

7.1 BREASTFEEDING

During the observation period, all the children were observed breastfeeding. As earlier indicated, observations were noted each minute for a total of 360 minutes (6 hours) per child. Table 7 indicates that among the well-nourished and malnourished children, there were differences in the time spent breastfeeding although they were not statistically significant. In a linear regression for each age group, it was found that among those age 3-4 months, well-nourished children breastfed on average for 19 minutes more than their malnourished counterparts. This result has borderline significance ($p=0.181$) but may be significant with a larger sample size. Among those age 5-6 months, well-nourished children breastfed for on average 11 minutes more than those who were malnourished. However, among those age 7 months or more, those who were well-nourished breastfeed for on average 10 minutes less than their malnourished counterparts.

Table 7: Mean number of minutes child spent breastfeeding during the six-hour observation period, by nutritional status and age

Age of child (months)	Well-nourished children (N=16)		Malnourished children (N=15)	
	No. mins	% time	No. mins	% time
3-4	61.3	17	42.3	12
5-6	41.8	12	30.3	8
7+	37.2	11	47.2	13

These data indicate that younger children of better nutritional status spend more of the early months breastfeeding but then appear to reduce breast milk consumption to take in additional liquids and solids by at least six months of age. Those who are malnourished seem to breastfeed less in the early months but more during the later months, compared with their well-nourished peers. It is impossible to say whether the shorter amount of breastfeeding in early life is a cause or consequence of their nutritional status without knowing the full medical and nutritional history of the children in question.

Factors leading to difficulties with feeding may include problems associated with congenital disorders or low birth weight about which we have no information. However, it may be that such conditions lead to problems with suckling and/or breast milk intake and later to a reluctance to take solid food at six months when their well-nourished counterparts are able to do so.

In summary, the general patterns indicate that at younger ages, those with better nutritional outcomes breastfed for a longer duration during the observation period. In contrast, at the older ages, those with poorer nutritional outcomes breastfed slightly longer during the period they were observed.

Further analysis indicated that the mean duration of each period of breastfeeding did not vary between the well-nourished and malnourished children observed. Among those age 3-4 and 5-6 months, each period of breastfeeding lasted approximately 6 minutes, while those age 7 months or more fed for approximately 7 minutes at a time. Thus, the hypothesis that well-nourished children would breastfeed longer than malnourished children (hypothesis 4, section 4.1) was not supported.

7.2 MOTHERS' REPORTS OF LIQUIDS AND SOLIDS CONSUMED

Mothers were asked to name everything that their infant had consumed since birth and to state when the child began to take it. The categories of interest were the following: water, *cobal*, animal milk, formula, and traditional medicines for the liquids; meat or fish for the solid proteins; *to* and rice for the starch staple; and fruit. All the infants 6 months old or younger had been given water early on, and most had often been given traditional medicines in the weeks after birth.

All children received breast milk except one child in Mopti whose mother had died. Nearly all children received water and traditional medicines from early ages. Indeed, not one infant was truly exclusively breastfed, although many of the younger infants did not receive "food" until they were 6 months old. Children were, in general, receiving *cobal* at about 6 months, and *to* or rice was introduced at about 9-10 months. However, a few children in the rural areas were receiving only *cobal*, breast milk, and traditional medicines at 11-12 months of age.⁷

7.3 OBSERVATIONS OF LIQUIDS AND SOLIDS CONSUMED

The observations over a total of six hours in a day showed that the children spent very little time consuming any kind of liquid. As seen in Table 8, 16 well-nourished and 15 malnourished children were observed. However, in general, the older children spent more time consuming both water and other liquids than the younger children. It is noteworthy that of the three children exhibiting good nutritional status at 3-4 months, only one consumed water during the observations, compared with two out of the three others of the same age. Of the five children in good health at age 4-5 months, only one consumed water during the observations, compared with one out of the three who were malnourished. Nevertheless, none of the differences in the consumption of water at the different ages by nutritional outcomes were statistically significant.

Even children age 7 months or older, who needed complementary feeding for optimal growth and development, only spent about 2 percent of their time consuming liquids other than breast milk and water. Further analysis indicated that on average those age 7 months or older spent approximately six minutes more than the youngest children consuming liquids. Those who were better nourished spent an extra minute per observation period consuming liquids, compared with their malnourished counterparts. Among those age 5-6 months and 7 months or more, there was no difference by nutritional status in their consumption of other liquids.

