

UNDERSTANDING BREASTFEEDING PRACTICES IN BANGLADESH:
LINKS BETWEEN MOTHERS' PERCEPTION AND PRACTICE

A Dissertation

Presented to the Faculty of the Graduate School

of Cornell University

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

by

Sabrina Rasheed

August 2007

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UNDERSTANDING BREASTFEEDING PRACTICES IN BANGLADESH: LINKS BETWEEN MOTHERS' PERCEPTION AND PRACTICE

Sabrina Rasheed, Ph. D.

Cornell University 2007

Although exclusive breastfeeding (EBF) for 6 months protects infants from morbidity and growth retardation, 70% of Bangladeshi mothers introduced non-breast milk foods during the first 6 months of lactation. The aim of our study was to understand mothers' decisions related to introduction of non-breast milk foods to 0-6 month old infants.

The qualitative study consisted of interviews with 27 women from the participants of Maternal Infant Nutrition Initiative in Matlab (MINIMat), key informant interviews and focus group discussions. We used constant comparative method to analyze data and compared the finding to the framework of theory of breastfeeding self-efficacy. We found that mothers introduced non-breast milk foods intermittently for different reasons but the perception of breast milk inadequacy resulted in early and sustained introduction of non-breast milk foods. Furthermore, mothers' experience of breastfeeding was shaped both by the determinants of self-efficacy and contextual factors such perception of breast milk inadequacy, workload and network support. Therefore, ecological theory was more suitable than the theory of self-efficacy to describe the experience of breastfeeding. We operationalized the new theory with the conceptual framework of insufficient milk supply (IMS) for the quantitative analysis.

In the quantitative analysis, using the data from 1472 MINIMat mothers, we used the insights about normative and non-normative breastfeeding practices from the qualitative study and the EBF recommendation to create breastfeeding trajectories from monthly assessments of breastfeeding practices. The trajectories were: full breastfeeding (breast milk and water), committed mixed feeding (continuous introduction of non-breast milk foods starting 0-4 months considered non-normative) and intermittent mixed feeding (other types breastfeeding practices, considered normative). The findings revealed that compared to mothers who practice normative breastfeeding, mothers from full breastfeeding trajectory were from poorer household and probably could not afford non-breast milk foods. Mothers who practiced non-normative breastfeeding were different in terms of compelling biological and socio-cultural factors that could be barriers to successful breastfeeding, compared to mothers who practiced normative breastfeeding. In conclusion, efforts focused on individual mothers' behavior change need to consider the influence of social structure and collective socio-cultural values on mothers' beliefs and behavior.

BIOGRAPHICAL SKETCH

Sabrina Rasheed was born and brought up in Bangladesh. She is the eldest daughter of Jahanara and Jahanzeb Rasheed. She did her B.Sc. (hons) from Jadavput University, Calcutta majoring in Nutrition in 1996. On her return to Bangladesh, she worked with BRAC (Bangladesh Rural Advancement Committee) in BRAC-ICDDR,B joint research project as a researcher for 18 months. Her work consisted of investigating the determinants of malnutrition among the elderly population of Matlab, Bangladesh. In 1998 Sabrina did a Post Graduate Diploma from University of Canberra, Australia on Public Health Nutrition. In 1999, Sabrina joined the Social and Behavioral Sciences Unit at ICDDR,B (International Center for Diarrheal Disease Research, Bangladesh). This time, her research was related to testing the effectiveness of a growth monitoring scale in terms of involving mothers in monitoring the growth of their infants. In 2001 she was selected for NIH maternal and child nutrition scholarship to attend Cornell University for a Ph.D. in nutrition.

To my parents Jahanzeb and Jahanara Rasheed

ACKNOWLEDGMENTS

In my journey through the often difficult and lonely path to this dissertation, I have much to be thankful of and many people to acknowledge. I am grateful to Nabila Hasan for inspiring me to divert my interest from Chemistry to Nutrition during my undergrad years in Calcutta. Dr. Rob at Population Council directed me to BRAC to find out how I can use my degree and still remains a mentor. Dr. A.M.R. Chowdhury gave me my first taste of community nutrition in my years in BRAC. Dr. Abbas Bhuiya at ICDDR,B challenged me intellectually, believed in me, shaped my understanding of nutrition in the context of community empowerment and helped to open the doors to Cornell. S.I. Khan acted as mentor, field-supervisor and a friend during data collection and the write-up process.

At Cornell, I gratefully acknowledge my friends and fellow travelers Ji-Yun Hwang, Joo-Wan Kim, Mohamed Ag-Ayoya, Chada Alat Mohamed, Simeon Nanama, Aline Lima, Joseph Mensah-Homiah, Sujata Rao, Amy Frith and Nkosi Mbuya. You were my constant companions, my family and my sustenance. I will never forget the times when we shared our food, home works and thoughts and dreams.

Kathleen Rasmussen, the chair of my special committee, encouraged and supported me through personal and professional travails. Thank you for sharing the essentials of scientific writing with me. Carol Devine started as my field representative and then became an essential part my discovery of qualitative enquiry. Thank you for the endless edits of my qualitative papers and helping me to think through the qualitative data. Edward Frongillo helped me through the complexities of quantitative research and encouraged me to think differently about feeding recommendations. Mon Cochran brought a holistic view of the breastfeeding from the ecological perspective. My talks with him were always encouraging and thought provoking. I thank David Pelletier for the seeds of thoughts he planted in me about looking at a situation from

different perspectives. Gretel Pelto and J.P. Habicht helped me to distill points of interest from loads of material by constantly asking the question “Why should we care?”.

I thank the members of maternal and child nutrition research group for their insightful comments on my various presentations which makes this whole experience a baptism by fire. I would like to specifically thank Punima Menon, Sera Young, Kate Dikin, Rahul Rawat, Mduduzi Mbuya, Suzanne Gervais, Maïke Rahn and many others who helped me formulate my ideas and looked at my first drafts.

My research wouldn't have been possible without the support of MINIMat team and Matlab field staff. I gratefully acknowledge their tireless encouragement. My special thanks go to Dr. Areefin, Badal Dhar, Nazma apa, Md. Shahidullah, Samiron apa for sharing their rich understanding of the complexity of Matlab. For the financial support for the various component of my study I gratefully acknowledge NIH Maternal and Child Nutrition training grant, Division of Nutritional Sciences and the Graduate school travel fund.

I thank all the participants of my interviews for the time and energy it took to answer my many questions. I stand humbled by the constraint under which they manage to breastfeed their infants.

Finally, I would like to express my heart-felt gratitude to my family. My parents love, prayers and belief in me helped me to arrive at this juncture of academic achievement. Thank you for supporting me in my quest for independence. My brothers, Shayan and Jame Rasheed have been my cheerers my support during my extended leave of absence from family responsibilities. My cousins Fatema, Tahmina, Farhan, Areefa and Hesham played various supportive roles in my time of need. I thank my friend and partner George Smith for sharing his life with me. My parent's-in-law Jesse and Cecile Smith I acknowledge for their love and support.

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CHAPTER 1

INTRODUCTION

1.1 Background

Infant feeding practices have been shown to be strong determinants of child growth, health and nutrition. Growth stunting in childhood is a risk factor for increased mortality, poor cognitive and motor development and other impairments in function. WHO recommends that infants be exclusively breastfed for 6 months (1), especially where the quality and quantity of complementary foods are inadequate. In a systematic review, Kramer and Ritsuko (2) concluded that exclusive breastfeeding (EBF) reduced the occurrences of gastrointestinal morbidity for the infant and found no evidence to suggest that EBF for 6 months had a detrimental effect on child growth.

Despite the benefits of breastfeeding, in developed countries, only half of the mothers continue to breastfeed beyond one month and only a quarter of the mothers maintain any breastfeeding until 6 months (3-5). In developing countries, the duration of breastfeeding is longer, but only 50% of the mothers practice EBF for 6 months (6). A similar finding was reported from Bangladesh. In a recent paper based on the Bangladesh Demographic and Health Survey 1999-2000, investigators described universal breastfeeding among women with a median duration of breastfeeding of more than 30 months (7). However, the median duration of full breastfeeding (breast milk and water) was reported as 3.7 months, and almost 70% mothers introduced foods other than breast milk before their infants were 6 months old. It is important to understand why this is happening.

In some countries, EBF has been successfully promoted through WHO/UNICEF Baby Friendly Hospital Initiative. These hospital-based initiatives have a significant impact on breastfeeding outcome in Bangladesh (8). However, hospital based initiatives, no matter how successful, fail to reach a substantial portion of pregnant women in countries like Bangladesh, where most deliveries are home-based (9). To address the problem of providing breastfeeding support to majority of the mothers, peer counseling has been used as an alternative strategy for promoting EBF. In a randomized controlled trial of breastfeeding support conducted in Mexico, significantly more women in the intervention group practiced EBF at 3 months post-partum compared to the control group (10). The researchers also found that there was a dose-response relationship between the length of breastfeeding and the number of peer counseling visits. It is important to remember that Bangladeshi mothers generally have better breastfeeding practice (mean duration of 3.2 months) compared to Mexican mothers.

In a similar trial in the slum population of Bangladesh, women in the intervention group initiated breastfeeding earlier, were less likely to provide pre-lacteal and post-lacteal foods to their infants and more likely to practice EBF at 5 months compared to the control group (11). Thus, there are strategies available that are effective in changing mothers' feeding practices in the developing countries that might be beneficial for child health, growth and development. Despite these efforts to promote EBF, however, the vast majority of Bangladeshi mothers introduced non-breast milk foods before the infant is 6 months of age. It is these feeding decisions and the practices that follow from them, that deserve further attention, both in terms of understanding the practices and their causes and to fully develop theoretical models that explain those practices.

Any discussion of infant feeding is incomplete without considering the caregiver herself. In the UNICEF (1990) model of care, child survival, growth and development are shown to be influenced by three underlying factors: household food security, availability of health services and healthy environment and care for children and women. Care for the infant is defined as the practices of the caregiver that affect the nutrient intake, health and the cognitive and psychosocial development of the child. Appropriate infant feeding is, therefore, a crucial part of the care component. In an adaptation of the UNICEF framework (12), six major categories of resources for care were identified from the literature: appropriate education, knowledge and beliefs; health and good nutritional status; mental health, self-confidence and lack of stress; autonomy, control of resources and control of intra-household allocation; reasonable workload and adequate time; and social support from the family members and community.

