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Early Complementary Feeding: The Role of Social Support

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Executive Summary

Introduction

In Nairobi, Kenya, although breastfeeding initiation is nearly universal, the majority of mothers offer some type of non-breastmilk liquid within the first month. Early complementary feeding is so widespread that it appears to be a normative behavior. Previous research on infant feeding practices in Kenya do not explain why early complementary feeding is so pervasive across ethnicity, age, marital status, and work status. Breastfeeding practices not only reflect an individual decision but constitute a social behavior that is influenced by the norms and expectations communicated by an individual's social networks. Correspondingly, social support and social networks have been positively associated with breastfeeding. However, the role of social support in exclusive breastfeeding versus partial breastfeeding has not been studied.

Study Objectives

The overall objectives of the study were to understand the socio-cultural context in which infant feeding decisions were made and to identify factors that influence the decision-making process. Specific objectives of the study were three-fold:

1. To describe infant feeding practices and identify factors influencing the duration of exclusive breastfeeding during the first four months of life.

2. To describe the structure of social networks and their support for infant feeding practices.

3. To provide information for the design of a community-based intervention to prolong the duration of exclusive breastfeeding.

Methods

The study was conducted in Kangemi, Nairobi between June 1993 and July 1995. Using both qualitative and quantitative research methods the study had three phases. Phase I included an ethnography of infant feeding and social support. The purpose of the ethnography was to provide a rich and detailed description of the cultural context of breastfeeding in the study setting. This phase consisted of structured and un-structured qualitative methods. The qualitative data were used to develop the formal survey instruments for Phase II and to provide interpretation of the quantitative results.

Phase II included a five-month, prospective study of 211 mother-infant pairs from 36 weeks gestation through four months post-partum. This phase consisted of bi-monthly, home interviews with mothers who were asked about utilization of health services, exposure to advertisements, promotions and

other sources of information. Data was also collected on the mothers' participation in social activities and maternal and infant morbidity status. In addition, a 24-hour dietary recall, one week frequency recall of foods and fluids given infants and reasons mothers gave their infants additional fluids and/or foods were requested. Social support information was collected on seventeen specific social support actions, characteristics of network members who performed the actions, and the mother's satisfaction with the social support she did or did not receive.

Phase III consisted of case studies of thirteen women, seven who fully breastfed (three exclusively) their infants for at least two months and six mothers who started complementary feeding before two months.

Results

Breastfeeding Knowledge

Mothers' knowledge of exclusive breastfeeding is generally high. Eighty-three percent of mothers reported prenatally that an infant could remain healthy by exclusively breastfeeding for three months. Mothers reported that water should be introduced at a median of five months of age and solids at a median of three to four months. Prenatally, 85% of mother's said they planned to give their infants colostrum. In the focus groups, a mother said, "the baby will get strength from it."

Breastfeeding Practices

Maternity practices were supportive of breastfeeding initiation. One hundred percent of the study mothers initiated breastfeeding, 56% of mothers reported that they put their babies to the breast within half an hour after delivery. While in hospital, 71% of mothers and infants roomed-in together. Virtually all mothers reported breastfeeding on demand. Only 11% reported giving a prelacteal feed, and 93% of mothers gave their infants colostrum.

Despite high breastfeeding knowledge, few mothers exclusively breastfeed. Two main infant feeding groups emerged: those who breastfeed 'almost exclusively;' and, those who 'partially breastfeed.' The almost exclusive category includes those who gave their infants water, salt sugar solution (SSS), gripe water and other medicinal waters. These mothers viewed themselves as exclusively breastfeeding since they were not giving other milks or foods to their infants. The partial breastfeeding category includes those who gave their infants milks and other soft/mashed foods.

Mothers quickly switched from the categories of 'exclusive breastfeeding' and 'almost exclusive' to complementing breastmilk with added milks, fluids and foods over the four month follow-up period. There appears to be three critical time periods when mothers who initially exclusively breastfed began to introduce fluids and foods: two weeks, six weeks, and three months. At birth, almost 90% of

women are exclusively breastfeeding. At two weeks it drops to 46% exclusively breastfeeding and at one month it drops again to 25%. From six weeks through three months there was a much slower rate of shifting away from exclusive breastfeeding. By four months, over 90% of the infants were receiving other non-breastmilk feeds.

What do mothers feed their infants in addition to breastmilk? The fluids and foods that mothers gave their infants changed over time. At two weeks, 53% of babies were given medicinal waters including salt sugar solution (SSS) (46%), water (30%), glucose water (24%), and gripe water (24%). Eleven percent (11%) received milk and 3% orange juice. At six weeks this pattern continued. By three months, however, a larger percentage of milks (33%) and orange juice (24%) were given along with potatoes (26%), papaya (20%) and cooked ripe bananas (19%). By four months, 56% of infants who received other non-breastmilk feeds were given milk and 41% were given orange juice along with water (46%) and SSS (39%). Thirty one percent of the babies were fed potatoes, 20% each were given papaya and avocado and 18% were given mashed raw bananas.

Breastfeeding Beliefs

Mothers were asked why they gave their infants foods and fluids. The main reasons were that 'the baby was growing teeth,' 'had stomach aches,' 'was crying,' 'was hungry,' that the 'mother's milk was not enough' and 'to get the baby used to food.' Reasons varied with the age of the infant. In the first two weeks, 17% of mothers indicated that the baby was growing teeth and 12% of mothers replied that the baby cried. Stomach aches were also important. At six weeks, 16% said that the baby was growing teeth and an equal percentage said that the baby cried. At three months, two other reasons were predominant, that 'the baby was hungry' (21%) and 'the mother's milk was not enough' (15%). By four months, 'getting the baby used to food' (17%) was the third most frequently given reason in addition to 'the baby was hungry' and 'the mother's milk was not enough.' In general, mothers were basically responding to the baby's crying cues after breastfeeding.

Social Support

The quantity of social support was hypothesized to be related to breastfeeding. A large quantity of positive social support was expected to be associated with exclusive breastfeeding. The quantity of social support was measured as the number of social support actions mothers received. The median number of actions were ten in each time interval. In contrast to our hypothesis, we found that low social support (less than ten actions) was associated with full breastfeeding.

Social support and breastfeeding (defined as full and partial) were examined at the three critical time intervals: two weeks, six weeks and three months. At two weeks, negative feedback (being told the baby was not growing well and that the baby was not getting enough to eat) were related to partial breastfeeding. Also 'having someone feed the baby' for the mother (a negative physical support) was found in 38% of those who partially breastfed but only 5% of those who fully breastfed. At six

weeks, 'receiving guidance/advice,' 'talking about private feelings,' 'being told the baby was crying too much,' 'having someone to take care of the baby' and 'having someone feed the baby' were all associated with partial breastfeeding. All of the social support actions associated with partial breastfeeding at six weeks were also present at three months. Positive feedback, i.e. 'being told the baby is growing well,' which was expected to be supportive of exclusive breastfeeding was also statistically significant at three months. Again contrary to the hypothesis, the relationship was associated with partial breastfeeding and not full breastfeeding.

Social Networks

The ethnographic findings also gave insights into the structure of social networks (defined as the individual(s) who provided social support) for infant feeding. We identified fifteen types of social network members that included husband, immediate family members, in-laws, other relatives, friends, neighbors, health and community workers, and church and women's group members. For each of the relevant social support actions, we found the networks to be 'narrow' (few different types of members). Only three or four network members were most frequently mentioned. Looking across time intervals, the network included the husband, neighbors, immediate family members or in-laws and/or friends. Husbands and neighbors were most frequently mentioned as the individuals to have provided guidance and advice about child care. Husbands and friends were most frequently mentioned as being the person a mother talked with about her private feelings. Neighbors were by far the most frequently mentioned as telling the mother the baby was crying too much. Husbands and neighbors were the most likely to have given food to the mother for the baby. Neighbors, husbands, and immediate relatives were the most frequently reported to have taken care of the baby. Feeding the baby (which is synonymous with partial breastfeeding) was done by husbands, neighbors, immediate relatives, and by three months also friends. These small networks of kin and neighbors are indicative of 'closed' networks. Closed networks typically provide little contact with outside influences and exposures to other sources of information.

Conclusions

Despite adequate knowledge of exclusive breastfeeding practices as promoted by health authorities, decisions related to infant feeding appear to be a result of a process in which a mother monitors her infant's behavior and adjusts her feeding style over time. Mothers felt that their infants were teething or experiencing stomach ailments in the early weeks and gave medicinal waters. These actions were promoted by the social support networks of mothers, reinforcing normative breastfeeding behaviors. Social support includes guidance/advice and positive and negative feedback and direct actions such as giving foods for the baby or feeding or taking care of the baby for the mother. In the early months, mothers received advice and guidance on how to handle perceived minor stomach ailments and teething problems. Negative feedback such as being told that the baby was not growing well and that the baby was not getting enough to eat influenced the mothers actions and encouraged early complementary feeding with milks and soft foods.

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Implications for Policy and Program Interventions

- Long-term policy and program interventions should be directed at changing norms of early complementary feeding. Key opinion leaders outside of the health system should be involved in promoting exclusive breastfeeding in the first six months of life.

