

Evaluation of community-based growth monitoring in rural districts of the Eastern Cape and KwaZulu-Natal provinces of South Africa

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Abstract

Background: The Health Systems Trust implemented a community-based growth monitoring intervention project that fits into the Integrated Nutrition Programme focus areas and commissioned an evaluation of this project.

Objective: To assess project volunteers' knowledge on infant and young child nutrition and growth monitoring, and evaluate community-based growth monitoring activities.

Design: Five randomly selected growth monitoring sites per sub-district were evaluated. Project volunteers (n = 45) and caregivers (n = 186) attending the growth monitoring sites were interviewed by means of a questionnaire. Growth monitoring and nutrition education activities were observed at the growth monitoring sites.

Setting: Two rural districts in KwaZulu-Natal (Umkhanyakude: sub-district Jozini; and Zululand: sub-district Phongola), and one rural district in the Eastern Cape (OR Tambo), South Africa.

Results: Project volunteers were mostly women (87%), 38 ± 10 years old, and 27% had matric/Grade 12. There was a high turnover of project volunteers. Their nutrition knowledge varied. Forty-six per cent of the project volunteers and 39% of the caregivers could correctly identify the growth curve of a healthy growing child. Seven of the 13 sites that were visited were at a crèche. There was a referral system between the growth monitoring site and the local clinic, and links with the Department of Agriculture and, to a lesser extent, the Department of Social Welfare. Weighing methods were inconsistent and the steps of growth monitoring were not followed through. Nutrition education to the caregivers was lacking at several of the sites.

Conclusion: The study highlighted both strengths and limitations of the project. Areas that need improvement include the selection, training and supervision of project volunteers performing community-based growth monitoring.

S Afr J Clin Nutr 2009;22(4):185-194

Introduction

Growth monitoring is defined as the regular measuring, plotting and interpretation of a child's growth in order to counsel or take action when abnormal growth is detected.¹ The aim is to improve the child's health, and it is widely recognised as an essential element of primary health care. According to a recent review of small- and large-scale studies, there is evidence that children whose growth is monitored and whose caregivers receive nutrition and health education and have access to basic health care have a better nutritional status and/or chance of survival than children who do not.²

Growth monitoring is an integral part of the Integrated Nutrition Programme (INP) of the South African Department of Health. The INP aims to ensure optimum nutrition for all South Africans by preventing and managing malnutrition. With regard to infants and young children, the INP aims to establish and strengthen sustainable growth monitoring practices, firstly at health facilities and, secondly, in communities.³ However, guidelines on how to implement and sustain community-based interventions such as community-based growth monitoring are not specific.

The Health Systems Trust (HST), a non-governmental organisation (NGO), implemented a community-based intervention project that fits into the INP focus areas in two provinces (KwaZulu-Natal and the Eastern Cape) in 2003. Community-based growth monitoring, particularly in deep rural areas, was implemented in the catchment areas of 10 clinics per district. Each community-based growth monitoring site was linked to a clinic. The community-based growth monitoring was performed by project volunteers who received training in growth monitoring and the community-based component of the Integrated Management of Childhood Illness (IMCI).⁴ A five-day training workshop on the community-based component of the IMCI was provided by a private consultant at the beginning of the project. In 2007 a training workshop was conducted by maternal and child health (MCH) trainers from the Department of Health for newly appointed volunteers in one of the districts. Informal training took place on an ad hoc basis and was presented by HST project facilitators, and in some cases by clinic staff. The project volunteers were supervised and supported by community-based organisations (CBOs) in collaboration with nursing staff at the local clinics. The project volunteers received a monthly stipend, which was paid by the

HST through the CBOs. The project volunteers worked a minimum of four hours per day, Monday to Friday. Growth monitoring equipment, e.g. scales, was provided by the HST, but the CBOs were responsible for the maintenance of the equipment. The project volunteers were also responsible for the maintenance of a vegetable garden at each clinic, as well as communal vegetable gardens. The produce of the vegetable gardens was used mostly for nutrition rehabilitation of malnourished community members.

The HST approached the Nutritional Intervention Research Unit (NIRU) of the Medical Research Council (MRC) to perform an evaluation of the HST project in one district in the Eastern Cape (OR Tambo) and two districts in KwaZulu-Natal (Umkhanyakude and Zululand) at fifteen clinics (five clinics in each of the three districts). The aim of the assessment was to help the HST to identify gaps and assist with focussing future activities towards remedial action. This article describes the results of the process evaluation of the activities at the community-based growth monitoring sites. The aim of the evaluation was to assess project volunteers' knowledge on infant and young child nutrition and growth monitoring, and assess the growth monitoring practices and nutrition education activities at the community-based growth monitoring sites.

