York City	
high-risk group	10–60
overall	2–4

Source A Nahmias, personal communication

Only one case of transfer of HIV-1 from mother to baby has been published in which the transmission could have been through breast milk [9]. The mother was infected by a postpartum blood transfusion, and her infant became seropositive either due to the six weeks of breast-feeding or by some other close contact with the mother. Four other cases, from Rwanda and Zaire, not yet published, also suggest breast milk as the mode of transmission.

No definite data exist as to the relative frequency of different modes of transmission of HIV-1 from mother to offspring. Among 104 children in the United States with AIDS who were studied for disease transmission, the risk factors were as follows, in order of frequency: maternal risk factors, paternal risk factors, sexual abuse, and exposure to needles at home [1]. The majority were children of intraven-

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ous-drug-abusing mothers and/or fathers or children of bisexual fathers.

Although intra-uterine infection from the mother may be most common, Chiodo et al have described 12 babies from HIV-1 seropositive mothers, of whom 3 of 7 delivered normally became infected, but none of the 5 delivered by caesarean section did [10] This could be taken to suggest that natural delivery increases the risk of perinatal transfer, but the matter certainly needs further study

The risk for babies of seropositive mothers of developing ARC or AIDS varies according to different sources, with figures ranging from 15% to 50% for the first child and from 60% to 80% for later siblings [1, A Nahmias, personal communication]. Only one of a pair of identical twins was infected in one instance [1]; the healthy twin was followed for 10 months

The risk of transfer of HIV-1 in breast milk

Few cases are known in which breast milk can have transferred HIV-1 Yet the risk cannot be discounted, and countries such as the United States [11] and Sweden are advising seropositive mothers not to breast-feed It is also advised that human-milk banks should pasteurize their milk [12, 13]. Such advice can be followed in places where diagnostic tests for HIV-1 infection are readily available and where pasteurization can be arranged. In such areas it is likely that the risk of contracting various gastro-intestinal and respiratory-tract infections is limited, and decreased frequency of breast-feeding may not have disastrous effects.

The problem is much more serious, however, in areas where such infections are frequent and breast-feeding is very important in protecting against them. A recent estimate of mortality from various diseases in east Africa shows that approximately one person dies of AIDS in large cities for every 10 who die of diarrhoea, but in rural areas the proportion is only one death from AIDS for every 4,000 deaths from diarrhoea [14] This illustrates the complexity of the problem. It might be added in this connection that the median relative risk of diarrhoea mortality is estimated to be about 25 times as high in non-breast-fed as in exclusively breast-fed infants.

With the limited information presently available concerning the risk of transfer of HIV-1 through breast milk, it seems of prime importance to propose research that can expand our knowledge. Specifically, it is important to determine whether or not those at risk of being infected through milk have not already been infected in utero Any recommedations concerning breast-feeding in relation to AIDS must be provisional and temporary until additional information appears. It should be realized that today the mortality of infants from AIDS is still minimal compared to that from conditions such as diarrhoea. Diminished breast-feeding would make that difference even more striking

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Community-based food and nutrition surveillance as an instrument of socio-economic development in Central America: A point of view

Maarten D. C. Immink

This paper offers some ideas for the establishment of community-designed, -operated, and -evaluated food and nutrition surveillance systems, in support of food security of the poor and bottom-up planning processes for socio-economic development in Central America. Current social processes are opening up opportunities for the poor to play a greater role in solving poverty problems and to contribute to their own food security. Community-based food and nutrition surveillance systems should be seen as an instrument of socio-economic development.

The current state of food and nutrition surveillance in Central America

The predominant current view in Central America regarding food and nutrition surveillance is that its main purpose is policy and programme advocacy in relation to improving the nutritional status of low-income populations. What have been explicitly identified as food and nutrition surveillance activities have largely been confined to the health sector, using health and nutritional status indicators for the identification of population groups at some degree of risk of undernutrition. Recently, macro-level tools such as food-balance sheets and basic-food-basket analysis have also been considered as relevant instruments of food and nutrition surveillance.

Under the aegis of a regional and EEC-supported food-security programme, efforts are being initiated in some countries to integrate sectoral information systems into a public-sector network in support of food-security activities Much of the recent technical discussion among public-sector agencies has centred on organizational structures, indicators to be generated, and needed infrastructures for data processing and analysis What has been largely absent from these discussions is a careful consideration of the use of surveillance data, and of the mult-functional dimensions of food and nutrition surveillance systems as proposed by the FAO and other agencies [1]

Food and nutrition surveillance systems are seen as supporting public-sector, top-down planning processes and as a basis for sectoral actions in the form of national programmes. Information routinely or periodically generated at the community level is rarely fed back in support of local decision making and action taking. Serious operational bottlenecks at national levels related to data processing and analysis have greatly limited the effective use to which the eventually disseminated information is put. Lack of clarity in the definition of the functions of the surveillance systems and of operational concepts and implementation procedures, as well as "territorial" concerns among public-sector agencies, have prevented the Central American countries from organizing such a system as a basis for multisectoral decision making and action taking in the short and long run. It is difficult to see how surveillance activities to date have contributed effectively to the food security of the poor in Central America.