- Focus of interventions should be on encouraging the initiation of exclusive breastfeeding and preventing switching at two weeks, six weeks, and three months by targeting certain behaviors. In conjunction with the Control of Diarrheal Diseases Program, mothers should be discouraged from giving SSS and other medicinal waters.

- Messages should encourage mothers, particularly at two weeks, six weeks and three months, by reminding them that they have adequate breastmilk to feed their infants and discourage the introduction of medicinal waters and other non-breastmilk milks and foods. A baby does not need to get used to foods before six months. During clinic visits for immunizations, mothers could be encouraged to continue exclusive breastfeeding and to not give complementary waters, milks, and foods.

- Health communication programs need to target women who advise mothers and not just breastfeeding mothers. Messages such as 'breast is best' and 'exclusively breastfeed for four to six months' are too vague. Messages tied to specific behaviors (such as the use of SSS and other medicinal waters and responses to crying after breastfeeding) would better address early complementary feeding in this community.

- Men and how they can support exclusive breastfeeding should also be specifically targeted by programmatic efforts.

Introduction

Global infant feeding recommendations promote exclusive breastfeeding (EBF) for the first four to six months of an infant's life.[1 2 3 4] Exclusive breastfeeding, however, is rarely practiced. In Nairobi, Kenya, breastfeeding initiation is nearly universal (97%). However, the majority of mothers offer some type of non-breastmilk liquid after one month of age or less.[5] In the 1989 Demographic and Health Survey, 55% of infants were exclusively breastfed at one month of age. By 1993, only 27% of infants under two months of age were exclusively breastfed with a duration of exclusive breastfeeding of only 0.5 months.[6 7] Early complementary feeding is so widespread that it appears to be a normative behavior in this setting.

Previous research on infant feeding practices in Kenya do not explain why early complementary feeding is so pervasive across ethnicity, age, marital status, and work status.[8 9 10] In Nairobi, infant formula is widely used as a complement to breastmilk.[11 12] Research attributes its use to the marketing and advertising of breastmilk substitutes and the influences and practices of health professionals and hospitals.[13]

In response to the increased use of infant formula, Kenya adopted the Code of Marketing of Breast-milk Substitutes in 1983.[14] Campaigns by non-governmental and governmental organizations promoted EBF for four to six months. Health professionals received training in lactation counseling and breastfeeding promotion, and some hospital policies and practices did shift, becoming more supportive of breastfeeding.[15 16] Despite these changes and the current negligible use of infant formula, the introduction of milk, non-breastmilk fluids, and foods into an infant's diet in the first few months still appears to be the norm.

Breastfeeding practices not only reflect an individual decision but constitute a social behavior that is influenced by the norms and expectations communicated by an individual's social networks.[17] Correspondingly, research in a variety of settings has shown social support and social networks to be positively associated with breastfeeding.[18 19 20] The majority of the studies, however, did not fully explore the multidimensional aspects of social support. Social support was primarily measured by the composition of a mother's social network as sources of influence for breastfeeding or bottle-feeding. Matich and Sims (1992) made an important contribution to the literature by incorporating multi-dimensionality in their measure of the sources, types, and amounts of social support provided to women who intended to breastfeed or bottle-feed.[21] However the authors admitted that some of their social support items were not specific to breastfeeding.

Other studies have found positive social support for breastfeeding to include physical assistance such as helping with child care and household chores during the early post-partum period and the provision of guidance and advice.[22] Negative social support has been described as including material support through the provision of money or the purchase of breastmilk substitutes, lack of breastfeeding advice or guidance for early supplementation, and negative feedback from the husband regarding breastfeeding.[22 23 24]

In a critique of the social support literature, O'Reilly (1988)[25] suggests that social support indices should include: 1) population-specific questions that are appropriate to the health outcomes being measured; 2) an indication of the perceived adequacy of the support; 3) a distinction among the multiple aspects of support; and, 4) identification of the support provider. The role of social support in exclusive breastfeeding versus complementary feeding has not been widely studied. Perez-Escamilla, et al. looked at influences on exclusive and full breastfeeding, over time, including social support. Although they found a positive association, again, social support was defined as a single dimension of the approval of a mother's choice of infant feeding mode by her mother or husband.[26]

For this study, we designed a culturally-specific, multi-dimensional measurement of social support for breastfeeding in which variations were expected in the content, quantity, and degree of satisfaction as assessed by the pregnant or breastfeeding woman. In addition, the information collected on social networks included the composition (who provided the social support), size (number of people providing the support), and complexity (how many different types of people provided the support). The purpose of this report is to describe current breastfeeding knowledge, practices, and beliefs, and the role of social support among mothers in a low income community in Nairobi. Recommendations are also made for interventions to prolong the durations of exclusive and full breastfeeding in urban Africa.

Study Objectives

The overall objectives of the study were to understand the socio-cultural context in which infant feeding decisions were made and to identify factors that influence the decision-making process. Specific objectives of the study were three-fold:

1. to describe infant feeding practices and identify factors influencing the duration of exclusive breastfeeding during the first four months of life in the population;

2. to describe the structure of social networks and their support for infant feeding practices in the population; and,

3. to provide information for the design of a community-based intervention to prolong the duration of exclusive breastfeeding in this population.

Hypotheses

With respect to these objectives, we hypothesize that:

1. the duration of EBF will be longer among mothers with "broad" and "large" as compared to "small" and "narrow" networks; and,

2. the greater the amount and the stronger the content of positive social support for EBF, and the greater the mother's satisfaction with the social support she receives for EBF, the longer will be the duration of EBF.

Methods

The study was conducted in Kangemi, Nairobi, between June 1993 and July 1995. The study, comprised of three phases, integrated both qualitative and quantitative methods to understand the process and influences of infant feeding in the first four months post-partum. Phase I included an ethnography of infant feeding and social support. This phase consisted of both structured and unstructured qualitative methods. The findings were used to develop survey instruments for Phase II and to provide interpretation of the quantitative results. Phase II was a prospective study of 211 mother-infant pairs who were followed for five months (one month prenatally and four months postnatally). In Phase III, both structured and unstructured interviewing techniques were used to develop in-depth case studies of thirteen women.

Phase I: Ethnography

The purpose of the ethnography was to provide a rich and detailed description of the cultural context of infant feeding in the study setting (Kangemi) and to design quantitative instruments for the prospective study phase. The ethnographic data focused on defining local beliefs and practices associated with infant care and feeding and the content and role of social support and social networks in the early post-partum period. Methods included community observations and mapping, in-depth, unstructured interviews with Kangemi residents, focus group discussions with mothers of babies less than six months of age, and a series of freelist and pile sorting exercises (described below).

Observations

Participant and scripting observations were made of community activities, including mothers and babies in their homes and in the community; demonstration, supplementary infant feeding sessions by the Breastfeeding Information Group, breastfeeding lectures, income generation training sessions for women's groups; a Chief's baraza (community meeting) on environmental health; market activities; and, a church service and clinic activities in the two main clinics serving the area.

Ethnographic Interviews

In-depth interviews were conducted with 26 women who were pregnant, who had infants less than six months of age, or who were mature mothers with grown children. Repeated interviews were conducted with eight men and women community leaders, including church pastors, administration

police, the area Chief, women's group leaders, and volunteer community health workers. Twenty-four staff and volunteers were interviewed several times from institutions serving the community. The respondents were chosen based upon their role in the community or health facility, specialized knowledge about community life, experience, willingness to participate in repeated in-depth interviews, and their non-analytic approach to providing information.[27] A variety of responses were provided. Information from the interviews was collected until consistency was reached and no new information was obtained.

Focus Groups

The purpose of a focus group discussion is to stimulate in-depth exploration of feelings, attitudes, and perceptions regarding a selected topic.[28] The information obtained from the discussions reflect group norms, whereas the ethnographic interviews include more individual variation in beliefs and practices. Seven focus groups were held with an average of six women each. The focus groups were comprised of women with infants six months of age or less. There were separate groups of tenants and landlords, the two main ethnic groups (Luhyas and Kikuyus), and one group of adolescent mothers. Three of the focus groups were on women's activities in general and breastfeeding beliefs and practices in particular. Two focus groups included a discussion of social support in addition to the women's activities and breastfeeding. Two additional focus groups had social support and social networks as their sole focus. Through the focus groups, ideas, definitions, and relationships of breastfeeding and women's activities emerged that were explored further in the case studies and as part of the prospective follow-up.

Freelisting[29]

Freelisting is the compilation of a list of items to define a domain to determine what concepts and ideas are related to which specific beliefs and practices. Freelists were conducted on women's activities/work, men's work, and maternal illnesses after giving birth to secure codes for answers to questions in the prospective follow-up phase. Freelists were also conducted of social networks (people who help or are important to mothers in the early post-partum period) and what help (support) mothers needed and received during this time. The results from the social support and social networks freelisting were used in the development of items for pile sorting.