Subjects and methods

Study population

The study population resided in two districts in KwaZulu-Natal (Umkhanyakude: sub-district Jozini; and Zululand: sub-district Phongola), and one district in the Eastern Cape (OR Tambo: sub-district Nyandeni), South Africa. A situation assessment that was conducted by the NIRU of the MRC in 2003 showed that childhood malnutrition and maternal overweight coexisted, and that a large proportion of the population did not have access to basic services such as tap water, electricity and sanitation.⁵

A cross-sectional descriptive study was conducted. Five clinics per district were randomly selected. One community-based growth monitoring site per clinic was evaluated; this amounted to five sites per district. Project volunteers were interviewed and growth monitoring and nutrition education activities were observed at the growth monitoring sites. An exit questionnaire was completed for caregivers attending the growth monitoring activities on the day of the survey (one day per site).

Project volunteers

Trained fieldworkers interviewed project volunteers in the local language using a structured questionnaire. Information was obtained on member profile and knowledge on growth monitoring and infant and young child nutrition. The aim was to interview four project volunteers per selected clinic; therefore twenty project volunteers per district. However, this did not materialise due to the unavailability of some project volunteers. In total, 45 project volunteers were finally interviewed – 13 in the Umkhanyakude district, 16 in the Zululand district and 16 in the OR Tambo district.

Community-based growth monitoring sites

One of the sites in the Umkhanyakude district and one in the OR Tambo district could not be reached because of bad weather. Activities were therefore observed at 13 sites. Each site was visited by the research

team once. The evaluation had two components. Firstly, caregivers attending the sites were interviewed in the local language at the end of the day's activities by experienced fieldworkers using a structured questionnaire to assess the caregivers' view on the day's activities (growth monitoring and education given to the caregivers), as well as their ability to interpret the growth curve. All caregivers present on the day of the survey were interviewed, except for the sites where the attendance was high, in which case every second caregiver was interviewed. In total, 186 caregivers were interviewed over 13 days (one day per site) – 35 in the Umkhanyakude district, 66 in the Zululand district and 85 in the OR Tambo district.

Secondly, growth monitoring and nutrition education activities at the sites were observed and recorded on monitoring forms. The observations were made by the researchers with the assistance of trained MRC-employed fieldworkers who had previous experience in community-based growth monitoring. The condition of the scales was checked using a standard weight, and by observing whether the scale zeroed when being switched on.

Ethical issues

The Ethics Committee of the MRC approved the study (EC07-005). The survey was planned in collaboration with the HST, who scheduled the dates for interviews and observations. Volunteers and caregivers who were interviewed gave written consent after the purpose and nature of the study were explained to them.

Results

Project volunteers

Eighty-seven per cent of the project volunteers were female (female $n = 39$; male $n = 6$); 36% were married, and the average age was 38 ± 10 years (range: 22–62 years). The educational level of the project volunteers varied; 27% had passed matric/Grade 12, 29% had between eight and eleven years of school education, 38% had seven years or less of school education, and 7% had no school education. There was a high turnover of project volunteers. Of the 45 project volunteers interviewed, 29 (64%) joined the project after 2003 (the year that the project was implemented and initial training on the community-based component of the IMCI was provided by a private consultant). Nineteen (42%) of the project volunteers joined the project during 2007 (the year that the survey was done).

Of the 45 project volunteers who were interviewed, 87% reportedly received some training in growth monitoring – either during the initial training provided by a private consultant in 2003, follow-up training by Department of Health MCH trainers and HST project facilitators in 2007 (in one of the districts), or ad hoc in-service training by other project volunteers and/or HST project facilitators. Almost all of the project volunteers (91%) thought they had the appropriate skills to perform growth monitoring and promotion.

Nutrition knowledge

Table I shows the project volunteers' knowledge on selected nutrition topics. Most (80%) of the project volunteers said that solid foods should preferably be introduced at four to six months, and they understood the term "exclusive breastfeeding". Nearly all (96%) of the project volunteers knew that a "sugar-salt" solution should be given to children during an episode of diarrhoea to prevent them

from becoming dehydrated. In the OR Tambo district, all but one of the sixteen project volunteers (94%) knew the correct method of preparation of the homemade sugar-salt solution. Fewer project volunteers in the two KwaZulu-Natal districts knew the correct method of preparation (46% in the Umkhanyakude district and 62% in the Zululand district). According to the IMCI guidelines (p. 84),⁴ milk products, fatty foods, whole wheat bread, high-fibre cereals and green vegetables may worsen diarrhoea and should be avoided, although this may vary among people. When asked to name two foods that can worsen diarrhoea, 33% of the project volunteers could do so, while 40% could not name any.

Just over half of the project volunteers were familiar with the term 'anaemia', but few knew the causes of anaemia. When asked to name two foods that can help to prevent people becoming anaemic, 11 (24%) of the project volunteers could name one food correctly.

