

Water, Koko, and Appetite

Complementary Feeding Practices
in Kumasi, Ghana



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September 2003



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This report presents findings from a qualitative study conducted as a follow-up to the 1998 Ghana Demographic and Health Survey (DHS). ORC Macro coordinated this activity and provided technical assistance. Funding was provided by the U.S. Agency for International Development (USAID) through its Africa Bureau.

This publication was made possible through support provided by the U.S. Agency for International Development under the terms of Contract No. HRN-C-00-97-00019-00. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development.

The MEASURE *DHS+* project is designed to collect, analyze, and disseminate data on fertility, family planning, and maternal and child health. Additional information about the MEASURE *DHS+* project may be obtained from MEASURE *DHS+*, ORC Macro, 11785 Beltsville Drive, Suite 300, Calverton, MD 20705 (telephone: 301-572-0200; fax: 301-572-0999; email: reports@orcmacro.com)

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Suggested citation:

Davis, Paula, Eva Tagoe Darko, and Altrena Mukuria. 2003. *Water, Koko, and Appetite: Complementary Feeding Practices in Kumasi, Ghana*. Calverton, Maryland USA: ORC Macro.

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ACKNOWLEDGMENTS

The authors thank: the mothers of Adugyama and Mossi Zongo for their time, openness to observations, and responsiveness to questions; community leaders for their assistance and cooperation with the research; health authorities at the study sites for permitting the use of their facilities to recruit and interview mothers; the University of Science and Technology under whose auspices the study was conducted; P. Stanley Yoder of ORC Macro for his direction, guidance, and careful review of this report; Juliana Yartey for her in-depth background paper; Noah Bartlett, Adrienne Kols, and Sidney Moore for editing; and Kaye Mitchell for document production.

EXECUTIVE SUMMARY

INTRODUCTION

This is one of two studies of complementary feeding practices conducted in West Africa in Ghana and Mali. Both studies examined the process of complementary feeding of infants in a context of high childhood malnutrition. Both studies compared the interaction between mother and child in a group of well-nourished children and a group of malnourished children, looking for contrasts in the nature of that interaction. This report presents the findings from the Ghana study. The results of the Mali study are reported in *Introducing Complementary Foods to Infants in Central Mali* (Castle et al., 2001).

Data from the Demographic and Health Surveys (DHS) indicate that malnutrition among young children in West Africa first appears at about four to six months of age, and peaks at about 21 months of age. The causes of malnutrition are complex. At the most basic level, malnutrition results from inadequate food consumption and infectious disease. Inadequate food intake may be due to insufficient availability of food at the household level or improper feeding practices (Haggerty et al., 1998). Where food is available in the household, it is assumed that malnutrition occurs because of disease or improper feeding practices by the caregiver. Examples of the latter are failure to feed age-appropriate foods to the child and failure to feed the child sufficient quantities of food. However, many questions remain about the factors that determine the nutritional status of young children: What is the role of feeding behaviors? What is the role of the mother's social network? What is the role of the child's actions? How might we characterize the interaction between mother and child? How critical is this interaction to children's nutrition?

Current infant feeding guidelines from the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO) emphasize exclusive breastfeeding for the first six months of life, followed by the introduction of appropriate solid foods along with breastfeeding between six and nine months of age. Continued breastfeeding is recommended through the second year of life. The guidelines also recommend continued feeding during illness to support the infant's immune system and to maintain adequate nutritional status.

RESEARCH QUESTIONS

This study used a positive deviance approach to identify patterns of mother-child interaction associated with good and poor growth. It compared adequately nourished and malnourished young children. Four questions guided the research:

1. What did mothers do to prepare infants to take food other than breast milk?
2. What foods did mothers give to young children who were still breastfeeding?
3. What cues did mothers interpret as signs that young children wanted food other than, or in addition to, breast milk?
4. What did mothers give their young children to eat during their most recent illness, and what did mothers do to encourage them to eat?

The study also examined whether research findings supported the following four hypotheses:

1. In households where the father regularly provides food or money to purchase food, a young child will not be malnourished.
2. Young children who are cared for during the day by persons other than their own mothers will likely be malnourished.

3. Mothers of well-nourished young children respond more often to cues from the child (such as crying) by giving breast milk and other foods.
4. Mothers of well-nourished young children feed them more often than mothers of malnourished young children.

METHODS

Two study sites, one urban and one rural, were selected in the Ashanti administrative region near Kumasi. Both communities are multiethnic and have many residents who rely on farming and trading for their subsistence. The urban community of Mossi Zongo has a population of over 12,000 residents and is located in the center of the business district of Kumasi. The rural community of Adugyama has a population of 3,500 people and is located about 40 kilometers west of Kumasi.

The study was conducted between August and November, 1999. Children were recruited during local growth monitoring clinics if they were aged 3-18 months and their anthropometric measures fell within the range of selection criteria. Children were recruited as “malnourished” if their weight-for-age fell between the 60th and 80th percentiles on Ghanaian growth monitoring cards or if their measures fell below the 60th percentile but they had not been hospitalized in the previous three months. Children were recruited as “well nourished” if their weight-for-age was above the 80th percentile on the growth monitoring cards. A total of 104 children were eligible for the study, 62 from Mossi Zongo and 42 from Adugyama. Of this group, mothers of 46 malnourished and 45 well-nourished children agreed to participate. Fewer mothers of boys, particularly malnourished boys, agreed to participate.

The study employed three research methods: structured observations, in-depth interviews, and focus group discussions. A total of 23 children, 12 malnourished and 11 well nourished, were observed over a continuous 12-hour period, during which research assistants recorded the child’s activities and interactions at five-minute intervals. Sixty-five mothers, including 33 mothers of malnourished and 32 mothers of well-nourished children, were selected for extensive interviews. The interviews covered their living arrangements, life history, assistance with chores and childcare, satisfaction with life in the community, experiences with infant feeding, and opinions and practices related to childcare and feeding. In-depth interviews and focus group discussions also were conducted with grandmothers and adolescents, including older siblings, who often care for and feed young children.

FINDINGS

Water

Water and glucose solutions are widely given to infants, beginning in the first few months of life. Mothers and grandmothers explained that water may be given to infants immediately after birth because they are thirsty after the exhaustion of the birth process or as a cultural gesture to welcome the child into the world. Water also is used to cleanse the mouth of a baby after breastfeeding. In addition, grandmothers believed that “breast food” and water are different and that a baby needs both, just as adults do.

Porridge

Koko, a maize-based fermented porridge, is given to infants as early as the first month of life. The fermented dough used to make koko requires four or five days to produce. Once prepared, however, the dough does not require refrigeration and can be kept for about one week and used for daily consumption. Mothers have adopted the concept of enriching maize with legumes, such as soybeans and groundnuts, to improve its nutritional value, and many prepared koko this way. Weanimix, a centrally processed, packaged alternative to koko, is a maize-based porridge enriched with legumes that has been developed and

marketed as an improved weaning food in Ghana. Most mothers had seen Weanimix at the growth monitoring clinic, but not many used it, in part because of the cost.

Appetite

Overall, mothers of malnourished infants found feeding problematic. They reported that their babies refused certain foods and had strong likes and dislikes for various foods. These likes and dislikes changed rapidly over time, so the mothers felt that they needed to vary the foods they offered to their children. Mothers of malnourished infants attributed the problems they encountered with feeding to their children's poor appetites as well as episodes of illness. Their cures included vitamin syrups, tonics, blood tests, and hygiene practices that improve the taste of food.

In contrast, mothers of well-nourished infants did not view infant feeding as a difficulty they had to overcome. They had fewer complaints about their babies' refusing to eat, did not emphasize babies' likes and dislikes, and did not feel a need to vary the foods they offered.

Process of Complementary Feeding

Mothers recognized a variety of cues that signaled their infants' desire to eat foods other than breast milk. These included the babies' watching other people eat, holding people's hands while they ate, putting objects in their mouths, and fidgeting when they saw or smelled food. Teaching an infant to take complementary foods began with these cues and then proceeded by trial and error. Some mothers prepared their infants to eat solid foods by trying porridge intermittently from a young age. Other mothers simply began feeding their infants porridge when they thought the infant was interested in eating and had achieved the physical capacity to swallow. Most mothers began by feeding the infant porridge with a spoon and later let the infant feed himself/herself from a plate.

Mothers of well-nourished infants focused on porridge as the main complementary food. They thought giving infants a wide variety of foods was unhealthy. Their approach was to give the infant one complementary food, such as koko, for a few weeks or months and then to switch to another food, such as rice.

Mothers of malnourished infants worried that the infant was not consuming enough food, noting that their breast milk no longer satisfied the infant. This was their strongest indicator to begin complementary feeding. When the infant refused food or got diarrhea, mothers became concerned for the child's health. The infant's lack of interest in food sometimes led to harsh measures involving force-feeding, but most mothers and grandmothers preferred coaxing the child to eat. Grandmothers felt that mothers of this generation lacked the patience to feed their infants properly. They believed grandmothers should assume the task of coaxing a baby to eat when the mother lacked the time to do so.

Care and Support for Women

The Ashanti, like many other ethnic groups in Ghana, are a matrilineal society. The primary kinship unit, the abusua, is comprised of the descendants of one grandmother—her children, her daughters' children and her granddaughters' children. Members frequently live together, share access to farm land, and exchange services and resources. This arrangement may explain why, in both research sites, coresidence with the maternal grandmother appeared to have a positive impact on children's nutritional status. In contrast, there was no evidence that the presence and/or financial support of the husband or father contributed to better infant nutrition, as one hypothesis predicted.

Motherhood for Ashanti women is a social identity that depends as much on providing adequate financial support for children as it does on physical intimacy and direct childcare. Women who could not earn any income were more likely to have malnourished children, whether the husband provided support or not.

According to local beliefs, earning money to support children cannot be delegated, but childcare can be entrusted to responsible relatives. Most mothers reported that their own mothers, as well as husbands, daughters, sons, and other relatives, assisted them with household chores and childcare. There was a marked difference between mothers of well-nourished and malnourished children in this respect. Mothers of malnourished children were more likely to report that they had no substitute caregivers, while mothers of well-nourished babies were more likely to report that their own mother assisted them with childcare.

Psychosocial Interactions and Other Childcare Practices

Contrary to expectations, observational data showed that malnourished children received slightly more of their mother's time than well-nourished children, perhaps because they were more likely to be ill, they needed more encouragement to eat, or there were no substitute caregivers available.

Mothers viewed crying and refusing food as key behavioral cues by infants. If an infant was not in any danger, mothers and other caregivers attributed his/her crying to hunger. When an infant refused food, mothers of malnourished children assumed it meant that he/she was fed up with that type of food and wanted something different. Grandmothers thought that the only reason a child refused food was illness and that medical attention should be sought.

Mothers and grandmothers also emphasized the importance of one aspect of infant hygiene for feeding: cleaning a white foamy substance from a baby's mouth was expected to increase the baby's appetite and make food taste better.

Conclusions

Infant feeding is a process that begins at birth when a child is welcomed into Ghanaian society with water. Virtually all infants are breastfed for 18-24 months. Mothers respond to a variety of behavioral cues indicating that an infant is ready for solid foods. Once the infant demonstrates readiness, mothers proceed by trial and error, starting with porridge as the main complementary food. Usually mothers feed their infants home-enriched koko, but if an infant refuses to eat koko, the mother will prepare other foods to stimulate the infant's appetite.

Mothers of well-nourished infants tend to feed them only koko and water along with breast milk, introducing other kinds of porridge and adult foods one at a time as the child grows older. Mothers of malnourished infants complain that complementary feeding is difficult because their babies are ill and have suppressed appetites. They try to stimulate their infants' appetites and coax them to eat by offering a variety of foods.