Pile Sorting[29]

Pile sorting is a method used to elicit informants' system of categorization and to further clarify the relationships (similarities and differences) between concepts and ideas. The types of support commonly provided to mothers during the early post-partum period that were identified during the focus group discussions, observations, ethnographic interviews, and freelists were included in the pile sorting. Twenty items were initially included in the social support pile sorts. Social support was

depicted in pictures of women in the research area performing specific social support actions. These pictures were put on cards, and under each picture there was a description of the activity written in Kiswahili and English. To ascertain how social support was categorized, 30 women were asked to sort the piles. Those items that mothers easily understood and that had consensus in the pile sorts were used in the final prospective study questionnaire. From an initial twenty items, the list of support behaviors were reduced to fifteen items. (These were later increased to seventeen items—two questions were split into two for clarity). The final categorization of social support was based upon the theoretical groupings and from the findings from the pile sorts.

Phase II: Prospective Study

Phase II was a five-month, prospective study of 211 mother-infant pairs from 36 weeks gestation through four months post-partum. This phase consisted of bi-monthly, home interviews during which mothers were asked about their utilization of health services, exposures to advertisements, promotions, and other sources of information. Data was collected on the mothers' participation in social activities, maternal and infant morbidity status, 24-hour dietary recall, and one-week frequency recall of foods and fluids given to the infant, the reasons why the mother gave the infant additional fluids and/or foods, maternal dietary in-take, and reproductive status.

Social support information was also collected on seventeen specific social support actions, characteristics of network members who performed the actions, and the mother's satisfaction with the social support she did or did not receive. Those support activities that were identified as important for infant feeding and those individuals who were important sources of social support for breastfeeding mothers were incorporated into each item of the social support questionnaire.

Questionnaire Development

Based upon the literature and the findings from the preliminary ethnography, six questionnaires were designed and pretested. The questionnaires were prepared in English by the field-based Co-investigator and reviewed by the Kenyan Co-Investigator, faculty and students of the Unit of Applied Nutrition, members of the Faculty of Food Science and the Department of Paediatrics at the University of Nairobi. The questionnaires were revised and sent to The Johns Hopkins University for review by the Principal and Co-Investigators and a faculty member of the University of Maryland who had recently completed a study on social support and breastfeeding in the United States.

Survey Interviews

Study participants were recruited from two ante-natal clinics serving the community. Women were selected who were willing to participate and who had a normal prenatal prognosis for a singleton birth

and who subsequently had vaginal deliveries of single live births. The women lived within the study villages and planned to stay in the study area for at least six months post-recruitment.

Eight research interviewers were hired and trained over a two month period. Their training included interviewing techniques and an in-depth review of the questionnaires in both English and Kiswahili with practice sessions on each other and women in the community.

The questionnaires were administered by the trained interviewers at the two area clinics. At enrollment, demographic characteristics, including age, marital status, ethnicity, religion, level of education, parity, length of stay in Kangemi, and work status was collected. Maternal anthropometric measurements were taken.

The second interview scheduled at the woman's home prior to delivery (36-38 weeks gestation) was more extensive. Seven types of information were collected during this interview: 1) information on the household composition and socio-economic status; 2) maternal infant feeding knowledge, attitudes, beliefs, and previous infant feeding practices; 3) maternal intention to EBF this baby; 4) attendance of prenatal care; 5) exposure to marketing of breast milk substitutes and other infant feeding influences; 6) structure of mother's actual social networks, including but not limited to health workers, family members, neighbors, friends, spouse; and, 7) nature, quantity, content, and satisfaction with social support.

From the birth of their baby (two weeks post-partum), mothers were followed bi-monthly for four months. During the first follow-up visit, information was collected regarding the baby's delivery (e.g., type, place), infant characteristics (birth weight, gender, morbidity) and breastfeeding practices in the early post-partum period. During this and subsequent interviews, maternal and infant nutritional status were assessed, and mothers were queried with respect to: 1) their current breastfeeding practices, including the timing and reasons for introducing other fluids and foods; 2) maternal and infant morbidity; 3) characteristics of social network members; and, 4) enacted social support actions and the mothers' satisfaction with the social support she received or did not receive.

Phase III: Case Studies

The purpose of the case studies was to provide detailed prospective descriptions of mothers and infants from birth through the first four months of age and to capture the decision-making process for infant feeding. Fifteen women were recruited to participate in the case studies. Two women were lost to follow-up. One had a cesarean section and therefore no longer met the inclusion criteria. One other woman was unavailable for interviews after one month. Thirteen women, therefore, were included in the case study component. Seven fully breastfed their infants (three exclusively) for at least two months and six mothers introduced non-breastmilk fluids, milks, or foods before two months. Nine of the case study mothers were interviewed weekly for at least three months using both structured and unstructured methods. Four case study mothers, who were from the original prospective study cohort, were interviewed at the end of the study. The case studies provided in-

depth ethnographic information that complements the quantitative, longitudinal data. The case study approach provided opportunities to "follow" mothers through their infant care and feeding choices in the first four months of the infant's life, to assess the nature, quantity, and function of their social support and social networks on the study outcomes, and to provide in-depth descriptions of the process and determinants of decision making for infant feeding in this setting.

Analytic Methods

Data from the bi-monthly, 24-hour infant dietary recalls were used to categorize breastfeeding modes. Those infants who received no fluids or foods in the past 24 hours were categorized as exclusively breastfed in accordance with the Labbok and Krasovec 1990 definition of exclusive breastfeeding.[1] Those who received fluids and foods comprised three categories. The first category, almost exclusive, included those who received plain water or medicinal waters of salt sugar solution (SSS), sugar water, glucose waters, or gripe water in addition to breastmilk in the past 24 hours. The second category of breastmilk and milk included those infants receiving other milks in addition to breastmilk. Breastmilk and fluids and foods included all who received other non-breast milk liquids and/or solids along with breastmilk.

Infant feeding modes were later collapsed into two categories for the analysis of the first month postpartum, 'exclusive' vs. 'non-exclusive' (includes all other modes). In the third month, 'full' and 'partial' breastfeeding were examined. Full breastfeeding encompassed exclusive breastfeeding and almost exclusive breastfeeding. Partial breastfeeding included breastmilk plus other milks and fluids and foods. Descriptive statistics and content analysis of the qualitative data were the primary analytic techniques. Frequencies of prenatal knowledge and beliefs and previous breastfeeding experiences were reported. Mothers attitudes towards colostrum, breastmilk adequacy, and expression of breastmilk were analyzed from the survey responses as well as from the focus group discussions, in-depth interviews, and case studies. The changes over time in postnatal breastfeeding practices and the reasons why mothers began complementary feeding were also described. Chi-square test of association at $p < 0.05$ was used to compare breastfeeding modes by maternal demographic characteristics, infant characteristics, and aspects of social support.

Social Support

In this study we measured enacted social support which refers to the actions that others perform when they render guidance or assistance to a focal person.[30] This social support measure includes population-specific questions that are appropriate to the outcome variable, breastfeeding. Structured and semi-structured qualitative methods were used to identify social support actions and social network members that were important to mothers in the early postpartum period. Based upon the qualitative findings, the Arizona Social Support Interview Schedule[31] was modified to develop a culturally-specific social support scale for breastfeeding. Seventeen actions were included in the scale of social support. These actions were judged as positive or negative for exclusive breastfeeding

and categorized into eight groupings, as follows: positive physical support, negative physical support, guidance/advice, private feelings, financial assistance, material support, positive feedback, and negative feedback (see Table 1 for a detailed listing). Situations were described in which different social support behaviors or advice may have been provided to the mother over the previous two weeks. For each item, the mother was asked if she received this type of support over the past two weeks. Questions were asked about who provided the social support. To measure satisfaction, the mother was asked to choose one of the following to best describe her assessment of the social support she did or did not receive during the period: 1) she would have liked a little more of this type of support or 2) a lot more of this type of support, 3) the support was enough or 4) she did not need this type of support. Using the Chi-square test of association between $p < 0.20$ and $p < 0.001$, a comparison was made of breastfeeding modes by social support (content, quantity, and satisfaction) and by social network characteristics (composition, size, and complexity).

Logistic Regression

Forward stepwise multiple logistic regression was used to identify determinants of exclusive breastfeeding at one month and full breastfeeding at three months. The hypotheses to be tested were that the duration of exclusive breastfeeding would be dependent upon the quantity and content of positive social support and the mother's satisfaction with the positive social support she received and that a woman with a large and complex network would exclusively breastfeed for longer durations. Two models were developed. One for the first month to determine the effects of social support and social networks on exclusive breastfeeding of those mother-infant pairs who exclusively breastfed up to one month. At three months, since there was so few women exclusively breastfeeding, we looked at full breastfeeding up to three months.

The first step in building the model was the initial selection of the variables to be included. Based upon the findings of the bivariate analyses at each time interval, we selected those variables that were associated at a p value of 0.10 or less. With each aspect of social support (content, quantity, and satisfaction) and social networks (composition, size, and complexity), the corresponding variables were placed into a model separately to determine the best representative set of variables for that particular aspect. Each of variables that stayed in the individual models for the six aspects were reentered and reanalyzed for a complete model of social support and another for social networks for each time interval using the p value of 0.10 and above as the criterion for variable removal. The variables included in the models are listed in Table 12.

The role of social support and social networks were assessed by exploring the relationships between social support (content, quantity, and satisfaction) and social networks (composition, size, and complexity).

The Ethnographic Setting

Information on the study area was taken from observations, in-depth interviews with key informants, and results from the prenatal survey interviews with study participants.