Our general interest is in better understanding the feeding practices of mothers during the first 6 months of the child's life. The specific goals of our research were threefold. First, we wanted to gain an in-depth understanding of how the decisions regarding introducing non-breast milk foods are made from the mothers' perspective. Second, we wanted to examine and strengthen the theory of self-efficacy to understand breastfeeding practices in the context of Bangladesh. Finally, we wanted to test the revised conceptual model against empirical data.

1.2 Theories related to breastfeeding practices

Our first step in better understanding breastfeeding practices from the mothers' perspectives involved examining the existing theoretical frameworks used to describe breastfeeding practices in different populations. Ecological theory has been used by several researchers to study different aspects of breastfeeding. Although the studies

using the ecological theory vary in terms of the terminologies used and areas of emphasis, they all make the point that to understand human behavior, one must understand the context in which such behavior takes place (13,14). Belsky (15) described a model where parental contribution, children's characteristics and contextual sources of stress and support were the determinants of parenting skills. Harkness and Super (16) developed a concept of "developmental niche", which includes the social and cultural setting in which a child is placed, cultural rules of childcare and the caregivers' individual beliefs about development. Bentley et al. (17), used parental contribution, child's characteristics, contextual sources of stress and support and cultural beliefs about breastfeeding as the predictors for infant feeding decision making among adolescent mothers.

It is important to note, however, that ecological theory does not focus on maternal psychosocial factors such as self-efficacy. Therefore, the pathways through which the contextual factors may affect self-efficacy and thereby influence breastfeeding practices are not clear. Understanding the impact of contextual factors on mothers' self-efficacy and therefore, her behavior is important as many of our strategies to improve breastfeeding practices are designed to increase mothers' self-efficacy related to breastfeeding and have shown to be effective.

In recent years, social cognitive theory (SCT) (18) and the theory of self-efficacy (19) have been used to understand the factors that affect mother ability to practice optimal breastfeeding behavior. According to SCT, human behavior is described as "a triadic, dynamic, and reciprocal model in which behavior, personal factors (including cognition), and environmental influences all interact" (18). Thus, people respond to environmental events and, through cognition, they also exercise control over their own behavior. People's control of their own behavior influences not only the environment but also their cognitive, affective and biological state. SCT is,

therefore, an approach to understanding human cognition, behavior and environment that assumes that people are capable of self-reflection and self-regulation and can shape their own environment (18).

A key concept of SCT is self-efficacy, which is defined as one's judgment about his/her ability to perform specific tasks (19). In self-efficacy theory, beliefs of personal resources and abilities are the product of information from six primary sources. These sources differ in their power to affect self-efficacy. Performance experiences, in particular, clear success or failure, are the most powerful sources of self-efficacy. When a person does not have previous experience, vicarious experiences influence self-efficacy. Through vicarious experience, people observe behaviors of others, learn from the consequences of those behaviors and then use this information to form their own behavior. Verbal persuasion is a less potent source of self-efficacy than performance experience and vicarious experience. The potency of verbal persuasion as a source of self-efficacy expectancies is influenced by expertness, trustworthiness and attractiveness of the source of information. Imaginal experience relates to people's ability to generate beliefs about personal efficacy or inefficacy by imagining themselves and others behaving in future situations. Such images maybe derived from actual or vicarious experiences or verbal persuasion. Emotional state affects self-efficacy as people are more likely to have self-efficacious beliefs when their affect is positive than when it is negative. For example, both anxiety and depression may have deleterious impact on a person's self-efficacy. Physiological state affects self-efficacy when people associate negative physiological state with poor performance, perceived incompetence or perceived failure. The theory of self-efficacy has been adapted to describe breastfeeding practices by Dennis (20). In her adaptation of the theory, she chose to focus on previous experience, vicarious experience, verbal persuasion and emotional and physiological states (Figure 1.1).

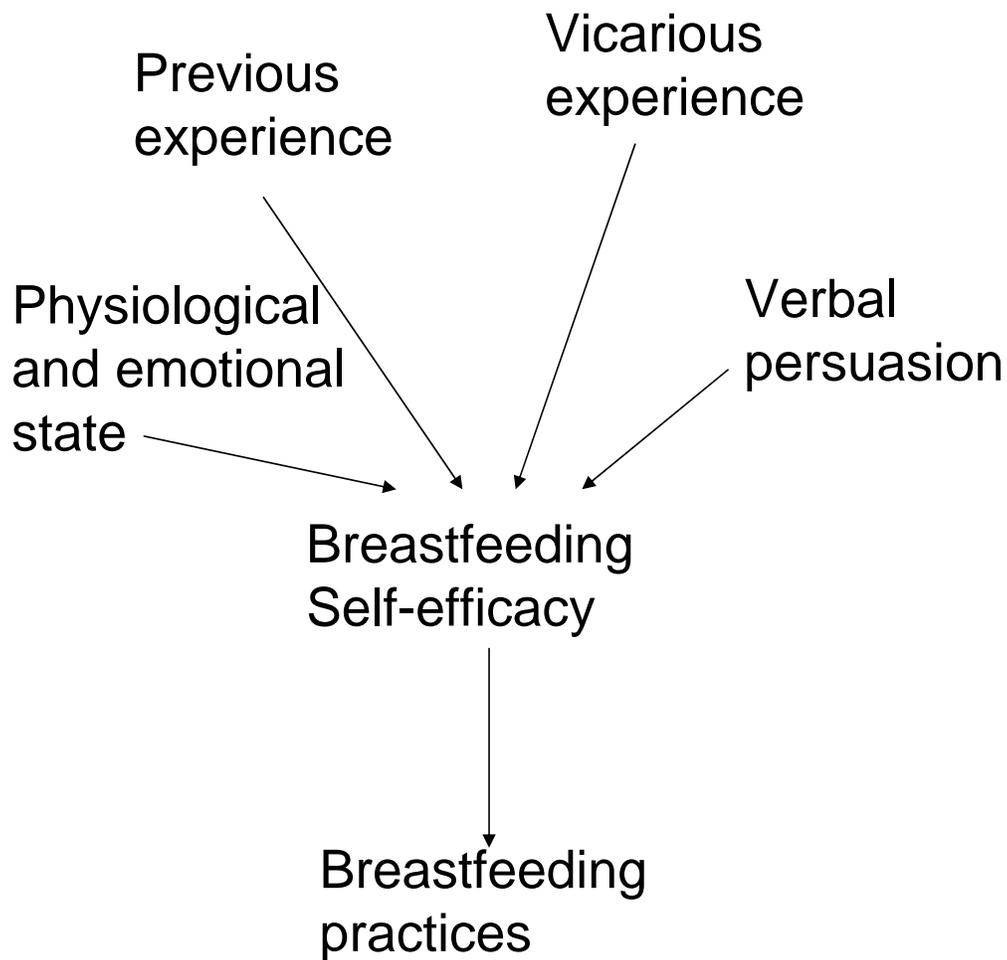


Figure 1.1: Sources of breastfeeding self-efficacy by Dennis (1999)

The idea of looking at mothers' self-efficacy have received much attention as, unlike many other individual and household level variables, self-efficacy is amenable to change through interventions. A thorough understanding of how maternal self-efficacy affects behavior can help to identify individuals or groups that need more support to breastfeed successfully. The self-efficacy framework can also be used to evaluate whether and how breastfeeding support interventions were successful in

affecting the cognition of the participants. In a recent study on parental attitudes towards breastfeeding among couples, researchers reported that maternal attitude towards infant feeding is a better predictor of feeding choices than demographic factors (21). A few investigators have reported the link between maternal confidence and duration of breastfeeding (3,22). One study showed that exposure to breastfeeding role models influenced mothers' decisions to breastfeed (23). Bandura (19) noted that self-efficacy influenced the amount of effort and persistence individuals will exert in the face of obstacles. In this respect, self-efficacy can be an important factor in the development of parental nurturing behavior. For this reason, we decided to begin our inquiry with a grounded inquiry into mother's perspectives on how they feed their infants and why they make those feeding decisions, giving special attention to self-efficacy as a possible explanatory concept. This study and its findings are described in Chapter Two.

1.3 Using the theory of self-efficacy for in-depth understanding of breastfeeding practices

To measure breastfeeding self-efficacy, Dennis and Faux (20) developed and tested a breastfeeding self-efficacy scale among urban Australian mothers. The breastfeeding self-efficacy scale was administered 1 week postpartum to mothers at a metropolitan hospital in Brisbane and mothers with high scores were significantly more likely to breastfeed and to be doing so exclusively at 1 week and 4 months postpartum compared to mothers with low scores. This scale was translated into Chinese and Spanish, and was tested on a Mandarin-speaking Chinese and also a Puerto Rican population (24,25). Among the Chinese mothers, the scale was administered immediately after delivery and was associated with whether the mother breastfed or bottle-fed her infant at 4 and 8 weeks postpartum (24). Among Puerto

Rican mothers, multiparous women had higher scores than primiparous women and there was significant difference in the initial self-efficacy scores of those who practiced EBF and those who did not (25). Although these studies were conducted among mothers from different cultures, all of the participants were urban women who educated and were employed outside home. Furthermore, the effect of self-efficacy on breastfeeding practices were evaluated between 1-16 weeks rather than 6 months as stipulated by WHO recommendation and breastfeeding information was collected through 24-hour recalls, which does not adequately represent the usual practice of breastfeeding. Therefore, we decided that although theory of self-efficacy theory was a good starting point, we should keep the data collection open-ended and flexible to incorporate other emerging themes. This allowed us to gain an in-depth understanding of the factors that affect the mothers' decisions regarding introducing non-breast milk foods beyond factors that was specified by the theory.

1.4 Adequacy of theory of self-efficacy to describe breastfeeding practices

Self-efficacy has been extensively studied in fields other than infant feeding. So, it is not surprising that criticisms regarding the theory originated in fields other than nutrition. Most of these criticisms have been about focusing on self-efficacy without understanding the context. In the theory of self-efficacy, causality begins with a person's control of his/her belief system that determines his/her control over a particular behavior. Control over one's belief system also allows a person to control the feelings and anxieties about his/her achievement. This idea, however, stands in stark contrast to theories that begin with the premise that our actions are constructed around social relations, involving social "selves" who engage in social action (26). In other words, self-efficacy emphasizes the individual, while there is not much emphasis on the fact that an individual is a part of a social system that affects both their belief

and behavior. Bandura (27) proposed that improved self-efficacy benefits those who suffer from perceived lack of control. The assumption behind this is that all failures are self-made. However, the importance given to individuals in self-efficacy theory is also in direct contrast to ideas of collective coping (28). In the stress literature, Banyard (28) described collective coping as “efforts by multiple persons, in conjunction with each other, to influence adverse circumstances”. This idea is particularly important for non-Western cultures where the beliefs and value systems are more community-oriented. In contrast to collective coping strategies, self-efficacy is a “culturally positioned trend that subscribes to blaming-the-victim approaches to social inequality and powerlessness” (29). In the self-efficacy theory, the control over one’s life is treated as a cognitive factor of the individual, without reference to social context. As self-efficacy is defined without social context, it is often applied to any number of behaviors regardless of its social origin or consequences.