In Ghana mothers may delegate childcare responsibilities, but for the most part they prepare the foods their children eat. Mothers are expected to earn income or farm to support their children. Mothers of well-nourished infants reported coresidence with their mothers, and these maternal grandmothers were an important source of support and childcare. Mothers of malnourished infants often lacked the support of a maternal grandmother because they resided away from their abusua. They also lacked other substitute caregivers to look after their children while they worked or farmed away from home.

In this community, where malnutrition is common, it appears that illness affects nutritional status. Infants who are ill often have suppressed appetites and are malnourished, and their mothers struggle to find a food that the infant will eat. Infants who are well nourished—whose mothers are able to work or farm, provide a clean, safe environment, and provide food and water—are less likely to be sick and are better able to survive in this poverty-stricken environment. Maternal grandmothers are important sources of support, childcare, and health information for mothers and should be incorporated into any intervention to improve child nutrition along with appropriate health services.

Part I: Introduction and the Research Setting

1

INTRODUCTION

Despite more than twenty years of research, policy initiatives, and program work on infant feeding in sub-Saharan Africa, rates of infant malnutrition and undernutrition have remained consistently high. In Ghana, an estimated 17 percent of children under age five are moderately stunted¹ while another 9 percent are severely stunted (Ghana Statistical Service, 1999). In the past two decades, research has generated definitive and compelling evidence of the consequences facing poorly nourished children. Infant malnutrition results in growth retardation and smaller adult stature and also is correlated with inadequate immune response, an increased risk of childhood mortality, delayed motor development, and cognitive deficits. The need to reverse the trend of high infant malnutrition becomes even more urgent in light of these findings.

Research on infant complementary feeding offers some optimism for improving infant and child nutrition in the developing world. Measures of infant and child nutritional status, based on both longitudinal nutrition studies and cross-sectional surveys, suggest that rates of malnutrition increase markedly between 4 and 12 months of age, around the time that infants begin to receive complementary foods in addition to breast milk. Targeting this age group may prove more efficient than addressing all children under age five. Furthermore, research on complementary feeding has produced specific guidelines on the optimal age to introduce solid foods and liquids in addition to breast milk. While these guidelines are sensitive to the need to continue breastfeeding, there is little understanding of whether they accommodate or contradict local knowledge about infant feeding.

The purpose of this study is to explore the role of maternal care practices, including infant feeding, food preparation, hygiene practices, and mother-child interaction, in child nutrition. Specifically, the study examines differences in maternal care practices between well-nourished and malnourished children living in the Kumasi region of central Ghana. It uses observational methods and in-depth interviews to explore mothers' perceptions and motivations as well as constraints to feeding their infants.

¹ A child's nutritional status is determined by comparing his/her anthropometric measurements to the NCHS/CDC/WHO international reference population. Children are considered malnourished if they are more than two standard deviations below the median of the reference population on any of three indicators: stunting, wasting, or underweight. Stunting, or low height-for age, is a measure of chronic malnutrition. It occurs when a child has experienced inadequate food intake over a long period of time and may be exacerbated by repeated episodes of illness. Wasting, or low weight-for-height, is a measure of acute malnutrition and indicates either a recent failure to receive adequate nutrition and/or a recent illness, such as diarrhea. Underweight, or low weight-for-height, is a composite indicator and can result from either chronic or acute malnutrition or a combination of both. Malnutrition is classified as moderate when anthropometric measures are from two to three standard deviations below the median and as severe when measures are below three standard deviations.

2.1 INTERNATIONAL GUIDELINES FOR INFANT FEEDING

Current guidelines for infant feeding, developed jointly by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), emphasize exclusive breastfeeding² for the first six months of life and the subsequent addition of appropriate complementary foods to meet the increasing energy requirements for infant growth. Continued breastfeeding is recommended for the first two years and beyond. These guidelines also emphasize the importance of continued feeding during illness in order to maintain the infant's immune and nutritional status.

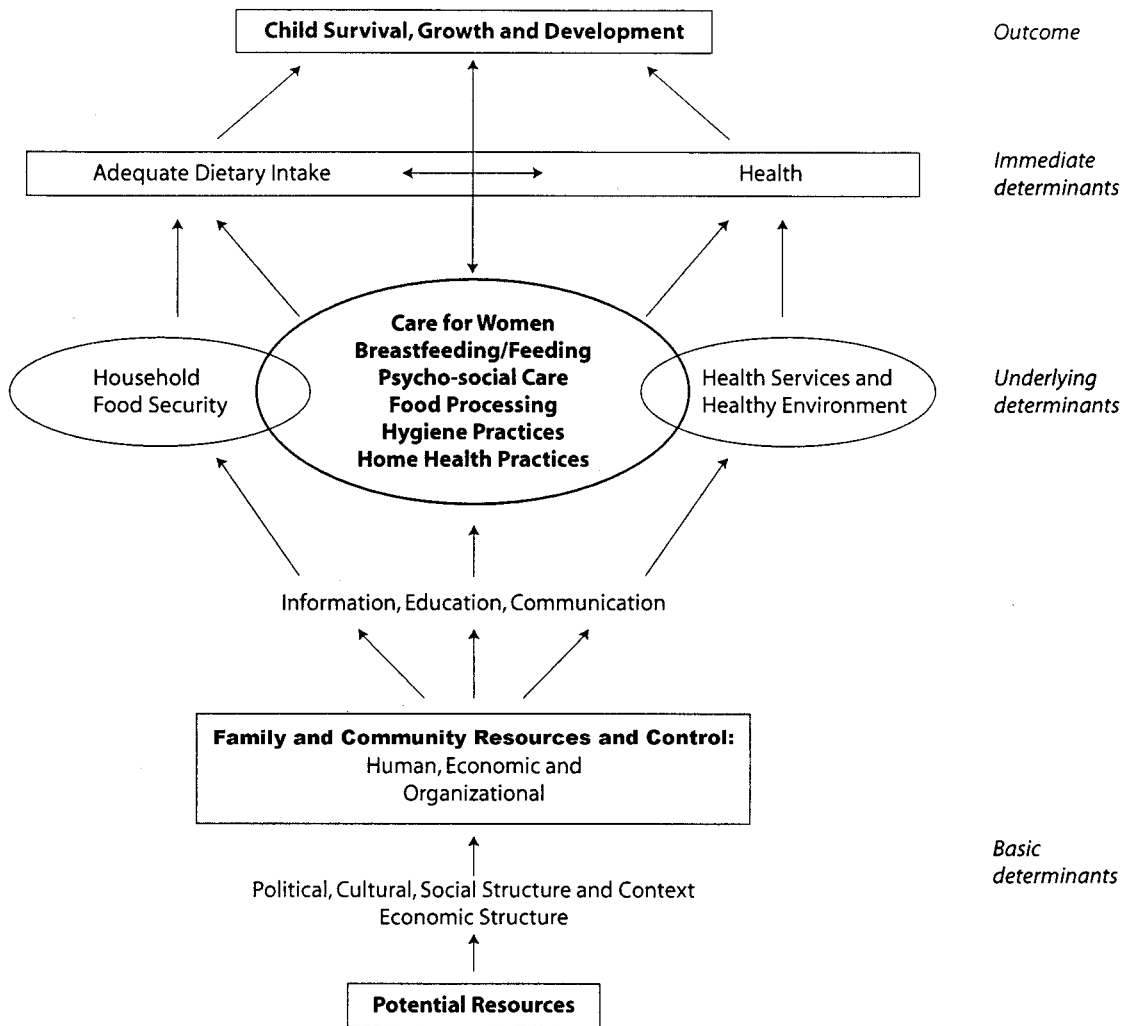
There has been considerable controversy over the optimal age at which complementary foods should be introduced to infants. Although most discussion has centered on introducing complementary foods at too early an age, in many countries in sub-Saharan Africa certain complementary foods are introduced too late. The tendency is to introduce water and other liquids too early and to introduce solid foods too late. Evidence for these practices comes from a comparative study of infant feeding in 18 sub-Saharan countries using data from Demographic and Health Surveys conducted between 1990 and 1996 (Haggerty and Rutstein, 1999). In most of these countries, more than 80 percent of infants under 4 months of age were already receiving other liquids in addition to breast milk. At the same time, many older infants were not receiving solid foods. In four countries, from 48 percent to 67 percent of infants age 6-9 months were not receiving any complementary foods; in eight countries this proportion ranged from 25 percent to 40 percent. These patterns of mistimed complementary food introduction may contribute to the high rates of infant and child malnutrition observed in sub-Saharan Africa.

2.2 CARE BEHAVIORS

The UNICEF conceptual framework shown in Figure 1 looks at the broader context in which infant feeding occurs (Engle et al., 1997). It divides the determinants of infant growth and development into three levels: immediate determinants, including adequate dietary intake and health; underlying determinants, including food security, care practices, and access to health services; and basic determinants, including resources and the political, social, and cultural context. Caregiving behaviors occupy a central place in this model as one of three underlying determinants of child survival, growth, and development.

² Since the terms used to describe infant and child feeding are often used differently in various literatures, considerable effort has been invested in their standardization. The terms for breastfeeding used in this report conform to those established by the Interagency Group for Action on Breastfeeding (Labbok and Krasovec, 1990). Exclusive breastfeeding means that all the fluids, energy, and nutrients in an infant's diet are provided by breast milk, with the exception of small amounts of medicinal supplements. Full breastfeeding refers to the use of only plain water or other non-nutritive liquids in addition to breast milk. Following the suggestion of Brown et al. (1998), this report defines complementary foods as any nutrient-containing foods or liquids other than breast milk given to breastfed infants and young children. It does not restrict the term complementary feeding to solid or semisolid foods as in previous WHO documents (WHO, 1991).

Figure 1 UNICEF Conceptual Framework on Care for Nutrition



Adapted from Engle et al., 1997:4-5

The focus on care practices may be crucial for child survival programs in Ghana, since previous research has shown no correspondence between the availability of food in the household and malnutrition among children from infancy through age five (Asenso-Okyere et al., 1995). The UNICEF model specifies six care practices as underlying determinants of adequate infant nutrition: care for women, breastfeeding and feeding, psychosocial care, food processing, hygiene practices, and home health practices. This study examines care practices in two communities, comparing and contrasting malnourished and well-nourished infants and young children.

RESEARCH SETTING: CENTRAL GHANA

3.1 MALNUTRITION

Ghana is located in West Africa and has a population of about 18.3 million, two-thirds of whom live in rural areas and are subsistence farmers (Ghana Statistical Service, 1999). Child malnutrition is common in Ghana: 26 percent of children under age five are stunted, indicating chronic malnutrition and long-term growth faltering, while another 10 percent are wasted, indicating acute malnutrition. Table 1 shows the proportion of children under age five who were classified as malnourished in the 1998 Ghana Demographic and Health Survey (GDHS) (Ghana Statistical Service, 1999). Malnutrition is rare in the first months of life, but the percentage of underweight children rises to nearly 20 percent in the 6-12 month cohort. Rates of malnutrition increase sharply during the second year of life, with 27 percent of children stunted and 38 percent underweight.

Table 1 Percentage of children under age five who are malnourished, by child's age

Age in months	Height-for-age	Weight-for-height	Weight-for-age	Number of children
<6	2.9	3.3	0.5	259
6-11	8.8	16.1	18.7	300
12-23	27.0	20.1	38.0	591
24-35	27.5	7.4	25.7	488
36-47	37.3	3.2	23.2	484
48-59	35.1	4.0	26.6	448
Total	25.9	9.5	24.9	2,570

Note: Includes children whose anthropometric measurements are more than two standard deviations below the median of the NCHS/CDC/WHO international reference population.
Source: Ghana Demographic and Health Survey 1998

The prevalence of malnutrition within Ghana varies markedly by region, with rates generally increasing from south to north (Alderman, 1990; Asenso-Okyere et al., 1995). Regions in the north (Northern, Upper East, and Upper West) have the highest rates of stunting, followed by the Western and Ashanti regions. Rates of stunting in these five regions are approximately 50 percent to 100 percent greater than elsewhere in the country.

