Growth Promotion for Child Development

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

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Community-Based Growth Monitoring

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

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

Primary School Education and Health

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

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

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

TALC Direct Recording Scale

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

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

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

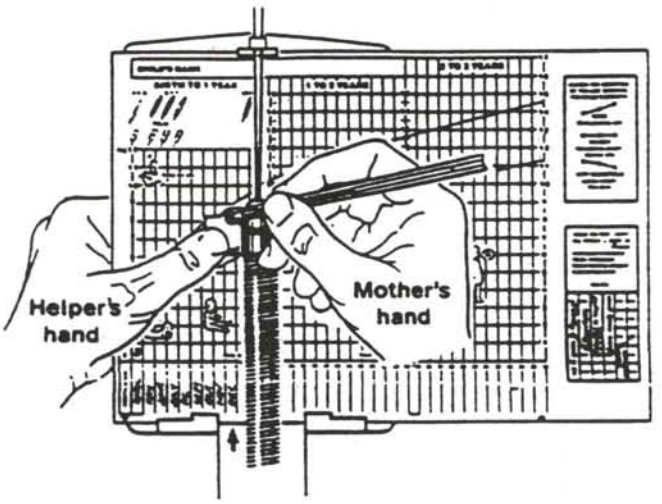
Dial Scale	TALC Direct Recording Scales
	
Scales kept in the clinic.	These robust, low-cost but accurate scales are kept and used in the community.
Mother is confused. No obvious relationship between movement of pointer on dial, the plotted growth curve, and her child's weight gain.	The mother enjoys and is proud to be involved. She sees the spring lengthen each month as the child grows. As she sees the dots *she* makes each month, she understands the meaning of a growth curve even if illiterate.
No involvement of family decision-makers in discussing changes in the child's diet. Children often cry and this makes talking with mothers difficult.	Weighing at home allows discussion by family decision-makers. Child cries less often. Weighing is done at time and place convenient to mother.
Late detection of low birth weight babies.	Babies can be weighed at birth even if born in remote villages.
Lost productivity while carrying infant to clinic, irregular attendance in farming season.	No time lost travelling to clinics. Mothers who never attended clinics may be reached at home.
Weighing can absorb much of a health worker's time.	Health workers are free to spend time on other aspects of primary health care. They can be encouraged to visit homes.
Health workers make many errors in plotting growth curve.	Errors in plotting less likely.

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

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

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

Initial Studies

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

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

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

Growth Monitoring of Maasai Children

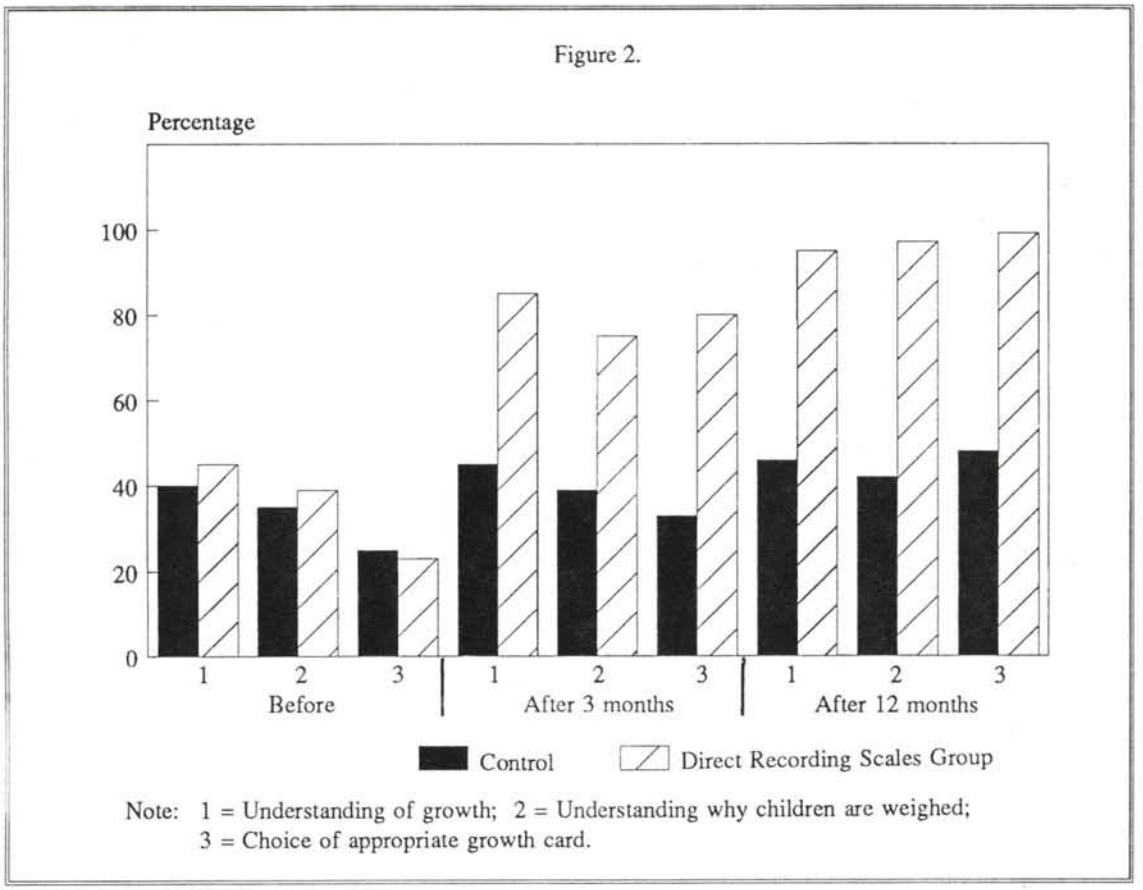
The success of these two initial studies encouraged a larger study that involved 138 mothers from a pastoral, mainly nomadic, Maasai population, dispersed over the Kenya/Tanzania border. All mothers had at least two children under five, were illiterate and had a mean age of 29. In this area, the infant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

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

Results of Maasai Study

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

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



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

Conclusion

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

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

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

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