

# The role of care in nutrition programmes: current research and a research agenda

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The importance of cultural and behavioural factors in children's nutrition, particularly with regard to feeding, has been recognized only recently. The combination of evidence regarding the importance of caregiving behaviour for good nutrition, and improved strategies for measuring behaviour have led to a renewed interest in care. The UNICEF conceptual framework suggests that care, in addition to food security and health care services, are critical for children's survival, growth and development. The present paper focuses on the care practice of complementary feeding, specifically behavioural factors such as parental interaction patterns, feeding style and adaptation of feeding to the child's motor abilities (self-feeding or feeding by others). Three kinds of feeding styles (Birch & Fisher, 1995) are identified: controlling; laissez-faire; responsive. Probable effects of each feeding style on nutrient intake are described. A number of studies of feeding behaviour have suggested that the laissez-faire style is most frequently observed among families and communities with a higher prevalence of malnourished children. Nutrition interventions that have been able to show significant effects on outcomes, such as the Hearth Model in Vietnam (Stermin *et al.* 1997), have usually incorporated behavioural components in their intervention. At this time, there have been no tests of the efficacy of behavioural interventions to improve feeding practices. Research is needed to understand behavioural factors in complementary feeding, and to identify and test intervention strategies designed to improve nutrient intake of young children. Finally, the paper concludes with a discussion of how nutrition programmes might change if care were incorporated.

## Care and child nutrition: Complementary feeding: Child development: Malnutrition

It is well known that inadequate food intake in the first 2 years of life is responsible for stunting and underweight in millions of children around the world (United Nations Children's Fund, 1998). Poor breast-feeding patterns, low nutrient density and poor quality of the foods that complement breast-feeding accounts for much of the nutrient deficiency (Brown *et al.* 1998). These patterns of feeding are not simply the result of low food availability in the household. In the present paper we suggest that caregivers' behaviours during feeding of complementary foods (those foods ingested by the child while the child is still being breast-fed, theoretically between the ages of 6 months and 2 years. Even though many children are not still breast-fed at this time, the term continues to be useful to describe this transitional period of food consumption (Brown *et al.* 1998)) contribute significantly to the adequacy

of children's nutrient intake, and therefore to their nutritional status. The present paper will discuss four issues: (1) why there is an interest in feeding practices and care for nutrition; (2) the definition of care and its conceptual framework; (3) examples of research that illustrate the importance of caregiver behaviours for children's nutrient intake or nutritional status during complementary feeding; (4) suggestions for research and programmatic implications.

## The development of the concept of care

### *Why study feeding behaviour?*

Clearly dietary quality and quantity are important for nutrient intake, but they do not account for all the variance. Practices related to how food is provided to children and fed

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to them are also important (for example, see Dettwyler, 1989; Bentley *et al.* 1991; Gittelsohn *et al.* 1998; Shanker *et al.* 1998). Feeding complementary foods requires much more from the caregiver than food selection and preparation (Engle *et al.* 1997b). For example, caregivers must feed a child several times daily, and must decide when and under what circumstances to feed. They may encourage intake with praise, or may use demands or threats. They may feed children with a spoon or fingers, or expect children to feed themselves. Caregivers often must decide how to deal with children who are not interested in food or refuse it.

Even though it appears logical that these behaviours should affect intake, they have not been widely investigated, nor have intervention programmes been designed to change these specific behaviours (Caulfield *et al.* 1999). In contrast, breast-feeding has received more scientific attention, and interventions have been developed that have successfully increased rates of partial and exclusive breast-feeding (for example, see Morrow *et al.* 1999). The few programmes that have tried to modify complementary feeding practices have found that they are difficult to change without face-to-face communication (Kanishiro *et al.* 1991; Manoff Group, 1991; Academy for Educational Development, 1995, 1996).

### *Care for nutrition*

Feeding behaviours serve as examples of the broader group of care practices critical for good child nutrition. Thus, an analysis of the role of feeding practices for children's nutrient intake and growth, and strategies for improving feeding practices can illustrate how care might be incorporated into nutrition programmes.

The term 'feeding practices' has many different meanings. It is sometimes used to refer just to the foods recommended for a child, but it is also used to describe the broad scope of dietary, behavioural and physiological processes involved (Brown *et al.* 1998). Feeding behaviour and feeding style are often used to differentiate the behavioural aspects of feeding from the narrower food-based definitions.