3.2 TIMING AND NUTRITIONAL VALUE OF COMPLEMENTARY FOODS

As in other countries in sub-Saharan Africa, complementary feeding in Ghana diverges from international infant nutrition guidelines in two important ways. Liquids are given to infants too early, while solid and semisolid foods often are introduced too late.

From the earliest months of life, a sizeable proportion of infants in Ghana consume liquids such as water, infant formula, milk, and fruit juice in addition to breast milk. According to the 1998 GDHS, almost two-thirds of breastfeeding infants age 0-3 months were given liquids (Table 2).

Table 2 Percentage of breastfeeding children receiving complementary foods, by child's age

Age in months	Liquids			Solid or mushy foods					Number of children
	Formula	Other milk	Other liquids	Any solid	Grains and tubers	Eggs, fish, poultry	Meat	Other semi-solid	
0-3	6.9	4.2	62.8	9.4	8.8	0.0	0.6	3.2	196
4-6	8.8	9.3	80.9	41.5	33.2	7.1	3.0	16.4	158
7-9	18.3	9.8	95.8	67.7	59.9	29.6	8.6	37.2	168
10-11	8.3	11.8	96.8	72.9	62.3	37.5	11.2	42.1	72
12-13	9.7	9.8	96.7	91.6	80.4	61.6	30.4	61.5	113
14-15	9.3	8.9	100.0	90.8	73.3	51.5	28.7	64.4	99
16-17	10.9	10.3	96.2	95.0	83.8	62.4	28.8	71.0	92
18-23	6.9	9.1	98.2	96.1	84.4	64.8	28.9	72.6	201

Source: Ghana Demographic and Health Survey 1998

Koko, a maize-based fermented porridge, and infant formula (Lactogen, Nido, or skimmed milk) are usually the first foods mothers offer their infants, although some mothers make porridges from fortified cereals such as Cerelac. *Koko* is given to infants as early as the first month of life. The fermented dough used to make *koko* requires four or five days to produce. Once prepared, however, the dough does not require refrigeration and can be kept for about one week and used for daily consumption. The dough may also be purchased in a ready-to-use form in local markets. Fermentation is a benefit because it lowers food viscosity—which results in higher energy and nutrient density by volume—and improves the digestibility of proteins and other nutrients (Armar-Klemesu et al., 1991). As a weaning food, *koko* is low in protein and high in energy density, meeting 49 percent and 90 percent, respectively, of recommended daily intakes of protein and energy (Kwaku et al., 1998; Lartey et al., 1999).

Prior studies have found that *koko* was given to infants as their first solid food by 68 percent of mothers in Kumasi (Kwaku et al., 1998), 69 percent of mothers in Techiman (Lartey et al., 1999), and 60 percent of mothers in Accra (Armar-Klemesu et al., 2000). Sometimes, with the addition of milk and Lactogen, mothers introduce *koko* to their babies as early as 2 months of age. The poor nutritional quality of *koko* makes this especially problematic, since it replaces more nutritious breast milk (Brown et al., 1998).

Equally disturbing is the proportion of infants who have reached six months of age but are not yet receiving solid foods. As Table 2 shows, the 1998 GDHS found that 42 percent of breastfeeding infants age 4-6 months were receiving solid foods of any kind; at ages 7-9 months and 10-11 months that proportion increased to 68 percent and 73 percent, respectively. This suggests that nearly 30 percent of children in Ghana are not receiving any solid foods between the ages of 6 and 12 months.

Other solid foods commonly given to infants older than 6 months in Ghana include rice with stew and *fufu*, *kenkey*, and *banku*, all of which are served with soup (Annan-Prah and Agyeman, 1997; Kwaku et al., 1998). *Fufu* is made from boiled cassava, yam, cocoyam, plantains or other staple foods, which are pounded into a sticky, doughy mass. *Kenkey* is made from fermented maize dough, which is boiled into a thick porridge, mixed with fresh (unfermented) maize dough, made into balls, wrapped in plantain leaves, and steamed. *Banku* is made from the same fermented maize dough as *koko*, but it is shaped into balls. Ghanaians distinguish between “light” soups, which are made from vegetables like tomatoes, cocoyam leaves, and eggplants, and “heavy” soups, which are made from legumes like palm nuts or groundnuts and contain more fat and protein (Hudelson et al., 1999).

According to one study, *banku* with groundnut soup has the highest protein and energy composition of all weaning foods—even exceeding Weanimix, a cereal-legume mixture promoted as an appropriate weaning food (Lartey et al., 1999). Table 3 shows the nutrient contents of common weaning foods.

This data suggests that adding locally available protein sources such as fish powder, groundnuts, and soybeans greatly enhances the nutritional quality of weaning foods.

Table 3 Nutrient content of common weaning foods in Ghana

Weaning food	Protein density (g/kg)		Energy density (kcal)	
	Wet weight ¹	Dry weight ²	Wet weight	Dry weight
Koko	6.0	na	240	na
Koko with groundnuts	17.0	na	693	na
Koko with fish powder	21.0	250	545	3,870
Banku with groundnut soup	64.0	na	1,053	na
Weanimix	26.0	150	786	4,350
Kenkey	29.2	na	na	na

Sources: Annan-Prah and Agyeman, 1997; Kwaku et al., 1998; Lartey et al., 1999

¹ Nutrient content was determined on as-is samples of prepared foods (Annan-Prah and Agyeman, 1997; Kwaku et al., 1998).

² Nutrient content was based on weights of dry powdered ingredients in a feeding trial that compared Weanimix and koko enriched with fish powder (Lartey et al., 1999).

na = Not applicable

UNICEF and the Ghanaian government have developed Weanimix as an alternative to koko, the fermented maize porridge most often given to infants as their first solid food. As shown in Table 3, Weanimix has more energy and protein than koko, although a randomized feeding trial found no significant difference in the growth patterns of infants fed koko enriched with fish powder and those fed Weanimix (Lartey et al., 1999). In that feeding trial, however, infants who received Weanimix fortified with mineral supplements had improved micronutrient levels compared to other groups. The acceptability of enhanced porridges such as Weanimix and koko enriched with fish powder has not been thoroughly assessed. Centrally-processed Weanimix is widely available through the same clinics that conduct growth monitoring, and community health nurses instruct mothers' groups on the preparation of a homemade equivalent. Despite promotional efforts, however, some recent studies have indicated extremely low use of this innovation (Kwaku et al., 1998).

3.3 INFANT FEEDING AND MOTHER'S WORK: SUBSTITUTE CAREGIVERS

The Ashanti, like many other ethnic groups in Ghana, are a matrilineal society. The primary kinship unit is the abusua, which is comprised of the descendants of one grandmother—her children, her daughters' children and her granddaughters' children. Therefore, the strongest kinship ties are those between a mother and her children and between siblings born of the same mother. Members of the abusua frequently live together in the same compound house or in adjacent rooms, share access to farm land, and, through continual negotiations, provide services and material resources to one another.

The emphasis on the abusua creates a tension between marriage ties and lineal ties, which is expressed in proverbs such as: "You can get a new husband, but not a new brother." From the child's point of view, this tension sets father against uncles (mother's brothers). In the words of a popular Ghanaian writer: "A father is only a husband, and husbands come and go; they are passing winds bearing seed. They change, they disappear entirely, and they are replaced. An uncle remains" (Armah, 1969: 139). In addition, the bond with siblings, especially with older sisters who served as primary caregivers during infancy, is particularly intense. Although older sons often take care of infants, daughters are preferred as caregivers once they reach the appropriate age. Children are frequently fostered out to other relatives, including grandparents, aunts, and cousins. These relationship patterns serve as templates for selecting a

place of residence, gaining access to land for farming, finding work, and enlisting substitute caregivers for infants.

For Ashanti women, motherhood is a social identity that depends as much on providing adequate financial support for children as it does on caregiving and physical intimacy. The cultural meanings of mothering and women's work present different contradictions to Ashanti women in Kumasi than they do in some Western societies (Clark, 1999). Work that earns a cash income is associated with an ideal of motherhood, *obaatan*, and working mothers are the primary providers for their children—even though that same work may challenge their identities as wives. A mother rests for forty days after giving birth and then immediately sets about her *obaatan adjuma* or “nursing mother work.” Gracia Clark contrasts this kind of work with work that yields bigger profits. *Obaatan adjuma* is steady and consistent work that may yield small proceeds but carries little risk, in contrast to trading, for example, which can produce large profits. *Obaatan adjuma* is defined by its single-mindedness and purpose, which is providing the best possible material existence for the child (Clark, 1994; Clark, 1999).

While childcare can be delegated to other responsible relatives who already have strong ties of intimacy with the baby, *obaatan adjuma* cannot be delegated. Ashanti market traders drive home this point:

One mother explained that “no one will sit and listen to a child cry,” so anyone around will see that they have water, food and shelter, but “no one will work for them like I do.” Her devotion to her children, far from making her feel ambivalent about working, drove her to work harder and longer. Taking time off work to raise children seems almost a contradiction in terms (Clark, 1999: 720).

Thus, delegating childcare does not threaten the mother-child bond. Furthermore, Clark (1999) argues that the domestic work of children does more to intensify the mother-child bond than domestic work done by mothers. Mothers are described as hardworking and a constant source of material support to the family, and it is this trait that adult children remember and praise in a good mother.

Part II: Study Design and Research Methods

4

RESEARCH DESIGN AND HYPOTHESES

This study examined infant care and the process of complementary feeding from the mother's point of view. Like other qualitative research, it can improve our ability to interpret quantitative data from sources such as the Demographic and Health Surveys, and it can generate new hypotheses to be tested in the future. Furthermore, because of its focus on the mother's perspective, this particular study may suggest more effective ways of intervening to improve infant nutrition.

Four main questions guided this research:

1. What did mothers do to prepare infants to take food other than breast milk?
2. What foods did mothers give to young children while they were still breastfeeding?
3. What cues did mothers recognize as signs that young children wanted food other than, or in addition to, breast milk?
4. What did mothers give their young children to eat during their most recent illness, and what did mothers do to encourage them to eat?

These questions enabled the study, first, to record mothers' recent experiences with infant feeding in their own terms and, second, to understand the logic that mothers themselves apply to the process of infant feeding.

4.1 POSITIVE DEVIANCE RESEARCH DESIGN

The current research attempts to identify correlates of nutritional resilience in Ghana by comparing mother-child interactions in groups at two ends of the nutritional spectrum: infants who demonstrate good growth despite the impoverished environment and infants who have poor growth. This approach, sometimes referred to as a positive deviance inquiry, assumes that the characteristics of well-nourished infants are not simply the opposite or mirror image of malnourished infants. For example, several studies have demonstrated that infants with both the best and the worst growth curves may receive more breast milk substitutes than infants with average growth curves (Zeitlin, 1991). Although few studies in the nutrition literature have explicitly employed a positive deviance approach, enough have been published to make some generalizations (Guldan et al., 1993; Zeitlin et al., 1990). While not all these studies are based in developing countries, they are conducted in communities where poverty, socioeconomic underdevelopment, and deprivation prevail.