In both the Umkhanyakude and OR Tambo districts all the project volunteers were familiar with the term 'vitamin A', versus 75% in the Zululand district. One-third of the project volunteers knew that vitamin A is a nutrient in food. When asked to name three foods that are good sources of vitamin A, 29% of the 45 project volunteers could name three foods correctly.

When asked to name two foods that children need for strong bones, milk was named by five project volunteers (11%), amasi (sour milk) by two (4%) and cheese by one project volunteer (2%). When asked to name two foods that protect against colds, orange was named by four project volunteers (9%), and lemon and tomato each by one project volunteer (2%).

Four different growth curves were shown to the volunteers and they were asked which one of the four growth curves was that of a healthy growing child. Approximately half of the project volunteers (46%) could identify the appropriate growth curve (Table I).

Table I: Project volunteers' knowledge on infant feeding, feeding during an episode of diarrhoea, anaemia and vitamin A, as well as their interpretation of the growth curve

	District							
	Umkhanyakude (n = 13)		Zululand (n = 16)		OR Tambo (n = 16)		Total (n = 45)	
	n	%	n	%	n	%	n	%
Age for introducing solid foods								
3 months	-	-	1	6	1	6	2	4
4–6 months	12	92	12	75	12	74	36	80
> 6 months	1	8	3	19	3	19	7	16
Meaning of "exclusive breastfeeding"								
Breast milk only	10	77	11	69	12	75	33	73
Breast milk and water	1	8	3	19	-	-	4	9
Breast milk, but no solids	-	-	-	-	1	6	1	2
Don't know	2	15	2	12	3	19	7	16
Recipe for the homemade sugar-salt solution for children with diarrhoea								
Correct recipe ^a	6	46	10	62	15	94	31	69
Gave a recipe, but it was wrong	7	54	5	31	1	6	13	29
Don't know	-	-	1	6	-	-	1	2
Foods that may worsen diarrhoea								
Milk	2	15	7	44	10	62	19	42
Fatty foods	6	46	4	25	9	56	19	42
Whole wheat bread, high fibre cereals	-	-	7	44	-	-	7	16
Green vegetables	2	15	6	38	4	19	11	24
Number of foods that may worsen diarrhoea named correctly								
None	3	23	9	56	6	38	18	40
One	6	46	4	25	2	12	12	27
Two	4	31	3	19	8	50	15	33
Familiar with term 'anaemia'								
Cause of anaemia								
Lack of food	1	8	4	25	2	12	7	16
Lack of animal foods (meat)	-	-	-	-	1	6	1	2
Bleeding	4	31	1	6	1	6	6	13
Don't know	4	30	7	36	3	18	14	31
Never heard of anaemia	4	31	4	25	9	56	17	38

	District							
	Umkhanyakude (n = 13)		Zululand (n = 16)		OR Tambo (n = 16)		Total (n = 45)	
	n	%	n	%	n	%	n	%
Number of iron-rich foods named								
None	4	31	5	31	3	19	12	27
One	5	38	4	25	2	12	11	24
Don't know	-	-	3	19	2	12	5	11
Never heard of anaemia	4	31	4	25	9	56	17	38
Yellow-/orange-coloured vegetables are good for children								
	8	62	12	75	14	88	34	76
Reason why yellow-/orange-coloured vegetables are good for children								
Have vitamin A	4	31	8	50	9	56	21	47
Have vitamins	2	15	1	6	2	12	5	11
Good for eyes	-	-	1	6	-	-	1	2
Healthy/nutritious	1	8	2	12	2	12	5	11
For growth	-	-	-	-	1	6	1	2
Don't know	1	8	-	-	-	-	1	2
Not applicable	5	39	4	25	2	12	11	24
Familiar with term 'vitamin A'								
	13	100	12	75	16	100	41	91
What is vitamin A?								
A food	2	15	5	31	7	44	14	31
A nutrient in food	4	31	5	31	5	31	14	31
A medicine	2	15	1	6	4	25	7	16
Don't know	5	38	-	-	-	-	6	13
Never heard of vitamin A	-	-	4	25	-	-	4	9
Number of vitamin A-rich foods named								
None	3	23	1	6	-	-	4	9
One	1	8	1	6 ^b	4	25	6	14
Two	6	46	4	25	8	50	18	40
Three	3	23	6	38	4	25	13	29
Never heard of vitamin A	-	-	4	25	-	-	4	9
Importance of vitamin A								
Prevents illness/strengthens immune system	4	31	3	19	3	19	10	22
Growth	-	-	1	6	7	44	8	18
Healthy eyes	3	23	2	12	-	-	5	11
Strong body	1	8	3	19	1	6	5	11
Healthy/nutritious	3	23	3	18	1	6	7	16
Don't know	2	16	-	-	3	18	5	11
Never heard of vitamin A	-	-	4	25	-	-	4	9
Colour of vitamin A-rich vegetables								
Yellow/orange	6	46	9	56	6	38	21	47
Dark green	-	-	1	6	2	12	3	7
Green	7	54	2	12	8	50	17	38
Never heard of vitamin A	-	-	4	25	-	-	4	9
Growth curve identified as that of a healthy growing child^b								
Flattening growth curve	1	8	-	-	1	6	2	5
Growth curve follows the reference curve	7	54	8	57	5	31	20	46
Growth curve increases above the reference curve	5	38	6	43	10	62	21	49