### *Why is there an interest in care for nutrition?*

First, there is a general consensus that increasing income alone is not sufficient for improving children's nutritional status. Several decades of development projects designed to increase men's income have illustrated that the effects on children's nutritional status tend to be small and less robust than expected (for example, see Kennedy & Garcia, 1993). A second reason for the increased interest in care stems from investigations in the late 1980s and early 1990s that identified behavioural factors, such as a mother's ability to plan and organize her work, that were significantly associated with children's nutritional status apart from standard socio-economic indicators (Zeitlin *et al.* 1990; Zeitlin, 1996; and numerous studies that emerged from the three Collaborative Research Support Program (supported by US Agency for International Development) projects in Mexico (Allen *et al.* 1992), Kenya (Sigman *et al.* 1989) and Egypt (Kirskey *et al.* 1992)). A third reason is the increasingly powerful evidence for a link between nutrient

intake and child development (Pollitt *et al.* 1993, 1995) and the role of care practices in enhancing both these factors (Pelto *et al.* 1999). Finally, international agencies, particularly UNICEF, have taken the lead in advocating the importance of care for child nutrition. Several recent publications have outlined these positions (Engle *et al.* 1997b, 1999), and the recent WHO/UNICEF/University of California at Davis/Institut Francais de Recherche Scientifique pour le Developpement en Cooperation report on complementary feeding includes a discussion of care practices in feeding (Brown *et al.* 1998).

In 1990, UNICEF proposed a conceptual framework that suggested that not only were food security and health care services necessary for child survival, but care for women and children was equally important (United Nations Children's Fund, 1990). The document argued that food, health and care are all necessary, but none alone is sufficient for healthy growth and development. All three elements must be adequate in order for children to have the opportunity to be well nourished. Even when poverty causes food insecurity and limited health care, enhanced caregiving can optimize the use of existing resources to promote good health and nutrition in women and children. In fact, it is under these circumstances that care is most important. Breast-feeding is an example of a practice that provides food, health and care simultaneously.

'Care' had not yet been defined in 1990, but its importance was obvious. Food on the shelf would not be ingested unless someone prepared it and fed it to the child; similarly, a health care centre would be of no value unless someone took a child to the centre, and followed the recommendations received. The initial definition referred to the actions of caregivers that translated food and health services to positive outcomes for the child. Initially, the outcome measure of interest was child survival only, but soon the outcomes of growth and development were included as well.

Through the period of the 1990s, UNICEF worked to define care through literature reviews (Engle, 1992), research (Zeitlin, 1996; LaMontagne *et al.* 1998), and consultation. A number of practices were identified in the literature that occur in the family and contribute to child survival, growth and development. Researchers and practitioners in many parts of the world helped refine the framework for understanding these practices through comments and suggestions. In a workshop in South Asia in 1996, our system underwent considerable change and modification. In 1997, the Care Initiative, a description in non-technical terms of this concept, was published (Engle *et al.* 1997b). The resulting framework seems to work well. Recently in Brazil, the workshop attendees were pleased with the structure (Engle *et al.* 1997a). They commented that we had 'given names to what they had been observing', and helped them recognize these practices.

### *Care framework*

Care as it has come to be defined over the past 10 years refers to the behaviours and practices of caregivers (mothers, siblings, fathers and childcare providers) that provide the food, health care, stimulation and emotional

support necessary for children's healthy growth and development. These practices translate food security and health care into a child's well-being. Not only the practices themselves, but also the ways they are performed (with affection and with responsiveness to children) are critical to children's survival, growth and development. It is impossible for caregivers to provide this care without sufficient resources, such as time and energy (Engle *et al.* 1997b).

The Care Initiative manual (Engle *et al.* 1997b) now lists six care practices, with subcategories, and three kinds of resources needed for good care. For example, often mothers are told to increase the frequency of feeding, but they have too much work to have the time for giving an additional feed. Instead of being helped, they may find themselves blamed for providing inadequate care. We must avoid this situation by being aware of the resources required, and helping the caregivers to increase their resources. Throughout the Care Initiative manual, the term 'caregiver' rather than 'mother' is used, in order to emphasize that in many cases it is not the mother who performs all these functions. Siblings, grandparents, a childcare centre, or even one of the men in the family can also provide care. Programming is probably more effective if caregivers are recognized and supported for their positive practices, as well as being guided to adopt improved practices.

These care practices and resources for care are not only important for children's good nutritional status, but also for their growth and development. In fact, they have now been recognized as the building blocks of Early Childhood Care for Survival, Growth and Development, UNICEF's integrated approach to young children. The six care practices will be described relatively briefly, and then the care practices in complementary feeding will be described in greater detail. The reader is referred to the Care Initiative manual (Engle *et al.* 1997b) for a complete description of all practices and resources.

First, care for women represents a number of behaviours on the part of the family to support women, including making sure that they receive adequate prenatal care and safe birthing, and have equal access to education. Second, food preparation takes enormous amounts of the caregiver's time and effort. Adequate stoves prevent women's exposure to indoor air pollution. Third, hygiene practices have long been recognized as critical for child nutrition. Fourth, home health practices include diagnosing illness in the home, use of preventative health care and protection from pests and accidents. Fifth, good psychosocial care, including warmth, verbal interaction and encouragement of learning causes improved cognitive development of children, and is related to complementary feeding styles. Feeding, including both breast-feeding and complementary feeding, is the sixth care practice. The care practices of complementary feeding are the focus of the present paper.

