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information to improve growth monitoring at the community level.

Materials and methods

A total of 518 mothers, randomly selected from Adeta, Saw-Mill and Baboko Communities of Ilorin Local Government Area in Kwara State, Nigeria, were interviewed. The total population of women in the child-bearing age group for the three communities is 1960 (Adeta 640, Baboko 842, and Saw-Mill 478). By proportional allocation, 169 women were randomly selected from Adeta, 223 from Baboko and 126 from Saw-Mill, constituting approximately 25% of the target population. These communities represent the indigenous, migrant and mixed population respectively. The questionnaires administered by community health assistants enquired about how mothers assess growth in their children, the major reasons for growth failure or faltering and what mothers should do to foster growth in children. Their knowledge of the growth chart was also assessed, and this formed the basis of another report [2].

The health workers had a 2-day pre-training during which the questionnaire was discussed, and the interpretation of the growth chart thoroughly explained.

Statistical methods and analysis

In this section we present the methodology aimed at recognizing the two important reasons for this study:

- 1 the recognition of the important indicators of growth in children; and
- 2 the identification of the relationships (within each indicator) that exist between maternal age, parity and education, which are regarded as the essential factors in this study.

We examined the relationship between these factors using pair-wise relationships.

It is common knowledge that experience increases either with higher educational status or parity. Therefore, we assumed that there would exist the joint association between these two factors and so the age by parity as well as age by educational status were considered. Any indicator whose frequency of use was 20% or higher was regarded as reliable for use to monitor a child's growth.

Results

Five hundred and eighteen mothers, aged 18 to 45 years, were interviewed. The personal characteristics of the mothers interviewed are as shown in Table 1. The features most frequently recognized by mothers as indicators of growth in children were related to the age, educational status and parity (Table 2). The other features not tabulated when put together accounted for less than 15%. Generally, it was found that in mothers ≤ 20 years, weight, health (i.e. presence or absence of diarrhoea, cough or fever), height, activity and stages of development were easily recognizable. In the group aged 21-30 years, weight, health, stages of development and appetite were recognizable. Mothers aged 31-40 years recognized all the indicators, with stages of development and activity as the commonest. In the older mothers (>40 years), activity and health were most easily recognizable, followed by weight, appetite and stages of development, in that order.

Related to parity, women with parity 1, recognized weight and health most easily, followed distantly by stages of development and mood. Parity 2 mothers used appetite, weight, health and stages of development, in that order, as indicators of growth. Weight was the major indicator recognized by women with a parity of 3; but all the features, except comparison with children of same age (which was almost not recognized) were recognizable. Weight was the yardstick mostly used by mothers with parity 4. Health and stages of development were mostly recognized by women who had had five or more children. These two were closely followed by weight, activity and appetite, in that order.

Table 3 shows the relationship of age and parity to the features identified by mothers in decreasing order of importance, while Table 4 presents the test statistics for independence between age and parity within each of the indicators of growth.

The recognition of weight was positively influenced by maternal age and parity (P < 0.01). Mothers aged 21–30 years, and with a

Mothers as agents of growth monitoring: implications for widespread community growth monitoring

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Summary

A total of 518 mothers, aged 18 to 45 years, were interviewed to study a variety of indicators and local standards used to assess the course of their children's growth. The features most frequently recognized by mothers as indicators of growth were related to maternal age, parity and educational status. The younger mothers (age \leq 30 years and parity \leq 3) used weight and health frequently to assess growth, while the older mothers recognized growth by comparison with other children and changes in mood (P < 0.01). The latter two indicators were found to be a function of maternal experience. Unlike age and parity, age and education seemed to have no joint association with the various responses. We conclude and recommend that weight, health and stages of development are reliable and acceptable indices for community growth monitoring.

Résumé

Cinq cent dix-huit mères d'un âge allant de 18 à 45 ans ont été interviewées en vue d'étudier une variété d'indicateurs et de paramètres locaux employés dans l'évaluation de l'évolution de la croissance de leurs enfants. Les traits les plus fréquemment reconnus par les mères comme indicateurs de la croissance étaient en rapport avec l'âge maternel, la parité et le niveau d'instruction. Les mères plus jeunes (âge \leq 30 ans et parité \leq 3) se servaient fréquemment du poids et de la santé pour évaluer la croissance, alors que les mères plus âgées reconnaissaient la croissance par rapport à

Correspondence: Dr 'Doyin Fagbule, Department of Paediatrics, Obafemi Awolowo College of Health Sciences, Ogun State University, P.M.B. 2001, Shagamu, Nigeria. l'état d'autres enfants et aux changements d'humeur (P < 0.01). L'on a découvert que les deux derniers indicateurs étaient en fonction de l'expérience maternelle. Contrairement à l'âge et à la parité, l'âge et l'instruction semblaient ne pas jouir d'aucune association conjointe en termes de diverses réponses. Notre conclusion et recommandation est que le poids, la santé et les étapes de croissance sont des indices valables et acceptables pour surveiller, au niveau communautaire, la croissance.