^a Correct recipe: 1 litre boiled and cooled water + 8 level teaspoons of sugar + ½ teaspoon of salt

^b Zululand: missing n = 2

Sites for growth monitoring

The project volunteers were asked how the sites for growth monitoring were selected. The major criterion was that the site had to be relatively far from the clinic. Other factors that were considered included close proximity to households, particularly those with small children, adequate space to hold meetings and accessibility. A participatory approach was used to select these sites, as shown by some of the comments given by the project volunteers:

- “we first had the meeting with the mothers and also with the crèche teachers”
- “we had the meeting with the community so that we can choose the place where we can work”
- “consulted chief for permission; decision made at a community meeting with the chief”
- “permission from chief and councillor to use premises; decision made at community meeting”

Most of the project volunteers were responsible for two to three growth monitoring sites. Approximately 30% of the project volunteers used public transport to get to the sites (Table II).

Table II: Project volunteers' mode of transport to the community-based growth monitoring sites

	District						Total (n = 45)	
	Umkhanyakude (n = 13)		Zululand (n = 16)		OR Tambo (n = 16)			
	n	%	n	%	n	%	n	%
Walk – less than ½ hour	2	15	4	25	-	-	6	13
Walk – 30 to 60 minutes	3	23	3	19	4	25	10	22
Walk – longer than 1 hour	2	15	5	31	6	38	13	29
Public transport	4	31	4	25	6	38	14	31
Other	2	15	-	-	-	-	2	4

Problems experienced with growth monitoring as perceived by the project volunteers

The project volunteers were asked to name problems, if any, experienced with the growth monitoring.

- A common problem listed in both Umkhanyakude and Zululand was that not all the children attending the growth monitoring sessions were accompanied by their caregivers. If the growth monitoring sessions were held at a crèche, this was even more problematic as the parents of the crèche children did not attend, which made it difficult to report the child's growth faltering to the parents, and to advise them on corrective measures.
- A number of children did not have a Road to Health Card (RTHC), and for some the cards were incomplete. This made it difficult for the project volunteers to check the child's immunisation status and growth curve.
- Because some parents did not accompany their children to the growth monitoring sessions and only saw the project volunteers working in the clinic garden, the project volunteers had the perception that the parents did not believe that they had the skills to perform growth monitoring of the children.
- There was such a high turnover rate of project volunteers that the project volunteers had to train new ones constantly.

Feedback to nursing staff at local clinic

According to the project volunteers, they gave feedback on the growth monitoring sessions to the clinic sister, mostly monthly or when problems occurred. During the feedback sessions they would discuss the process and problems experienced.

Caregivers attending the growth monitoring sites on the day of evaluation

In total, 186 caregivers were interviewed. The average age of the respondents was 32 ± 14 years and 96% were women. Seventy-four per cent of the respondents were the mother of the child, 16% the grandmother, 8% an older sibling and 3% were not related to the child. When being shown four different growth curves, 39% of the caregivers could identify the growth curve of a healthy growing child (Table III).

Table III: Caregivers' interpretation of the growth curve

	District			Total (n = 186)
	Umkhanyakude (n = 35)	Zululand (n = 66)	OR Tambo (n = 85)	
Growth curve identified as that of a healthy growing child	%	%	%	%
Growth curve going down	15	12	8	11
Flattening growth curve	24	8	14	14
Growth curve follows the reference curve	30	41	42	39
Growth curve increases above the reference curve	30	39	27	32
Don't know	-	-	8	4

The caregivers were asked what they liked most at the growth monitoring site (only one answer could be given). The majority (74%) of the caregivers named weighing of the children, and close proximity to their homes was mentioned by 12% of the caregivers in both the Umkhanyakude and Zululand districts. For those caregivers interviewed, the child's weight was discussed with 72% of the caregivers in the OR Tambo district, versus 35% and 47% in the Umkhanyakude and Zululand districts, respectively. Nine per cent (n = 3) of the children in the Umkhanyakude district and 5% (n = 4) in the OR Tambo district were referred to the clinic on the day of the evaluation.

Observation of the community-based growth monitoring

The 13 sites that were used for growth monitoring are listed in Table IV. Seven of the thirteen sites that were visited were at a crèche.

The involvement of the Department of Health was reflected by the presence of a nutrition advisor (matriculant who completed the Department of Health's informal training programme, and who is employed by the Department of Health) at one of the sites in the Umkhanyakude district, and two community health workers, one site each in the Umkhanyakude and Zululand districts on the day of the survey.