According to Bandura (27,30), the value and meaning we give to proposed actions influence our behavior. The values and meanings we give to any action, however, are dictated by the culture. To cite an example: although all humans are subject to stress, the specific stressors and the ways to cope with them are defined by culture. In other words, the need to feel that the outcome of one’s behavior is under one’s own control is a social value (31). Some studies of self-efficacy, therefore, reveal that culture rather than actual performance outcome is a better predictor of change in the feeling of self-efficacy (32). Network support, often embedded in the cultural context in this case, affected the relationship between self-efficacy and the behavior of interest.

Although a person is trained to believe that she needs to use her own power and resources to make changes from sickness to health, power and resources needed are not necessarily available. This is particularly true for groups, such as women, that

are discriminated against. Within such groups, the assumption of individual responsibility is not possible given that the power to make decisions is often taken away from them by family members and powerful others (33). Taking action then, depends on a variety of resources (financial, social and legal) that may or may not be available. In the nutrition literature, a mother's education has been seen to affect the nutritional status of the child, when there are enough resources to support her choice (34). When living under conditions of discrimination people are not able to make changes in their lives, this would be defined as dysfunctional within self-efficacy parameters.

From the discussion above, it seems that the meaning of individual-level maternal psychosocial constructs, such as self-efficacy, should be understood within the context of the cultural bounds and the resources available to the mother. Therefore, we wanted to examine the adequacy the theory of self-efficacy in describing the breastfeeding practices and to develop an expanded conceptual framework for explaining breastfeeding practices if our in-depth study of mothers' perspectives revealed factors not captured by self-efficacy theory. This theory-building process was the second goal of our research, and is described in Chapter 3.

1.5 The capacity of the expanded conceptual paradigm to identify the determinants of long-term breastfeeding patterns

Although qualitative studies that are focused on the perspectives of the mothers themselves are essential in terms of providing insights into the process of decision making regarding the introduction of non-breast milk foods to infants, these studies are often designed with small samples that limit their interpretation and generalizability. Once concepts have been developed from grounded inquiry with mothers, it is important to test those concepts with a large and more representative

sample of mothers through a quantitative study. In this case, such an opportunity was provided through the existence of the MINIMat data set and this researcher's access to the data. The third general goal of this research into breastfeeding practices was, therefore, to test an expanded theory against appropriate data on breastfeeding practices gathered from a large sample of Bangladeshi women.

1.5.1 Suitability of MINIMat (Maternal and Infant Nutrition Intervention in Matlab)

In Bangladesh the under-five mortality rate is 73/1000 live births (6). Almost 36% of Bangladeshi infants are born with low birth weight (6) and often do not catch up in terms of growth because of the combination of high prevalence of infectious diseases and sub-optimal feeding practice (35). In this situation, MINIMat was designed to provide different combinations of food and micronutrient supplements during pregnancy to mothers in Matlab to observe their effect on birth outcome. Half of the MINIMat mothers were randomly assigned to receive intensive breastfeeding counseling and data on infant feeding practices were collected monthly during 0-6 months of lactation. There were some implicit assumptions regarding the impact of contextual factors on study outcomes, and therefore, the MINIMat dataset contained a wealth of detailed individual-level and household-level information on each participant. Thus, the quantitative data from MINIMat provided a unique opportunity to test the qualitative insights in a representative sample of mothers to understand a broader range of different factors that might influence breastfeeding practices.

1.5.2 Why do mothers feed non-breast milk foods to infants?

The idea of optimal breastfeeding practices is often culturally constructed and both mothers' perceived ability to feed her child and her choice of feeding methods

contribute to this characterization. According to the recent Demographic and Health Survey, both-less educated and rural Bangladeshi mothers are more likely to practice full breastfeeding (breast milk and water) for a longer period than their more educated and urban counterparts (7). From a survey conducted among Bangladeshi urban mothers, researchers reported that mothers did not understand the EBF messages properly and thought that children needed water and pre-lacteal feeds (36). Furthermore, mothers did not believe that they could supply adequate milk to meet to needs of their infants for 6 months. Other researchers have also reported the gap between mothers' normative practices and the recommendation of EBF for 6 months that result in early introduction of non-breast milk foods (37).

In many communities mothers' idea of the ideal breastfeeding practices during 0-6 months differed from EBF. Researchers have reported that mothers force-fed certain foods to young infants to enhance their growth (37), provided non-breast milk foods in small amounts to develop taste so that infants would easily transition into weaning foods (38) and fed specific traditional foods to infants to keep them healthy and protect them from harm (39). The ideas about optimal breastfeeding are often culturally determined and driven by ideas about optimal parenting (15). Mothers' social network (17,40) and healthcare professionals (40,41) also play important roles in both shaping the ideas about optimal infant feeding and helping to translate these ideas into practice. The choice of feeding method is, therefore, determined by the rules and behavior that demonstrate participation in a social group rather than by perceptions about the nutritional value of the feeding method (42).

Some infant level factors were also reported to be important predictors of breastfeeding decisions. Researchers have shown the profound effect of infant demand (43) and health (44) on mothers' feeding choices in Peru. Despite the normative practice of force-feeding certain foods to very young infants in Indonesia, researchers

reported that infants who refused to eat non-breast milk foods or were ill, were fed only breast milk (37). Others reported that mothers of weaned infants resumed breastfeeding in response of infant demand (43). Infant fussiness and crying were often used as the indicators for inadequate breast milk by the mothers (17,45,46).

In the breastfeeding literature, perception of breast milk inadequacy was a major reason reported by mothers in developed and developing countries, for both introducing non-breast milk foods and discontinuing breastfeeding altogether (46). The idea of breast milk inadequacy represents both mothers' understanding of breastfeeding and their response to infant demand. We will, therefore, concentrate our inquiry into the perception of breast milk inadequacy. A number of researchers have explored phenomenon of insufficient milk supply (IMS) through mothers' perspective (40,47,48). Although these studies were conducted in different countries, there were some interesting similarities in findings. In all the studies mothers' diet and nutritional status (i.e. illness, quality and quantity of food intake) and emotional status (i.e. anxiety, grief or sadness) were thought to affect the quality and quantity of breast milk and to lead to IMS. In one study, researchers connected a first-time mother's lack of experience to her inability to breastfeed (40).

In the quantitative studies, the researchers have observed the effect of maternal nutritional status on the quality and quantity of breast milk (49). It has been acknowledged, however, that it is hard to isolate the effect of maternal nutrition on breast milk volume as infants can increase breast milk volume by increasing suckling frequency (49). In a few reviews of maternal perception of IMS, researchers have explained that it is likely that most cases of perceived IMS were a bio-cultural phenomenon caused by lack of constant contact between a mother and a child (46) It is generally agreed, however, that the conditions that affect the production of breast milk

are primarily a function of breastfeeding behavior and both reduced breastfeeding frequency and early supplementation can lead to IMS (50).

The link between mothers' work and early supplementation has been reported both in Bangladesh and other countries. In a randomized trial of breastfeeding support among the slum-dwellers in Dhaka, Haider et al. (11) reported that the mothers cited breast milk inadequacy, followed by familiarizing the baby with the bottle to enable a working mother to return to work, as the major reasons for the introduction of non-breast milk foods before the baby was 4 months old. Researchers suggested that although very few rural mothers worked outside home, they had heavy workloads which may adversely affect their breastfeeding practices. Cain et al. (33), in their study of the effect class and patriarchy on women's work in rural Matlab, reported that the annual agriculture cycle resulted in substantial rise in the time use of both men and women. Although the women in all households spent similar amount of time at agricultural work, the men from wealthier households were less involved in agricultural work. The authors noted that in the richer households men probably employed other people to help with their work but women's chores were not alleviated in a similar manner.

Huffman et al. (51) reported that infant suckling time reduced during November through February in Matlab, when the mothers were busy with post-harvest activities. Brown et al. (52), in their study of the effect of seasonality on infant energy intake, reported that as the reduced suckling did not completely coincide with reduced energy consumption from breast milk among weanlings (5-18 month old). They proposed the reduced milk consumption by the infant was due to reduced maternal lactation capacity as a result of the synergy between the widespread malnutrition among Bangladeshi women and increased workload. Therefore, in rural Bangladesh, there is evidence that some contextual factors, such as maternal workload

and nutrition, affect breastfeeding practices. As a part of MINIMat intervention, contextual information regarding infant and maternal health, employment status and other household information were collected. The availability of such extensive information made this dataset well suited to test the theory for explaining breastfeeding decisions and behaviors.

1.6 Organization of the dissertation

This dissertation has 3 specific goals.

Goal 1: We wanted to gain an in-depth understanding of why mothers offered complementary foods to breastfed infants aged 0-6 months. Working with the criteria developed from theory of self-efficacy, we selected mothers who had 5-7 month old infants. We used in-depth interviews and focus group discussions with mothers and key informants. The breastfeeding decision points that emerged from the constant comparative method of data analysis are described in Chapter 2.

Goal 2: We wanted to test the adequacy of theory of self-efficacy for explaining the breastfeeding practices identified in Chapter 2. Our analysis resulted in the expansion of the conceptual framework to integrate self-efficacy theory with concepts relating to the contexts surrounding these rural mothers. This theory building process is described in Chapter 3.

Goal 3: We wanted to test, using a large quantitative dataset from MINIMat, the capacity of the expanded conceptual paradigm that was developed (Chapter 3). We identified the determinants of long-term breastfeeding patterns constructed from breastfeeding decision points (Chapter 2). We used logistic regression to compare the mothers practicing normative breastfeeding with those who practiced non-normative breastfeeding in terms of their individual, infant and household characteristics. In chapter 4, we discussed this analysis and its findings.

Finally in Chapter 5 we summarize the results from the research program as a whole (Chapters 2-4) and discuss the research, program and policy implications of these findings.