The study was conducted in Kangemi, a low income, peri-urban, unplanned settlement area of Nairobi. Kangemi is comprised of fifteen "villages" and has an estimated population of 35-40,000 people. The residents are predominantly from two major ethnic groups, Kikuyu (60%) and Luhya (23%), with people from other ethnic groups in the minority.[32] This community was selected because it is formed by a naturally, well-demarcated area with distinct geographic boundaries. Kangemi also represents the living conditions of many working, low-income households in Nairobi.[33]

Kangemi is located in the western suburbs of Nairobi. It was traditionally a rural, agricultural area inhabited by four Kikuyu families and one Masaai family. Over the years, through the sub-division of the land inherited by the sons of the families, the plots became too small to be agriculturally viable. Many residents built single-room, row houses for rent to a growing number of people who migrated from other parts of Kenya in search of work. As the plots are privately owned, road infrastructure is poor with a network of small dirt roads. In this unplanned settlement area, even the major arteries are often impassable by vehicles during the rainy seasons.

Parts of Kangemi remain rural with small farms. Plots are situated along the Nairobi River banks. Other areas comprise densely populated plots of row houses with shared sanitation facilities and no refuse removal. Prenatal survey data showed that houses are constructed of wood walls (58%), corrugated iron sheets (30%), stone (20%), or mud (2%). Ninety-two percent (92%) of the residents rent their dwellings while 4% owned their homes. Another 3% live with their parents. The median monthly rent paid is Kshs 550 with a range of Kshs 250 to Kshs 4,000 (US$60 - $100). (At the time of the study the exchange rate was Kshs 40 to US$ 1.00.) The majority of the residents dwell in one to two-room houses with an average of three people (range 2-10 people); two adults over eighteen years of age with one child under five years. Families share a pit latrine with other households on the dwelling compound. Almost 90% of the households get their water from a communal tap, 7% have sole use of a water tap, and 2% have no regular access to piped water.

Over half of Kangemi residents do not have electricity. Household possessions generally include a radio cassette player (53%) and a three-piece sofa set (40%). Cooking is primarily done with paraffin (86%) on a one burner stove.

There are numerous nursery and primary schools in the area but only one high school. The high school is over-enrolled and unable to absorb all of the students in the area. Many students drop out after primary school or attend other schools in Nairobi if their parents can afford the school fees and transportation costs.

Women in the community are either full-time house-wives or work in the informal sector, mostly as self-employed traders or as house servants in the neighboring affluent Nairobi suburbs. In this study,

95% of the households were male-headed, with the head of household having a median of 11 years of education.

There are two main health facilities serving the community; a Nairobi City Council clinic and a Catholic mission clinic. The City Council clinic's services are basically free but residents have to bring syringes if they need injections for curative care or immunizations of children. Drugs are often in short supply or are available from the City Council clinic. The Catholic clinic is well equipped but charges a fee for clinic visits (Kshs 50 for an initial antenatal visit and Kshs 20 for follow-up visits).

Women are encouraged to seek ante-natal care and ante-natal care is required to deliver in one of the Nairobi hospitals. During the study period, however, there were major economic upheavals in the country and the cost of a hospital delivery was prohibitive to most families in this community. The charges ranged from Kshs 750 to Kshs 1,500 (US$19-$38) deposit (equivalent to one month's salary for many residents). A stay in the hospital longer than three days costs an additional Kshs 100 to Kshs 300 per day. During this period, doctors and university faculty went on strike, and women were not assured that a physician would attend a complicated delivery. Public hospitals also suffered from lack of drugs and equipment. Women reported they had to bring their eating utensils, wash basins, and towels to one city hospital despite the fees charged. Increasingly, women chose to deliver at home alone or were assisted by their neighbors and relatives.

Results

The results include the findings of prenatally assessed breastfeeding knowledge, actual breastfeeding practices, mother's beliefs around breastfeeding, and why they introduced other fluids and foods. The types of social support received and the social network members who provided specific social supports are described. A more in-depth examination of maternal characteristics, child characteristics, social support, and social networks is made at two key time intervals (one month and three months) when most mothers made decisions to introduce additional fluids and foods. At one month a comparison is made of exclusive vs. non-exclusive and at three months, full vs. partial breastfeeding is observed.

Breastfeeding Knowledge

Mothers' knowledge of exclusive breastfeeding is generally high. Eighty three percent (83%) of mothers reported prenatally that an infant could remain healthy by exclusively breastfeeding for three months. Mothers reported that water should be introduced at a median of five months of age and solids at a median of three to four months. Prenatally, 85% of mothers said they planned to give their infants colostrum. In the focus groups, a mother said, "the baby will get strength from it."

Overall Breastfeeding Practices

Maternity practices were supportive of breastfeeding initiation. Seventy-six percent (76%) of mothers delivered in a hospital. One hundred percent (100%) of the study mothers initiated breastfeeding. Fifty-six percent (56%) of mothers reported that they put their babies to the breast within half an hour after delivery. In the hospital, rooming-in was the general practice with 71% having done so. Virtually all mothers reported breastfeeding on demand, either whenever the baby cried or otherwise wanted to breastfeed. Ninety-three percent (93%) of mothers gave their infants colostrum. Only 11% reported giving a prelacteal feed.

Few mothers exclusively breastfed. Two main groups emerged, those who breastfed 'almost exclusively' and those who 'partially breastfeed.' The almost exclusive category includes those who gave their infants water, salt sugar solution (SSS), gripe water, and other medicinal waters. These mothers viewed themselves as exclusively breastfeeding since they were not giving other milks or foods to their infants. The partial breastfeeding category includes those who gave their infants milks and other soft/mashed foods.

Mothers quickly switched from the categories of 'exclusive breastfeeding' and 'almost exclusive' to complementing breastmilk with added milks, fluids, and foods over the four month follow-up period. Initially, complementary feeding was primarily with fluids. There appears to be two critical time periods when mothers who initially exclusively breastfed began to introduce fluids and foods: one month and three months (Table 2). At birth, almost 90% of women are exclusively breastfeeding. At two weeks it drops to 46% exclusively breastfeeding and 47% are almost exclusive. From one month, exclusive breastfeeding drops from 46% to 25%. At this key time period, the number of mothers adding fluids and some foods increases by 20%, from 54% to 75%. Most of the shift is to 'almost exclusive' breastfeeding (from 47% at two weeks to 60% at one month).

From six weeks through three months there was a much slower rate of shifting away from exclusive breastfeeding. At six weeks, 17% of mothers were exclusively breastfeeding. The shift was no longer just into almost exclusive but also into partial breastfeeding with an increase of 11%, from 15% at one month to 26% at six weeks. After three months, there was another major shift from 11% exclusive breastfeeding to 6% at 3.5 months. Again the shift was into partial breastfeeding (from 61% at three months to 75% at 3.5 months). By four months, over 90% of the infants were receiving other non-breastmilk feeds.

What do mothers feed their infants in addition to breastmilk? The fluids and foods that mothers gave their infants changed over time. At two weeks, 53% of babies were given medicinal waters including 46% salt sugar solution (SSS), water (30%), glucose water (24%), and gripe water (a commercially prepared sugar water with anise and other flavorings and a little alcohol which mothers buy for their infants) (24%). Eleven percent (11%) received milk and 3% received orange juice. At six weeks this pattern continued. By three months, however, a larger percentage of milks (33%) and orange juice (24%) were given along with potatoes (26%), papaya (20%), and cooked ripe bananas (19%). By four months, 56% of infants who received other non-breastmilk feeds were given milk and 41% were

given orange juice along with water (46%) and SSS (39%). Thirty one percent (31%) of the babies were fed potatoes, 20% each were given papaya and avocado, and 18% were given mashed raw bananas.

Breastfeeding Beliefs

Mothers were asked why they gave their infants foods and fluids. The main reasons were that 'the baby was growing teeth', 'had stomach aches', 'was crying', 'was hungry', that the 'mother's milk was not enough', and 'to get the baby used to food.' Reasons varied with the age of the infant. In the first two weeks, 17% of mothers indicated that the baby was growing teeth and 12% of mothers replied that the baby cried. Stomach aches were also important at this time. At six weeks, 16% said that the baby was growing teeth and an equal percentage said that the baby cried. At three months, two other reasons were predominant, that 'the baby was hungry' (21%) and 'the mother's milk was not enough' (15%). By four months, 'getting the baby used to food' (17%) was the third most frequently given reason in addition to 'the baby was hungry' and 'the mother's milk was not enough'. In general, mothers were basically responding to the baby's crying cues after breastfeeding.

A case study mother who was exclusively breastfeeding took her six week old infant to a doctor because she had a fever or a cold. The doctor removed the 'plastic teeth', which 'were not hard like real teeth' says the mother. Four of these 'plastic teeth' were growing just below the surface of the gums. The mother says, "These come from the baby's blood and if they are not removed the baby's body will become hot and she will cry a lot." The doctor gave her drugs to use after the minor surgery. Despite the perceived health problem, this mother did not give any medicinal waters. Another case study mother who 'almost exclusively' breastfed gave her baby SSS because the baby had the hiccups and to help ease the stool because the baby had 'stomach ache'. She reported that SSS is like medicine and when the baby stopped crying, she stopped giving it. A case study mother who was 'partially breastfeeding', gave her infant SSS twice a day from two weeks of age for 'stomach ache'. By one month, she was giving the infant orange juice and glucose water. At two months she added uji (a local porridge) because 'the baby was hungry and cried after breastfeeding'. By three months, the mother added a variety of fruits, porridge, and milk to get the baby used to foods before she returned to full-time work.

