Infant Feeding in Urban Kenya: A Pattern of Early Triple Nipple Feeding

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Much interest has been shown in the widespread decline in breast feeding. This is reflected both in articles in the scientific literature[1,2] and in reports in the mass media and elsewhere.[3,4] What is the nature of that decline in places where this is taking place? In much that is written the main problem addressed is the large percentage of new mothers who have abandoned the breast in favour of the bottle often much earlier than is desirable, and sometimes even from birth. The concern is mainly for those mothers who stop breast feeding, often precipitously, and totally replace it with infant formula or other breastmilk substitutes.

Two recent WHO papers[5,6] describe a typology of three phases and eight stages of breast feeding situations found in countries around the world (Table 1). These range from a widespread, long-duration, traditional breast feeding pattern through a series of patterns of declining breast feeding in different country subgroups to a final pattern of widespread breast feeding resurgence. This WHO model suggests a sequential progression through the eight stages, with change occurring within each country first within groups of high socioeconomic status (SES) urban women, followed by their lower SES urban counterparts, and finally the rural poor.

TABLE 1
WHO typology of infant feeding patterns

Phases of breast feeding prevalence and duration	
Phase 1	'Traditional phase' with high prevalence and duration
Phase 2	'Transformation phase' prevalence of breast feeding falling and duration becoming shorter
Phase 3	'Resurgence phase' with rising prevalence and duration of breast feeding
Typology or stages of breast feeding prevalence and duration for national picture	
Stage 1	All groups in the traditional phase—India, Zaire
Stage 2	The lead group in phase 2, the rest in phase 1—Nigeria
Stage 3–5	Prevalence and duration of breast feeding falling—Philippines, Brazil
Stage 6	The lead group in phase 3, the rest in phase 2—Singapore, Spain
Stage 7	The lead group in phase 3, the other groups following close behind—USA, UK
Stage 8	All groups in phase 3—Sweden

However, in many parts of the world the common pattern is less one of early total abandonment of breast feeding, and more one of introducing other foods, especially infant formula and cow's milk in place of breast-milk, while breast feeding continues. When this form of mixed feeding occurs in the first 4–6 months of life, this too may be a source of serious concern. This is especially so if in the first few months after birth the alternative food provides a substantial proportion of the infant's energy needs, and if it is fed from a bottle. The concern here is mainly for poor families in non-industrialized countries who use what we term the triple nipple method of infant feeding; that is, infants who on the same day are fed with nipples both from a feeding bottle and the mothers' breasts.

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Our findings from a study conducted in Kenya suggest a pattern of early mixed feeding which is at variance with any of the WHO stages. In low income Nairobi women we find a situation with a very high prevalence and long duration of breast feeding, but where breast-milk substitutes in substantial amounts are fed to the majority of infants in the first 4 months of life. Using the WHO classification of breast feeding, these women would be in Phase 1 and Stage 1, but their pattern of infant feeding is not 'traditional', in the sense of being the feeding method practised by their ancestors who did not have access either to feeding bottles or infant formula.

An important problem with the WHO typology is that it classifies countries and communities based entirely on breast feeding prevalence and duration. This ignores the situation where breast feeding is prolonged, but where these same mothers feed breast-milk substitutes to their infants at a dangerously early age while continuing to breast feed. Under these circumstances a very young infant fed both from the breast and from the bottle receives some of the advantages of breast feeding, but many of the disadvantages of bottle feeding. The unnecessary very early partial replacement of breast-milk with breast-milk substitutes from a bottle introduces risks and sometimes serious problems for the infant, the mother and the family. These include a greater likelihood of infections[7] including those from contaminated bottles and infant formula; the possible problem of overdilution of the breast-milk substitute; the economic disadvantages because of the high cost of formula;[8] and finally the increased risk of an early pregnancy for the mother because the period of lactational anovulation[9,10] may be significantly reduced by partial breast feeding.

Policy decisions based on a country's closest fit to one of the WHO typology stages and the assumption of sequential stage progression may be misleading. The policy recommendations in a situation where breast feeding is frequently continued for more than 12 months, but where it is also common to introduce significant alternative feedings before 3 months of age, are likely to be different from those where total early abandonment of breast feeding was common.[11]

The results of a recently completed study of infant feeding practices in urban Kenya are used here to illustrate just such a situation where triple nipple infant feeding is prevalent in the first 3–4 months of life. The pattern of changing infant feeding is not unique to Nairobi and may have implications for policy in several other countries.

Materials and Methods

The Kenya Infant Feeding Practices Study (IFPS) was part of a four country study co-ordinated by a consortium of three US institutions, namely Cornell and Columbia Universities and the Population Council.[12] The Kenya study consisted of an ethnography; three co-ordinated substudies on the marketing of breast-milk substitutes, medical infrastructure, and government policies and programmes; and a large cross-sectional survey. The institutions in Kenya conducting the study were the Central Bureau of Statistics (CBS), and the African Medical and Research Foundation (AMREF). For the survey, 980 mothers who had given birth in the previous 18 months were interviewed in their homes between March and June 1982 using the CBS urban sampling frame. Data from the resulting weighted sample are representative of low and middle income mothers from the Nairobi area.