In determining correlates of above average infant growth, researchers have identified "maternal technologies" of infant feeding that promote growth and nourishment. These include permitting the baby to control the duration of feeding episodes, encouraging the child to eat during feedings, actively spoon-feeding young children rather than allowing self-feeding, and keeping the child's face, body, and play surfaces clean (Mata, 1981). These activities were the main focus of the current research, but other aspects of caregiver-child interactions also emerged in the course of data collection

4.2 POTENTIAL BIAS OF RESEARCH DESIGN

The research design includes a serious age bias. Malnourished children are under-represented in the youngest age group (3-6 months) because breastfeeding has a protective effect at this age and over 95

percent of these infants were breastfed. Malnourished children are over-represented in older age groups since, as DHS data shows, rates of malnutrition increase with age. Thus, age biases in the sample recruited for this study are inherent in the study's design. Nevertheless, much can be learned from those children who thrive in an environment of high malnutrition.

4.3 Hypotheses

This study tests how well each of the following four hypotheses fits the qualitative evidence gathered:

1. In households where the father regularly provides food or money to purchase food, a young child will not be malnourished.
2. Young children who are cared for during the day by persons other than their own mothers will likely be malnourished.
3. Mothers of well-nourished young children respond more often to cues from the infant (such as crying) by giving breast milk as well as other foods.
4. Mothers of well-nourished young children feed them more often than mothers of malnourished young children.

The two communities included in this research are located in the Ashanti administrative region near the city of Kumasi, the second-largest city in Ghana and the regional capital. While one community is urban and the other rural, both are multiethnic and have many residents who rely on farming and trading for their subsistence. It was assumed that most households had access to adequate food and that, within each community, most residents had access to similar levels of health care services and sanitation. In both communities, the mothers and children participating in the study were recruited at postnatal clinics for immunization and growth monitoring.

5.1 URBAN SITE: MOSSI ZONGO

The urban community of Mossi Zongo is an area of high-density housing located in the center of the business district of Kumasi. The approximately 12,500 residents of Mossi Zongo earn their livelihoods as traders, food sellers, laborers, drivers, and tailors and by farming plots of land on the city's edges. Twenty-two percent of the population identify themselves as Ashanti, but more than 30 ethnic groups are represented in the community. Education levels are generally low: 46 percent of the population has attended middle school, and 44 percent has no education at all. Just over half of the population is literate. Mossi Zongo has a private clinic that is regularly staffed by a physician, but most residents rely on the subsidized government hospital, Manhiya Polyclinic, for their health care needs. The government hospital sends a mobile clinic to Mossi Zongo each month to provide child growth monitoring and immunizations.

5.2 RURAL SITE: ADUGYAMA

The rural community of Adugyama has a population of 3,449 and is located about 40 kilometers west of Kumasi. Adugyama is a multiethnic farming community. About 66 percent of the population belongs to the Ashanti ethnic group, although more than 17 ethnic groups are represented in the community, including several Northern groups and other Akans. The literacy rate in Adugyama is around 45 percent, and about one-third of adults have attended middle school. There is one primary health center in Adugyama: Saint Edward's Maternity Clinic, established in 1996. The clinic provides 24-hour health care for the people of Adugyama, including pre- and postnatal care, delivery, and well-baby services.

Amenities in Adugyama are almost nonexistent: there is no electricity, no piped water, and no community center or place of entertainment. Since the settlement sits astride the main highway, there are many accidents involving residents crossing the road. Buses run regularly from Adugyama into the city of Kumasi, and some people in this community commute daily to work in Kumasi. Others go to Kumasi less frequently to purchase household goods, trade, bank, and visit relatives.

RESEARCH METHODS

6.1 RESEARCH TEAM

A team of 12 research assistants and a field research investigator conducted all of the fieldwork. Most of the research assistants were current or former students at the University of Science and Technology (UST) in Kumasi, and two were residents of the study communities. The research assistants usually worked in pairs.

Over a two-week period in August 1999, all research assistants were trained how to conduct interviews and observations. The research instruments were developed during the training sessions in the Twi language, and the entire research team participated in various stages of their evolution. Much of the discussion during revisions centered on the specificity of feeding behaviors and on the use of probing or follow-up questions to elicit more details from the mother about her experiences with infant feeding.

A physician in residence at UST Hospital also participated in the research. He provided medical services and medicines to mothers participating in the study and to those who attended the growth monitoring clinics at which the team recruited mothers and children. The physician also visited both research sites later in the study for follow-up visits, and mothers were notified of the days he would be present in the communities.

6.2 RECRUITING STUDY PARTICIPANTS

Children age 3-18 months were recruited for the study if their anthropometric measures fell within a specific range. Children were recruited as “malnourished” if their weight-for-age fell between the 60th and 80th percentiles on Ghanaian growth monitoring cards or if their measures fell below the 60th percentile but they had not been hospitalized in the previous three months. Children were recruited as “well nourished” if their weight-for-age was above the 80th percentile on the growth monitoring cards. Most young children attending the clinics weighed at or just below the 80th percentile. The supine lengths of all children selected were measured and recorded.

Mossi Zongo

Study participants were recruited on September 14, 1999 at the monthly mobile clinic sent by the Manhiya Polyclinic. Six community health nurses from the clinic’s public health section conducted the growth monitoring and immunizations, while the field research investigator and study physician examined the growth monitoring cards to identify young children who met study requirements for age and anthropometric measures. A total of 62 children met the study requirements, of whom 33 were malnourished and 29 were well nourished (Table 4). Members of the research team recorded information about these 62 children and their families so that they could be located for subsequent phases of the research.

Adugyama

Study participants were recruited on October 6, 1999 at the Saint Edward's Maternity Clinic. The study physician and another member of the research team examined the growth monitoring cards to determine which children met the age and anthropometric requirements. A total of 42 children met the study requirements, of whom 23 were malnourished and 19 were well nourished (Table 4). Members of the research team recorded information about these 42 children and their families so that they could be located for subsequent phases of the research.

Table 4 Number of study participants by site

Participants	Site and child's nutritional status				Total
	Mossi Zongo		Adugyama		
	Well nourished	Malnourished	Well nourished	Malnourished	
Children and mothers					
Children eligible for study	29	33	23	19	104
Children observed	6	5	6	6	23
Mothers interviewed	16	17	16	16	65
	Mossi Zongo		Adugyama		Total
Other family members					
<i>Interviews</i>					
Grandmothers	6		0		6
Adolescent caregivers	6		8		14
<i>Focus group discussions</i>					
Grandmothers	10		8		18
Adolescent caregivers	7		9		16

6.3 STRUCTURED OBSERVATIONS

At each research site, 6 malnourished and 6 well-nourished children were selected for observation from the pool of eligible children (Table 4). A total of 23 were observed (one was unavailable at the time of observation). The observations were carried out as focal individual following of the child. Observers recorded the activities of each child at five-minute intervals over a continuous 12-hour period, beginning around 6:00-7:00 a.m. and continuing until 6:00-7:00 p.m. Research assistants worked in pairs, with each making observations for two hours before the other took over. For the most part, the mother and/or other caregiver remained nearby, although there were instances of the child being left unattended for brief periods.

Observers used codes developed in the training sessions to record specific interaction behaviors. Codes included, for example, carrying baby in arms, bathing baby, talking to baby, playing with baby, and being present in the same room as the baby. Observers recorded the presence of people other than the mother, including siblings, fathers, other relatives, and neighbors, if they interacted with the child or the mother.

6.4 IN-DEPTH INTERVIEWS

The research team selected 33 mothers in Mossi Zongo and 32 mothers in Adugyama to interview based on their willingness and availability to participate. The mothers were equally divided between those with malnourished and those with well-nourished children (Table 4). In some cases, their children were among those observed. The research assistants worked in pairs, with one conducting the interview while

the other made notes and recorded the interview on audiotape. The interview guide was organized around specific topics and listed a series of open-ended questions for each topic. Topics included the woman's current living arrangements, people who assisted her with chores and childcare, her life history, satisfaction with life in her community, her experiences feeding her infant, and her opinions and practices on specific issues regarding childcare and feeding. Interviewers also asked for two types of information on complementary feeding: (1) 24-recall data on everything the child was offered to eat or drink during the past day and (2) the age at which the child was first offered certain common weaning foods. Interviewers were encouraged to ask follow-up questions during the interviews to elicit details about infant feeding experiences. The interviews took place over a series of two visits.

The research assistants also conducted interviews with two groups of people who frequently act as substitute caregivers, contribute to the process of infant feeding, and influence mothers' ideas and actions related to infant feeding—that is, grandmothers and adolescents (often the older siblings of infants). Interviews were conducted with 6 grandmothers and 14 adolescents, most of whom came from the same families as the children observed and mothers interviewed (Table 4). All except one of the adolescent caregivers were related to the mothers of the study children: six were older daughters, two were older sons, three were sisters, two were nieces, and one was a neighbor.

Interview guides for grandmothers and adolescent caregivers followed a similar format to the mothers' guide but covered different topics. The grandmothers' guide asked about their role in the daughter's household, their specific actions related to feeding the child participating in the study, and their reflections on how mothers today feed and care for infants. The adolescent caregivers' guide asked about their role in assisting the mothers, their household chores, their specific actions related to feeding the child participating in the study, and their observations about peers who care for infants.

6.5 FOCUS GROUP DISCUSSIONS

Two focus group discussions were conducted at each site, one with grandmothers drawn from the pool of eligible families and another with adolescent caregivers (Table 4). Group discussions with grandmothers focused on their views of childcare and feeding and their perceptions of changes in these practices over time. Group discussions with adolescents focused on the range of activities that 9- to 16-year-olds perform to assist their mothers and other relatives, including household chores, childcare, and infant feeding.

7.1 CHILDREN

Mothers of 91 children identified at the growth monitoring sessions agreed to participate in the study. Three-quarters of the malnourished children in this group were girls, while nearly two-thirds of the well-nourished children were boys (Table 5). Since there is no sex bias nationally in infant nutritional status, this suggests a significant bias in the recruitment process. Boys and girls were equally represented among the malnourished and well-nourished children identified at the growth monitoring sessions. The bias occurred when the research team tried to locate mothers who had attended the growth monitoring sessions. At this stage of recruitment, fewer mothers of malnourished boys agreed to participate in the study.

Table 5 Percent distribution of participating children by sex and age, according to nutritional status

Sex and age	Well-nourished children (N=45)	Malnourished children (N=46)	All children (N=91)
Sex			
Boys	62	24	43
Girls	38	76	57
Age			
3-6 months	55	9	32
7-11 months	29	52	41
12+ months	16	39	27
Total	100	100	100

7.2 MOTHERS

Mothers interviewed in the study were similar in terms of demographic characteristics, regardless of their children’s nutritional status (Table 6). There was little difference in mothers’ marital status, educational levels, and occupations. However, mothers over age 35 were more likely to have malnourished children than well-nourished children.

Husband’s residence also varied between the two groups: 70 percent of mothers of malnourished children reported that their husbands resided in the same room(s) as themselves, compared with 59 percent of mothers of well-nourished children.

Table 6 Percent distribution of interviewed mothers by sociodemographic characteristics, according to nutritional status of their children

Characteristic	Mothers of well-nourished children (N=32)	Mothers of malnourished children (N=33)	All mothers (N=65)
Age			
<20	9	6	8
20-24	34	30	32
25-29	28	27	28
30-34	25	21	23
35+	3	15	9
Marital status			
Married	84	88	86
Single	16	12	14
Husband co-resident			
Yes	59	70	65
No	41	30	35
Education			
None	34	36	35
Some	66	64	65
Occupation			
Trader	34	33	34
Farmer	22	21	21
Other	44	46	45
Total	100	100	100

Overall, mothers of malnourished children felt that infant feeding was problematic. They said their babies refused certain foods and had strong likes and dislikes for various foods. Furthermore, these likes and dislikes changed rapidly so that mothers felt they had to vary the foods they offered and wasted a lot of food that their babies rejected. Because difficulties with infant feeding were expected, mothers of malnourished infants were well versed in both the problem and potential cures, including vitamin syrups, tonics, blood tests, and hygiene practices that improve the taste of food.