Table IV: Site for the community-based growth monitoring and number of children who attended

	Site	No of children who attended
UMKHANYAKHUDE		
Site 1	Outside a tuck shop close to the road. There is a shelter with some benches.	34 children
Site 2	Open field; no trees; well organised.	34 crèche children and 4 babies
Site 3	Crèche.	Crèche children (number not known) and 3 babies
Site 4	Crèche, two small rooms. Weighing was done outside under a tree. The crèche children were sitting on little chairs outside.	31 crèche children and 6 babies
ZULULAND		
Site 5	Crèche – small room (approx 3 m x 6 m); very crowded.	51 children (including 13 crèche children)
Site 6	Crèche.	23 children (including 12 crèche children)
Site 7	Under a tree in front of the school.	27 children
Site 8	Crèche.	13 crèche children
Site 9	Crèche; very crowded; unorganised and noisy.	56 children (including 28 crèche children)
OR TAMBO		
Site 10	Dwelling of a household.	32 children
Site 11	Church building.	83 children
Site 12	Dwelling of a household.	12 children There were 60 children on the register, but on the day of evaluation the weather was rainy and misty.
Site 13	Crèche linked to a school; used one of the classrooms; crowded, but orderly.	74 children

Scales

Of the 13 scales observed at the sites, 10 (77%) were in a good condition, 2 needed to be serviced, and 1 could not be used because the batteries were flat. One of the sites in the Umkhanyakude district was not visited due to bad weather, but according to a project volunteer they did not have a scale at the site and children were therefore no longer weighed. They did, however, still provide education (on e.g. immunisation, gardening, child feeding) to caregivers.

Weighing procedures

At some of the sites the children were weighed while wearing heavy clothing, while at other sites some of the children were weighed naked. A hanging scale was used to weigh babies at four of the thirteen sites. The project volunteers' ability to weigh the babies using the hanging scale varied. At one of the sites, where their ability to use the hanging scale was considered to be poor, the researchers repeated the weight measurement for 12 babies (wearing the same clothing as when being weighed by the project volunteer) using an electronic Mascot scale and the direct weighing method. The two readings (volunteer versus researcher) differed by more than 20% for four of the twelve babies (data not shown). At some of the sites the project volunteer interfered with the child while weighing, e.g. wiping the child's nose, touching or holding onto the child. In some cases smaller children were weighed seated with the feet touching the ground.

Nappies of babies were removed in all three the districts, and several of the babies urinated while being weighed, which poses a health

risk. According to documentation received from the HST, hygiene requisites such as a small bucket, a hand towel and soap were provided by the HST to be used at the sites. The use of these when needed was however not observed.

Recording of child's weight

The project volunteers used an A4 hard-cover exercise book to record the growth information in all three districts. In the Umkhanyakude and Zululand districts every session started on a new page, and the children's information (name, date of birth, sex and weight) was recorded in the order that they were being weighed. After the day's activities were completed, the project volunteer would compare each child's weight with the previous weight in order to identify those children that had lost weight. Depending on the site, they would either ask the caregiver of the child to come to the crèche the next week, or in the next month would inform the caregiver of the child's weight loss. Most of the time the project volunteer would then refer the child to the clinic. In the Umkhanyakude and Zululand districts the referrals were done either verbally or written, while in the OR Tambo district it was done mostly verbally as this was perceived to be less threatening to the caregivers. The project volunteers were not allowed to plot the child's weight on the RTHC at most of the sites in KwaZulu-Natal.

In the OR Tambo district a register system was used (the child's name, date of birth, sex and 12 columns [Jan–Dec] for the weight). It is therefore easy to see a change in weight. Generally, after the child had been weighed, the weight was written in the child's personal booklet, plotted on the growth chart and then written in the record

book. It was observed that the child's weight was discussed with the caregiver more often in the OR Tambo district than in the other two districts.

Education given during growth monitoring session

The education given at the growth monitoring sites was based on the IMCI manual.⁴ During the follow-up training in 2007, the project volunteers were each provided with a booklet – extracted from the IMCI manual – written in the local language.

The project volunteers were not provided with visual aids specifically designed for the nutrition education component of the project. They were encouraged to use existing posters from, for example, the clinic. According to 68% of the project volunteers, they had visual aids to use for nutrition education. These aids included a range of pictures, posters and/or pamphlets.

On the day of the evaluation, the project volunteers used a pamphlet on growth monitoring and a booklet on vegetable gardens (both from the Department of Health) during the education at two of the sites in the Umkhanyakude district, and copies of this pamphlet and booklet were handed out to the caregivers. No visual aids were observed at the other two growth monitoring sites in the Umkhanyakude district or at any of the sites in the Zululand district. At all the sites in the

OR Tambo district several posters (obtained from various sources) covering a variety of topics were displayed on the day of the growth monitoring session; however, some of the posters were not in the local language.