Characteristics of Mothers and Infants in the First and Third Months

It was found that in the first month, although mothers over thirty and of higher parity were more likely to exclusively breastfeed than younger mothers, these relationships failed to reach statistical significance. Other characteristics of mothers such as age, education, ethnicity, religion, maternal illness status, or work status were not associated with exclusive breastfeeding (Table 3). Infant characteristics, such as gender, illness, and maternal perception of health, were also not associated with exclusive breastfeeding at either months one or three (Table 4).

Social Support Content

Eight of the social support items (listed in Table 5) were associated with exclusive breastfeeding in the first month. However, social support operates in the opposite direction of our hypotheses. In the first month, the absence of physical support whether positive or negative was associated with exclusive breastfeeding. Not having someone to clean house, wash clothes, or cook food was also associated with exclusive breastfeeding. A larger percentage of those who did not have someone to take care of their baby (33%) or feed their baby (27%) exclusively breastfed compared to those who did have someone to take care of (17%) or feed (11%) their babies. This relationship (the absence of support) was also seen with guidance/advice and feedback. Twenty-seven percent (27%) of those who did not have guidance/advice exclusively breastfed compared to 17% of those who did receive this type of support. The absence of positive or negative feedback was associated with exclusive breastfeeding. That is not having someone to tell the mother that her baby was growing well (37%) or that the baby was crying too much (28%) was associated with exclusive breastfeeding.

At three months, again contrary to our expectations, we see that positive physical social support was not associated with full breastfeeding. Rather, the presence of negative physical support was positively associated with full breastfeeding in the third month. This association worked in the opposite direction in that not having someone to take care of or feed the baby was associated with full breastfeeding. Guidance/advice, private feelings, and positive and negative feedback were also associated with full breastfeeding. A larger percentage of those who did not have these types of supports fully breastfed.

Quantity of Social Support

The quantity of social support as depicted in Table 6 was hypothesized to be related to breastfeeding. A large quantity of positive social support was expected to be associated with exclusive breastfeeding. The quantity of social support was measured as the number of positive, neutral or negative social support actions mothers received. In contrast to our hypothesis, we found that those reporting a smaller amount (< or = 4 actions) of positive social support were more likely to exclusively breastfeed (48%) compared to those who had a larger amount (> 4 actions) of positive social support (20%). Negative social support decreases the likelihood that a mother exclusively breastfeeds. That is those without any negative social support are more likely to exclusively breastfeed (41%) compared to those who had a larger amount (> or = 3) of negative social support (14%).

At three months, positive social support is not statistically significant. The more negative social support a mother has, the less likely she will exclusively breastfeed. Those without negative social support were more likely to fully breastfeed (61%).

Satisfaction with Social Support

In month one, satisfaction was found to be associated with exclusive breastfeeding for positive physical support (cook food or tea), guidance advice, and positive feedback (baby is growing well) (Table 7). For these three social supports, a larger percentage of those who said they did not need these types of supports, exclusively breastfed when compared to the percent of those who said they thought that the support they received was adequate or that they needed more of these types of supports.

In month three, a larger percentage of those who said that they did not need negative physical support (feed baby), guidance/advice, someone to talk to about private feelings, financial assistance nor to be given food for the baby fully breastfed. Satisfaction with the other social support actions were not associated with full breastfeeding.

Characteristics of Social Networks

Social support is supplied through a social network and the characteristics of these networks are important in understanding the role of social support in breastfeeding. The ethnographic findings gave insights into the structure of social networks (defined as the individual(s) who provided social support) for infant feeding. We identified fifteen types of social network members that included husband, immediate family members, in-laws, other relatives, friends, neighbors, health and community workers, and church and women's group members. For each social support action, we looked at three characteristics of the structure of the social networks that provided that support. These included composition, size, and complexity.

Composition

The composition of the network, describes who are the key network members providing social support to this population of mothers. Of the possible fifteen types of people, we found husbands, neighbors, friends and relatives to be most frequently mentioned. Once again this variable operates contrary to expectation but consistent with the social supports. Table 8 has the results for month one. At one month, not having friends to wash clothes for you was related to a mother most likely exclusively breastfeeding (27% vs. 7%). Not having relatives cook food or tea for you was also reported by a higher percentage of those who exclusively breastfed. Not having her husband take care of the baby was reported by a larger percentage of mothers who exclusively breastfed. As was not having guidance or advice received from her husband was reported by more of those who exclusively breastfed. A difficult one to interpret is that more mothers who exclusively breastfed reported not having a friend give positive feedback (to say 'the baby is growing well'), than those who reported that they did receive this type of feedback. On the other hand, it is understandable, given the living conditions in Kangemi, that not having a neighbor complain that the baby is crying too much was associated with a higher likelihood of more who exclusively breastfed.

Table 9 shows the results at three months. The one positive relationship was that 57% of those who had friends to cook food or tea for them were fully breastfeeding at three months. Full breastfeeding was significantly related to not sharing feelings with one's husband. Likewise, not having the husband say to the mother that the baby was growing well was related to full breastfeeding (p=0.14). Neighbors proved significant in their relationship when we looked at 'taking care of the baby'. Thirty five percent (35%) of those who did not have a neighbor take care of their baby were fully breastfeeding compared with 21% who had a neighbor look after their child. As one would expect, not having a neighbor complain about the baby crying again proved to be associated with full breastfeeding. Not having a relative taking care of the baby was approaching significance in its association with full breastfeeding.

Size of Network

The size of the network refers to how many people actually provided social support to the mother. For positive physical support, the size of the network became important for cleaning house, washing clothes, and cooking food or tea. A larger percentage of those who did not have a network for this type of support were exclusively breastfeeding the infant at one month (Table 10). The relationship is linear in that the larger the network, the fewer were those who exclusively breastfeed. The same relationship exists with taking care of the baby and positive feedback; the more you have, the less likely you were to exclusively breastfeed.

At three months, positive physical support was not important. Negative physical support, the taking care of the baby, was negatively associated with full breastfeeding in that the more people you had to provide this type of support, the less likely you were to fully breastfeed. The relationship was the same for positive feedback.

Complexity

The complexity of the network refers to the number of different categories or types of network members a mother has to provide social support. The categories of importance in this study were the husband, neighbors, friends, and other relatives. We compared whether a mother had no network, one category, or more than one category of social networks providing social support. In Table 11, we show that 'go to the market', 'clean house', 'wash clothes', and 'cook food or tea' all proved significant with regards to complexity of the network. The relationships were clearly linear. A larger percentage of those who exclusively breastfed did not have a network for these types of support, and those who had a network were more likely to exclusively breastfeed if their network was not complex (only one category of network member). Negative physical support was another category of significance. If the mother did not report a network to take care of the baby, then she was more likely to exclusively breastfeed. As the network became more complex, the smaller the percentage of those who exclusively breastfeed.

Also in Table 11, at three months, negative physical support proved important. Not having a network to take care of the baby, to feed the baby, to share private feelings, or to provide positive feedback were reported by a larger number of those who fully breastfed. However 'feed the baby' differed from the others because a larger percentage of those with a complex network for feeding the baby were mothers who reported fully breastfeeding rather than those with a less complex network. However, we caution that this was probably due to the small numbers in the cells.

The case study mothers who exclusively breastfed appeared to be more influenced by clinic staff teachings than those who breastfed 'almost exclusively' and those who 'partially breastfed'. These later groups appeared to respond more to peer pressure and advice. A mother who exclusively breastfed was told by a clinic staff that 'the milk in the breast is his (the baby's) water'. An almost exclusive breastfeeding mother said that she was advised by her in-laws to give her baby SSS because the baby cried a lot but later she was told 'not to' by the clinic staff. However, a single, new mother who partially breastfed was advised how to begin systematic complementary feeding by her sister (a single mother of three) who lived with her. Another mother of five, who partially breastfed her infant, was advised by her mother-in-law to begin giving diluted and sweetened milk at two months because the mother of five expressed doubt that she had enough breastmilk.

Logistic Regression

At one month, exclusive breastfeeding was negatively associated with the quantity of negative social support ($p < 0.05$) and with a complex network providing negative physical support for breastfeeding ($p < 0.01$) (Table 12). Those mothers who had one to two types of this negative social support were 0.41 (0.17, 0.97) less likely to be exclusively breastfeeding and those with at least three types were 0.28 (0.11, 0.70) less likely to be exclusively breastfeeding at one month. The only other variable influencing the likelihood of exclusive breastfeeding at one month described the complexity of a woman's network providing support by cooking or preparing tea. Compared to women with no such network, those with a complex network (of > one type individual) preparing food and/or tea were 0.18 (0.06, 0.58) less likely to be exclusively breastfeeding at one month. Women with this type of network but consisting of only one type of person (e.g., a non-complex network) were also less likely to breastfeed with an OR of 0.45 (0.19, 1.11).