Socio-economic development, popular participation, and food and nutrition surveillance

Socio-economic development may be viewed as the full achievement of human potentiality in both material and spiritual terms. Food security at all times is a high-priority component of socio-economic development, in fact an essential pre-condition. Food and nutrition surveillance is an operational instrument to achieve food security for all members of society, and thus an instrument of socio-economic development.

It has been recognized for some time that popular participation is essential for development, and that

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The views expressed in this paper are those of the author and do not necessarily represent those of INCAP

development is in fact participation [2]. This idea found formal expression in 1979 in the declaration of the World Conference for Agrarian Reform and Rural Development, which stated in part: "Rural development strategies can realize their full potential only through the motivation, active involvement and organization at the grass-roots level of rural people . . . in conceptualizing and designing policies and programmes" [2]. This focus has since then guided the development work of UN specialized agencies, and of some international and national non-governmental organizations, though often it has not been put into effective operation.

Popular participation occurs essentially in two ways. In the first, certain groups are organized in order to participate in development activities designed and operated from above, often by a public-sector agency. Participation is seen as making the outcome of the activities more effective in accordance with criteria adopted by central planners, and may consist of community members providing free labour services or material goods for development projects. The second type of participation is a bottom-up process that results in grass-roots organization and allows the poor to take major responsibility for their own development in accordance with their own perceived needs. As part of the process the poor are better equipped to formulate and express their needs and their priorities for actions, and to participate technically in designing and implementing development activities, thus over time decreasing their dependence on external technical and financial sources of development assistance.

It is my contention that there is a role for food and nutrition surveillance in fostering socio-economic development with grass-roots-level participation. This role has not yet been recognized in Central America. Economic growth is often confused with socio-economic development, and participatory processes are only seen as necessary in order to increase the local impact of national and regional social action and development programmes However, new social and political currents start to create space for effective community organization at grass-roots levels in support of bottom-up development activities. This is probably even more true for populations living in marginal urban areas than for the rural poor. Nevertheless, food and nutrition surveillance activities, if designed, operated, and evaluated by communities organized at the grass-roots level, can in turn strengthen development-oriented participation processes and contribute significantly to the food security of the poor and their socio-economic development

Such activities by the community should result in an understanding of the factors that produce food and nutrition problems and should provide a basis for self-determination and implementation of solutions in accordance with the aspirations collectively held by the community and within the broad context of socio-economic development.

The implementation process

The following should be the principal functions of community-based food and nutrition surveillance systems·

a. to provide early warning signals that will allow the community to take preventive actions when acute hunger conditions arise;
b to provide the community with technical bases with which to plan poverty-alleviation, economic-survival, and community-development strategies and to formulate and implement social-action and development programmes and projects aimed at improving the short- and long-term food security of the poor;
c. to provide the community with systematic and continuous information to monitor and evaluate its programmes and projects; and
d. to provide the community with data with which to obtain political commitments for development assistance, and with which to mobilize external and community resources for programmes and projects in accordance with priorities established by the community.

The community should set priorities as to what basic functions should be emphasized in the initial design of the systems. For example, communities that frequently suffer from acute food shortages may wish to emphasize the system's early-warning function.

No operational blueprint is possible of community-designed, -operated, and -evaluated food and nutrition surveillance systems. Inherently, they are not necessarily duplicable, although they may coincidently have elements in common. This may be partly the result of a demonstration effect among communities that are in contact, especially those that face similar poverty problems or acute hunger conditions

The role of external (to the community) technical assistance should be to help to create the necessary conditions so that the community can effectively manage, use, and evaluate the system. This may take the form of training community members in data recording, tabulation, and interpretation, establishing certain infrastructure for data processing and analysis, or technical assistance with the design of the system. In general, the system should be simple and flexible in design and should contemplate incorporating qualitative information, not only quantitative data. The former has the advantage of often serving more effectively as a basis for rapid decision making or action taking, especially in situations that do not allow or require in-depth study of underlying causes. The sys-

tem should be flexible enough so that it can continuously be adjusted in accordance with the current data needs of the community.

The sequence of different stages of the implementation process might be as follows:

a. identification by the community of its food and nutrition problems, their dimensions and underlying causes, and available resources;
b. identification and establishment of priorities for community actions in the immediate, medium, and long term to solve the identified problems;
c. identification of information needs for the support of decision making and action taking by the community;
d. design of the community-based food and nutrition surveillance system with external technical assistance,
e. creation of the necessary technical and logistical conditions for the effective functioning of the system;
f. implementation and operation of the system by the community;
g. continuous evaluation of the system by the community, and continuous identification and application of needed adjustments in the system.