A summary of formal education observed at the growth monitoring sites is given in Table V. The caregivers were asked what information/advice they received, either through formal education or one-to-one counselling on the day of the survey; the results are listed by topic and are also given in Table V. Information collected by questionnaire confirmed the observations for most of the sites. At Site 1, for example, the education focussed on the growth curve and vegetable gardens; during the interview 12 out of 19 caregivers recalled that they received information on growth monitoring, and 7 on gardens. It is interesting to note that at Site 2 the same education was given as at Site 1, but 6 out of 13 caregivers reportedly received no information (it could be that they arrived late after the education was already given), and 7 of 13 received information on micronutrient-rich foods. At Site 9 no education was observed; nonetheless 5 of the 29 interviewed caregivers recalled that they did receive some information, probably on a one-to-one basis. At one of the sites the project volunteers gave some education on social welfare after all the children had been weighed.

Table V: Formal education observed and topics of information received as reported by the caregiver during the exit interview

Site	Education observed	Topics of information received as reported by caregiver ^a	
UMKHANYAKUDE			
Site 1	Started the session with education on the growth curve and vegetable gardens. The project volunteer was good with the education – she had the caregivers' attention and it was interactive. She used a pamphlet from the Department of Health, as well as a booklet with gardening messages. The pamphlets were given to the caregivers. After all the children had been weighed they gave education on social welfare.		(n = 19)
		Growth monitoring	12
		Vegetable gardens	7
		Take sick children to clinic	6
		Immunisation	3
		Nothing	2
		Micronutrient-rich foods	1
		Non-supportive men	1
		Child injuries	1
Social welfare	1		
Site 2	Education on the growth curve and vegetable gardens. The project volunteer used a pamphlet from the Department of Health, as well as a booklet with gardening messages.		(n = 13)
		Micronutrient-rich foods	7
Site 3	No education was observed.		(n = 3)
		Nothing	3
Site 4	No education was observed (the 6 caregivers had already left when the research team arrived). The project volunteers did not have any visual aids with them.		
ZULULAND			
Site 5	Topics were (i) breastfeeding until 6 months, and (ii) diarrhoea. No visual aids were used.		(n = 21)
		Breastfeeding	8
		Growth monitoring	4
		Feeding of sick children	2
		Immunisation	2
		Take sick children to clinic	1
		Nothing	3
Caregiver came late	1		
Site 6	No education was observed.		(n = 5)
		Nothing	5

Site 7	The project volunteer did not give any nutrition education, but there was a community health worker (who previously was a project volunteer) who did. No visual aids were used.		(n = 11)
		Hygiene and sanitation	2
		Immunisation	4
		Take sick children to clinic	3
		Nothing	1
		Don't know	1
Site 8	No education was observed – there were no caregivers.		
Site 9	No education was observed.		(n = 29)
		Breastfeeding	1
		Growth monitoring	2
		Feeding of sick children	1
		Nothing	23
		Vegetable gardens	1
		Don't know	1
OR TAMBO			
Site 10	Health and nutrition education. Various posters on the wall.		(n = 26)
		Breastfeeding	7
		Child feeding	1
		Micronutrient-rich foods	1
		Growth monitoring	16
		Take sick children to clinic	6
		Came late	1
Site 11	Very good. Caregivers were very much involved and had to repeat a lot of what had been said. Education was very focused – on immunisation. The caregivers sang a song on breastfeeding while the small babies were being weighed. There was a lot of singing throughout the day while the weighing was done – very nice atmosphere. Various posters on the walls.		(n = 20)
		Breastfeeding	10
		Child feeding	2
		Nothing	1
		Growth monitoring	3
Site 12	Topics were HIV/AIDS; gardens and vitamin A; breastfeeding; diarrhoea and oral rehydration solution. Each of the four project volunteers spoke on one topic. The talk on HIV/AIDS stimulated a participatory approach – the caregivers actively participated. Two of the four project volunteers who gave the education were quite confident. Various posters on the walls.		(n = 5)
		Breastfeeding	5
		Child feeding	2
Site 13	Very short, after all the children had been weighed. Participatory approach. According to the caregivers, the project volunteers give education every month (this month was an exception). Posters on the wall.		(n = 34)
		Nothing	34*
		* According to the caregivers, this was an exception, as usually there is nutrition and health education.	