Complementary feeding practices include timely introduction of complementary foods, feeding frequency, and active or responsive styles of feeding. Responsive feeding includes: (1) adapting the feeding method to the child's psychomotor abilities (e.g. spoon handling); (2) feeding responsively, including feeding when the child is hungry, encouraging a child to eat, recognizing possible low

appetite, balancing child v. caregiver control of eating, and using an affectionate or warm style of relating to the child during feeding; (3) creating a satisfactory feeding situation by reducing distractions, developing a consistent feeding schedule, and supervising and protecting children during eating. Each factor is now discussed in more detail.

*Adaptation to psychomotor abilities for self-feeding.* Adapting to children's changing motor skills can require close attention by the caregiver, since these abilities change rapidly during the first 2 years of life. Caregivers need to assist children initially, and then change their degree of assistance in accord with the child's developing abilities.

For example, by 7 months of age, the gag reflex moves to the posterior third of the tongue, permitting the child to ingest solids more easily than earlier (Milla, 1991; Brown *et al.* 1998). The time required for a child to eat a certain amount decreases with age for solid and viscous foods, but not for thinner purees (Gisel, 1991). Children's abilities to hold a spoon, handle a cup, or grasp a piece of solid food increase with age and practice (Connolly & Dalglish, 1989). Self-feeding with a spoon requires a number of steps: putting the spoon in the plate; filling it with food; taking it to the mouth; emptying it. Children practice these components separately at first, putting the spoon in the dish over and over, often banging the spoon and handling it to gain skills. Only several months later are the sequences linked together (Connolly & Dalglish, 1989). Further examples are shown in Tables 1 and 2.

*Feeding responsively.* Feeding responsively can be particularly important for young children. Caregivers encourage, cajole, offer more helpings, talk to children while eating, and monitor how much the child eats. Mothers and other caregivers that show or model for children how to eat healthy foods will encourage children's eating, especially when food quality is low. The amount of food that children consume may depend as much on the caregivers' active encouragement of eating as the amount offered (Bentley *et al.* 1991; Engle & Zeitlin, 1996; Gittelsohn *et al.* 1998).

Caregiver understanding of and response to children's hunger cues may be critical for adequate food intake. For example, if caregivers perceive a child's typical mouthing actions in response to new food sensations as a food refusal and cease to feed, a child will receive less food (Kotchabhakdi *et al.* 1987). When children are fed from a common pot, the amount eaten is not easy for the mother to determine. Having a separate bowl for each child can help determine quantities eaten and protect the slow eater, although the person with whom the plate is shared makes a difference (Shanker *et al.* 1998).

Cultures vary along a dimension of control of eating; at one extreme the caregiver has all the control and children are force-fed, whereas in the other extreme control is given entirely to the child. Neither extreme is good for children. When too much control is in the hands of the caregiver, force-feeding, or continued and even intrusive pressure on children to eat is seen, which may lead eventually to inability to monitor food intake, and to obesity (Brown *et al.* 1988; Birch, 1998). Theoretically, too much caregiver control may also lead to high levels of food refusal and a dysfunctional caregiver-child interaction during mealtimes

**Table 1.** Developmental stages and recommended feeding behaviours for 6–12-month-old infants

Age (months)	Developmental changes	Caretaker feeding behaviours
6	Develops normal swallow (6 months) Can place upper lip on spoon (6 months) Beginning of normal bite (6 months) Can hold head steady but perhaps not sit alone for an extended period Language: Babbling with expressions Fine motor: Grasps objects, examines them and moves them to mouth	Maintain breast-feeding on demand Introduce complementary foods Mashed, puree consistency is best Acquaint baby with a variety of foods Encourage frequent small amounts, and watch for subtle cues that child is hungry Allow finger play with foods Allow play with eating utensils, own cup and spoon Develop appropriate feeding setting Verbally encourage baby to eat and to experience food Sit down and interact with child, physically help child to eat and verbally encourage Even if the baby appears not to want to eat, encourage more eating Infants need to try a food several times before they really know if they like it or not
7–8	Closes mouth on spoon (7 months) Picks up bits of food with thumb and first two fingers (7–8 months) but messy self-feed Cannot use utensils, enjoys hitting and banging with them, dropping them (7–8 months) Language: Uses gestures to make wants known Fine motor: Transfers object from hand to hand; lifts up cup by handle	Increase frequency, building to five times per d and developing a schedule and organization (e.g. three meals and two snacks) Continue to increase quantity and variety of the foods you offer Continue to increase the thickness of the foods
9	Can sit alone for 10 min, can lean forward and re-erect (9–10 months) Uses cup handle, drinks one or two swallows at a time (9–10 months), plays with cup Language: Can respond to spoken request; Babbles and expects a response (proto-conversation) Fine motor: Uses partial thumb opposition; uses pads of fingers to grasp things	Continue breast-feeding Increase the variety of food consistencies and textures, e.g. offering whole banana as well as mashed banana Supply finger foods Recognize that eating is a social time as well as a time for eating Allow the child time both to eat and to play with food, remembering that children can get easily distracted and it does not mean that they are not hungry Encourage eating verbally and with gestures Be patient, sit down and interact with child Respond to child's language attempts with naming (vocalizing) foods, utensils etc. When the child appears to not want to eat any more, try feeding a little more Encourage the child to begin learning to feed him/herself, and using cup and spoon
10–11	Desire for finger foods, wants to self-feed Chewing begins to be coordinated Tongue can draw back in anticipation of food, can move food laterally (11 months), bites off correct amount	Continue as previously, increasing the amounts given Perhaps offer family foods (rice, stew) to increase the variety of tastes and textures

(Birch, 1998). Passive feeding, particularly if a child has anorexia or poor appetite, may result in inadequate intake (Dettwyler, 1989; Bentley *et al.* 1991, 1995). Caregivers have been observed to encourage feeding only after seeing that the child is refusing to eat, which may simply result in fruitless battles (Engle & Zeitlin, 1996).