Introduction

Promotion of healthy growth is part of worldwide efforts to improve health and survival. Growth is an indicator of a healthy child, just as growth faltering is an early indicator of health and nutrition problems. Growth promotion is an evolving response to individual, family and community needs. It relies heavily on the full participation of the mother in the recognition of growth faltering, and in the action that she can take to correct it.

Mothers in all cultures have always used a variety of indicators and local standards to assess the course of their children's growth. Even illiterate mothers can understand the concept, and indeed have their own way of measuring growth [1]. They are known to visualize growth at a time when even the most expert paediatrician could not detect growth faltering. Such mothers are willing to take action in response to tangible evidence that a child is not growing optimally.

In response to the worldwide efforts to improve child survival through growth monitoring and promotion, this community survey was carried out to explore the attitudes and practices of local mothers concerning children's growth; and to suggest ways of applying this

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Table

		Age (years)	SK.			Parit	y			Ed	ucational sta	tus	
Indicator	≤ 20	21-30	31-40	≥ 40	6 ^Q Y	7	3	4	₩ 2	Nil	Primary	Secondary	Post-secondary	Total
Weight	18	176	27	18	CF	40	84	05	53	00	16	74		0.0
Health	18	114	58	23	1 00	2 2	4	36	3 59	85	28	31	4 2 2	607
Stages of development	13	115	70	14	26	3	56	36	60	88	54	35	25	C17
Appetite	7	116	52	16	19	8	40	28	47	69	5 5	88	33 23	717
Activity	14	46	11	30	20	10	47	2	50	285	2	90 00	04	161
Height	16	54	32	11	13	16	28	31	x	44	5 92	11	<u> </u>	101
Mood	V	VY	5	0	24	14	2 2		3 2	; ;	6	1	1/	CI1
MIOUU	t	8	76	0	57	0	33	1	24	2	30	13	27	104
Comparison with										0				
children of same age	0	10	41	2	12	3	6	18	16	25	19	10	7	58
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Characteristic	No. interviewed	% of total
Age		
≤ 20	37	7.1
21-30	313	60.4
31-40	113	21.8
> 40	43	8.3
Unknown	12	2.3
Educational status		
No formal education	420	81.1
Primary	35	6.7
Secondary	32	6.2
Post-secondary	31	6.0
Parity		
1	39	7.5
2	60	11.6
3	271	52.3
4	91	17.6
≥ 5	57	11.0

Table 1. Personal characteristics of the mothers interviewed

parity of 3, showed the highest recognition rate. All other features listed followed the same pattern of relationship.

From Table 4 it is clear that association exists between age and educational status, using appetite as indicator of growth. The recognition of this indicator drastically reduced when educational status was post-secondary. Those within age group 21–30 years with no education seemed to recognize weight most, while those in age group 31–40 with no formal education recognized health. Any mother with postsecondary education used appetite least as an indicator of growth. Effectively, therefore, and unlike age and parity, education and age did not have a joint association.

Finally, we observed that there exists significant joint association of age and parity, as well as parity and education, in the recognition of any of the eight indicators in this study. Furthermore, the effects of age and educational status are conditionally independent, in the presence of parity which assumes a dominant role.

Generally, mothers (80.1%) recognized good food as the major ingredient of growth in children. This was distantly followed by good parental care (32.2%), adequate breastfeeding (20.7%) and good personal hygiene (18.5%). Other ingredients of growth mentioned by mothers included regular hospital or clinic care, God's grace and use of traditional concoctions or orthodox medical drugs.

Poor feeding was recognized by half of the mothers (59.7%) as the major reason for growth faltering in children. Inadequate maternal care, poor hygiene and teething problems were others, recognized by 40.9%, 26.1% and 12.5% respectively.

Three hundred and sixty-nine (71.2%) mothers noted that if a mother gives good food to her child, he will grow well. This was distantly followed by regular hospital or clinic visit (34.4%), good care (33.2%) and good personal hygiene (27.6%). Breastfeeding, immunization, traditional concoctions and prayers each accounted for less than 10% of the total responses.