^a Information obtained through an open-ended question; all values are given as the actual number of caregivers

Discussion

Community-based growth monitoring activities were well established at the sites that were observed. Sites used for growth monitoring were identified using a participatory approach. A variety of sites were used as growth monitoring points in this study, with at least half of the sites being at a crèche. Crèches are convenient sites, as access to children attending the crèche is readily available. However, using a crèche as the site for growth monitoring has its limitations, as the caregivers of the children were often not present during the growth monitoring sessions, making it difficult for the project volunteer to give feedback to the caregiver on the child's growth. Two of the fifteen sites that were selected for evaluation were not functioning

optimally due to equipment being inadequate or absent. Maintenance of scales, particularly servicing, has financial implications and could be problematic for long-term sustainability.

The project volunteers' skills to perform growth monitoring varied. Some of the project volunteers were very comfortable with the weighing procedures. Others, however, struggled with operating the scale and handling difficult children. Often the volunteers interfered with the children while being weighed. The project volunteers were trained by a private consultant and Department of Health MCH trainers to weigh the children according to the IMCI guidelines⁴ – i.e. children in light clothing and babies in a dry nappy and vest. The feasibility of removing wet or soiled nappies before weighing infants

at community-based sites is, however, debatable from a hygiene perspective. The practicality of removing children's clothing in cold weather in unheated rooms could also be a point of contention as well as the embarrassment of asking children to remove clothes when they are not wearing underwear.

Ashworth et al² describe five activities linked to growth monitoring and promotion, namely (i) weighing the child, (ii) plotting the child's weight on a growth chart, (iii) interpreting the growth chart, (iv) discussing options with the caregiver and agreeing on further action, and (v) evaluating the child's response. The first four of these five activities were evaluated in the current study, and they all proved to have limitations. Weighing methods were inconsistent and the steps of growth monitoring were not followed through to the final stage. The shortcomings in terms of the project volunteers' growth monitoring practices found in this study are not unique.^{6,7} Similar problems in terms of growth monitoring performed by nurses have been reported previously.⁸

For successful growth monitoring, it is important that both the project volunteers and the caregivers understand and have the ability to interpret the growth curve. Nearly half of the project volunteers and 38% of the caregivers could correctly identify the growth curve of a healthy growing child. As was the case for a community-based project in Lusikisiki in the Eastern Cape,⁹ many of the project volunteers and caregivers had the perception that a healthy child has a growth curve indicating weight gain above the reference curve. According to Ruel et al,¹⁰ growth monitoring can be made understandable to even those caregivers with low educational levels. The growth curve was well understood by caregivers participating in a community-based growth monitoring project operating in a rural village in KwaZulu-Natal.¹¹ In the latter project, initial training of nutrition monitors (similar to the project volunteers performing the growth monitoring) was followed up by continuous in-service training, and the performance of the nutrition monitors was closely monitored and regular meetings were held with them to identify and rectify problems; also, nutrition education messages and visual aids were specifically designed for the project.¹¹

For effective growth monitoring, growth faltering needs to be identified as early as possible. A good system for recording the children's weight is therefore needed, particularly where the RTHC is lacking or where nursing staff did not allow the project volunteers to plot/document the child's weight on the RTHC. Because of the register system used, together with plotting the weight on the growth chart, it was relatively easy for the project volunteers to identify and refer children with growth faltering to the clinic on the day of attendance in the OR Tambo district. However, it was more difficult to identify growth faltering in KwaZulu-Natal because the child's weight was recorded on a session basis. As a result, the caregivers were often notified about the child's weight loss after already having left the site. The fact that the project volunteers were not allowed to plot the child's weight on the RTHC in several of the sites in KwaZulu-Natal reduced the chances of identifying growth faltering early.

Nutrition education was lacking at several of the sites on the day of observation, particularly in KwaZulu-Natal. At the sites where nutrition education was observed, it was given with great

enthusiasm. At three of the sites, one in the Umkhanyakude district and two in the OR Tambo district, the project volunteers captured the caregivers' attention and stimulated spontaneous participation. The project volunteers' poor knowledge on nutrition is, however, a concern. Providing the volunteers with sufficient nutrition education material, including specifically designed key messages and visual aids for each nutrition education lesson,¹² may improve the nutrition education component at the growth monitoring sites.

Poor health worker performance has been identified as one of the constraints of effective growth monitoring in several studies.² Similar findings were observed in this study. It can be argued that continuous in-service training and regular monitoring of the project volunteers' performance are critical, more so because of the high turnover and low literacy levels of the project volunteers. A recent review paper reported that growth monitoring programmes with good outcomes entailed considerable time spent on training and supervising health workers, while little time was spent on training in the poorly performing programmes.²

The high turnover of volunteers (particularly in the two districts in KwaZulu-Natal) contributed towards the discrepancies in growth monitoring performance. This high turnover of project volunteers was not anticipated and budgeted for. Project volunteers who joined the project after the initial training were trained by the existing project volunteers, regardless of their growth monitoring skills. As a result, project volunteers who were not competent in growth monitoring themselves trained new project volunteers. Some of the competent project volunteers obtained employment within the Department of Health (e.g. in the two KwaZulu-Natal districts three volunteers were employed as community health workers, one as a lay counsellor, one as a youth ambassador and one as a volunteer nurse [personal communication, M Masuku]), which contributed to the high turnover. This does, however, demonstrate the project's potential to invest in human capital, which is a great asset to the larger rural community and the health sector, and could be an incentive for the volunteers in their performance.