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CHAPTER 2
HOW MOTHERS' PERCEIVE THEIR OWN DECISIONS RELATED TO
INTRODUCTION OF OTHER FOODS TO BREASTFED INFANTS IN MATLAB,
BANGLADESH

2.1 Abstract

Exclusive breastfeeding (EBF) for 6 months has been promoted as an ideal way of feeding infants worldwide. In Bangladesh, breastfeeding is universal, but EBF is rare as mothers offer pre-lacteal feeds and other foods along with human milk to infants. Through ethnographic interviews and focus group discussions (FGDs) with mothers of 5-7 month old children and other care givers, we studied how the decisions about introducing other foods were made. We conducted interviews with 27 mothers and 17 key informants and FGDs with 30 women in Matlab, Bangladesh between December 2004 and February 2005. Interviews were taped and analyzed using the constant comparative method with ATLAS.TI. Mothers described three stages at which other foods were introduced to infants: 1) pre-lacteal feeding, when family members and birth attendants made decisions; 2) intermittent feeding, when foods were offered as a medicine, as a response to infant demand and to develop taste; and 3) when mothers experienced breast milk inadequacy. The main reasons expressed by the mothers for inadequate milk were their inability to eat, illness and contraceptive use. Thus, mothers did not feel that they had control over EBF. There was a significant gap between the ways in which the mothers in the community and the nutrition experts viewed breastfeeding. To promote EBF, mothers and other family members may need to understand not only about the meaning and importance of EBF, but also to be aware of various external cues (from the infants) and how to manage them.

2.2 Introduction

Results from observational studies suggest that exclusive breastfeeding (EBF) in the early months of a child's life, continued partial breastfeeding and timely transition to high quality complementary foods provide maximum benefit in terms of growth, development and survival of children (1-3). In a paper based on the data from Bangladesh Health Survey 1999-2000, the median duration of full breastfeeding (breast milk and water) was only 3.7 months and almost 70% mothers introduced foods and nutritive liquids to their breastfed infants before they were 6 months old (4).

Attempts to improve child feeding are often frustrated when normative behavior in a community does not match technical recommendations. Some researchers have shown that the perception of milk inadequacy, workload and lack of social support can undermine maternal intention to maintain breastfeeding (5-7). In ethnographic studies of some communities, researchers have reported that the normative feeding practices believed to enhance child survival included pre-lacteal feeding, late initiation of breastfeeding, discarding colostrum, early feeding of water and other nutritive liquids and delayed feeding of semisolid and solid foods (8,9). These local strategies are contrary to current recommendations but shed some light on why mothers in some communities do not abide by the current infant feeding recommendations.

Although mean breastfeeding duration among Bangladeshi mothers is about 24 months (4), growth faltering occurs quite early (10), which has led to efforts to identify effective interventions that can change this situation. Under the Baby Friendly Hospital Initiative of UNICEF, hospital-based health professionals were training to support breastfeeding. In one such hospital in Bangladesh, researchers were successful in improving the feeding practices of mothers of 1-12 week old partially breastfed infants who were hospitalized with acute diarrhea. Of all the mother-infant

pairs followed up 2 weeks after their release from the hospital, 75% had resumed EBF (11). This study, however, was limited to 24 infants and there was no information available about whether the improvement in feeding practice was sustained.

Hospital-based initiatives, often fail to reach rural Bangladeshi mothers effectively as only 10% of rural births take place in the hospitals (12). In an effort to find interventions that can effectively change breastfeeding practices, peer counseling offers a viable option. In a randomized trial of breastfeeding support, where peer counselors conducted 15 home visits to women in the slums of Dhaka, Haider et al. (2000) reported that 70% of the mothers in the intervention group practiced EBF at 5 months compared to only 6% in the control group. In this study, the major reasons cited for introducing other foods before the baby was 4 months old was inadequate breast milk, and familiarizing the baby with the bottle because the mother had to return to work. In a less-intensive monthly group breastfeeding counseling intervention in Dhaka slums, researchers reported 54% prevalence of EBF on the fifth month in the study group compared to 36% in the comparison group (13). There are a few limitations of the last two studies: the data on the monthly infant feeding practices were collected through 24-hour recall which allowed an indication of breastfeeding trends but did not allow a longitudinal assessment of breastfeeding practices; and the researchers did not explore either mothers' understanding of breast milk inadequacy or the pathways through which the intervention changed mothers' behavior. Furthermore, none of these studies was conducted in a rural population where mothers were less likely to work outside home but still introduced non-breast milk foods earlier than recommended.

In the present study, we attempted to understand how mothers and other caregivers experienced giving other foods to breastfed infants during the first 6 months of their lives. This information will allow us to understand why there is a gap

between the technical recommendations and the practice of breastfeeding. This knowledge will allow us to take a fresh look at the how mothers feed their infants, provide insights about suitable intervene and set realistic goals for improving breastfeeding practices.

2.3 Methods

This study was conducted as a part of the doctoral research of the principal researcher who was from Bangladesh, had a background in nutrition and was trained in qualitative methods. The research assistant had a graduate degree in anthropology and had experience in dealing with sensitive topics. We used the theory of self-efficacy (14) and literature review to guide the development of the initial list of topics to be discussed with the participants. As the theory of self-efficacy (SE) was concerned with an individual's role (the mother's role) in performing a given task (breastfeeding), it provided an appropriate starting point to our inquiry.

The study was conducted in the interpretive tradition (15). We used grounded theory (16) as a method of generating an understanding of different influences that shape infant feeding decisions. We used three data collection methods: in-depth interviews with mothers and key informants, and Focus Group Discussions (FGDs).

An interview guide was developed in English and then translated in Bengali. Colleagues who worked both in Matlab and in the field of breastfeeding were consulted about its contents. The interview guide was field tested with three mothers in Matlab. The final interview guide covered the following: background situation (parent's house before marriage and husband's house after marriage), descriptions of experiences during pregnancy and delivery, feeding practices of the infant since birth, previous experience with breastfeeding, mother's social support, workload, understanding of breastfeeding techniques and their aspirations for their infants

(Appendix 1). Although the interview guide was developed using the theory of SE and literature review, the topics were used with flexibility in response to how the participants wanted to direct the interview.

2.3.1 Study area

This qualitative study was conducted during November 2004–February of 2005 in Matlab Thana of Chandpur district. Matlab is a rural area in Bangladesh about 50 km from the capital, Dhaka. The respondents for the in-depth interviews were selected from mothers enrolled in the larger study called “Maternal and Infant Nutrition Initiatives in Matlab” (MINIMat). MINIMat staff members personally collected child feeding information every two weeks from the mothers. MINIMat was operating in 4 geographic blocks (A, B, C and D) in Matlab. For our study, we selected blocks B and C only as these represented ecologically similar rural areas and were easily accessible.

2.3.2 Recruitment of study participants

Recruitment of mothers - The theory of SE proposed that previous experience at breastfeeding and verbal persuasion (in our case counseling) affect mothers’ self-efficacy and therefore her feeding practice. We selected 27 women who participated in the MINIMat study and had 5-6 month old children on November 2004 with different feeding patterns from the MINIMat longitudinal feeding information (exclusively breastfed for 5 months or not). For each feeding pattern mothers were recruited based on their parity (1 or 2-3) and assignment to breastfeeding counseling (received at least 7 out of 8 counseling sessions or control group). Recruitment of mothers continued until no new themes emerged.

Breastfeeding is not a private issue among women in Bangladeshi culture. These mothers frequently received advice and information about breastfeeding from other women and health workers and they were quite comfortable about discussing

their experience at home where most of the interviews took place. Some privacy however, was needed to help the mother express her opinions freely without interruption from other women in the house hold. Only one interview took place in the health center.

Recruitment of the FGD participants - Three FGDs were conducted with women between 17-45 years of age who had at least one child-rearing experience. These households (for FGDs) were selected in an opportunistic fashion. While conducting in-depth interviews with mothers, we found households with several women from different generations with child bearing experience. We sought permission to conduct an FGD with these women on a day, time and place of their convenience. Five to eight women participated in each of the FGDs. We explored similar themes as in the in-depth interviews through the FGDs. We sought to understand the social norms and the collective understanding about breastfeeding that prevailed in these households through these FGDs.

Key informant interviews - We interviewed 17 key informants for this study. We chose key informants based on in-depth interviews with the mothers where mothers mentioned the role of a particular person or group as influencing their infant feeding decisions. Our final list of key informants included four mother-in-laws, one husband, five local health care providers, an ICDDR,B community health workers, two traditional birth attendants (TBAs), two nurse midwives and three MINIMat breastfeeding counselors.

2.3.3 Informed consent and ethical approval

We approached the mothers in their homes for their written consent to participate. Mothers who could not read asked other women in the household or their children to help them with the consent form. The study protocol received ethical approval from both the University Committee on Human Subjects at Cornell

University and Ethical Review Committee of International Center for Diarrhoeal Disease Research, Bangladesh (ICDDR,B).

2.3.4 Data collection and analysis

We (the researcher and research assistant) conducted the interviews and FGDs in Bengali. We were allowed to audiotape-record most of the interviews. When we were not allowed to record our conversations, we both took extensive notes. The interviews took 1-2 hours depending on whether the mothers needed breaks for household chores. Some mothers were visited more than once for further clarification of specific issues.

The interviews and FGDs were tape recorded and transcribed by experienced transcribers. The quality of transcription was checked by the researcher or the research assistant. Both the researcher and research assistant kept extensive field notes during the study. These field notes provided additional information on the observed context and quality of the interviews. Initial analysis of the interview data was done in Bengali by the researcher with extensive consultation with the research assistant. An experienced medical anthropologist helped supervise the data collection. After the initial analysis, the primary researcher returned to the U.S. to conduct more in-depth analysis using the software ATLAS.ti (Berlin 2005) in consultation with faculty members who had expertise in qualitative research.

We used a systematic and iterative method of analysis based on the constant comparative method (16). Steps in the analysis included: 1) Open coding of transcripts from the interviews and FGDs using ATLAS. ti to capture emergent themes; 2) Creation of a cognitive map for each interview to understand how these themes were related to each other; 3) Peer debriefing to clarify themes; 4) iterative development and revision of a conceptual framework based major themes and the relationship between them; 4) When 3 decision points of feeding non-breast milk foods to

breastfed infants emerged from the data, charting the presence and absence of each of these decision points and factors leading to them for each mother; 5) Grouping of other major and minor themes under each decision point in a matrix; 6) Revision of the conceptual model; 7) Determination of the fit of each interview with the revised conceptual model; 8) Peer debriefing with other members of the research team and graduate students in the field; 9) Consideration of the fit of findings with existing theoretical and empirical research.

2.4 Results

Among 27 mothers participating in the interviews, 13 were primiparas whereas the others had 2-4 children (Table 2.1). Five women lived with their parents as their husbands lived abroad or had abandoned them, while the others lived with their husbands and children either in a nuclear or extended family. All the women, however, had family members (parental or by marriage) living in the houses around them. Only seven women gave birth at home while others gave birth at the health sub-center, Matlab hospital or Chandpur hospital.