Results

Characteristics of the sample population

Table 2 provides information from the mothers on age, tribal origin, education, and length of residence in Nairobi. Also given are the age, the percentage weight for age, and place of birth of the infants and young children examined. Household characteristics for the sample show a mean household size of 5.5 persons (range 2–13); that only 30 per cent had piped water in their household; that 40 per cent had access to a flush toilet (often outside the house); and that 29 per cent had electricity.

Infant feeding patterns

Current infant feeding practices by age are shown in Table 3. These data refer to feeding at the time of interview. The table does not include retrospective findings. Seven 'types' of feeding are included; all the possible combinations of breast-milk, breast-milk substitutes (defined here as cow's milk or infant formula), and food supplements. The table shows that while almost all infants were initially breast-fed, few were exclusively breast-fed for very long. At between 1 and 2 months of age, just 53 per cent were receiving only breast milk, and some 38 per cent were already receiving some combination of foods including breast-milk substitutes. For infants between 3 and 4 months of age, 11 per cent received only breast-milk, while 65 per cent received some combination of foods including breast-milk substitutes. Only three infants in the entire sample, however, were being exclusively fed with breast-milk substitutes.

Our results show that in mothers interviewed there is a widespread initiation and long duration of breast feeding. Ninety-seven per cent of the women interviewed started breast feeding, and 85 and 50 per cent were still breast feeding at 6 and 15 months, respectively. The use of breast-milk substitutes rises sharply in the first few months of life and then levels off. Fifty-four per cent of the index children were reported as having received infant formula at some time. Cow's milk is added to the infant diet later and its use is continued up to 18 months of age and beyond.

TABLE 2
Characteristics of mothers and infants

Mothers			Infants		
Age	No.	%	Age	No.	%
19 and under	164	16.7	0–2 months	202	20.8
20–24	422	43.1	3–5	148	15.2
25–29	262	26.7	6–8	174	17.9
30–35	84	8.6	9–11	147	15.1
35 and over	49	5.0	12–14	148	15.2
Mean		24 yrs	15–18	151	15.5
			Mean		8.5 mth
Tribe	No.	%			
			Percentage weight for age	No.	%
Luo	300	30.6			
Kikuyu	269	27.4	Below 60	13	1.4
Luhya	217	22.2	60–69	56	6.1
Other	185	19.8	70–79	115	12.5
			80–89	189	20.0
Education	No.	%	90–99	209	22.6
			100–109	164	17.8
None	175	17.8	110+	176	19.1
Standard 1–7	485	49.4			
Form 1 and above	321	32.7	Place of birth	No.	%
Length of residence in Nairobi	No.	%	At home	232	23.7
			Government facility	645	66.1
			Other	99	10.1
< 1 year	150	15.3			
2–5 years	489	49.8			
> 5 years	342	34.9			

The foods consumed by study children in the previous 24-hour period as recalled by the mother or guardian at the time of the interview are presented in Table 4. It shows the extent to which glucose is fed in the first few months of life, the moderately high use of packaged cereals for young infants, and the very extensive consumption of a thin gruel (called uji) usually made from maize meal either with or without milk. Fruits, other than bananas, and vegetables, other than potatoes, were not widely consumed. Once again this table shows the very high level of breast feeding at all ages, the wide use of cow's milk, and the variable consumption of infant formula, with the highest percentage of study children using it between 2 and 4 months of age.

Discussion

From the Kenyan data a good argument can be made against the concept of a sequential progression of breast feeding stages upon which the WHO typology is based. Changes may take place over time in the proportions of breast-milk and of substitute fed to infants at different ages, but there are no current data to suggest a transition, at least among poorer women, away from a high prevalence and long duration of breast feeding. Our evidence suggests that Kenyan women consider breast feeding an interactive process, more than simply a source of nourishment. This concept is based both on statistical and qualitative data on Kenyan breast feeding style.[13] The Nairobi pattern of almost universal prolonged and successful breast feeding, overlaid with widespread supplementation with infant formula especially in the first 6 months of life, is clearly not adequately represented by any of the stages in the WHO typology.

While the effects of exclusive breast feeding and exclusive formula feeding have been widely investigated, the effects of a mixed feeding pattern such as seen in Kenya have been less well studied. If prolonged breast feeding can be expected to coexist with bottle feeding then the health, nutrition, fertility, and financial implications of this mixed pattern of triple nipple feeding need to be more carefully examined.