At three months, the likelihood of full breastfeeding was negatively associated with the presence of a network to feed the baby for the mother ($p < 0.01$) (Table 13). Those mothers who had at least one type of person to feed their baby were 0.07 (0.01, 0.66) less likely to fully breastfeed. Although marginally significant, the quantity of negative social support was also included in the model, suggesting that the greater the amount of negative social support the less likely the woman would be fully breastfeeding at three months. Mothers who reported that they shared their private feelings with their husbands were 0.31 (0.11, 0.88) less likely to be fully breastfeeding at three months. Finally, a mother's satisfaction with her network of cooking food and/or preparing tea influenced the likelihood of full breastfeeding, with mothers who wanted more of this support 0.24 (0.08, 0.73) less likely to fully breastfeed as compared to women reporting that they don't need this kind of support.

Conclusions

Despite adequate knowledge of exclusive breastfeeding practices as promoted by health authorities, decisions related to infant feeding appear to be a result of a process in which a mother monitors her infant's behavior and adjusts her feeding style over time. Mothers felt that their infants were teething or experiencing stomach ailments in the early weeks and gave medicinal waters. These actions were probably promoted and reinforced by the social support networks of mothers, reinforcing normative breastfeeding behaviors. Social support that includes guidance/advice and positive and negative feedback and direct actions such as giving foods for the baby or feeding or taking care of the baby for the mother. In the early months, mothers probably received advice and guidance on how to handle perceived minor stomach ailments and teething problems. Negative feedback such as being told that the baby was not growing well may have influenced the mothers actions and encouraged early complementary feeding with milks and soft foods.

There were two critical time periods for intervention to prevent early complementary feeding. At one month, when many mothers who initially, exclusively breastfed had already shifted to complementary feeding with fluids. The second time period is at three months, when mothers move from fluids to milks and foods. Social support appears to have reinforced early complementary feeding at both time intervals. Those who exclusively breastfed and those who did not probably received similar advice and feedback. The mothers who exclusively breastfed, however, appeared to be able to resist the advice and encouragement of their social network and responded more to the advice of the health workers. Those who exclusively breastfed at one month and fully breastfed at three months had smaller networks, particularly networks that provided 'negative support' for their breastfeeding style. Those women who exclusively and fully breastfed, appear to be a special group of self-efficacious mothers who were able to manage their home without much help and continue to breastfeed.

Neighbors, husbands, and immediate relatives were the most frequently reported to have taken care of the baby. Feeding the baby (which is synonymous with partial breastfeeding) was done by husbands, neighbors, immediate relatives early on, and also by friends at three months of age. These small networks of kin and neighbors are indicative of 'closed' networks. Closed networks typically provide little contact with outside influences and exposures to other sources of information.

Social support is important for breastfeeding but appears to operate in the opposite direction of our hypothesis. In a community in which early complementary feeding is the norm, social support appears to promote and reinforce the norm. This analysis, indicates that mothers who had a broad (complex) network did not exclusively breastfeed up to one month, nor fully breastfeed up to three months but rather were more likely to begin complementary feeding early on. The content of social support is mostly 'negative' towards exclusive and full breastfeeding. Although it is clear that social support is not a single concept but multi-dimensional, it is not clear which social supports are necessary to promote exclusive breastfeeding. As discussed by Bryant (1982), the proximity of the network may be an important factor, enabling those who are not in proximity of their networks to try exclusive breastfeeding.[19] A more in-depth study of the 'positive deviants', those who were able to exclusively

breastfeed may provide more insights into the factors that enabled them to go against the norm and optimally breastfeed for longer durations.

Implications for Policy and Program Interventions

Considering the infant feeding patterns in this setting, long term policy and program interventions should be directed at changing norms of early complementary feeding. Key opinion leaders outside of the health system should be involved in promoting exclusive breastfeeding in the first six months of life. In the interim, the focus of interventions should be on encouraging the initiation of exclusive breastfeeding and preventing switching at one month or earlier. Secondly, to prevent the introduction of foods at three months or earlier, certain behaviors must be targeted. At one month and before, mothers should be discouraged from giving SSS and other medicinal waters. In conjunction with the Control of Diarrheal Diseases Program, this practice could be discouraged.

Messages should encourage mothers that they have adequate breastmilk to feed their infants and discourage the introduction of medicinal waters and other non-breastmilk milks and foods. A baby does not need 'to get used to foods' before six months. During clinic visits for immunizations, mothers could be encouraged to continue exclusive breastfeeding and to not give complementary waters, milks, and foods.

Another behavior to target is the mother's response to the baby's crying cues. What does it mean if a baby cries after breastfeeding? Is there something in the way the mother breastfeeds that makes the infant anxious or uncomfortable? Maybe the infant is forced off the breast too soon but is not hungry. Health workers and other community development workers should be trained in lactation management to be able to assist mothers with more technical aspects of breastfeeding.

Health communication programs need to target women and men who advise mothers and not just breastfeeding mothers. Messages such as 'breast is best' and 'exclusively breastfeed for four to six months' are too vague. Messages tied to specific behaviors (such as the use of SSS and other medicinal waters and responses to crying after breastfeeding) would better address early complementary feeding in this community.

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Table 1. Social Support and Social Network Categories
Kangemi Infant Feeding Study, Nairobi, Kenya

A. Positive Physical Support

1. Go to market
2. Collect water/firewood
3. Clean house
4. Wash clothes
5. Cook food/tea

B. Negative Physical Support

1. Take care of baby
2. Feed baby

C. Guidance Advice

1. Provide guidance or advice

D. Private Feelings

1. Share private feelings

E. Financial Aid

1. Loan money
2. Give money

F. Material Aid

1. Give clothing/something
2. Give food

G. Positive Feedback

1. Baby is growing well

H. Negative Feedback

1. Baby is not growing well
2. Baby is not getting enough to eat
3. Baby is crying too much

Table 2. **Infant Feeding Modes (n - %)**
Kangemi Infant Feeding Study, Nairobi, Kenya

Time	Exclusive Breastfeeding	Breastmilk and Waters	Breastmilk and Other Milks	Breastmilk and Fluids and Foods	Totals
0.0	176 - 89%	13 - 6%	9 - 5%		198
0.5 mos.	53 - 46%	54 - 47%	2 - 2%	6 - 5%	115
1.0 mos.	44 - 25%	104 - 60%	6 - 3%	20 - 12%	174
1.5 mos.	29 - 17%	96 - 57%	9 - 5%	34 - 21%	168
2.0 mos.	24 - 16%	65 - 43%	11 - 7%	52 - 34%	152
2.5 mos.	20 - 12%	56 - 35%	9 - 6%	75 - 47%	160
3.0 mos.	16 - 11%	29 - 20%	11 - 8%	87 - 61%	143
3.5 mos.	7 - 6%	17 - 14%	6 - 5%	88 - 75%	118
4.0 mos.	7 - 6%	5 - 4%	4 - 3%	103 - 87%	119

Table 3. **Characteristics of Mothers by Feeding Mode**
Kangemi Infant Feeding Study, Nairobi, Kenya

		1 Month (n = 175)		3 Months (n = 142)	
		n	% Exclusive	n	% Full
Age:	15 - 19 years	31	19%*	27	37%
	20 - 24 years	73	22%	59	25%
	25 - 29 years	49	27%	59	34%
	> 30 years	22	41%	41	33%
Education:	≤ 8 years	107	26%	87	32%
	9 - 12 years	59	24%	49	31%
	> 12 years	9	22%	6	33%
Ethnicity:	Kikuya	53	24%	44	30%
	Luhya	83	26%	60	35%
	Luo	20	20%	20	25%
	Other	19	26%	18	33%
Religion:	Catholic	52	23%	50	36%
	Protestant	115	27%	89	29%
	Other	8	12%	3	33%
Parity (live births, not including study baby):	0	57	18%	46	30%
	1-2	90	27%	75	31%
	≥ 3	28	36%	21	38%
Maternal Illness:	Yes	52	23%	38	26%
	No	123	26%	104	34%
Work Status:	At home	2	0%	6	17%
	Away w/child	0	0%	8	38%
	Away w/out child	0	0%	11	0%
	Not working	173	26%	117	35%

* $P < 0.05$

Table 4. **Characteristics of Infants by Feeding Mode**
Kangemi Infant Feeding Study, Nairobi, Kenya

	1 Month (n = 175)		3 Months (n = 142)	
	n	**% Exclusive**	**n**	**% Full**
Gender:				
Male	95	23%	77	30%
Female	80	27%	65	34%
Infant Illness:				
Yes	70	21%	58	29%
No	105	28%	84	33%
Maternal Perception of Infant Health:				
Healthy/Okay	117	24%	111	32%
Not healthy/Not growing well	58	28%	31	32%

Table 5. Content of the Social Support
Kangemi Infant Feeding Study, Nairobi, Kenya