Mothers described three stages during the infant feeding continuum when foods other than breast milk were offered to the infant. The first decision point was reached just after delivery when a decision about pre-lacteal feeding was made. All 27 mothers went through this stage. The second decision point was reached after the milk came down. Mothers sometime introduced other foods intermittently at this stage, yet her breast milk was perceived to be adequate. A total of 12 mothers practiced intermittent feeding while 2 did not. The third decision point was reached when mothers perceived that their breast milk was inadequate to meet the needs of the baby. Mothers offered special foods (*alga khabar*) to their infants continuously when they

perceived breast milk inadequacy. Two of the mothers described intermittent feeding followed by breast milk inadequacy (Figure 2.1).

Table 2.1 Characteristics of the mothers, their place of delivery and living situations

Characteristics	n
Parity	
1	14
>1	15
Education	
None	11
1-5 years	5
> 5 years	13
Breastfeeding counseling	
Yes	16
No	13
Place of delivery	
Home	8
Health facility	21
Living situation	
Nuclear	13
Joint	11
Parental family	5

2.4.1 Use of pre and post-lacteals

Place of delivery: The place of delivery (at home or in a healthcare facility such as a hospital or health sub-center) played an important role in what was fed during the first few hours of birth to the baby. During home delivery, Traditional Birth Attendants (TBAs) and other family members assisting the delivery often fed pre-lacteals. Their decisions had more impact for the primiparous compared to the multiparous women. Although a few multiparous mothers did describe deciding about pre-lacteal feeding, none of the primiparous mothers did. Sometimes pre-lacteals were given without the mother's knowledge. A mother of two children who delivered her first child at her parent's place recalled:

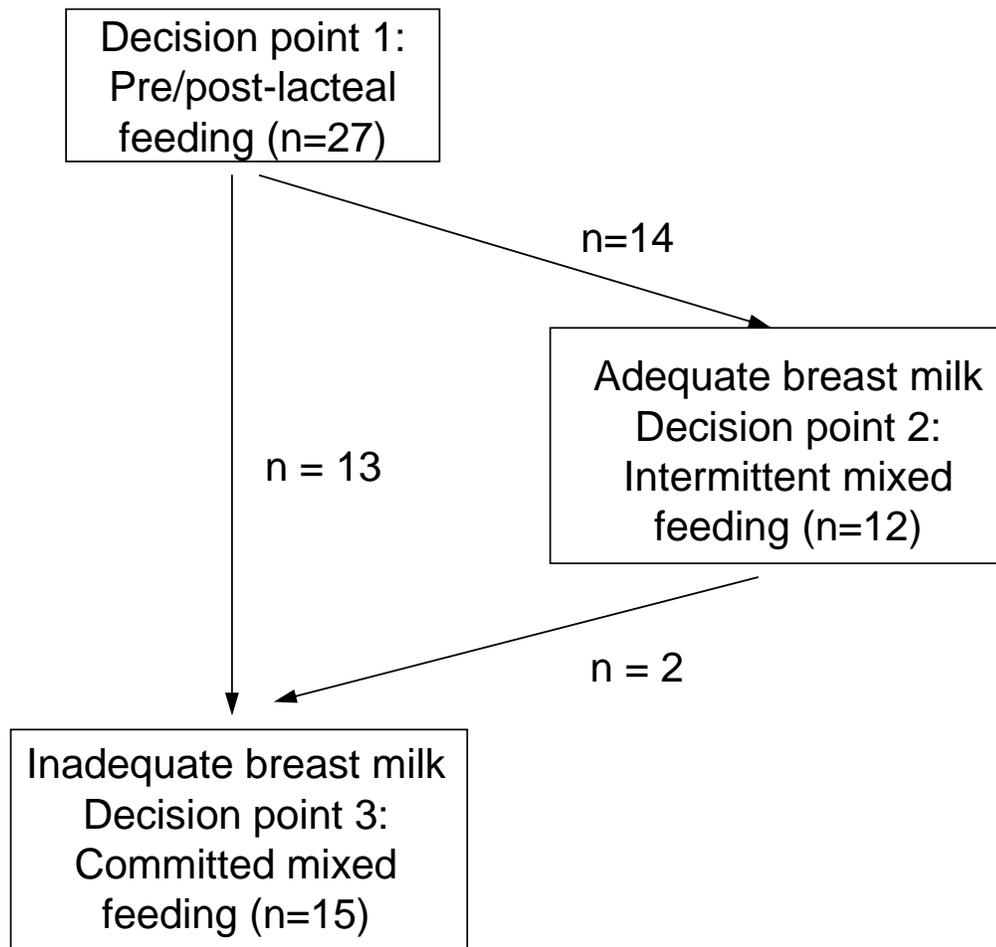


Figure 2.1 Maternal breastfeeding decision points

My older child was given breast milk. But at first she was given honey. We were at home (parental home). I think they (family members) fed her honey first. I have not seen this but I heard later that they fed honey. (ID #5)

During facility-based vaginal deliveries, the nurse or doctors attending the birth did not allow pre-lacteal feeding. Mothers usually listened to this advice. It appeared that mothers gave considerable importance to the advice given by the doctors and nurses. As one first mother describes the effect of delivery place on pre-lacteal feeding:

I did not give anything to the baby. She was born in the hospital. They (nurses) did not let me feed anything to the baby. If I gave birth at home they (family members) would have given things. (ID # 17)

During cesarean section however, pre-lacteal feeding was likely. One mother (ID # 18) in our study who had cesarean section at Chandpur (district hospital where the facilities for difficult delivery were available), said that while she was unconscious for 12 hours after the delivery, her mother-in-law fed the baby sugar water at first to pacify the baby and then the doctors prescribed “biomeal” (a formula) until she (mother) was well enough to breast feed. They stopped feeding the formula after 3 days when breast milk came. Mother’s status after delivery, in this case, made it necessary to feed pre-lacteals to the baby although the delivery took place at a health facility.

Importance of role of people assisting the home-based delivery: Sometimes a mother’s knowledge regarding the harmful effects of pre-lacteals was not enough to prevent pre-lacteal feeding because of how she felt after delivery. Mothers needed support to initiate breastfeeding. One of our key informants, a nurse midwife, said that after her baby was delivered, all she wanted to do is rest. She asked her mother to take the crying baby away. Only when her mother insisted that she should breastfeed the baby, the baby was put to breast. The nurse midwife observed that although she had counseled many women about early initiation of breastfeeding, she could not put her own knowledge to practice without her mother’s support. Other mothers also mentioned the influence of family members and TBAs on the decision to feed pre-lacteals to their infants.

Whether the TBA assisting the delivery received formal training or not affected their practice regarding pre-lacteal feeding. When we interviewed a trained TBA, she reported that she does not give pre-lacteals to infants. An untrained TBA with 30 years of experience, however, described mustard oil feeding as a part of her

after-delivery ritual, which included washing the baby, massaging him with mustard oil, wrapping him up in soft cloth and then putting him to the mother's breast. As most deliveries in the rural areas take place at home, TBA training could have an impact on pre-lacteal feeding.

Local understanding about the need of post-lacteals: Sometimes pre-lacteals or post-lacteals were offered to pacify the baby before the first milk let-down happened. This idea was illustrated by the advice about post-lacteals from the untrained TBA to a mother she assisted during delivery:

The mother's milk will not come down for two and a half days. I told the girl yesterday to take lightly sweetened lukewarm water, and feed it to baby with a spoon. She does not have milk now. *Obuijja* (baby) screams for food. If she (mother) wets the mouth with sugar water, the baby will be quiet. The baby will suck the breast and get something too. A day later *goilla* (milkman) will bring milk anyway (meaning milk will come down).

This comment shows that there was a perception in the community that milk did not come down for two and half days after delivery and TBAs suggested post-lacteals to pacify the baby in the interim. Some mothers also mentioned lack of milk in the first few days as a reason for feeding other liquids to the infant. This idea was shared by participants in the FGDs. The perception related to the inadequacy of colostrum to meet the initial needs of the infant explains why mothers feed post-lacteals to the baby.

Effect of breastfeeding counseling: During the MINIMat intervention mothers in the breastfeeding counseling group received 3 counseling sessions in quick successions before and after delivery. Both mothers and household members were motivated to prevent pre-lacteal feeding during these visits by the counselors. According to mothers, this had some positive effect. One mother of three children

compared her two previous experiences with the current experience of pre-lacteal feeding:

Then they (health workers) did not tell me anything - that you need to feed the baby this (colostrum). When my first child was born, the elders told me (to feed honey and mustard oil) so I fed my older son and my daughter. I did not feed these things to this baby. (ID#26)

This mother received breastfeeding counseling from MINIMat for the present child.

A few mothers mentioned that they did not let the attendants feed pre-lacteals to the baby as they knew that a new born should be given breast milk at first. These mothers knew about pre-lacteals from the intensive breastfeeding counseling sessions or from the health workers who visited them during pregnancy. In the FGDs women also talked about an increased importance given to pre-lacteal feeding during MINIMat intervention compared to previous programs reducing the prevalence of pre-lacteal feeding. Regardless of whether an infant was given pre and post lacteals or not, however, all the women in our study initiated and practice breastfeeding.

2.4.2 Intermittent mixed feeding (when breast milk was adequate)

All interviewed mothers thought that breast milk was the best food for the infant and infants should be given only breast milk for at least 6 months. Despite this knowledge, they sometimes fed non-breast milk foods intermittently. This type of feeding occurred when mothers perceived to have adequate breast milk. One mother of two described breast milk adequacy in the following way:

I know that people feed their babies from both breasts. My baby so far gets enough breast milk. When she finishes from one breast she does not demand the other, she is full drinking from one breast, she does not want any more. (ID #12)

Mothers in this group reported that they fed only breast milk because they could. If they had felt that their breast milk was not enough to meet the demand of the baby,

they would have introduced other foods. The kind of foods offered depended on the age of the infant (Table 2.2).

Reasons for introducing other foods: The reasons for intermittent mixed feeding were varied. Mothers did not really acknowledge this kind of intermittent feeding as feeding “other foods” (*alga khabar*), because the child’s main source of nourishment was breast milk and they did not usually prepare separate foods regularly for this purpose. Furthermore, all the mothers gave their babies water from time to time in to quench the baby’s thirst and clear his palate after feeding. Water was not considered to be “food”.