*The feeding situation.* The feeding situation may also influence the food intake of young children. Some children are fed on a regular basis each day, sitting in a prescribed place with food easily accessible, whereas other children

are fed while wandering around, or at the time that the caregiver finds convenient (Guldan *et al.* 1993). If the main meal is prepared late at night, children may fall asleep before it is completed. Children can be easily distracted, particularly if food is difficult to eat (e.g. soup with a spoon the child is unable to use) or not particularly tasty. If supervision of feeding is not adequate, other siblings or even animals may take advantage of a young child's vulnerability and take food away, or food may be spilled on the ground.

**Table 2.** Developmental stages and recommended feeding behaviours for 12–15-month-old infants

Age (months)	Developmental changes	Caretaker feeding behaviours
12	Beginning rotary jaw movement, upper lateral incisors (11–12 months) Table foods are easily chewable Language: Combines word and gesture; can use a word to make wants known Fine motor: Can lift and manipulate very small objects, close a small container with both hands	Increase amounts and solidify structure of meals and snacks Incorporate more family foods, knowing that the child may not be able to chew many foods well and still requires much supervision and help Use the eating period as an opportunity for language development Sit down and interact with child and encourage verbally Even if child appears to refuse food, encourage more eating, and perhaps wait a few minutes and offer the food again, or one more bite Continue breast-feeding
13–14	Head tilts backward to enable infant to drain last drop from cup (13 months) Interest in utensils, can hold cup alone (13 months)	Increase amounts and variety and increase emphasis on family foods Continue helping the child to eat, but allow him/her to learn to feed him/herself
15	Can use lips to remove food from spoon (15 months) Finger feeds well, preferred mode, demands to help feed herself (15 months)	Continue progression Encourage child to eat, and help her

### Examples of research investigations on care practices in complementary feeding

In order to determine whether caregiver behaviours play a significant role in nutrient intake of the 6–18-month-old child, in addition to food quality, several studies are described. The first of these studies are investigations of the relationship between feeding styles and nutrient intake and children's nutritional status. The second is a study relating overall quality of care during feeding to children's nutritional status, and the third is an evaluation of a nutrition intervention programme that has a substantial 'care' component.

#### Feeding styles

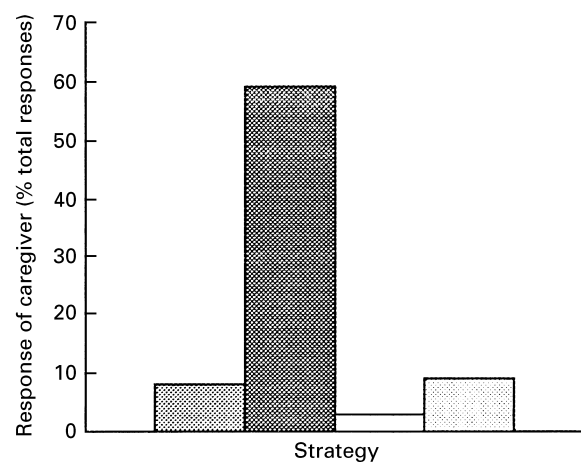
The care practices during feeding often appear together in patterns that can be considered to represent an overall 'style' of feeding. Three feeding styles have been identified: controlling; laissez-faire; responsive. Each of these feeding styles has roots in cultural belief systems and parental theories (ethno-theories) of appropriate behaviour. These terms for feeding styles were introduced by Birch & Fisher (1995) and have been further developed by Bentley *et al.* (1999).

In a highly controlling style of feeding the caregiver has complete control of when and how much the child eats. In some cases this control may result in forced feeding. Under these circumstances children may be unable to develop mechanisms for learning to regulate their intake. This style of feeding has been observed to be common in Nigeria (Brown *et al.* 1988). This feeding style also appears in industrialized countries such as the USA. Johnson & Birch (1994) found that in the USA parental pressure for a child to eat regardless of her hunger is a precursor of later obesity for girls, though less so for boys. Thus, these behavioural

aspects of feeding may have relevance not only for under-nutrition but also for obesity.

In a laissez-faire style, the caregiver makes little effort to encourage eating, and may often expect children to eat on their own at an early age. These attitudes may reflect the belief that children know best how much they should eat. Parents may say that the child's 'stomach knows its limits'. These attitudes may be detrimental when children have low appetites.