The low literacy level of some of the project volunteers suggests that the selection process was not optimal. Within rural communities project volunteers are often selected from a pool of available people, largely comprising older (and often illiterate) men and women who are willing and passionate about serving their communities, or who are already supporting similar activities. More objectivity and clear guidelines in terms of project volunteer selection is required to ensure success and sustainability of community-based growth monitoring. Assigning project volunteers who are not competent in growth monitoring to the equally important activity of managing the vegetable garden at the clinic and promoting local production of nutrient-rich foods could potentially strengthen project activities and should be explored.

The project volunteers were not remunerated, but received a stipend for travelling. It could be speculated that adequate remuneration may attract the younger and more literate generation. Adequate remuneration would probably also have helped to retain project volunteers and thereby decrease the turnover. According to Mason et al,¹³ remuneration and incentives are critical for successful community nutrition programmes.

A strength of the community-based growth monitoring activities was the link with the local Department of Health. A referral system between the community-based growth monitoring site and the local clinic was in place. According to nurses at the clinics, the benefits of this referral network system included improved nutrition rehabilitation, improved food security and additional assistance for the clinic (data not shown). In some cases, community health workers, and in KwaZulu-Natal nutrition advisors employed by the Department of Health, assisted project volunteers with nutrition and growth monitoring activities. Besides performing the community-based growth monitoring activities, the project volunteers also assisted at the local clinic with the clinic-based growth monitoring. Although the agreement with the Department of Health was that nurses would support the project volunteers, nurses at several of the clinics had concerns regarding the project volunteers' growth monitoring activities (data not shown), reinforcing the need for continuous training, monitoring and supervision.

At three of the thirteen sites, the nutrition education included aspects of vegetable gardens on the day of evaluation. Using community-based growth monitoring as entry point for agricultural interventions has been shown to be effective in improving child nutritional status¹⁴ and maternal knowledge, dietary intake and health status of children under five, as reported by the caregivers.⁹ Most of the clinics had a well-maintained vegetable garden growing a variety of crops that were used for nutrition rehabilitation of malnourished patients. Mostly the volunteers work in the garden. A strength of the project is the intersectoral linkage with the Department of Agriculture and, to a lesser extent, the Department of Social Welfare. Part of the volunteer's responsibilities was to educate the community on the procedures for accessing social grants.

A limitation of the project evaluation was the lack of outcome measures such as child nutritional status. Considering the shortcomings in terms of the growth monitoring practices that were observed, we suggest that these activities be optimised before conducting an impact evaluation. Measuring impact will, however, be difficult because of the lack of control areas.

In conclusion, the community-based growth monitoring sites gave households in deep rural areas the opportunity to have their children growth monitored within the community. These activities were however not done in isolation, as there was a referral system between the growth monitoring site and the local clinic, as well as links with the Department of Agriculture and, to a lesser extent, the Department of Social Welfare. However, the growth monitoring activities were not optimal, and more should be invested in the project volunteers. For example, newly appointed volunteers should all receive the formal training, and refresher courses should be provided regularly. The feasibility and sustainability of community-based activities performed by voluntary workers receiving a small stipend need urgent attention. Government departments and NGOs/CBOs who plan on embarking on or investing in community-based growth monitoring activities should note that areas that need improvement include the selection, training and supervision of project volunteers doing community-based growth monitoring. This recommendation is in accordance with one of the key messages of the review performed by Ashworth

et al,² who stated that "[t]raining, supervision and support for health workers must be improved if they are to be effective counsellors in growth monitoring programmes". The difficulties and complexities of implementing growth monitoring are well documented,² and the strengths and limitations of the project described in this article are of value not only to the HST but also to other organisations (e.g. the Department of Health, NGOs) who wish to implement similar community-based growth monitoring activities.

Acknowledgements

The study was commissioned and funded by the HST as an internal quality-assurance process to identify strengths and weaknesses in the project that needed review in implementation practices. Our sincere thanks and appreciation go to Mzi Masuku and Hlengiwe Gumede, HST facilitators, for co-ordinating the activities; Bongu Duma, Lindiwe Msiya and Eunice Maphumulo from the NIRU of the MRC for interviewing study participants, assisting with the observations and translating questionnaires from Zulu into English; Lize van Stuijvenberg from the NIRU of the MRC for assisting with the fieldwork; Lungi Kwitshana and Benita Mayosi for interviewing study participants and translating questionnaires from English into Xhosa and Zulu respectively; and Arnold Mabapa for translating questionnaires from English into Xhosa.

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