Mothers sometimes introduced other foods because of their medicinal value. A first-time mother who fed honey to the baby 5 days after delivery explained:

She (the baby) screamed during the day, did not sleep. She slept at night. I fed the baby honey and I took honey also. She slept after that. (ID #24)

Some mothers expressed the idea that developing acceptance for a variety of foods will help the baby transition from breast milk to adult foods. One primiparous mother who followed a neighbor’s advice and fed fruit juice to the baby said:

She (the neighbor) told me baby will not want to have anything else but breast milk if she is not used to the taste. (ID #25)

A few multiparous mothers expressed the same idea when they complained about their older breastfed children having problems accepting complementary foods when they were 5-6 months of age.

Table 2.2 Age of food introduction and type of food introduced by mothers in the intermittent mixed feeding trajectory

Food introduction (age in months)	Type of food	Counseling
1	Honey	Yes
1	Fruit juice	No
3	Fruit juice, milk	No
5	Fruit juice, solid	No
5.5	Milk	Yes
5.5	Semi solid	Yes
6	Solid	Yes
6	Fruit juice, solid	Yes
6.5	Fruit juice, semi solid, solid,	Yes
6.5	Fruit juice, solid	No
7	Fruit juice, semi solid, solid	Yes
7	Fruit juice, semi solid, solid	Yes

The infant demand and ability to eat also had a role to play in both introduction and type of foods offered. Mothers and other care givers talked about feeding a variety of foods depending on what a baby liked to eat as well as what his skill level allowed him to eat. One grandmother said about her month old grandchild:

When the baby cries I pick him up, he opens his mouth (*haa kore*), he wants to eat. He lunges towards the food, so I give him some. If the baby wants to eat rice, I feed rice and if he wants to eat *khichuri* (a dish made of mainly rice and lentil with occasional addition of vegetables and fish), I feed that. Whatever the baby wants to eat, that is important. Baby does not want to eat the same thing again and again.

A mother of two explained about feeding her 5 month old son:

Among fruits I can only feed oranges. I can't feed anything else. Sometimes he drinks cow's milk. When we eat, I feed him a little rice. He can't swallow. He has not learnt how to. (ID#5)

In this community, people linked a mother's ability to eat to the adequacy of her breast milk. Therefore during Ramadan (Muslim month of fasting) study

participants expressed concerns about breast milk inadequacy. One mother of two told us:

As Ramadan was drawing near, my mother-in-law kept telling me to start getting the baby used to other foods. She told me ‘if you fast during Ramadan, the baby might not get milk. She is only a baby how will she get milk if you don’t eat? So why don’t you start getting her used to other foods?’ I did not listen to this advice. I thought that the baby has never been able to finish all the breast milk. My milk (after feeding the baby) flows out (*baiya pore*). If I ate sweets and milk (during Ramadan) I would be able to maintain my milk flow. (ID#19)

Although this particular person did not start feeding the baby other foods in anticipation of inadequate breast milk, she took the advice seriously and ate foods that will maintain her milk flow. This suggests that there might be mothers in this community who would introduce complementary foods in anticipation of breast milk inadequacy during Ramadan. Similar concerns were also expressed by a few mothers who experienced breast milk inadequacy during Ramadan.

Effect of breastfeeding counseling on intermittent mixed feeding: Breast feeding counseling had a positive effect on reducing intermittent feeding. Counseled mothers knew pathogens can be introduced through food and generally refrained from intermittent mixed feeding before the infant was 5 months old. Women who did not receive counseling did not mention such concerns regarding intermittent feeding.

Complementary food introduction at 5-6 months: Although most study mothers believed that other food should be given regularly to the baby at 6 months whether her breast milk was adequate or not, information from MINIMat longitudinal feeding data (data are not shown) indicated that many mothers started continuous feeding of other foods (other milk, fruit juice, semi solid and solid foods) by the time the infant was 5-6 months old. Only two mothers in the intermittent mixed feeding group practiced EBF for full 6 months. So, by the time an infant is 5 month old, the

difference between feeding practices of the mothers with adequate and inadequate breast milk disappeared.

2.4.3 Committed mixed feeding (when breast milk was inadequate)

A total of 15 mothers in our study reported breast milk inadequacy. 13 mothers reported breast milk inadequacy without going through the stage of intermittent mixed feeding. Two of the mothers started with intermittent feeding and then experienced breast milk inadequacy. At anytime between 1-7 months after delivery, when breast milk inadequacy occurred, mothers started giving their infants complementary foods (*alga khabar*) regularly along with breast milk (Table 2.3). Infants under 5 months of age were offered cow's milk or formula. As they grew older, rice powder or semolina was added to both formula and milk to thicken it (in the table this gruel is the semi solid food). Older children were offered *khichuri*, fruits, biscuits and occasionally food from the family pot.

Some mothers offered other foods on a schedule (1-3 times a day) while other mothers started each feed with breast milk and, if the baby was not satisfied, offered complementary foods. The mothers in the later group reported that some days they did not feed complementary foods at all because the breast milk flowed well, but some days the baby got breast milk at night only if he had not been breastfed the whole day.

Signs of inadequate breast milk: All the mothers identified breast milk inadequacy by themselves and in consultation with other family members. Although the initial sign of inadequate breast milk was the baby crying after being breastfed, mothers also reported failing to express milk and not having the sensation of milk let-down. Their understanding of causes of breast milk inadequacy was quite nuanced. One first-time mother living in a nuclear family describing how she identified breast milk inadequacy said:

Table 2.3 Age of food introduction and type of food offered to infants for mothers with breast milk inadequacy

Food introduction (age in months)	Type of food	Counseling
1-1.5	Cow's milk	No
2	Formula	Yes
2	Cow's milk	No
2	Cow's milk	No
3	Cow's milk	Yes
3-4	Formula	Yes
4	Cow's milk	Yes
4	Formula	No
4	Cow's milk	No
5	Biscuit	Yes
5.5	Cow's milk	No
6	Khichuri	Yes
6	Formula	Yes
6	Biscuit	Yes
7	Biscuit	No

I gave complementary food as breast milk was not enough for the baby. He would cry after being breast fed. When I fed cow's milk he fell asleep comfortably. (ID#23)

A mother of three compared her previous and current breastfeeding experiences:

They (older children) used to be full after feeding from only one breast, milk used to flow out from the other breast and wet my clothes, and he (current child) feeds from both breasts and still does not get enough to fill his stomach. (ID#6)

Talking about the advice she received from her mother-in-law relate to breast milk inadequacy, a first-time mother living in a joint family recalled:

My mother-in-law told me 'press your breast and see whether milk comes out' I saw that it did not. (ID#1)

All mothers talked about being able to "tell" (*bujha jai*) whether milk was coming down and whether they would be able to feed the baby. They told us that when the milk came down they felt a sensation in their breasts (*dudh shin shinaya name*) and their breasts felt heavy. In fact one mother said that she scheduled feeding sessions

both according to this sensation of milk let-down as well as infant demand. Several mothers mentioned that when the baby cried after being breast fed they noticed not feeling that sensation any more.

Perceived reasons for inadequate breast milk: A recurring theme in the topic of breast milk inadequacy was the link between mother's health and breast milk production. Illness, inability to eat and use of contraceptives (it is unclear what kind of contraceptives they used) were cited as the major reasons for breast milk inadequacy. A mother of two, discussing the reason why she could not feed her older child breast milk for 6 months said:

I had a miscarriage and six months later I conceived again. I had *roktoshunnota* (anemia). My body was weak, I did not sleep well. Four months after delivery the baby did not get enough milk.
(ID#5)

Another mother of two, linked inflammation in one of her breasts to inadequate milk and said:

He (baby) could only get milk from one breast. My other breast had *bath* (inflammation). The milk was spoiled, so the baby did not get enough milk. (ID#13)

Some mothers thought that they could not produce enough milk because they did not have appetite and could not eat until they were full (*pet bhore khaoya*). They thought illness (diagnosed or not) affected their appetite and when they could not eat adequately, the demand of a growing baby outstripped the mother's ability to produce milk.

My child's stomach grows as he grows older. Maybe that is why breast milk is no longer enough for him. But, if I am well, I am able to eat more and my baby gets more milk. If I am ill, I cannot eat and my baby does not get enough milk. I don't have much appetite. (ID#3)

A few mothers noticed that their milk production declined after they started to take contraceptive pills.

“ I started taking pills. I think that is why I have less milk. I started taking pills after 2 months (of delivery).” (ID#17)

In this community, there was an underlying belief that taking modern medicine during pregnancy could increase the size of the baby (and therefore harmful) and during lactation could dry up milk. One mother mentioned that her mother-in-law advised her not to take antibiotics prescribed after delivery because she thought that medicines would dry up the mother’s breast milk. Some mothers and mothers-in-laws during FGDs blamed frequent consumption of modern medicine (which includes contraceptive pills) for inadequate breast milk among mothers in recent times.

Very few women connected heavy work load with breast milk inadequacy. When talking about household work, women listed cooking, cleaning, childcare, washing clothes, fetching water, and taking care of agricultural products (seasonal) and livestock as “work”. They told us that they fed the baby between these household chores. Work received higher priority unless the baby cried for food, and family members were more likely to help the mother with childcare rather than housework. It was interesting to note that 11 out of 15 women who mentioned breast milk inadequacy also mentioned being very busy with household work as compared to only 2 out of 12 women in the intermittent feeding group. Only one woman explicitly linked overwork with breast milk inadequacy. She told us:

I am busy all the time. No one helps with work. Some times I don’t have even have time to eat properly. When I visit my parents, I don’t have to do any housework. I eat well and the baby gets enough milk. (ID#24)

A few women mentioned that, during times of high workload, they reduced breastfeeding frequency but they did not link this to breast milk inadequacy. In the

FGDs participants mentioned that any dispute with the in-laws resulted in distressing the mother and reducing any help (usually related to childcare) the mother got from the family members. The mothers were unable to eat properly as a result of the stress and workload and were prone to breast milk inadequacy (Figure 2.2).