In contrast, mothers of well-nourished children did not view infant feeding as a difficulty to be overcome. They focused on porridge as the most appropriate main weaning food, and for many, it was the only complementary food given until the baby reached one year of age. They had fewer complaints about their babies' refusal to eat; quite a number even boasted that their baby would eat anything. Mothers of well-nourished children did not emphasize the baby's likes and dislikes, although some of their babies did become ill after eating some complementary foods. These mothers spoke less about the need to vary the foods offered or to find a food that the baby liked.

8.1 EXCLUSIVE BREASTFEEDING VERSUS EARLY COMPLEMENTARY FEEDING

All of the infants age six months or younger were still receiving breast milk, and most were well nourished. According to the observational data, however, the few malnourished infants in this age group were fed more frequently and spent more time breastfeeding than well-nourished infants. Mothers of well-nourished children described the infant's satiation point as when the baby loses interest in the breast, stops suckling, and begins playing; the mothers also checked whether the infant's stomach had expanded. In contrast, mothers of malnourished infants said they themselves interrupted the infant's suckling.

Mothers' ideas about introducing complementary foods and water varied markedly. Nearly half the mothers of infants age 3-6 months had not yet offered them complementary foods, but they were planning to do so once the infants reached six months of age. These mothers believed that infants require only breast milk (or breast milk and plain water) during the first six months of life.

Interviewer: *What did you give to the baby yesterday?*
Mother: *It's only breast milk that I give the baby. I have not yet introduced any complementary foods to the baby . . . I don't usually give my babies any food until after the sixth month. And I don't experience any problems in that way, too.*

(Mother of a well-nourished 5-month-old girl, Adugyama)

³ Information from the observations, interviews, and focus group discussions are presented here to form a complete picture of the findings. Quotes, examples, and case studies are used to illustrate general patterns and trends observed. Because this is a qualitative study, statistical analyses are not appropriate and were not included. While some numbers are presented in the tables and text to summarize information from the observations and interviews, they should be interpreted as descriptive only.

In contrast, many mothers reported giving their infants some sort of complementary food or liquid—whether water, milk, porridge, stew, soup, or fruit—before they reached the age of 6 months. Most mothers reported first offering their infants water before they reached 6 months old; about half had introduced porridge by this age, while smaller numbers had offered other milk, stew, soup, and fruit. Most mothers said they intended to continue breastfeeding for two years, although quite a few women in Mossi Zongo planned to continue breastfeeding until their child was two and a half or three years old.

Case Study 1—Complementary Feeding Too Early

G lives in Mossi Zongo and her five-month-old infant daughter is well nourished. The baby is G's third child. G has learned much about infant feeding from her experience as a mother. She recounts how she gave her first child complementary foods too early. She laughs about the fact that she gave him porridge at two weeks of age:

- Mother: *I initiated feeding early. You know those times we were not told not to give food early in their lives. So the eldest child, for instance, I started feeding him porridge when he was two weeks old. [Laughs]*
- Interviewer: *Two weeks exactly?*
- Mother: *Yes. Whenever the baby rejected the porridge, I prepared soya bean porridge for him, and when he rejected that too I would buy dried fish, mix it with maize and grind it to prepare porridge for him. At the age of three months I started giving him cocoyam leaves stew, and so by the tenth month he started toddling.*

Her son grew and developed well, possibly even slightly ahead of other children based on the early age at which he began learning to walk. Her second child, a daughter, also was a learning project. Due to the determination of her watchful co-tenant, she refrained from giving this baby water until she was four months old. This child also developed early and was healthy, a testament to the practice of waiting to give water (and perhaps complementary foods) until the baby is at least four months old.

- Mother: *About the second born too, we had been told not to give water. At that time we were staying with an Ashanti and she used to put checks on me against that. It was after four months that I started giving her water and by the seventh month, the baby started toddling. . . .*
- Interviewer: *That means her feeding was quite different from this one.*
- Mother: *Yes. I have not yet offered any food to this baby.*

Although she was at first skeptical about the water, G seems convinced that these changes in her approach to infant feeding have been beneficial. She seems hopeful that her current baby will be even healthier than her older siblings. During the interview, her older daughter is eating breakfast and G asks her to sit far away from the baby, who has already begun to fidget and cry for food. Her neighbor comments that the baby really likes food, so the interviewer questions G, thinking she had misled him regarding the baby's complementary feeding. She replies, "Yes, if one is eating, the baby will keep on crying. And if one does not exercise restraint, one may offer [the baby] some of the food." With some reservations, she follows the advice of the community health nurses and her co-tenants.

8.2 WATER

In Ghana, the practice of giving plain water to infants in addition to breast milk is pervasive and often begins on the day of birth. According to previous research in Ghana, midwives in the Ashanti region may have promoted the practice. In one study, 93 percent of midwives interviewed said that water should be given to infants on demand within a few hours of birth. Seventy-one percent said that a newborn infant should be offered either water or glucose solution immediately after birth and before first being breastfed in order to reduce the risk of low blood sugar and to stimulate the swallowing reflex and the gastrointestinal tract (Armar-Klemesu et al., 1991). Water also is thought to be essential for life, and some say it is necessary for cleaning the mouth after breastfeeding to prevent oral candidiasis. Water is customarily given to visitors as a gesture of welcome, and the arrival of a newborn baby is an event that evokes this ceremony.

International guidelines for infant feeding specifically discourage the practice of giving water to infants before six months of age. These recommendations are based on research indicating an increased risk of infection from contaminated water (Brown et al., 1989; Victora et al., 1987). Research also shows that water is not needed in addition to breast milk to maintain hydration, even in hot climates (Almroth and Bidinger, 1990; Ashraf et al. 1993). While the guidelines inform local health and nutrition education programs in Ghana, the practice of giving water persists in spite of mass media messages and community outreach activities (Agble et al., 1998; Steel et al., 1993).

Findings from this study confirm past research: most mothers gave the baby water at a very young age, although they did not clearly explain why. Many said their mothers advised it or actually gave the water to the baby:

- Mother: *The baby does take water. It's only water that the baby takes.*
Interviewer: *So at what age was the baby first given water?*
Mother: *It's when I returned from the hospital [clinic], the very day I gave birth.*
Interviewer: *Why did you give the baby water?*
Mother: *My mother said the baby was yawning and that meant he was thirsty.*

(Mother of a well-nourished 5-month-old boy, Adugyama)

Grandmothers clarified the practice in interviews and focus group discussions. They gave three kinds of explanations. The first centers on the significance of water in ritualized libations offered to the ancestors. When guests arrive or when a family celebrates a wedding or naming ceremony, the ancestors become “thirsty” and require libations. Water, beer, and/or liquor are poured onto the ground while prayers are said remembering the ancestors; then everyone drinks from the vessel. Babies arrive here from the same spirit world occupied by the ancestors, and a newly arrived baby also is thirsty, as one woman explained:

- Interviewer: *At what age did you give [your babies] water?*
Grandmother: *They say that the only thing that the baby needs as he comes from the ancestors is water, so as soon as he comes, I give him water.*
Interviewer: *Why do you give him water the moment it comes?*
Grandmother: *Because he is thirsty.*
Interviewer: *But there is water in the breast . . .*
Grandmother: *Breast food and water are different! When you eat, don't you drink water?*

(Grandmother, 80 years old, Adugyama)

Variations on this explanation emphasize that the baby is exhausted from the birthing process and that the relentless crying has parched the lips so water is needed. The mothers described putting drops of water on the baby's lips with a spoon on the day of birth. Because many said that water is given to alleviate the baby's crying, the amount cannot be assumed to be negligible. Through the first months of life it appears that many mothers continue to give water to alleviate crying, coughing, and thirst:

Mother: *As for water, I give it to the baby. We have been told not to give babies water and food, but I could not resist giving the baby water.*

Interviewer: *O.K. So how many times did you give the baby water?*

Mother: *I don't count the number of times I give the baby water. Whenever she cries, I offer some water before breast milk.*

(Mother of well-nourished 5-month-old girl, Mossi Zongo)

The second explanation was more pragmatic: water is required as nourishment during a 3- to 4-day period before the mother's breast milk flows. This explanation may account for the remarkably late initiation of breastfeeding in Ghana. As another grandmother explained:

Interviewer: *Could you please tell us why, during your time, you introduced water to your babies instantly?*

Grandmother: *Well, we never had any education from any medical officer that it was not safe to introduce water to babies at their tender state. At that early period, when enough breast milk has not been produced to feed the baby, we thought it was ideal to introduce water to them as a supplement, to keep them surviving for the first three to four days until the mother would be able to produce enough breast milk. Sometimes, we even put bread in the water as glucose for them.*

(Grandmother, 46 years old, Adugyama)

In the focus group discussion, several grandmothers elaborated on adding bread to the water. As in the quote above, another account specified that bread was soaked in the water to improve the nutritional quality:

Interviewer: *Why did you give it [the baby] water on that very day?*

Grandmother: *That's what my mother and company taught me. On the very day that I would deliver the baby, I went and bought bread and I roasted it. And I put it into water and squeezed it and sieved it and gave it to the baby. So that was what it would drink up to the time that the breast would be filled with milk.*

(Grandmother, 52 years old, Adugyama)

The third explanation returns to the earlier statement that "Breast food and water are different!" According to grandmothers and mothers alike, a baby needs both food and water just as adults do. The women also reason that, as with the hot peppers that enliven most Ghanaian foods, a baby needs to taste water at a young age in order to appreciate it when he/she is older:

Interviewer: *Do you think mothers follow the advice [against water for infants under 6 months of age] given by the "weighing people?"*

Grandmother: *I tried it on one of my grandchildren. The baby was not given water until after the sixth month and, by the eighth month, the baby did not like water and was therefore growing lean. Subsequently, we started giving the next-born a little water right after birth and increased the amount after the fourth month. That baby is very healthy and well nourished!*

(Grandmother, 46 years old, Adugyama)

Women presented other examples like this one, based on the empirical observations of neighbors and family members, that suggest the advice of the “weighing people” (that is, the community health nurses who conduct growth monitoring) should be disregarded. Only one grandmother gave an example of a mother who followed advice not to give a young baby water and had a healthy child as a result. While the grandmothers in Adugyama appreciated the improvements in health since the clinic opened in 1996, they strongly disagreed with the community health nurses on the issue of giving water to babies. Furthermore, the consensus was that mothers are not following this advice, even though they may say they are during growth monitoring visits or household surveys.

Indeed, in this study infants who were given water at an early age actually were more likely than others to be well nourished. While these results were contrary to researchers’ expectations, they confirmed the observations of many mothers and grandmothers who noted that infants were healthier and stronger if they were given water:

Interviewer: *At what age did you give the baby water?*
Mother: *Just after birth.*
Interviewer: *Why did you give the baby water.*
Mother: *Water helps the baby’s growth. It is a fact that the breast milk alone is energy-giving, but it should be complemented by water.*

(Mother of well-nourished 5-month-old girl, Adugyama)

8.3 FOOD PROCESSING

Most of the mothers described how they prepared koko for their baby during the course of the interview. There was a remarkable consistency in the process described, both among the mothers and with other studies that have examined the nutritional quality of koko. Mothers, grandmothers, and older siblings all were in agreement on the amount of fermented corn dough to start with, the amount of sugar to add, and the importance of boiling it a long time to make it more digestible for the baby.