Finally, a caregiver with a responsive or interactive feeding style responds to the child's hunger cues in reasonable time, feeds using strategies of encouragement and praise, feeds in a consistent manner, and feeds more actively when the child is recovering from an illness. These



**Fig. 1.** Percentage of 393 feeding events for eighty urban Nicaraguan children aged 12–18 months in which the caregiver made the following responses: (■), demonstrate; (▨), encourage; (□), threaten; (▤), offer more. (From Engle & Zeitlin, 1996.)

behaviours are presumed to help the child develop an internal mechanism for regulating food intake.

### *Research evidence for feeding styles*

Several studies in Latin America have identified a *laissez-faire* style of feeding, with more responsive feeding observed only when the child's intake drops due to illness. Engle & Zeitlin (1996) studied eighty children 12–18 months old in low-income areas of urban Nicaragua. Fig. 1 shows the number of eating events in which particular strategies were used. Many strategies were relatively infrequent; only about 10 % of mothers demonstrated or modelled eating, threatened, offered more food, or told the child to eat an additional food. The majority encouraged eating verbally, although 40 % made no verbal comments about eating during the meal. The most common types of encouragement were orders such as 'eat your food'.

Surprisingly, better-nourished children did not receive more encouragement (Engle & Zeitlin, 1996). Caregivers were more likely to encourage eating only during meals in which children refused food, suggesting that the encouragement was a response to low intake, and was not pro-active. Thus, it is not surprising that there was no association between parental encouragement and child nutritional status. However, child interest in food was associated with children's nutritional status.

On the other hand, the mother's belief that she could and should do something to help a child eat more was associated with better nutritional status, even controlling for maternal education and family wealth (Engle *et al.* 1996). This parental 'ethno-theory' was measured using a simple three-question scale assessing the age at which she thought that children should be able to eat alone (41 % said that they could do this at 12 months), whether she would offer additional food if the child refused food, and whether she thought that there were things that could be done if a child was uninterested in eating.

Two studies in rural Guatemala and rural Peru by Bentley *et al.* (1991, 1992) also found *laissez-faire* feeding styles to be predominant. In Peru, among caregivers in the rural Sierra, no encouragement or responsive feeding was shown in 70 % of the feeding episodes. More encouragement was observed during illness episodes. In rural Guatemala, a similar lack of encouragement or responsivity was seen when children were 'healthy'. They showed more responsive patterns of feeding when children had persistent diarrhoea.

Is the *laissez-faire* feeding style, with increased encouragement limited to illness episodes, acceptable for these children? We suggest that it is not, since these behaviours were observed in populations with a high percentage of stunting. Intake is probably limited by low appetite even when children are not ill. Also, the probable poor quality of the diet means that children may not eat enough unless given considerable encouragement. However, we do not know at this time whether using more responsive feeding strategies would be sufficiently powerful to increase intake significantly. To answer this question, a randomized controlled trial is needed.

### *Need for intervention*

We are currently planning an intervention study to test this hypothesis in Peru. In order to identify possible intervention strategies for increasing intake, we must first describe key behaviours to support or to change, and the contextual and cultural factors influencing these behaviours. We have begun this process with an observational and formative research project in Peru. We are examining the behavioural components of complementary feeding in detail. A new observational methodology was developed which records feeding behaviour at the level of the 'feeding intention'. For each feeding intention (often a spoonful given by caregiver or eaten on his own by a child), the observer recorded who fed the child, if the child accepted the food, and whether or not the caregiver spoke to the child during the 'feeding intention'.

The design of the study was a 2 (urban and rural)  $\times$  4 (age category) crossover design. Children were categorized into age-groups of 6–9, 9–12, 12–15 and 15–18 months. The reason for focusing on these age differences is that not only do the food requirements differ significantly within these age-groups, but also these are a number of bio-behavioural changes in developmental abilities emerging during this period which have a significant impact on the child's ability to self-feed. Tables 1 and 2 illustrate some of the changes that occur at various ages that could have relevance for feeding practices as well as development.

The data for the formative research project are still being collected. Some patterns are already emerging (P Engle, M Bentley, H Creed, P Penny and L Caulfield, unpublished results). As in most of Peru, the urban children have much lower rates of stunting than the rural children. Even though poor, the urban community tended to be much better off than the rural communities. There are many differences between urban and rural families in terms of socio-economic conditions and food quality.

The purpose of the project was to determine whether, in addition to these differences, there were differences in behaviours that might be amenable to intervention and could result in higher nutrient intakes, particularly of different kinds of food. The data so far suggest that there are marked differences between the styles of feeding of urban and rural mothers. Two striking differences between the urban and rural samples were the amount of self-feeding expected of the children, and the strategies used to encourage children to eat.

At this point, urban caregivers appear to be much more likely to feed children in the three oldest groups (rather than expect them to feed themselves) than are rural caregivers. There was no difference in the percentage of feeding intentions by the caregiver in the youngest age-group. The marked differences in the percentage of children self-feeding, particularly at 9–12 months, when self-feeding is usually difficult, suggests a possible strategy for intervention.