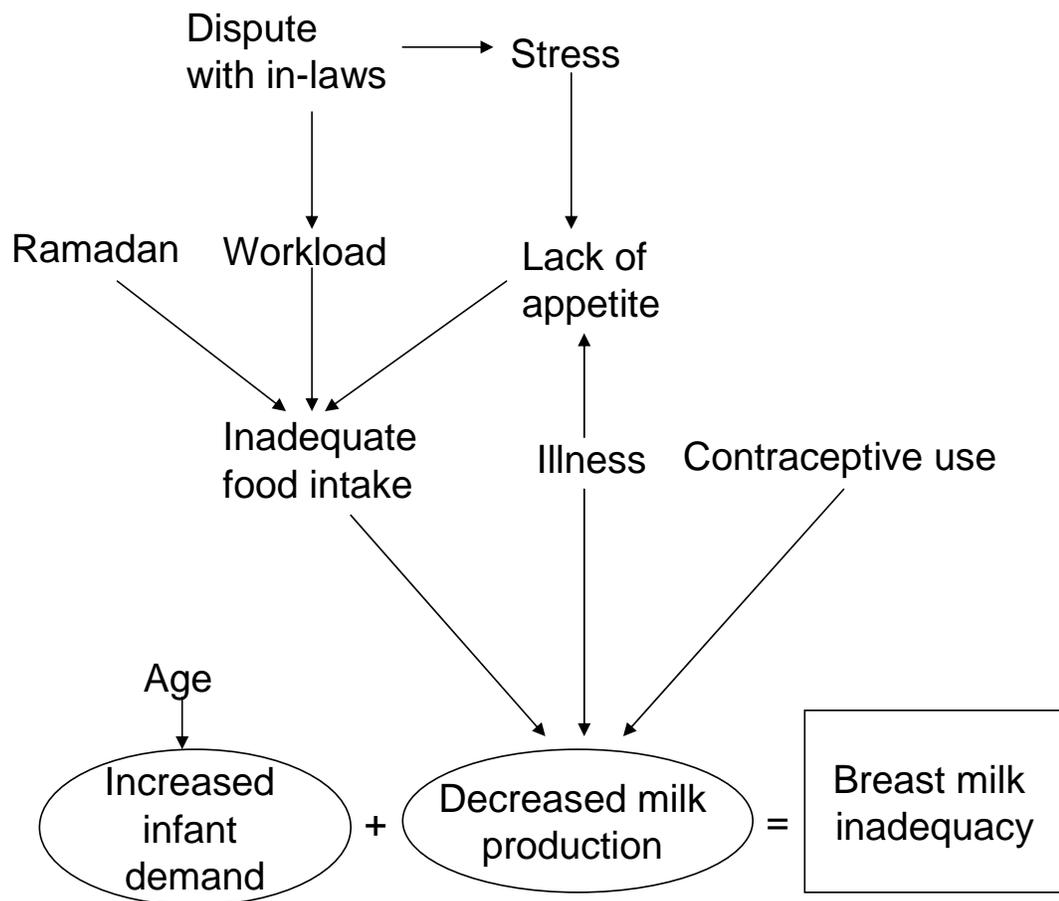


Figure 2.2 The conceptual framework describing maternal perceptions of the pathways to breast milk inadequacy

Remedies sought for breast milk inadequacy: The remedies sought for inadequate breast milk was related to its perceived causality. When mothers linked inadequate diet to breast milk inadequacy, they tried to either eat more or eat foods that increase milk production (for example milk, fish, sweets and *kalijeera*). When asked for a list of foods that promote milk production, however, mothers answered that each mother could have a special food that serves that purpose. If eating better or more was not possible or if after changing their diet mothers did not obtain results, they considered giving complementary foods regularly. One primiparous mother who lived in a joint family said:

My father-in-law thought that I probably did not eat enough (for adequate milk production) so he bought milk and eggs for me. I still did not have enough milk so he bought lactogen (formula). (ID#1)

When mothers related breast milk inadequacy with contraceptive use, they either tried to change the kind of contraceptives used or stopped taking them entirely. We interviewed the husband of one of our respondents who said:

We have to use some kind of contraceptive because we are young. When my wife uses pills, my baby does not get enough milk. So she stopped. Now I use condom and my baby gets more milk.

Only one first-time mother consulted a local health care provider for medicine to increase milk production. She did not understand why she experienced breast milk inadequacy. Consulting a doctor did not help her. She told us:

I went to N *dactar* in Matlab. He has a practice in the bazaar. I told him my problem (inadequate breast milk) and he prescribed vitamins, but milk still did not come down. I tried taking Horlicks (brand name for malt and milk powder mix usually used to make hot drinks). (ID#5)

The local health care practitioners we interviewed (village doctor, homeopath) reported that mothers sometimes sought their advice before choosing complementary

foods but very few came to resolve issues regarding breast milk inadequacy. When anyone came, however, none of the health care practitioners had any solution to offer.

Mothers did not receive specific advice related to resuming EBF from any source either at home or from outside. The village doctors and homeopaths we interviewed told us that they usually asked these women to increase their food intake or start complementary feeding. One woman who went to a doctor when her four-month-old had diarrhea told us that the doctor asked her why she did not practice EBF and then asked her to feed with a spoon rather than a bottle. Only one mother in our sample responded to breast milk inadequacy with increased feeding frequency. She told us that she could not afford to make separate complementary foods (*alga khabar*) for her child because she was poor. So she breast fed more frequently.

2.5 Discussion

This study described the breastfeeding decision points related to offering non-breast milk foods to infants in the absence or presence of perceived breast milk inadequacy. When mothers perceived that they had adequate breast milk, they sometimes decided feed non-breast milk foods to infants intermittently. On the other hand, when they perceived breast milk inadequacy, they were committed to feeding non-breast milk foods continuously. Mothers in Matlab were capable of discerning breast milk inadequacy and their understanding of the causes of inadequacy affected the remedial measures they chose. The health consequence (infant morbidity and growth) of these decision points described by the mothers are hard to discern as they do not match the standard definitions of breast feeding patterns (exclusive, predominant and partial breast feeding). It is important, however, to understand breastfeeding practices from the mothers' perspective because mothers' perspective of

breastfeeding practices allow us an opportunity to design interventions to improve breastfeeding practices while meeting the needs of the mothers.

The strength of our study was linking longitudinal feeding data with qualitative data on maternal perceptions of infant feeding decision points. The longitudinal feeding information (from MINIMat) allowed us to sample women purposively according to standard definition of EBF or pre-dominant breastfeeding and partial breastfeeding. As the feeding information was collected through monthly recalls, this was a good representation of breastfeeding practices. Also, when collecting feeding information, mothers were asked to report whether they gave non-breast milk foods during the first or the second 2-week period of the month. This kind of inquiry allowed mothers to report their usual feeding practice.

In the grounded data analysis of qualitative data, different decision points related to introduction of non-breast milk foods emerged. These decision points linked maternal perception to different types of breastfeeding practices. Most studies of breastfeeding used the standard breastfeeding patterns, such as exclusive, predominant and partial breastfeeding, that are formulated based on biomedical concerns (17). These patterns do not take into account what mothers mean by such practices. Using the feeding decision points described by the mothers in our study to describe breastfeeding practices provides an alternative to the standard patterns generally used. The use of breastfeeding decision points allows us to separate the normative breastfeeding patterns from the non-normative breastfeeding patterns from the mothers' perspective. We can then design messages and programs to address these patterns based on their impact on infant health.

Like other qualitative studies based on purposively selected populations, the insights from this study can be used only to generate hypothesis about mothers of similar characteristics and social context but cannot be generalized to all mothers in

Bangladesh. There were some additional limitations specific to our study. The first limitation was the small pool of women from which we could choose our subjects. We started data collection when the last group of MINIMat mothers had 5-6 months old infants. The number of available mothers dwindled further as it was customary for mothers to travel to parental homes for extended vacations during this season. As there were very few mothers in the available pool of mothers who practiced EBF, we had to select mothers based on pre-dominant breastfeeding. It is possible therefore that we were not able to understand mothers decisions regarding EBF adequately. The second limitation of our study is related to choosing mothers from only small part of the MINIMat birth cohort. Our study took place between November and February, which meant that the pool of mothers we choose from did not represent the diversity of seasonal factors (i.e. workload) that could affect their ability to breastfeed. Furthermore, we used the theoretical framework of SE theory for sampling the mothers. As a result, we may have missed important criteria, such as maternal workload and network support, to sample mothers.

2.5.1 Infant feeding decision points and actual breastfeeding practices

Although maternal breastfeeding practice is often conceptualized as a linear progression from exclusive to partial to weaning (no breastfeeding), in real life it is quite complex. Zohoori et.al (18) in their longitudinal assessment of breast feeding practice in Philippines observed that mothers move in and out of different types of breast feeding categories. It was also observed that these “movements” were associated to urban residence, age, nutritional status and presence of diarrhea among infants. As the proportions of breastfeeding among infants <6 months of age is very high in Bangladesh (19), it is possible that mothers moved from exclusive to partial breastfeeding and back again. Our study suggested that the mothers who move back and forth between partial breastfeeding and exclusive breastfeeding are those who

perceived that they had adequate breast milk. The mothers who perceived breast milk inadequacy were less likely to move from partial breastfeeding to full breastfeeding.

The intermittent introduction of non-breast milk foods for reasons other than breast milk inadequacy had been reported in many communities. Some researchers have reported that mothers and other family members gave pre-lacteal liquids intermittently after delivery to allow the mothers to rest and to pacify the babies until the milk came in (8,20,21). Some mothers fed non-breast milk foods intermittently to stimulate appetite, provide strength or to help the baby sleep through the night (22), while others introduced different foods to prepare the infants for the transition from breast milk to family foods (13). In some studies researchers have also reported household food availability (23) and infant size (24) as reasons for the introduction of non-breast milk foods. The researchers in these studies however, did not describe these different reasons for introducing other foods in the context of maternal perception of breast milk adequacy or how these different reason for affect long term breastfeeding patterns. Insights from our study suggested that the various reasons for introduction of non-breast milk foods should be examined in the context of perceived breast milk adequacy to understand maternal breastfeeding choices more completely.

Perceived insufficient milk (PIM) is among the most common reasons cited by mothers around the world for introduction non-breast milk foods to infants (5,11,25-27). Our study provided a greater understanding of symptoms, causes and remedial measures used to deal with PIM from mothers' perspective than described previously. Researchers have reported that PIM is closely linked with the maternal perceptions of infant satiety which are based on feeding, sleeping and crying patterns of the infants (28). In addition to infant cues, mothers in our study recognized PIM by feelings of milk let-down and by trying to express milk, which have not been described before.

As for the causes of PIM, mothers' belief about the role played by maternal diet and illness on breast milk production had also been described elsewhere (29-31).

Researchers who studied PIM in different communities often reported that when faced with PIM mothers were more likely to introduce non-breast milk foods rather than increasing breast feeding frequency (32,33). From the conceptual framework developed from our data, however, it is clear that mothers did not link breastfeeding frequency to PIM. As the remedial measures mothers used were closely related to the perceived causes of PIM, our findings elucidated the reason why increasing feeding frequency was not a part of mothers' remedial measures. This finding resonated with findings from other studies where researchers found associations between PIM and inadequate breastfeeding knowledge and technique (28,33).