The assertion made in the WHO typology paper that the abandonment or curtailment of breast feeding is in part due to women's employment outside the home also needs to be examined. In the Nairobi sample only 9 per cent of the mothers had paid jobs away from home. Analysis of data on age when an infant was first given a breast-milk substitute (either cow's milk or infant formula) showed no significant difference between the group whose mothers worked

TABLE 3
Type of feeding by age of index child (n = 833)

Age (months)	Breast-milk only		Breast-milk and breast-milk substitutes		Breast-milk substitutes only		Breast-milk, breast-milk substitutes and food supplements		Breastmilk and food supplements		Food supplements only		Breast-milk substitutes and food supplements	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<1	52	70	12	16	0	0	6	8	5	6	0	0	0	0
1–2	36	53	22	32	0	0	4	6	7	10	0	0	0	0
2–3	19	33	20	34	1	2	10	17	8	14	0	0	0	0
3–4	4	11	11	27	0	0	14	35	9	23	0	0	1	3
4–5	6	13	7	16	0	0	25	54	6	14	2	3	0	0
5–6	4	6	10	17	0	0	33	55	7	12	0	0	6	10
6–7	1	1	4	5	1	2	32	47	22	33	1	2	7	13
7–8	0	0	0	0	0	0	31	57	15	27	1	2	7	13
8–9	0	0	1	3	0	0	27	55	13	26	1	2	7	13
9–10	2	3	3	4	0	0	23	38	11	17	6	10	17	27
10–11	2	6	1	3	0	0	9	23	11	31	1	3	13	34
11–12	1	3	0	0	0	0	21	48	12	27	1	3	8	19
12–13	2	5	0	0	0	0	21	39	14	25	2	4	15	28
13–14	2	5	2	5	1	3	14	33	9	22	2	5	12	28
14–15	0	0	2	4	0	0	17	41	6	16	5	11	11	28
15–16	0	0	0	0	0	0	12	27	10	22	2	4	20	46
16–17	1	4	0	0	0	0	11	35	8	25	1	5	9	31
17–18	0	0	0	0	0	0	5	18	3	12	6	22	12	46
18–19	0	0	0	0	0	0	5	15	3	10	11	32	15	43

TABLE 4
Percentage of foods consumed by index children in the previous 24 hours by age of infant

Child's age (months)	Breast-milk	Cow's milk	Infant formula	Glucose drink	Tea + milk	Uji + milk	Uji − milk	Pkgd. cereal	Ugali	Potatoes	Bananas	Eggs	Meat	Other veg.	Fruits
<2	96	9	25	21	0	2	2	9	2	1	3	0	0	1	2
2–4	95	14	44	19	0	9	7	18	2	5	8	3	0	1	3
4–6	92	23	38	12	4	30	16	21	10	13	18	3	0	6	6
6–8	80	31	28	15	3	43	20	12	20	29	34	11	7	6	5
8–10	66	37	21	9	8	54	17	9	29	32	41	9	7	23	3
10–12	64	38	11	3	13	51	18	5	34	40	44	14	8	18	10
12–14	59	37	10	3	9	54	16	3	44	27	37	14	8	22	5
14–16	46	39	16	8	27	43	23	5	53	38	29	17	19	29	9
16–18	40	50	3	0	23	40	24	2	60	36	36	16	18	31	11

outside the home and those whose mothers did not. While analysis of the Nairobi 24-hour recall data showed a significantly larger percentage of children whose mothers worked outside the home receiving infant formula, more of them were also receiving protein rich foods, vegetables, and fruits. These differences hold even when standardized by child's age and presumably reflect the working mother's greater financial resources. These data reflect both the complexity of feeding patterns and the need to examine all the components of an infant's diet. Clearly, the effects of maternal employment on infant feeding are not straightforward.

Conclusions

The data presented here suggest that infant feeding patterns, even within a specific group of a well defined

population, are highly complex. The mixed feeding, or triple nipple pattern, found to be prevalent in the Nairobi sample and its effects on child health and nutrition need further study.

This pattern is also common in Bogota (Colombia), but is less evident in Bangkok (Thailand) and Semarang (Indonesia), all cities where our group has recently completed studies.[12] Data from a recent paper[14] describing infant feeding patterns in Kinshasa (Zaire), Cebu City (Philippines), and St. Kitts-Nevis (in the Caribbean) show that this mixed pattern of infant feeding in the first 3 months of life is common in St. Kitts-Nevis and to a lesser extent in Cebu City.

Any global model of breast feeding patterns must rely on broad generalizations at the expense of the structural and cultural peculiarities which make each population unique. Such a reliance on surface similarities and neglect of context severely limits such a model's legitimate use.

The WHO typology analyses only one component of the infant diet (breast-milk) and only certain aspects (prevalence and duration) of that. Its suggestion of an ordered progression through set stages is at odds with the data we have presented, and none of the typology stages adequately describes the mixed feeding pattern seen in Kenya and elsewhere. The typology, as presented, gives little emphasis to the determinants of breast feeding, ignoring some entirely (the influences of medical systems, colonial experiences, cultural meaning, etc.) and generalizing from others (such as women's paid employment).

The WHO model may be more useful for industrialized countries. However, without inclusion of factors such as age of introduction, prevalence, and extent of use of breast-milk substitutes, it is not a helpful classification for many non-industrialized countries.

We raise these issues because WHO views and publications are quite rightly held in high regard, and may influence national policies. The implied predictive value in a model which stresses a sequential progression could lead to policies which are inappropriate or even dangerous. It is likely that the differences more than the similarities between infant feeding practices in different groups may be more useful in formulating policies to improve the well-being of infants and children.

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