Content	1 Month		3 Months	
	Yes n (% Exclusive)	No n (% Exclusive)	Yes n (% Full)	No n (% Full)
Positive Physical Support				
Go to market	154 (23%)	21 (38%)	68 (28%)	74 (35%)
Collect water/firewood	156 (24%)	19 (32%)	70 (31%)	72 (32%)
Clean house	136 (21%)*	39 (41%)	62 (29%)	80 (34%)
Wash clothes	122 (21%)†	53 (34%)	49 (29%)	93 (33%)
Cook food/tea	146 (21%)*	29 (45%)	79 (29%)	63 (35%)
Negative Physical Support				
Take care of baby	87 (17%)*	88 (33%)	109(26%)*	33 (52%)
Feed baby	18 (11%)†	57 (27%)	47 (4%)*	95 (45%)
Guidance/Advice	52 (17%)†	123 (29%)	42 (19%)*	100 (47%)
Private Feelings	53 (21%)	122 (27%)	56 (20%)*	86 (40%)
Financial Aid				
Loan money	17 (29%)	158 (25%)	14 (50%)†	128 (30%)
Give money	149 (24%)	26 (35%)	123 (30%)	19 (32%)
Material Aid				
Give clothing/something	96 (25%)	79 (25%)	40 (30%)	102 (32%)
Give food	6 (0%)	169 (26%)	16 (6%)*	126 (35%)
Positive Feedback				
Baby growing well	118 (20%)*	57 (37%)	97 (26%)*	45 (44%)
Negative Feedback				
Not growing well	6 (17%)	165 (26%)	8 (25%)	134 (32%)
Not getting enough to eat	5 (0%)	166 (26%)	14 (21%)	128 (33%)
Crying too much	39 (15%)†	132 (28%)	21 (10%)*	121 (36%)

* $P < 0.05$; † $P < 0.15$

Table 6. Quantity of the Social Support
Kangemi Infant Feeding Study, Nairobi, Kenya

	1 Month (n = 175)		3 Months (n = 142)	
	n	**% Exclusive**	**n**	**% Full**
Positive Social Support[a]				
None	3	67%*	21	43%
≤ 4 Actions	32	44%	62	31%
> 4 Actions	140	20%	59	29%
Neutral Social Support[b]				
None	13	46%	12	33%
Some	162	24%	130	32%
Negative Social Support[c]				
None	59	41%*	23	61%*
< 3 Actions	51	22%	41	51%
≥ 3 Actions	65	14%	78	13%

* $P < 0.05$

[a] **Positive Social Support**
Go to market
Collect water/firewood
Clean house
Wash clothes
Cook food/tea
Positive feedback

[b] **Neutral Social Support**
Private feelings
Loan money
Give money
Give clothing/something

[c] **Negative Social Support**
Guidance/Advice
Give food
Baby not growing well
Baby not getting enough to eat
Baby crying too much
Take care of baby
Feed baby

able 7. Satisfaction with Social Support
Kangemi Infant Feeding Study, Nairobi, Kenya

Satisfaction	1 Month			3 Months		
	Not Needed n (%)	About Right n (%)	Need More n (%)	Not Needed n (%)	About Right n (%)	Need More n (%)
ositive Physical Support						
Go to market	9 (44)	65 (25)	101 (24)	27 (37)	57 (37)	58 (24)
Collect water/firewood	11 (18)	67 (22)	96 (27)	31 (29)	56 (36)	53 (36)
Clean house	16 (44)	74 (23)	85 (24)	35 (31)	48 (35)	59 (29)
Wash clothes	23 (35)	67 (19)	85 (27)	34 (41)	45 (31)	63 (27)
Cook food/tea	13(54)*	69 (19)	93 (26)	23 (30)	60 (37)	59 (27)
Physical Support						
Take care of baby	55 (35)	38 (21)	82 (21)	15 (53)	44 (30)	83 (29)
Feed baby	133 (26)	8 (12)	34 (24)	68(54)*	26 (4)	47 (15)
Guidance/Advice	25(44)*	18 (6)	132 (24)	31(45)*	22 (41)	89 (25)
rivate Feelings	56 (32)	35 (14)	84 (25)	60(42)*	31 (42)	51 (14)
cial Aid						
Loan money	108 (24)	26 (19)	41 (23)	90(31)*	20 (55)	32 (19)
Give money	9 (67)	62 (24)	103 (22)	4(25)*	47 (47)	91 (24)
Material Aid						
Give clothing/something	25 (14)	51 (28)	99 (22)	39 (41)	47 (29)	56 (27)
Give food	123 (29)	8 (0)	44 (18)	78(46)*	18 (17)	46 (13)
ositive Feedback						
Baby growing well	20(55)*	44 (25)	111 (20)	20 (25)	33 (36)	89 (63)

* $P < 0.05$

Table 8. **Composition of the Social Network at One Month and Exclusive Breastfeeding**
Kangemi Infant Feeding Study, Nairobi, Kenya

	1 Month							
	Husband		Neighbor		Friends		Relatives	
	Exclusive Breastfeeding		Exclusive Breastfeeding		Exclusive Breastfeeding		Exclusive Breastfeeding	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Positive Physical Support								
Go to market	45 (20)	130 (27)	35 (17)	140 (27)	22 (18)	153 (26)	98 (25)	82 (26)
Collect water/firewood	46 (28)	129 (24)	54 (28)	121 (24)	21 (14)	154 (27)	94 (22)	8 (28)
Clean house	19 (26)	156 (25)	19 (16)	156 (26)	24 (12)	151 (27)	92 (24)	83 (26)
Wash clothes	27 (18)	148 (26)	16 (25)	159 (25)	15 (7)†	160 (27)	81 (22)	94 (28)
Cook food/tea	61 (18)	114 (29)	16 (19)	159 (26)	20 (20)	155 (26)	99 (20)†	76 (32)
Negative Physical Support								
Take care of baby	33 (6)*	142 (30)	21 (24)	154 (25)	13 (8)	162 (26)	50 (20)	125 (27)
Feed baby	5 (0)	170 (26)	1 (0)	174 (25)	2 (0)	173 (25)	10 (20)	165 (26)
Guidance/Advice	15 (7)†	160 (27)	13 (23)	162 (25)	13 (8)†	162 (27)	26 (19)	149 (26)
Private Feelings	40 (22)	135 (26)	6 (33)	169 (25)	8 (12)	167 (26)	13 (23)	162 (25)
Financial Aid								
Loan money	1 (0)	174 (44)	3 (67)	172 (24)	5 (0)	170 (26)	167 (25)	8 (38)
Give money	124 (23)	51 (29)	9 (33)	166 (25)	16 (6)†	159 (27)	44 (24)	133 (26)

Material Aid								
Give clothing/something	37 (22)	138 (26)	21 (33)	154 (24)	34 (15)	141 (28)	49 922)	126 (26)
Give money	4 (0)	171 (26)	0 (0)	175 (25)	0 (0)	175 (25)	2 (0)	173 (25)
Positive Feedback								
Baby growing well	33 (18)	142 (27)	47 (26)	128 (25)	36 (8)*	139 (30)	59 (19)	116 (28)
Negative Feedback								
Not growing well	2 (50)	173 (25)	2 (0)	173 (25)	1 (0)	174 (25)	2 (0)	173 (25)
Not getting enough to eat	0 (0)	175 (25)	4 (0)	171 (26)	0 (0)	175 (25)	1 (0)	174 (25)
Crying too much	8 (12)	167 (26)	21 (10)†	154 (27)	5 (20)	170 (25)	11 (18)	164 (26)

* $P < 0.15$; † $P < 0.15$

Table 9. **Composition of the Social Network at Three Months and Full Breastfeeding**
Kangemi Infant Feeding Study, Nairobi, Kenya

	3 Months							
	Husband		Neighbor		Friends		Relatives	
	Full Breastfeeding		Full Breastfeeding		Full Breastfeeding		Full Breastfeeding	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Positive Physical Support								
Go to the market	14 (36)	128 (31)	11 (9)	131 (34)	9 (33)	133 (32)	48 (25)	94 (33)
Collect water/firewood	11 (46)	131 (31)	14 (21)	128 (33)	8 (50)	134 (31)	46 (35)	96 (30)
Clean house	1 (0)	141 (32)	3 (0)	139 (32)	5 (40)	137 (31)	50 (34)	92 (32)
Wash clothes	3 (67)	139 (31)	1 (0)	141 (32)	4 (25)	138 (32)	36 (31)	106 (32)
Cook food/tea	19 (32)	123 (32)	4 (25)	138 (32)	7 (57)†	135 (30)	56 (32)	86 (31)
Negative Physical Support								
Take care of baby	30 (23)	112 (34)	34 (21)†	108 (35)	19 (32)	123 (32)	69 (26)	73 (37)
Feed baby	8 (0)	134 (34)	5 (20)	137 (32)	7 (14)	135 (33)	30 (3)	112 (39)
Guidance/Advice	13 (23)	129 (33)	12 (0)	130 (35)	7 (29)	135 (32)	17 (12)	125 (30)
Private Feelings	47 (17)*	95 (39)	6 (33)	136 (32)	7 (14)	135 (33)	8 (13)	134 (33)
Financial Aid								
Loan money	1 (0)	141 (32)	2 (100)	140 (31)	5 (60)	137 (31)	8 (38)	134 (31)
Give money	109 (30)	33 (36)	2 (0)	140 (32)	9 (44)	133 (31)	26 (35)	116 (31)