What varies is the degree to which the women have incorporated the Weanimix concept. As previously described, Weanimix was developed and marketed as an improved weaning food for Ghana. The food is centrally processed and sold through various outlets. Most mothers had seen it at the growth monitoring clinic, although they could not afford to buy it. Weanimix is maize-based, but legumes (soybeans and groundnuts) are added in proportions that improve the protein and energy content. Although few mothers used prepackaged Weanimix, many mothers were making a homemade version by adding legumes to koko they prepared themselves. Mothers often substituted cowpeas for the soybeans and, in some cases, only added only one legume instead of both soybeans and groundnuts. Thus the concept of fortifying koko with legumes has been effectively communicated to mothers.

8.4 PROCESS OF COMPLEMENTARY FEEDING

Table 7 summarizes the food and drink mothers said they gave their children in the 24 hours preceding the interview. This information gives a general idea of how common the practice is of giving certain foods and liquids. Data show that most infants aged 3-6 months and nearly all those aged 7-11 months received water, although it is possible mothers underreported water consumption in the youngest age group due to the admonitions of the nurses in charge of growth monitoring.

Table 7 Number of children given specific foods and liquids during the past 24 hours, by age group			
Foods and liquids	Age group		
	3-6 months (N=21)	7-11 months (N=24)	12-18 months (N=20)
Breast milk	21	23	19
Water	16	23	20
Koko	12	23	6
Milk or lactogen	7	16	14
Soup or stew	4	18	14
Fruit juice	4	15	12
Rice	0	17	9
Tea	0	8	10
Tuo zaafi	0	8	4
Banku	0	7	10
Kenkey	0	7	5
Rice balls	0	7	9

By far the most common complementary food was koko, the fermented maize porridge. Over half of infants aged 3-6 months and nearly all of those aged 7-11 months received koko. By age 7-11 months, most infants also were given milk, soup, fruit juice, and rice; far fewer infants age 3-6 months received these foods. A good number of mothers added tinned milk or Lactogen to the baby's porridge, while a smaller number gave these milk or formula products alone as a supplement to breastfeeding. Soups and stews included "light" vegetable-based soups as well as "heavy" soups made from groundnuts and palm nuts. Orange juice is readily available, and although few mothers gave it to very young infants, many gave juice to older infants.

Some infants age 7-11 months were given other preparations of fermented maize flour, such as tuo zaafi, banku, and kenkey, which also form part of the adult diet. These staple foods are considered "light" foods, in contrast to dishes made from other cereals and tubers, such as rice, plantains, and cassava, which are considered too "heavy" for a young infant. Nearly all the infants aged 7-11 months drank water. Mothers and other caregivers also gave a good number of infants foods—usually rice balls—purchased from food vendors or chop-bars (eating establishments that serve cooked meals and snack foods).

As seen in Table 7, breastfeeding continues into the second year of life for almost all children. While some foods that are important at 7-11 months remain common at 12-18 months, koko is an exception. The proportion of infants regularly receiving koko declined to 32 percent among children over 12 months—a drop of nearly two-thirds from the 7-11 month age group. Children in the older age group also are given some additional foods that are consumed by adults.

Mothers of well-nourished infants use a consistent strategy: they focus on porridge as the main complementary food and believe it is unhealthy to give infants a wide variety of foods. Mothers and grandmothers in this group described giving one complementary food for a few weeks or months, for example, koko, and then switching to another, for example, rice.

- Interviewer: *Do you think a wide range of foods should be given to babies?*
 All: *No.*
 Grandmother 1: *It's good practice to introduce them one after the other when the baby gets fed up with one.*
 Interviewer: *Why do you think that a wider range of foods shouldn't be introduced to babies?*
 Grandmother 2: *A baby cannot eat all types of food like that . . .*
 Grandmother 3: *[Interrupting] They should be introduced to, say, porridge after two weeks and, after three months, you try kenkey, light one of course, especially in the afternoons. And thereafter, rice, fufu and so on as the baby grows to about one year.*
 Grandmother 4: *It's not healthy for babies to start eating food of all kinds.*

(Grandmothers, focus group discussion, Adugyama)

Mothers also recognized cues that children needed or wanted to eat foods other than breast milk. Crying after breastfeeding or continuous “greedy” suckling was a signal to some mothers that breast milk was no longer enough to satisfy their infants. Mothers also described a variety of signs indicating that a baby is interested in trying foods other than breast milk. For example, babies may watch other people eat, grab other people’s hands while they are eating, move their mouths while watching others eat, put objects in their mouths, and become fussy or fidget when they see or smell food. Teaching the baby to take foods begins with these cues and then proceeds by trial and error. Most mothers first fed the baby porridge with a spoon and later let the baby feed himself/herself from a plate.

For mothers, especially those with malnourished children, the introduction of foods is a frustrating process. Mothers complained about wasting money on food that the baby would not eat. Many worried that their child was not eating enough. Noting that breast milk no longer satisfied the baby was the strongest indicator to begin complementary feeding. When the baby refused food or got diarrhea—which often occurs when a baby begins taking porridge—mothers became concerned for their child’s health.

The baby’s lack of interest in food sometimes leads to harsh measures. Some mothers forced the child to take food, although they did not often resort to this measure. A grandmother described how she accomplished this task:

- Interviewer: *When your grandchild does not feed well, what do you do?*
 Grandmother: *I force him to take food.*
 Interviewer: *All right, but in what way do you get the baby to feed?*
 Grandmother: *I place the baby on my lap with the head between my upper arm and forearm and the face facing upwards while food is forced into his mouth. The baby may spew out some of it but some of it, too, will get into the stomach.*

(Grandmother, 50 years old, Adugyama)

For most mothers and grandmothers, coaxing was the preferred method of getting the child to eat. Grandmothers especially thought that mothers of this generation lack the patience to feed their infants properly. They believed that the children really do like food, but that their mothers do not have the time to see to their proper feeding. In those cases, they said that grandmothers should assume the task of coaxing the babies to eat. Others, like C in the second case study, turned to vitamins, tonics, and other supplements that would improve the baby’s appetite.

Case Study 2—Complementary Feeding Too Late

C lives in Mossi Zongo. Her seven-month-old son, although well nourished, does not currently consume much in the way of complementary foods; he mostly takes breast milk. Recently, C had an illness that disrupted the infant's feeding:

- Mother: *When the baby was two months old, one of my breasts got diseased. The other one, however, did not have much milk. As such, I prepared porridge as a supplementary feed for the baby. I fed him through a feeding bottle.*
- Interviewer: *After the porridge, what else did the baby take?*
- Mother: *Later on, the baby refused the porridge, so I bought . . . er . . . that thing like breast milk [Lactogen].*
- Interviewer: *For how long did the baby take Lactogen?*
- Mother: *Umm, the baby finished one tin and I bought a second tin of the Lactogen. Later on, when the breast healed, I started offering breast milk again.*

At age seven months, the baby takes only breast milk, water, and occasionally some light soup or palm nut soup from his mother's plate. Once in a while when he is offered porridge, he takes it. He was first given water at age six months, and at that time C tried to give him porridge to which she had added milk. On two consecutive days this food made him vomit, so she abandoned it. She has not offered it again. He has never taken fruit juice, tea, or cocoa, and he refused to eat tuo zaafi. C explained that she sometimes forces him to take food, but to no avail:

- Interviewer: *Don't you compel him to take the food?*
- Mother: *Sometimes when he is forced, he takes a little of it, and at other times rejects it altogether. Even when he takes it, he may spew it out.*

C compared her son's feeding to that of his siblings. She admitted some similarities: her other children did not like to eat food early in their lives, but the others did take tuo zaafi in their infancy. She said that for all her children it had been necessary for her to "buy medicines to whip up their appetite before they start eating food." In addition to these medicines, she explains other techniques can be used:

- Interviewer: *So what, in your opinion, can mothers do to make sure their infants feed well?*
- Mother: *Some children feed well on any food at all, while others do not. Under such circumstances, one has to try the baby on different types of foods to determine what the baby likes.*

For a combination of reasons, C's baby has delayed taking complementary foods and might suffer if this problem is not resolved. Like other mothers of well-nourished infants she is allowing him to control his own feeding—she does not often force him. But also, like the mothers of malnourished infants, she does not focus on porridge as the main food, and she believes in trying a wide variety of foods.

ILLNESS, HEALTH CARE, AND FEEDING

9.1 FEEDING INFANTS WHO ARE ILL

Most mothers noted that their children did not feed well when ill. Especially with complementary foods, mothers reported that the child either lost his/her appetite, had no interest in food, or could not take in food while ill. Breastfeeding also suffered. Observational data confirmed this: both the total number of minutes spent breastfeeding and the number of feedings were lower among children who were ill on the day of observation than among those who were well.

Mothers explained the phenomenon as a decrease in appetite that happens whenever anyone is ill. In fact, mothers of malnourished infants attributed much of their difficulty with complementary feeding to episodes of illness that suppressed their babies' appetites. On the day of observation, malnourished children were indeed more likely than well-nourished children to be ill.

During the child's most recent illness, mothers fed them breast milk. Mothers said they could usually coax the child into breastfeeding even when he/she was otherwise not interested in food.

9.2 VITAMINS, HERBS, AND TONICS

It also emerged from interviews that some mothers give vitamins, herbs, and liver tonics to their babies as a strategy to improve or, in the words of one respondent, "whip up" their appetites. The practice of giving these "medicines" was widespread: about one-fourth of the women interviewed in both Mossi Zongo and Adugyama reported regularly giving their infants vitamins, herbs, and liver tonics.

9.3 MEDICAL TREATMENTS

There was much discussion about what to do when a child was not eating well. The consensus among the grandmothers was that the only reason a child refused food was illness, so the child should see a doctor. Grandmothers mentioned a wide range of ailments that affect a baby's appetite and feeding and that require medical treatment, such as intestinal worms, some local illnesses that are cured by herbalists, and spiritual illnesses that can only be cured by fetish priests or priestesses. While traditional treatments were considered to be effective for specific ailments, the grandmothers agreed that the first line of treatment should be a doctor trained in biomedicine, a medical officer, or the community health nurses. Only when the doctor finds nothing wrong should traditional causes of illness be explored and traditional treatments sought. One of the participants in the grandmothers' focus group discussions was a fetish priestess, whose training and expertise included both herbal and spiritual curing. She, too, concurred that a doctor should be consulted first to rule out infections and diseases that biomedicine can cure.

Most households in this study purchased all the food they consumed, including staple foods such as maize, millet, sorghum, cassava, and yam, as well as other ingredients such as cooking oil, bouillon cubes, peppers and other spices, sugar, fish powder, and meat. About one-third of the households grew their own staple foods on plots of land located some distance from their homes. Even when households grew their own staple foods, they purchased other ingredients with money obtained from selling produce from their farms or other enterprises. Rural households were far more likely to grow their own staple foods than urban households: roughly half of the households in Adugyama produced their own staples through farming, compared with just one household in Mossi Zongo. Of the 16 households in Adugyama that produced their own staple foods, eight of the mothers were farmers, four were traders, three were hairdressers, one ran a chop-bar (an eating establishment that serves cooked meals and snack foods) , and one was a housewife.

Given that most households rely upon purchased food, mothers made it clear that the main problem with infant feeding was financial.

- Interviewer: *What problems are associated with infant feeding?*
 Mother: *[Laughter] This question is difficult. [Laughter] . . . The only problem lies in getting money to buy the food for them.*
- Interviewer: *In case you have no money to buy food for the baby, what do you do?*
 Mother: *One cannot do anything [other] than to sit down, and, if somebody sees your plight, he can give the children something to eat.*
- Interviewer: *Who are the people that can give mothers advice about infant care and feeding?*
 Mother: *It's when we go for weighing that we are advised. We are told what to do for the children. You may, however, know what to do for the children but if one does not have the means . . . you see?*
- Interviewer: *Financial problems?*
 Mother: *Yes.*

(Mother of malnourished 10-month-old girl, Mossi Zongo)

In fact, women who did not earn any income were more likely to have malnourished children, regardless of whether they received any financial support from their husbands.