Strategies caregivers used to encourage children to eat were coded as occurring once, occurring several times during the meal, or not occurring. Strategies included items such as 'caregiver orders child to eat' or 'caregiver uses an object (toy) to get the child's attention for eating'. Not

surprisingly, more strategies appear to be used in the urban area. The most common strategy for both groups was ordering the child to eat. There were a number of strategies that were only infrequently used, such as making positive comments about food, about the child, or changing the consistency of the food that was presented. These might also be incorporated into an intervention.

Since the purpose of this research was to examine the effects of feeding practices both on child development and nutrition, cognitive stimulation during a meal was observed. The number of feeding intentions during which the caregiver verbally addressed the child was recorded. Urban mothers made significantly more comments than rural mothers.

In summary, the rural mothers appeared to represent the laissez-faire style much more than the urban mothers, who tended to be responsive or controlling in style. Second, there are several possible behavioural-interventions that could be introduced to increase intake.

#### *Quality of care practices scale*

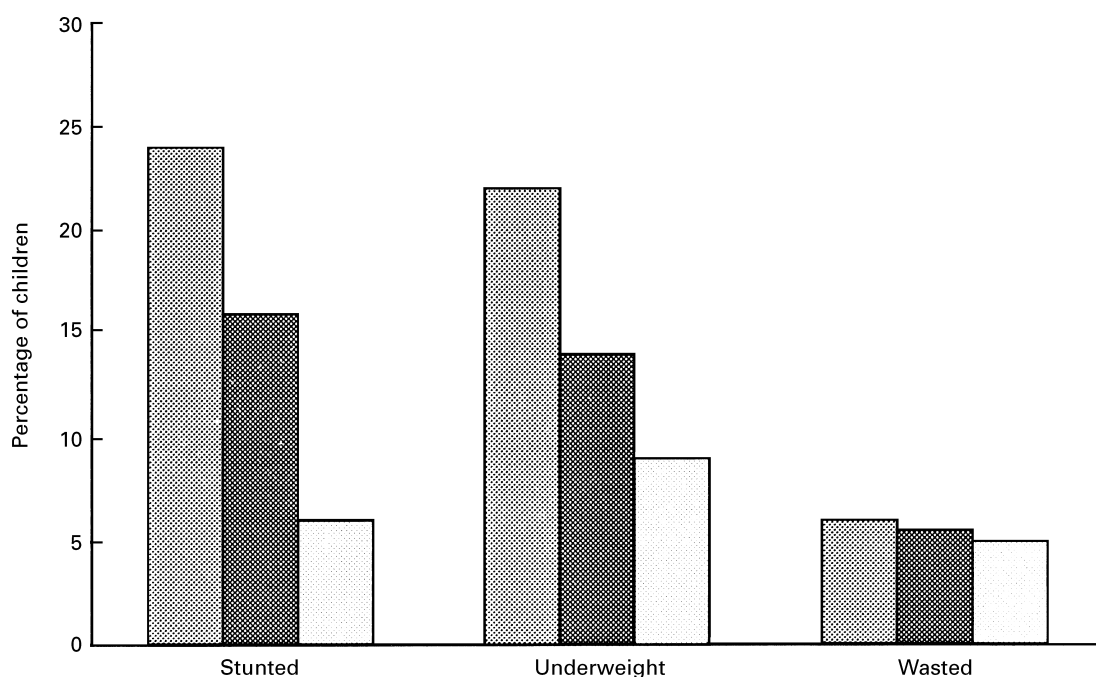
Recently, a team of researchers at the International Food Policy Research Institute, Washington DC, USA, headed by Ruel (Ruel *et al.* 1999) investigated the significance of care practices for the nutritional status of children. They sampled 475 low-income households in Accra, Ghana, that had a child between 4 and 36 months of age. Based on a recall questionnaire, a 'care practices' scale was constructed. The scale reflected breast-feeding patterns, timing of complementary feeding, food quality, and two questions related to feeding practices, i.e. whether anyone helps the child to eat (28 % said no) and whether the

caregiver 'does anything' if the child refuses food (21 % do nothing).