Material Aid								
Give clothing/something	6 (33)	136 (32)	2 (100)	140 (31)	13 (23)	129 (33)	23 (35)	119 (31)
Give food	11 (0)	131 (34)	3 (0)	139 (32)	1 (0)	141 (32)	3 (33)	139 (32)
Positive Feedback								
Baby growing well	18 (17)†	124 (34)	36 (39)	106 (29)	36 (39)	106 (29)	29 (24)	113 (34)
Negative Feedback								
Not growing well	3 (0)	134 (32)	3 (67)	139 (31)	0 (0)	142 (32)	1 (0)	141 (32)
Not getting enough to eat	4 (25)	138 (32)	4 (25)	128 (32)	1 (0)	141 (32)	5 (20)	137 (32)
Crying too much	3 (0)	139 (32)	13 (15)	129 (33)†	5 (0)	137 (33)	4 (0)	138 (33)

* $P < 0.05$; † $P < 0.15$

able 10. Size of the Social Network and Exclusive or Full Breastfeeding Kangemi Infant Feeding Study, Nairobi, Kenya

	1 Month			3 Months		
	Exclusive Breastfeeding			Full Breastfeeding		
	None n (%)	1 Member n (%)	>1 Member n (%)	None n (%)	1 Member n (%)	>1 Member n (%)
Physical Support						
Go to market	21 (38)	92 (27)	62 (18)	74 (35)	42 (36)	26 (15)
Collect water/ firewood	18 (33)	75 (31)	82 (18)	72 (32)	45 (33)	25 (28)
Clean house	39(41)*	86 (21)	50 (20)	80 (34)	49 (29)	13 (31)
Wash clothes	53(34)*	79 (23)	43 (19)	93 (33)	43 (28)	6 (33)
Cook food/tea	29(45)*	72 (28)	74 (15)	63 (35)	53 (30)	26 (27)
Physical Support						
Take care of baby	88(33)*	43 (21)	44 (14)	33 (52)	52 (27)	56 (25)
Feed baby	156 (27)	15 (13)	4 (0)	95 (45)	32 (0)	15 (13)
uidance/Advice	123 (29)	30 (17)	21 (19)	100 (37)	27 (19)	15 (20)
ivate Feelings	122 (27)	39 (21)	14 (21)	86 (40)	46 (22)	10 (10)
inancial Aid						
Loan money	156 (25)	17 (29)	2 (0)	126 (29)	11 (54)	5 (40)
Give money	26 (35)	105 (26)	44 (18)	6 (32)	100 (31)	23 (35)
ositive Feedback						
Growing well	57(37)*	54 (26)	64 (14)	45 (44)	39 (28)	58 (24)
Negative Feedback						
Not growing well	161 (4)	9 (22)	1 (0)	134 (43)	8 (25)	0 (0%)
Not getting enough to eat	166 (26)	3 (0)	1 (0)	128 (33)	9 (22)	4 (25)
Crying too much	132(28)†	27 (19)	11 (0)	121 (36)	18 (11)	3 (0)
Material Aid						
Give clothing/ something	79 (25)	44 (36)	52 (15)	102 (32)	26 (19)	14 (50)
Give food	167 (26)	7 (0)	1 (0)	126 (35)	13 (8)	3 (0)

* $P < 0.05$; † $P < 0.15$

Table 11. **Complexity of the Social Network and Exclusive or Full Breastfeeding Kangemi Infant Feeding Study, Nairobi, Kenya**

	1 Month			3 Months		
	Exclusive Breastfeeding			Full Breastfeeding		
	No Network n (%)	1 Category n (%)	> 1 Category n (%)	No Network n (%)	1 Category n (%)	> 1 Category n (%)
ositive Physical Support						
Go to market	21(38)†	110 (27)	44 (14)	74 (35)	50 (30)	18 (22)
Collect water/firewood	19(32)	97 (28)	59 (19)	72 (32)	55 (29)	15 (40)
Clean house	39(41)*	105 (22)	31 (16)	80 (34)	57 (28)	5 (40)
Wash clothes	53(34)*	92 (25)	30 (10)	93 (33)	46 (28)	3 (33)
Cook food/tea	29(44)*	92 (27)	54 (6)	63 (35)	65 (26)	14 (43)
Physical Support						
Take care of baby	88(33)*	55 (22)	32 (9)	33(52)*	66 (27)	43 (23)
Feed baby	157 (27)	16 (12)	2 (0)	95(45)*	37 (3)	10 (10)
Guidance/Advice	123 (29)	39 (20)	13 (8)	100(37)	29 (21)	13 (15)
rivate Feelings	122 (27)	41 (20)	12 (25)	34(40)*	46 (22)	10 (10)
cial Aid						
Loan money	158 (25)	16 (31)	1 (0)	128 (30)	12 (50)	0 (0)
Give money	26 (35)	111 (25)	38 (18)	19 (32)	101 (32)	22 (32)
Material Aid						
Give clothing/ something	79 (25)	54 (32)	42 (17)	102 (32)	33 (24)	7 (57)
Give food	169 (26)	6 (0)	0 (0)	126 (35)	12 (8)	4 (0)
ositive Feedback						
Baby growing well	57 (37)	76 (22)	42(14)	45(44)†	57 (28)	40 (22)
Negative Feedback						
Not growing well	165 (26)	5 (20)	5 (20)	134 (32)	7 (29)	1 (0)
Not getting enough to eat	166 (26)	4 (0)	5 (20)	128 (33)	13 (15)	1 (100)
Crying too much	132 (28)	33 (15)	10 (20)	121 (36)	18 (11)	3 (0)

* $P < 0.05$; † $P < 0.15$

Table 12. Adjusted Logistic Model for Exclusive Breastfeeding at One Month Kangemi Infant Feeding Study, Nairobi, Kenya

Variable	Exclusive Breastfeeding at 1 Month OR (95% CI)
[illegible]y of Negative Social Support	
0 Actions	1.00
1 - 2 Actions	0.41 (0.17, 0.97)
≥ 3 Actions	0.28 (0.11, 0.70)
omplexity of Network for Cooking/Tea	
No Network	1.00
Not Complex	0.45 (0.19, 1.11)
Complex	0.18 (0.06, 0.58)

'able 13. **Adjusted Logistic Model for Full Breastfeeding at Three Months**
Kangemi Infant Feeding Study, Nairobi, Kenya

Variable	Full Breastfeeding at 3 Months OR (95% CI)
[illegible] of Negative Social Support	
0 Actions	1.00
1 - 2 Actions	0.64 (0.21, 1.92)
≥ 3 Actions	0.30 (0.09, 1.04)
[illegible]k for Feeding Baby	
No	1.00
Yes	0.07 (0.01, 0.66)
[illegible] Available to Discuss Private Feelings	
No	1.00
Yes	0.31 (0.11, 0.88)
[illegible]'s Satisfaction with Network Giving Food	
Not Needed	1.00
About Right	0.52 (0.11, 2.51)
Need More	0.24 (0.08, 0.73)

WELLSTART INTERNATIONAL

Wellstart International is a private, nonprofit organization dedicated to the promotion of healthy families through the global promotion of breastfeeding. With a tradition of building on existing resources, Wellstart works cooperatively with individuals, institutions, and governments to expand and support the expertise necessary for establishing and sustaining optimal infant feeding practices worldwide.

Wellstart has been involved in numerous global breastfeeding initiatives including the Innocenti Declaration, the World Summit for Children, and the Baby-Friendly Hospital Initiative. Programs are carried out both internationally and within the United States.

International Programs

Wellstart's *Lactation Management Education (LME) Program*, funded through USAID/Office of Nutrition, provides comprehensive education, with ongoing material and field support services, to multidisciplinary teams of leading health professionals. With Wellstart's assistance, an extensive network of Associates from more than 40 countries is in turn providing training and support within their own institutions and regions, as well as developing appropriate in-country model teaching, service, and resource centers.

Wellstart's *Expanded Promotion of Breastfeeding (EPB) Program*, funded through USAID/Office of Health, broadens the scope of global breastfeeding promotion by working to overcome barriers to breastfeeding at all levels (policy, institutional, community, and individual). Efforts include assistance with national assessments, policy development, social marketing including the development and testing of communication strategies and materials, and community outreach including primary care training and support group development. Additionally, program-supported research expands biomedical, social, and programmatic knowledge about breastfeeding.

National Programs

Nineteen multidisciplinary teams from across the U.S. have participated in Wellstart's lactation management education programs designed specifically for the needs of domestic participants. In collaboration with universities across the country, Wellstart has developed and field-tested a comprehensive guide for the integration of lactation management education into schools of medicine, nursing and nutrition. With funding through the MCH Bureau of the U.S. Department of Health and Human Services, the NIH, and other agencies, Wellstart also provides workshops, conferences and consultation on programmatic, policy and clinical issues for healthcare professionals from a variety of settings, e.g. Public Health, WIC, Native American. At the San Diego facility, activities also include clinical and educational services for local families.

Wellstart International is a designated World Health Organization Collaborating Center on Breastfeeding Promotion and Protection, with Particular Emphasis on Lactation Management Education.

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