Most mothers recognized the relationship between their own food intake and breast milk production, noting the importance of both timing their own meals and eating specific foods that increase the flow of milk. Several mothers commented on infants who suckled constantly or greedily, which required them to consume more food in order to maintain their breast milk production:

- Interviewer: *Some complain that when their babies suckle they feel pains in the breast.*
 Mother: *[Laughs] When they suckle like that, you are always hungry and you have to eat very quickly.*
- Interviewer: *What foods do you eat to help you with more milk?*
 Mother: *It is groundnut soup. Yes. Palm nut soup, soup and others.*

(Mother of malnourished 16-month-old twin girls, Adugyama)

There was remarkable consistency in women's reports about which foods encourage breast milk production. The consensus among both mothers and grandmothers was that foods prepared from maize, such as koko, kenkey, and tuo zaafi, are the most beneficial for nursing mothers. These three foods are probably more nutritious than other common staple foods because of the fermentation process they go through. This means that nursing mothers would select maize as their staple food rather than rice, cassava, plantain, or yam. These maize-based foods are often referred to as "light" foods, in contrast to plantains and cocoyam which are considered "heavy" and unsuitable for young infants. After maize-based foods, many women recommended soups, especially groundnut and palm nut soups which contain more fat and protein, to increase breast milk production.

11.1 SOURCES OF SUPPORT

The study also examined the care and support that members of the family and the community provide to mothers, including helping provide food for the family, reducing women's workload, and encouraging postpartum rest (Engle, et al., 1997). For the most part, family members provide this kind of care and support, although friends and neighbors make a significant contribution in some areas, such as childcare. Coresidence with specific relatives—including husbands, mothers, and sisters—does not necessarily imply that they are providing support to a woman. Furthermore, a relative may offer only one type of help (e.g., financial support or assistance with chores) or may provide a wide spectrum of care and support. The interviews were sensitive to the range of possibilities, and the interviewers were instructed to get specific information about residence, shared facilities (such as rooms, cooking areas, and bathing facilities), and assistance with domestic chores and childcare.

About four-fifths of the mothers interviewed received some financial support from their husband or the baby's father. Fewer—about two-thirds—resided with them. Since all but nine of the women were married, this suggests that an appreciable number of women were married but not living with their husbands. Many women also named husbands as substitute caregivers for their young children. However, children's nutritional status did not noticeably differ based on whether their mothers received financial support from or resided with their husbands. In fact, patterns varied between the two study sites. In the rural community of Adugyama, mothers of well-nourished children were more likely than mothers of malnourished children to report a lack of financial support by the husband. The reverse was true in Mossi Zongo.

In both study sites, coresidence with the respondent's mother (i.e., the child's maternal grandmother) seemed to promote young children's nutritional status. In a number of cases, maternal grandmothers lived nearby, sometimes within the same compound or house, but did not share the same rooms as mothers. These mothers also probably benefited from this important source of support. Finally, many women who did not live with their husbands or mothers lived instead with other relatives, including grandmothers, uncles, sisters, and in-laws.

11.2 SATISFACTION WITH COMMUNITY

Another indicator of the level of care and support available to women is their overall satisfaction with life in their community. Many women were fatalistic, saying they had little control over this aspect of their lives and simply accepted their circumstances. Others cited specific aspects of their community that they felt fortunate to share, such as access to land for farming. To many, farming meant that the household always had access to food, even during economic downturns.

Interviewer: *Please explain what makes you satisfied?*

Mother: *[Laughs] When you go to farm, you get food. I am not in difficulty. Someone is living in difficulty somewhere . . . but I am not in difficulties, and that's why I'm satisfied with this place.*

(Mother of malnourished 9-month-old girl, Adugyama)

However, to some women farming presented physical difficulties, especially for nursing mothers:

- Interviewer: *In general are you satisfied with living here in Adugyama?*
Mother: *[Laughs] Sometimes, I feel happy that if maybe I had been in Kumasi I would have liked it.*
Interviewer: *Why would you have liked it had you been in Kumasi—is it because of the lights [electricity]?*
Mother: *It is not because of the lights. There, I may have some trading to do and the farming would go down. When there is a baby at your back and you go to farm it is . . . it is a great burden. My husband's sight, too, worries him. When it happens like that the burden becomes greater.*

(Mother of malnourished 12-month-old boy, Adugyama)

While the ready availability of work and amenities like electricity makes an urban community like Mossi Zongo seem attractive to rural people, the residents of Mossi Zongo had very different views and experiences. Women in Mossi Zongo mostly complained about the lack of services in their community, such as water, toilets, refuse disposal, and electricity. Others were dissatisfied with the noise and lack of privacy or with the interference of relatives. Although some residents of Mossi Zongo were unable to find work in their chosen profession (e.g., hairdressing or teaching), many women were still able to find work that sustained them. For example, one woman had been given money by her husband as capital to start a business, but he no longer contributed “chop money” for the family’s meals and necessities. As this mother of four who sells charcoal from her home explains, even less than successful businesses can be used to feed the family:

- Interviewer: *How do you use your income to assist the family?*
Mother: *In fact, the business does not yield any profit that I can use for anything.*
Interviewer: *So why do you engage in it then?*
Mother: *It is that which I use for everything . . . [Laughter, followed by a long pause] You know, it is not everyone whose business flourishes, such that one can save some of it for other purposes. The least that is derived from it is used to purchase food to feed the children . . .*
Interviewer: *Are you satisfied with living in Mossi Zongo here?*
Mother: *[Laughs] You know, satisfaction with any place has to do with having sound mind and body. If one's business is not progressing, even though one eats, one continues to emaciate, you see?*

(Mother of malnourished 10-month-old girl, Mossi Zongo)

11.3 REDUCTIONS IN MOTHERS' WORKLOAD

Most women reported that relatives—including mothers, husbands, daughters and sons, and other relatives—could take over for them while they were working or if they needed to go somewhere. However, the availability of these substitute caregivers varied greatly among respondents. Quite a few mothers of malnourished children reported that they had no substitute caregiver to call upon. In contrast, mothers of well-nourished children generally reported that their own mothers helped them with childcare and household chores.

A woman's mother seems to play an important and unequivocally positive role in the domain of infant nutrition. The contributions of maternal grandmothers, both with respect to childcare and household chores, seem to promote the infant's nutritional status. Furthermore, women who resided with their own mothers were more likely than other women to have well-nourished children.

The findings are less encouraging with regard to older siblings and other adolescent relatives who frequently act as substitute caregivers. Several women mentioned that their older children helped with household chores, such as carrying water, doing errands, and watching the baby, but children were not perceived as reliable helpers. The consensus was that children needed supervision: they were helpful when their mothers were present but could not be left to do these tasks on their own. For example, a ten-year-old described making porridge for her elder sister's baby:

- Interviewer: *What do you do for her [the baby] in the evening?*
Adolescent: *It is the mother who does the feeding in the evening, but sometimes I also help.*
Interviewer: *Do you prepare the baby's food?*
Adolescent: *The mother prepares it and gives it to me to feed the baby. But I do it sometimes, especially porridge.*
Interviewer: *Tell us how you prepare the baby's porridge?*
Adolescent: *Yes, I take a quantity of the dough, mix it with water. I then boil water before adding the dough. I keep stirring until it is ready to be eaten.*
Interviewer: *What do you do then?*
Adolescent: *When the porridge is well boiled, I clean the flask and then call [my elder sister] to pour the porridge into the flask.*

(Adolescent caregiver, 10-year-old girl, Adugyama)

While this girl often fed the baby in the mornings before she left for school, she needed supervision in making the porridge because she could not pour the boiling hot food into the flask where it is stored between feedings. Most of the children interviewed were somewhat older, usually between 13 and 16 years of age.

While most of the adolescent caregivers fed infants, few prepared porridge or other foods. Instead, they bought food when the baby in their care seemed to be hungry. Most also said they carried the infant, meaning they tied the infant on their back. For some this was part of the process of putting the baby to sleep, while for others it was to soothe a crying baby.

While many of the adolescents were too shy to express themselves well, this young lady explained her role in her baby sister's care:

Sometimes when mothers are overburdened, children who may not be able to assist in the work can at least take responsibility of the babies. For instance, if a mother is cooking, the child can take the baby out to play so that by the time she comes back with the baby, the food is ready for all of them to eat.

(Adolescent caregiver, 12-year-old girl, Adugyama)

Generally, most of the older siblings felt a strong obligation to help their mothers because their mothers work hard to support the family and are overburdened. According to some, the obligation comes from God. The adolescent caregivers also were aware of their own limitations in terms of the tasks they were capable of, their frustrations with the baby, and their reliability. Many noted that adolescents their age could not bathe very young babies and were too young to cook. Most disliked it when the baby cried or defecated or urinated on them. A few noted that while they usually did what their mothers asked, sometimes they did not complete the tasks assigned or they forgot about them.

This study examined two areas in the psychosocial care of young children: mother-child interaction and the interpretation of infant behavioral cues such as crying and refusing food. In addition, hygiene practices provided some insights into other childcare practices that may influence child feeding and nutrition.

12.1 MOTHER-CHILD INTERACTION

Contrary to expectations, analysis of the observation data found that mothers interacted more with malnourished than well-nourished children. Table 8 summarizes the data gathered by direct observation of 23 mother-child pairs. Each category combines multiple activities that observers coded separately. “Mother with child” sums up the time in which both were present in the same room. “Mother touching child” includes all activities that bring mothers in physical contact with the child, such as carrying, holding, and bathing the child. “Mother care” refers to activities in which the mother and child interact but do not have physical contact, such as talking to, playing with, and protecting the child.

Table 8 Minutes of mother-infant interaction during a 12-hour observation period, by nutritional status of children

Type of interaction	Nutritional status of child	
	Malnourished (N=11)	Well nourished (N=12)
Mother with child	641	622
Mother touching child	300	243
Mother care	47	39

In each category, the number of minutes of interaction is greater for malnourished than well-nourished infants. The association is unexpected since the UNICEF paradigm for psychosocial care—which addresses caregivers’ attention, affection and involvement—assumes that frequent touching, holding, and talking positively influence child growth and development (Engle et al., 1997). In Asia, North Africa, and Latin America, research has found that more interaction is indeed correlated with better nutritional status. However, a sub-Saharan study found the opposite: in Kenya children with reduced food intake and lower weight and length were more frequently held, carried, or given physical care (Engle and Ricciutti, 1995).

There are three possible explanations for the greater interaction between malnourished children and their mothers. First, it is possible that malnourished children require more care due to illness. Second, malnourished children may require more attention and encouragement to eat, as suggested by the mothers and grandmothers participating in this study. Third, if mothers of malnourished children have fewer substitute caregivers available, they may be forced to spend more of their own time on childcare.

12.2 INTERPRETING BEHAVIORAL CUES

Mothers associated a variety of infant behaviors with feeding, hunger, and satiation. For example, most interpreted crying as a sign of hunger, while they assumed the infant was satiated when the baby lost interest in the breast and/or its abdomen was raised. Interviews suggested that mothers of well-nourished infants were more likely to recognize and respond to these cues than mothers of malnourished infants.