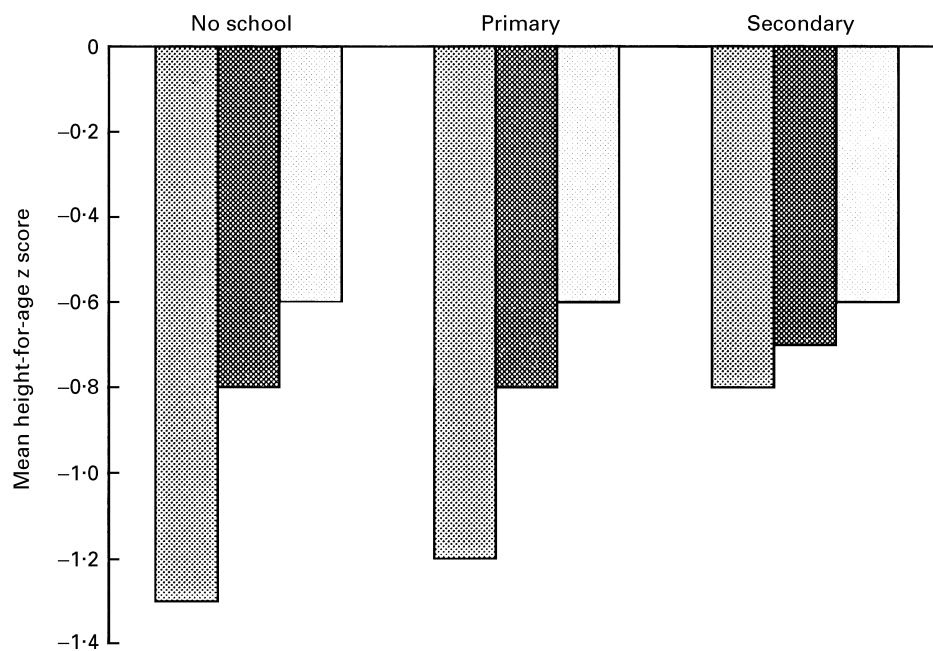
As Fig. 2 shows, there was a significant association between score on the care practices scale and stunting and underweight of the children. Was this association equally strong for children of more and less educated women? As Fig. 3 shows, care practices were unrelated to their children's height-for-age if their mothers had secondary education, but care practices were highly related to children's nutritional status if mothers had only primary or less schooling. The effect of income, when controlling for maternal schooling and care practices, was insignificant. Ruel *et al.* (1999) suggest that less-schooled mothers should be targeted for special messages about care.

#### *Evaluation of a nutrition intervention with care*

Finally, interventions which change care practices regarding feeding can have short-term and long-term effects on caregiving behaviour and children's nutritional status. The HEARTH/Positive Deviance model for nutritional rehabilitation and improvement was instituted by Save the Children in Vietnam in 1991 (Sternin *et al.* 1997). During 1993–5 this model was in operation in four different provinces. The programme involved growth monitoring, a nutritional rehabilitation programme for underweight children, as well as a revolving loan programme and a healthy pregnancy intervention. The two nutritional components involved behavioural messages related to care, as well as improving dietary quality without increasing household expenditures. Much of the programme was developed using the examples of 'positive deviants' in the



**Fig. 2.** Percentage of children ( $n$  475) aged 4–36 months from Accra, Ghana who were stunted, wasted or underweight as a function of quality of care practices ((■), poor; (■), average; (□) good). (From Ruel *et al.* 1999.)



**Fig. 3.** Mean height-for-age z score (standard score) for children from Accra, Ghana, as a function of schooling of the mother and quality of care score (□, poor; ▨, average; ■, good). (From Ruel *et al.* 1999.)

community, who were mothers who had well-nourished children despite living in conditions of poverty. Groups would attempt to understand the positive care practices that led to a favourable outcome in these families.

A pretest v. post-test analysis suggested that the programme had dramatic effects on children's nutritional status; weight-for-age improved by 0.36 standard deviations and malnutrition of under 3 year olds decreased by 40 % (Sternin *et al.* 1997). However, weaknesses in the research design and questions about sustainability raised concerns about the applicability and validity of these findings. Thus, a team from Emory University, Atlanta, GA, USA led by DG Schroeder returned 3 years later to assess long-term effects (Trinh *et al.* 1999). The group weighed eighty children, fifty-five of whose mothers had been enrolled in the programme 3 years earlier, and twenty-five controls from a different commune. Older children who had been in the programme previously and their younger siblings were weighed. The older children in the experimental group were slightly but not significantly heavier than the control children. The younger siblings were significantly heavier than the controls ( $P > 0.05$ ). Mothers reported remembering the experience of the programme. In addition, they differed significantly ( $P > 0.05$ ) from the controls in some care behaviours: meal frequency; whether the child received snacks; hand-washing behaviour. The fact that a behavioural intervention can have an impact several years later on a subsequent child is impressive.

In summary, these studies illustrate a number of care practices that are associated with children's nutritional status. A similar conclusion was reached by Caulfield *et al.* (1999) in their review of the effectiveness of nutrition education interventions. Those interventions that were successful tended to have behavioural messages, and often

incorporated into their messages the concept that food and nutrition are related to children's development. From the previous discussion, a reasonable hypothesis is that interventions to improve or support improved feeding behaviours should increase nutrient intake. Possible behaviours include more responsive (less passive) feeding, using more and different strategies for dealing with children's food refusal, and increasing feeding frequency. Other care practices that might be amenable to change are expectations for self-feeding that are too early, and lack of attention to children's excessive food refusal.

### A research agenda

Much remains to be learned about care practices in general, and those related to feeding in particular. A research agenda is needed to understand more clearly the 'black box' of caregiving. We will need descriptive studies of the ethno-theories of care and feeding, such as beliefs about what the response should be to a child's food refusal, and the links between child nutrition and development. Indicators must be developed; we are now able to compare a variety of methods of data collection that show promise for improved measurement. Randomized trials are needed. The relationship between feeding styles, caregiver interaction and children's developmental levels should be explored. For example, studies could elucidate the relationship between the controlling style, and later obesity and lack of internal regulation.