⁷It should be noted that the traditional medicines are usually given with butter from the shea nut, which may have some calorific value.

Table 8: Mean number of minutes child spent consuming water and other liquids during the six-hour observation period, by nutritional status and age

Age of child in months	Well-nourished children (N=16)		Malnourished children (N=15)	
	No. mins	% time	No. mins	% time
CONSUMED WATER				
3-4	1.0	0.3	2.3	0.6
5-6	2.6	0.7	2.7	0.8
7+	3.8	1.0	3.4	0.9
CONSUMED OTHER LIQUIDS				
3-4	0	0	1.6	0.4
5-6	4.2	1.2	1.3	0.4
7+	7.2	2.0	7.2	2.0

Overall, the results point to some compensation by the mothers of very young malnourished children who tend to give greater quantities of water and other liquids. This may be to counteract perceived inadequacies of their breast milk or to facilitate surrogate caretaking by leaving a child with a sibling or other babysitter. However, by 7 months, these differences seem to have disappeared and the children follow more or less the same additional liquid regime whatever their nutritional status. Nevertheless, the children who are malnourished at this age appear to be breastfed significantly more, whilst those who are well nourished consume greater quantities of solid mushy food (see below).

Although there may not be significant differences in the quantity of liquids consumed by well-nourished and malnourished children, important variations exist in the quality of their intake. The only liquid consumed by well-nourished children age 3-4 months was water (N=3). In contrast, those of the same age who were malnourished were consuming traditional medicines and *quinqueliba* (a local infusion with anti-pyretic and other healing properties). Giving traditional medicines and *quinqueliba* suggests that mothers or caretakers were aware of the weakened state of their child and were attempting to rectify it by administering local therapies.⁸

The small number of children age 5-6 months make generalization and comparison difficult: three were malnourished, and five were well nourished. For the 7- to 12-month-olds, gruel made up one-half of the liquid intake during the period they were observed. Unlike their malnourished counterparts, older children who were better nourished were also consuming cows' milk. It should be noted, however, that the gruel also sometimes contained soured milk. Malnourished children were thus likely to occasionally consume animal milk even though it was in a diluted form.

The amount of time spent consuming solid food by the 16 well-nourished and the 15 malnourished children was extremely minimal. Those in the youngest age groups did not consume any solids at all. However, even the older children who were capable of chewing and digesting solid food spent minimal time actually doing so. The observations found that a surprisingly high

⁸ Some traditional medicines are routinely given to healthy children to prevent illnesses such as diarrhea and to enhance growth (Castle, 1992). However, in this case, it was noted that the medicine was given for curative rather than preventive purposes.

proportion of the time spent consuming solids included the consumption of clay, earth, and/or sand. If these are added to the true solids (which can be classified as “food” and have a nutritive value), then the number of minutes spent consuming solids doubles to 5.7 for the malnourished children age 5-6 months. These figures indicate the malnourished children age 5-6 months spent twice as long eating clay or sand and actual food. In contrast, none of the well-nourished children of the same age were consuming such non-foods.

Geophagia (or the consumption of dirt or earth) among children has been reported in Africa and elsewhere. In Guinea, it was found that more than half of all children under age five routinely consumed dirt. The practice was strongly associated with subsequent parasitic infections (Glickman et al., 1999). In South Africa, geophagia was found to affect children from the age of 8 months onward (Taylor et al., 1999) and in Holland, it was noted to be linked to zinc and other mineral deficiencies (Van Wouve, 1995). In Mali, pregnant women have been observed deliberately eating dirt (which is also sold for this purpose in local markets). It is likely that in this group and among the infants, the practice is a biological response to anemia or other mineral deficiencies.

In addition, malnourished children were observed consuming millet husks, which have little nutritive value and are probably a source of contamination. The better nourished children consumed foods of a comparatively higher nutritional value such as rice and sauce, fish, or fresh fruits and vegetables.

A comparison of rural and urban children observed showed only slight differences in the type of food consumed. Interestingly the rural children age 4-5 months appeared to consume a greater variety of foods, but these foods were not always of high nutritional value. In contrast, the urban children of the same age appeared principally to consume fish and rice with sauce. By 7 months, both sets of children were consuming more or less the same items. It is important to note that both the 5- to 6-month-olds and the 7- to 12-month-olds in rural and urban areas were consuming both gruel and rice with sauce. This represents a contrast with both what was considered normative and what was reported by mothers. That is, the observations found far more complementary feeding at these ages than were found with other methods of data collection.