During the first stage, the community collectively thinks about and discusses its food and nutrition problems, their immediate causes, and what priorities should be given to solving them. For this process of diagnosis the community may use existing data and decide to obtain other information applying simple data-collection techniques. External technical assistance may facilitate this process. In participatory sessions the community decides on courses of actions and sets priorities. Identifying and assigning priorities to problems and courses of action constitute the bases for identifying information needs, and thus for the design of the information system. At this stage external technical assistance may be required in the forms of training of community members, technical help with validation of the system, infrastructure, etc. Once the system is operational, it should be evaluated continuously by the community. For this purpose, some operational indicators should be included that will allow the system's performance to be monitored as a basis for making adjustments over time

Conclusions

Community-designed, -operated, and -evaluated food and nutrition surveillance systems should not be seen as the only information systems in support of national food security. Decision making and action taking in relation to food security and socio-economic development take place at different levels and require information at those levels, including macro-level information and data obtained at the community level and integrated at aggregate levels (e.g., local, regional, national). But in Central America, as in other parts of the developing world, food and nutrition surveillance should not be limited to supporting top-down processes of decision making and action taking related to food security and socio-economic development. In view of the diminishing capacity of the public sectors to provide technical and financial solutions to poverty problems, there is an increasing need for the poor to be able to determine and take responsibility for their course of development

Once operational, the surveillance systems are likely to be effective because they allow firm integration of information-generating activities with decision making and action taking; they may strengthen community organization at the grass-roots level, which in turn will aid the social development process; they increase the effectiveness of external resources in contributing to the community's food security and socio-economic development; and they mobilize community resources in a more rational way.

The firm integration of information-generating activities with decision making and action taking ensures that the information can be transformed rapidly into decisions, and that it is appropriate and leads to actions that are relevant to local conditions and in accordance with the aspirations and priorities established by the poor themselves.

Community organization does not take place in a vacuum. It is generated as a need and often constitutes a pre-condition for taking actions. To the extent that these systems serve as a catalyst for strengthening community organizations at the grass-roots level, they contribute also indirectly to the social development process by making other actions at the community level more effective, whether undertaken with external or community-based resources. The community becomes better equipped to define what resources are needed in accordance with the priorities with which actions are to be taken, the timing of resource use, etc., thus increasing their impact. Depending on the process by which they are designed and operated, surveillance systems can be instruments that allow the communities to understand their own reality and thus take greater responsibility in charting their own development course.

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Training and personnel issues in the introduction of social and behavioural components into nutrition programmes and research

Marylou L. J. Mertens and Gretel H. Pelto

Introduction

The purpose of this statement is to express the need for training programmes explicitly designed to improve the quality of social-science inputs into nutrition and health research and programme activities.

From a variety of sources, including the expanding body of data on the social epidemiology of nutrition and studies of the social correlates of dietary practices as well as the experiences of health-care and nutrition professionals, the role of socio-cultural and behavioural factors in the aetiology of nutrition problems and their solution is becoming increasingly more evident. Nutrition has always been a multi-disciplinary field, drawing concepts and techniques from other natural sciences, including physiology, biochemistry, molecular and cellular biology, and medicine. Indeed, the common practice of naming a university unit devoted to nutrition a "Department of Nutritional Sciences" reflects the multi-sectoral nature of the enterprise. Recognition of the social components of nutrition has led to the need to cast a still wider net, bringing social-science concepts and methods into the investigation of nutrition issues and nutrition-policy implementation

One important vehicle by which new methods and theoretical perspectives are introduced into a field is through collaborative research activities. The expansion of the multi-disciplinary team of nutrition investigators to include anthropologists and other social scientists is a logical and timely extension of biological investigation. Including social scientists in the development and implementation of nutrition and health programmes would bring a social perspective to bear on direct problem-solving activities.

There are, however, a number of serious barriers to effective collaboration. One of the most important is the scarcity of social scientists with the requisite background, training, and professional situations. Throughout the world, in both industrialized and developing countries, nutrition and health-care projects have found it difficult at best, and often impossible, to develop appropriate working relationships with social scientists. To a large extent, this situation reflects the orientations and traditions of training and research in the social sciences. For example, in anthropology, attention to issues of contemporary health and nutrition, particularly in applied contexts, has only recently begun to attract serious attention. Moreover, the lack of experience in quantitative methods makes it difficult for traditionally trained anthropologists to collaborate with bio-medical researchers.

The professional circumstances and expectations that social scientists face is another barrier. Typically, most anthropologists are employed in universities, where administrators are reluctant to encourage their staff members to participate in projects that take them away from their academic pathways. Promotion and job security are tied to academic publications in the primary discipline, rather than to applied, multi-disciplinary, problem-solving research Positions outside academic settings have only recently become viable alternatives, and they rarely carry the same job security and opportunities for professional development that one finds in a university.

Social organization and attitudes within the bio-medical and nutrition community are another source of the problem. Too often, social scientists find themselves in a low status position compared to comparably trained bio-medical colleagues. Lack of understanding about the nature of social-science concepts and methods and unfamiliarity with the language and vocabulary lead to misunderstanding, charges of using jargon, and denigration of data quality. At the same time, social scientists often fail to appreciate the complexity of the bio-medical issues and are unable to communicate directly about the central issues of concern to biological researchers and clinicians.

Despite their prevalence and historic depth, none

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