Discussion

This study has shown that mothers have their peculiar, although local and subjective, indicators of growth in children. According to reports from Central Ghana [3], appetite, fatness (beads getting too tight), and expressions of mood were the commonest indicators recognized by Ghanaian mothers. Ghanaian mothers

	Age > d.f.	< parity = 12	Age × d.f.	education = 9
Indicator	χ²	P-value	χ²	P-value
Weight	105.55	0.001*	17.46	0.042
Health	185.19	0.001*	17.22	0.045
Stages of development	146.68	0.001*	10.62	0.303
Appetite	67.00	0.001*	27.68	0.001
Activity	166.02	0.001*	15.00	0.091
Height	90.01	0.001*	6.17	0.723
Mood	44.56	0.001*	13.24	0.152
Comparison with children of same age	29.73	0.003	11.48	0.244

 Table 4. Test statistics for independence within each of the eight important indicators

*Significant association.

expect to change the beads around their child's waist five times in the first 5 months of life as evidence of growth.

In our study, the younger mothers aged \leq 30 years and parity \leq 3 used weight frequently. as an indicator of growth. Subsequently, weight becomes less prominent, while comparison with other children and changes in mood, which can be influenced by maternal experience, have greater emphasis. Experience is evidently influenced by both age and parity. Therefore, those responses which require longitudinal observations can be seen to be recognized mostly by experience. Considering appetite, activity, height, mood and comparison with other children, parity plays a more important role than age or education. When experience is to be emphasized in growth monitoring these features may be used. Unlike age and parity, education and age did not have a joint association in the recognition of the various indicators. The low emphasis placed on appetite by mothers with post-secondary education is probably a reflection of the fact that many of them are office-working mothers or teachers, whose children often eat before their arrival home from work.

We suggest, therefore, that for future surveys, weight, health, and stages of development are reliable indices for childhood community

growth monitoring using mothers of childbearing age. In some countries, notably Indonesia, mothers themselves are now learning to weigh their children [4], and this has helped more mothers to understand that this is a useful tool for measuring their child's growth.

The observations made by these mothers with respect to health were both sensitive and broad. They referred to diarrhoea and acute respiratory infections, the two major childhood killers in Nigeria [5,6].

Taylor 1988 [7] noted, among other factors, that incidence of specific common infections, inadequate food or particular nutrients, limited knowledge of appropriate weaning and feeding practices, and lack of fuel or facilities to prepare appropriate weaning foods were some epidemiological factors responsible for growth faltering. Growth monitoring and promotion demands the promotion of good nutritional health [8]. Probably as a result of their exposure to health and nutrition education in various health facilities and the media, most Nigerian mothers, like their Ghanaian counterparts, recognized food as a major factor for growth or growth faltering.

This awareness by the mothers offers a link between the weighing process and nutrition education in the clinic. The mothers' responses indicate that growth monitoring is the result of

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					Ŕ					Age ((years)									
		Par	ity 1			Pari	ity 2			Pan	ty 3			Parit	y 4			Parity	5	
Indicator	≤ 20	21-30	31-40	> 40	≤ 20	21-30	31-40	> 40	≰ 20	21-30	31-40	> 40	≰ 20	21-30	31-40	> 40	≤ 20	21-30	31-40	> 40
Weight	12	30	0	0	4	24	8	7	-	73	2	0	-	31	14	4	0	18	3	10
Health	2	35	0	7	15	17	2	0	5	37	3	0	0	15	18	S	0	10	35	18
Stages of development	4	17	3	7	2	23	3	-	~~	4	10	0	0	15	18	3	0	16	36	8
Appetite	2	13	7	3	4	38	S	1	1	38	10	0	0	17	6	2	0	10	26	Ξ
Activity	13	2	0	0	0	9	4	0	0	29	18	0	-	3	25	S	0	-	24	25
Height	10	2	0	-	2	13	-	0	3	21	4	0	-	12	16	2	0	9	=	8
Mood	2	17	3	2.	7	8	5	1	0	28	5	0	0	4	3	0	0	3	16	5
Comparison with children of same age	0		Ś	4	0	3	0	0	0	0	6	0		0	13	0	0	0	13	3
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overall health, nutritional, environmental, social, psychic and developmental factors in the child [9]. Such mothers are likely to be receptive to recommendations about a child's diet, where these are presented in the context of weight assessment. The organization of the clinic needs to provide a forum for group discussions between mothers, at which they can exchange ideas on good food practices [10].

While breastfeeding is crucial for growth and survival of children in the developing countries (especially in the first 6 months of life), growth monitoring provides the critical feedback, the afferent component. Since mothers are the proven prime-movers for child health development in the community, a clear knowledge and understanding of the way mothers themselves look at growth and failure to grow, may be expected to facilitate growth monitoring and promotion in the community.

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