Questions need to be addressed both about determinants of caregiving, and about specific care practices. In the present paper, specific feeding behaviours that could be modified to increase food intake of young children were explored. It will be important to discover what psychosocial

behaviours promote both physical growth and psychological development in young children, such as contingent verbalization.

A second series of questions will examine the mechanisms through which resources for care influence care practices and children's nutritional status and development. For example, how does increased schooling affect growth (through improved food selection, greater knowledge, or increased responsiveness to children's needs)? A third series of questions concern feasibility of interventions (which of these determinants can be modified?) What family or community resources support good caregiving in conditions of poverty? Supporting the role of men and fathers in the care for children may be a promising intervention. How does the caregiver's nutritional status, such as anaemia or low BMI, affect quality of childcare? What are the roles of parental ethno-theories for caregiving behaviours?

As the research agenda develops, we will want to know how to support positive practices and understand the cultural context of these practices. We will need to estimate the magnitude and importance, as well as the feasibility of changes. This research agenda will involve ethnographic and epidemiological research, intervention trials, and programme evaluations.

### Programming for care

Finally, a nutrition project might change if care were incorporated. Some of these changes are already included in the planning of many nutrition interventions. These are summarized in Table 3.

Programmes that include care should focus on feeding behaviours as well as food, rather than on foods or recipes only. An example of the projects that did not consider feeding behaviours is the development of manufactured pre-prepared weaning foods, and many of the projects were carried out in Africa (Brown *et al.* 1998). Despite the breadth of these projects, there are few evaluations of their effectiveness in improving child nutritional status. Dijkhuizen (1992) concluded that this approach is relatively ineffective unless the foods are affordable, easier than regular food to prepare, and the caregiver has become convinced that they are important for her child's growth and development.

In contrast, the Academy for Educational Development (1995) project in Mali provided messages about feeding behaviours (use a separate bowl, increase frequency, provide encouragement and monitor the amount eaten) as well as about food. The latter project resulted in significant changes in nutritional status of children.

Second, programmes that include care should make an effort to identify and support good practices, rather than simply provide messages asking for change. They need to understand what motivates caregivers, through the systematic methodologies of formative research. In both kinds of programmes, new information or recommendations are given, but in the former, efforts are also made to identify and strengthen good practices, and motivate caregivers using their own values and motivations. The Positive Deviance approach described by Zeitlin *et al.* (1990) and applied in Vietnam in the Hearth Model (Sternin *et al.* 1997) uses this approach to nutritional change. Many other nutrition education programmes, however, simply provide a message to the mother telling her what she needs to change.

Third, because the care perspective is family-centred, parents' desires for their children should have central significance. Many valuable health and nutrition interventions, such as the control of diarrhoeal diseases, reduction of acute respiratory infection, and the micro-nutrient initiatives all target a single outcome in the child. The outcomes that parents want for their children are likely to be broader and more inclusive than these are. As Myers (1992) observes, parents want children to be 'happy and healthy', a definition that includes many dimensions of well-being. There are several examples of this broader focus. The WHO Integrated Management of Childhood Illnesses (Division of Child Health and Development, World Health Organization, 1998) combines assessment and treatment of a number of diseases as well as nutrition. Valuing child growth and development as well as child survival leads to the kind of integrated programming envisioned by UNICEF in their Early Childhood Care for Survival, Growth and Development agenda.

Finally, a programme that incorporates care must be aware of the resources needed for the additional caregiving usually recommended by a health or nutrition programme. There are many examples of interventions that have not been able to have a sustainable impact because the caregivers did not have the time or energy to follow recommendations. For example, the Bangladesh Rural Action Committee programme to improve complementary feeding (Brown *et al.* 1992) found that mothers were able to prepare a special food for the child, but did not have the time or resources to continue the programme. On the other hand, the Joint Nutrition Support Program project in Iringa, Tanzania, evaluated family resources needed for the recommended increases in feeding frequency. The project supported the development of feeding centres during the day to feed children when the mothers were working in the field, and developed methods for increasing the amount of help

**Table 3.** Examples of differences between programmes that include care in the design and those that do not

Without care	With care
Recommendations focus on foods and/or specific recipes	Recommendations include behaviours as well as foods and recipes
Messages focus on what caregivers do not know, and present new messages (deficit model)	Messages build on what caregivers already know and current good practices as well as new information (difference model)
Outcome is a single aspect of the child, such as micronutrient status, type of illness, or mortality	Outcome includes a number of dimensions of the child's well-being
Little concern for the resources available to make a change	Resources for changes are evaluated and enhancement strategies are included if necessary

that the men were willing to give in order to support changed feeding practices.

There are many other differences in programmes that do and do not incorporate care. The basic point is to recognize that behavioural components of nutrition are extremely important, particularly for the feeding and development of young children. We have a great challenge ahead in order to fulfill this research agenda. We should remind ourselves that in order to support families in providing the best possible care, we will need to learn to conceptualize the multiple tasks of child feeding and development from the perspective of the family, rather than the service agency. This programme will require the full participation of the families themselves.

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