Crying

Observational data found that well-nourished infants spent more time crying than did malnourished infants. Mothers and other caregivers unanimously attributed an infant's crying to hunger, especially if the child was in no apparent danger. Two mothers explained that when the child is hungry, he/she is distracted even from play:

Interviewer: *But how do you know that [your daughter] wants to be breastfed?*
Mother: *Well, when she is hungry she cries. Even when she is playing with the older children. When it happens that way I realize that she wants to breastfeed.*

(Mother of well-nourished 7-month-old girl, Mossi Zongo)

Interviewer: *What do you use as an indicator that the baby wants to be fed?*
Mother: *When a child is not hungry, you will see that it will be playing about. But when it becomes hungry, it will move closer to the mother or it will like to be with the mother. It becomes quiet and moody, while at other times it cries altogether.*

(Mother of well-nourished 7-month-old boy, Mossi Zongo)

Grandmothers explained that their role in their neighborhood included notifying mothers that their infants were crying to be fed. Adolescents who care for infants also are distressed by the infant's crying. Although they would purchase food to give to the baby in their care, sometimes this did not stop the crying. Some children said that it was part of their duties to bring the baby to its mother when the baby cried from hunger.

Refusing Food

When a child refused to take food, most mothers responded by offering different foods. When a baby refused porridge, for example, several mothers explained it by saying "the baby got fed up with porridge." This was interpreted as signal for the mother to purchase and begin preparing another complementary food, such as rice. Here is how one mother described this experience:

Interviewer: *What are the main problems you experience with infant feeding?*
Mother: *With infant feeding. If you prepare a certain food and keep it. Maybe, let me take porridge, for example. If you put soya beans into it and mix it with sugar on the fire and he [baby] eats it today, tomorrow he will not eat when you give it to him. And I will think that he has become fed up with it, and so I will have to change it. Find some method to get a different food to replace it. If you put your hope only on one food, then you have tired for nothing. He will feel hungry, so you will have to change the diet every time*

Interviewer: *What did you do if the baby refused to take food?*
Mother: *If he did not want to eat it, I changed it. If maybe he did not eat the rice ball, I hurry up and prepare porridge.*

(Mother of malnourished 12-month-old boy, Adugyama)

This statement communicates the frustration mothers experience when the money spent on a complementary food is lost and the baby is still hungry. As previously described, the fermented corn dough used to make koko keeps for four or five days. Thus, when the son of the woman above refused porridge, she realized she had wasted money on what should have been several days' feedings. In addition to the economic loss, she has lost the time and labor she invested in preparing the porridge. While she may eat the porridge herself to promote breast milk production, that still does not solve the problem of a hungry baby.

However, grandmothers viewed the problem somewhat differently. In the focus group discussions, there was a strong consensus that mothers of this generation did not have the patience to feed their babies properly. Grandmothers thought that the only reason a child would refuse food was illness, in which case the child should be taken to the hospital. If a child is not found to be ill, then he/she has to be forced to eat.

12.3 HYGIENE

Mothers, grandmothers, and adolescent caregivers all recognized the importance of hygiene in promoting infant nutrition. Hygiene practices mentioned during the interviews included bathing the baby, cleaning the baby's mouth before and after feeding, and cleaning up feces and urine in the baby's environment and sleeping areas.

One mother described in detail how a white foamy substance in her baby's mouth would affect his appetite. She assiduously cleaned the baby's mouth and tongue:

Interviewer: *In your opinion, what things can mothers do to make sure their infants feed well?*

Mother: *We should do our best that when we wake up we would clean their mouths because there is some foam on their tongues . . . I can see that it doesn't make them feel the full sweet taste of the food very well. So it makes one know that it makes them lose appetite. So we have to clean their mouths very well, to the extent of the baby about to vomit. You let the towel go down its tongue very well and clean it very well.*

(Mother of malnourished 12-month-old boy, Adugyama)

Grandmothers also mentioned the need to clean this film from the baby's mouth. They, too, believed that cleaning the mouth would make the food taste better and therefore improve the baby's appetite. One grandmother recounted that every morning she awakened and bathed and dressed her grandchildren. She paid specific attention to brushing their teeth first thing in the morning so that food tastes good to them. She also stressed the importance of giving babies "light" food like koko or tuo zaafi in the morning because "heavy" foods like mashed plantain or cocoyam might make them vomit.

13.1 COMPLEMENTARY FEEDING AND CHILDCARE

Mothers prepared their children to take complementary foods in three ways. First was early sampling of common weaning foods. Because most mothers thought that porridge was the most appropriate first food for infants, it was important that the baby developed a liking for porridge. Some mothers tried porridge intermittently from a young age to prepare their infants to consume it on a regular basis later, while others simply began offering porridge when they thought the baby was interested in eating and had achieved the physical capacity to swallow. The baby's interest in food was determined from the gestures he/she made while others were eating. Second, many mothers and grandmothers thought that cleaning the baby's mouth, specifically removing a whitish film that develops on the baby's tongue, improved the baby's sense of taste and promoted a more pleasurable experience of food. Third, some mothers gave babies vitamins or liver tonics to improve their appetites.

A wide range of foods was given to children while they were still breastfeeding, but mothers expressed strong preferences for particular categories of foods for their infants. Koko, the fermented maize porridge, was overwhelmingly the food of choice for infants among both mothers and grandmothers. While koko was the preferred first food for babies, it represented a larger category of foods prepared with fermented maize flour, including tuo zaafi, kenkey, and banku, that also were offered to infants during the first year of life. These are considered "light" foods in contrast to dishes made from other cereals and tubers (rice, plantains, cassava) which are considered too "heavy" for a young infant.

Many mothers enriched koko with soybeans, cowpeas, and groundnuts. Mothers may prefer to make their own weaning food instead of using commercial products like Weanimix because of the cost or perhaps because mothers and/or infants prefer the taste or consistency of homemade porridge.

Although mothers have clear preferences about which foods are appropriate for infants, they also are quite responsive to the baby's own tastes and desires for various foods. In addition to porridges like koko and Weanimix, mothers also gave infants tinned milk, soups, stews, and fruit juices while they were still breastfeeding. In addition, a good number of malnourished infants received foods purchased from food vendors or chop-bars, most commonly rice balls, during the first year of life.

Mothers associated many different infant behavioral cues with hunger, satiation, or interest in complementary foods. Sustained crying was the most commonly mentioned sign that an infant was hungry, while many mothers gauged whether the baby had had enough to eat by the size of its abdomen. Crying after breastfeeding or continuous "greedy" suckling was a signal to some mothers that breast milk was no longer enough to satisfy their infants. Mothers judged whether infants were interested in complementary foods by their behavior while other people were eating. Positive signals included the babies' watching the food, grabbing the people's hands, opening their mouths or making chewing motions, fidgeting, and crying. Some mothers may find it difficult to refrain from giving complementary foods to infants under six months of age when they display these behaviors.

During their children's most recent illness, mothers gave them breast milk. Most mothers noted that their children had little appetite when ill and were more easily coaxed into breastfeeding than eating complementary foods.

13.2 VALIDITY OF HYPOTHESES

1. *In households where the father regularly provides food or money to purchase food, young children will not be malnourished.*

Although the study did not collect detailed information on the relative financial contributions of husband, wife, and others, interviewers did get a sense of whether the father contributed financially to the family. Of the 65 women interviewed, 23 did not reside in the same household as their husband or the baby's father, probably because of the importance of matrilineage in organizing life in this part of Ghana. However, only 12 women out of 65 said they received no financial support from these men, whether co-resident or not. Fathers' financial support did not appear to influence children's nutritional status.

This hypothesis may have been ill conceived, since it is based upon a patrilineal construction of the family. In the study sites, the abusua, which includes a grandmother and her descendents, is the primary kinship unit. Household composition and the financial contribution of its members may conform more to the abusua than to the nuclear family pattern, thus diminishing the importance of the father's financial contributions.

2. *Young children who are cared for during the day by persons other than their own mothers will likely be malnourished.*

Findings suggest the exact opposite of this hypothesis: mothers who could call upon a wide variety of relatives to care for their infants while they were working or doing other chores were more likely to have well-nourished infants. In contrast, the mothers of malnourished infants were more likely to report that they had a limited social network and no one to call on to help care for their infants. The shortage of substitute caregivers thus may imply a lack of physical, informational, and financial support which can directly contribute to a child's nutritional status or, indirectly, enable the mother to better provide for her child. Another African study supports this interpretation. It found that, among other attributes, caregiver's influence on child feeding decisions, willingness to seek advice during child illness, and the number of individuals available to assist with domestic chores, were positively associated with nutritional stature (Begin et al., 1999).

The most important substitute caregiver was the woman's own mother, whose help seems to have a beneficial impact on the child's nutritional status. While women also frequently named husbands and older children as substitute caregivers, there does not seem to be any clear relationship between their help and a child's nutritional status. Mothers usually assign adolescent caregivers age-appropriate tasks, such as feeding, playing, or carrying infants on their backs to put them to sleep. While a few also prepared porridge, their instructions regarding this task also seemed to be age-appropriate.

3. *Mothers of well-nourished young children respond more often to cues from the child (such as crying) by giving breast milk as well as other foods.*

Interviews with mothers support this hypothesis. Mothers of well-nourished infants were more likely than mothers of malnourished infants to recognize crying and more subtle behavioral cues that indicate infants are hungry. They also were more likely to describe the infant's satiation point as when the baby loses interest in the breast, stops suckling, and begins playing, in addition to noting the infant's stomach is raised. In contrast, mothers of malnourished infants said they themselves interrupted their infant's suckling.

Observational data shows that well-nourished infants spent more time crying than did malnourished infants. Combined with the information that many of the malnourished infants were ill on the day of

observation, this may suggest that malnourished infants had suppressed appetites and were less able to communicate hunger due to illness.

Both mothers and grandmothers responded to feeding difficulties, such as refusal of food and sickness following complementary feedings, with more intensive caring and feeding activities. Indeed, many grandmothers blamed mothers for infant malnutrition, accusing them of not persisting in offering food and proper infant care.

4. *Mothers of well-nourished young children feed them more often than do mothers of malnourished young children.*

The observational data contradicts this hypothesis. It found that malnourished infants were fed more frequently and that, in the 3-6 month age group, malnourished infants also spent more time feeding than well-nourished infants. The same pattern was observed for both breastfeeding and complementary feeding. Interviews with mothers supported these observations as mothers of malnourished infants talked more about feeding difficulties, seemed to spend a lot of time preparing complementary foods, and constantly worried that the infant would not like the food offered. Similar findings were reported in a study conducted in Kenya where mothers of low weight and length babies held and fed their babies more frequently (Engle and Ricciuti, 1995).

These data suggest that the frequency of infant feeding and mother-infant interaction is generally less important than the quality of those behaviors. Maternal responsiveness to the infant regarding hunger, satiation, and the need for physical and verbal stimulation seems to be the link between maternal behaviors and infant nutritional status. More research to determine culturally appropriate patterns of maternal responsiveness are required in order to formulate policy statements. This study has shown that there are clear differences in maternal responsiveness, but more information is needed to define how this develops and to identify factors that enhance the quality of mother-infant interactions.

13.3 POLICY RECOMMENDATIONS

Five recommendations can be suggested based on the findings of this study:

1. Although infants do not require water before six months of age, during the complementary feeding period, and beyond, messages should emphasize giving babies *clean* water. Because of the strong cultural support for giving water from birth and its widespread prevalence, attempts to change this practice—even prior to six months of age—will be difficult.
2. The use of fermented and enriched koko as a complementary food should be supported and promoted among mothers.
3. The relationship between early childhood illness and feeding needs to be addressed. Interventions should promote home and community-based prevention and treatment as well as help mothers adopt more effective feeding practices during episodes of illness—practices which also support their mothering skills.
4. Social support for family or community-centered childcare to enable mothers to work would be a culturally acceptable way to help mothers provide for their children. It would also provide a network through which mothers could share childcare strategies to improve child health and nutrition.

5. Grandmothers are an important source of childcare and other support for mothers. Any interventions providing educational training in infant feeding and childcare should include them as well as mothers.

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