In many studies, researchers reported that the most common maternal response to PIM was the offering non-breast milk foods to infants (5,22,25). In our study, mothers started committed mixed feeding when the remedial measures (i.e. increasing food intake) were either impossible or ineffective, which meant that offering non-breast milk foods was not a remedial measure but an indicator of failure of remedial measures. It is important to know that the role of increased feeding frequency on breast milk volume is not understood by the mothers. The efforts to improve the breastfeeding practices of the mothers therefore, should address mothers understanding of the causes and management of PIM.

WHO promotes EBF for the first 6 months as the ideal way of feeding infants (34). This recommendation is based on 2 assumptions. The first assumption is that early introduction of foods can be a source of infection for infants whose immune systems are not mature. The second assumption is that mothers can satisfy the nutritional needs of their infants with breast milk for the first 6 months. From our

discussions of maternal decision points regarding infant feeding, it is clear that mothers do not understand breastfeeding in the same way as nutrition experts. It is not surprising, therefore, that the practice of breast feeding does not conform to the WHO recommendation of EBF for 6 months. If we want to improve breast feeding practices, it is important to investigate the biological implications (infant growth and morbidity) of maternal decision points and design interventions based on the both biological implications and meaning of such practice in the community.

2.5.2 Infant feeding decision points and standard definitions of breastfeeding patterns

An issue of particular importance that arises from this study is that of the adequacy of standard breast feeding patterns to describe the practice of breastfeeding. WHO proposed three standard definition of breastfeeding patterns (17): exclusive, pre-dominant and partial breastfeeding (17). These feeding patterns do not adequately account for intermittent feeding of non-breast milk foods. In a study by Moore et al. (35) among mothers in Matlab, when monthly recalls of EBF were validated with deuterium dilution technique, it was found that although maternal recalls of feeding practices were accurate at the group level, they did not adequately distinguish among feeding practices at the individual level. This means some mothers who said that they practiced EBF actually did not, while some mothers who said that they fed non-breast milk foods actually practiced EBF. In cross-sectional assessments of feeding practices, it is possible that misclassifying mothers who practiced intermittent mixed feeding into EBF group could result in reducing the overall protective effect of EBF on infant morbidity. On the other hand, if mothers who practiced intermittent mixed feeding were classified as partial breast feeders, the overall deleterious effects of partial breastfeeding on infant morbidity and growth may be reduced.

In longitudinal studies, forcing the existing breastfeeding practices into established patterns does not allow us to understand the implication of intermittent mixed feeding for growth and morbidity of infants. For example, in the Multicentre Growth Reference Study (36), predominant breastfeeding was defined as feeding of non-nutritive liquids, nutritive non-milk liquids, and taste amount of other foods in addition to breast milk; and partial breastfeeding was defined as any other types of breastfeeding. Furthermore, once mothers transitioned from one pattern to the other, they were not allowed to come back. As a result, we did not find out the real impact of intermittent mixed feeding on growth of infants. In a seminal study linking breastfeeding patterns to morbidity by Brown et al. (37), only regular consumption of non-breast milk foods were taken into account. This means that mothers who fed non-breast milk foods intermittently were forced into the EBF group. The idea of breastfeeding decision points allow us, for the first time, to have a different basis than biology for looking at long term breastfeeding practices.

2.6 Conclusion

Our study findings indicated that mothers had distinct decision points for introducing non-breast milk foods based on their perception of breast milk adequacy. As these mothers described breastfeeding practices resulting from their decision points by the frequency of feeding rather than the type of non-breast milk foods, they did not conform to standard feeding patterns used by nutrition experts. In future studies, it will be important to construct the breastfeeding patterns resulting from these breastfeeding decision points in a more representative sample of mothers. Both the determinants and effect of these breastfeeding patterns need to be understood to appreciate their implications for infant health and design appropriate messages and interventions to address them.

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CHAPTER 3
HOW WELL DOES THEORY OF BREASTFEEDING SELF-EFFICACY FIT
MOTHERS' EXPERIENCE OF BREASTFEEDING IN MATLAB,
BANGLADESH?

3.1 Abstract

This study examined the results of a study of mothers' infant feeding experience in Matlab, Bangladesh in the light of the theory of breastfeeding self-efficacy (BSE). The ethnographic study included in-depth interviews with 27 mothers based on their breastfeeding patterns, parity and breastfeeding counseling status. A total of 18 key informant interviews and 3 focus group discussions (FGD) were also held to obtain a holistic understanding of the issues. The ethnographic field guide focused on mothers' experiences of breastfeeding decisions with questions guided by the concepts in the theory of BSE, but it allowed other themes to emerge. All interviews and FGDs were taped and transcripts were analyzed using ATLAS TI. Mothers' narratives indicated that although their decisions to introduce non-breast milk foods were determined by some forces represented as concepts of BSE theory, community norms, infant satiety, workload and network support system also had powerful effects on breastfeeding practices, which were not explained by the theory of BSE. Therefore, a more holistic theory that considered the determinants of BSE as well as contextual factors and specified how these factors maybe linked with breast milk production, was needed to understand mothers' experiences related to breastfeeding. Ecological theory provided a holistic framework that allowed us to understand the nature of breastfeeding practices better.

3.2 Introduction

Breastfeeding provides adequate nourishment and prevents diseases among young children around the world (1). The World Health Organization recommends that infants be exclusively breastfed for 6 months (nothing but breast milk and medicine), especially in the developing-country setting, where the quality and quantity of complementary foods are inadequate and microbial contamination of foods and fluids are common (2-4). In developing countries, the duration of breastfeeding is long, but only 38% of mothers practice exclusive breastfeeding (EBF) for 6 months (5). In Bangladesh, the median duration of EBF (defined in the study as breast milk and water) in Bangladeshi mothers was only 3.7 months and almost 70% mothers introduced foods other than breast milk before their infants were 6 months old (6).

Researchers have generally demonstrated an association between duration of EBF and demographic factors such as mother's age, poverty, social support, infant gender, birth weight, maternal intention to breast feed, employment outside the house, place of delivery and urban living conditions (7-11). As most of these factors are not modifiable, maternal self-efficacy is attractive to both researchers and interventionists because it can be changed through intervention. O'Campo et al. (12) found that maternal confidence was the most significant of 11 psychosocial and demographic factors that influenced breastfeeding duration. Other researchers also associated maternal confidence with both breastfeeding cessation and perception of breast milk inadequacy (13,14).

Dennis (15) adapted the theory of self-efficacy proposed by Bandura (16) to examine breastfeeding behavior specifically. For this paper, we will call Dennis's adaptation, the theory of breastfeeding self-efficacy (BSE) (15). BSE has two components, outcome expectancy (belief that practicing EBF and refraining from introducing complementary foods, is important) and BSE expectancy (the personal

conviction that one can successfully perform behaviors that allow one to continue EBF). BSE expectancy is thought to be influenced by four main sources of information (15): a) performance experience (past breastfeeding experience); b) vicarious experience (watching other women breastfeed); c) verbal persuasion (encouragement from influential others i.e. family, friends and healthcare professionals); and 4) inference from physiological and affective responses (i.e. fatigue, stress, physical discomfort).

To measure BSE, Dennis and Faux (17) developed and tested a breastfeeding self-efficacy scale, which was translated and tested on Australian (18), Chinese (19) and Puerto Rican (20) populations. The antenatal and 1-week BSE score were significantly and positively associated with breast feeding duration and EBF at 1 and 4 months (18). The BSE scores just before hospital discharge were positively associated with breastfeeding duration and EBF at 1 and 2 month (19) and multiparous mothers had higher scores than primiparous mothers (20). All of these studies were conducted among women who were educated, worked outside home, lived in a city and had hospital deliveries.

Mothers in rural Bangladesh have very different social and demographic characteristics compared to mothers who have been studied to date. They deliver at home, have little or no education, and do not typically work outside the home. Furthermore, for mothers in rural Bangladesh, the concern is the early introduction of non-breast milk foods, not the total duration of breastfeeding, as they breast fed for more than 30 months (6). Therefore, although we considered BSE theory an appropriate perspective from which to examine mothers' experiences feeding their infants, we did not limit data collection to components of BSE and instead allowed the emergence of other important factors that capture the lived experience of these

Bangladeshi mothers. The purpose of this research was to test the adequacy of theory of self-efficacy for explaining the breastfeeding practices of mothers in Matlab.

3.3 Methods

This study was conducted as a part of the doctoral research of the Bangladeshi principal researcher who has a background in nutrition and was trained in qualitative methods. The research assistant, also a Bangladeshi, has a graduate degree in anthropology and had experience in dealing with sensitive topics. Both had prior work experience in Matlab.

The details of the study design and selection of the participants were discussed in Chapter 2. Therefore only a summary will be presented here. The study was conducted in the interpretive tradition. We used grounded theory (21) to generate an understanding of different influences that shape infant feeding decisions in the context of Matlab, Bangladesh. We conducted interviews with 27 mothers and 18 key informants and 3 focus group discussions. The BSE theory was used (15,22) to develop initial topics of discussion and select the mothers for in-depth interviews.

An interview guide was developed in English and then translated into Bengali. Colleagues who worked both in Matlab and in the field of breastfeeding were consulted about its contents. The interview guide was then field tested with three mothers in Matlab. The final interview guide covered the following: background situation (parent's house before marriage and husband's house after marriage), descriptions of experiences during pregnancy and delivery, feeding practices of the infant since birth, previous experience with breastfeeding, mother's social support, workload, understanding of breastfeeding techniques and their aspirations for their infants. Although the interview guide was developed using the theory of SE and an

associated literature review, the topics were used with flexibility in response to how the participants wanted to direct the interview.

3.3.1 Study area

This qualitative study was conducted during November 2004–February of 2005 in Matlab Thana of Chandpur district in Bangladesh. Matlab is a rural area about 50 km from Dhaka, the capital of Bangladesh. The respondents for the in-depth interviews were selected from mothers enrolled in a larger study Maternal and Infant Nutrition Initiatives in Matlab (MINIMat).

3.3.2 Study participants

Mothers who participated in the MINIMat study and had 5-6 month old children on November 2004 were selected for in-depth interviews on the basis of their parity (1 or 2-3); history of breast feeding from the MINIMat longitudinal feeding information (exclusively breastfed for 5 months or not); and assignment to breast feeding counseling (randomized to BF counseling or control group). The FGDs were conducted in households with 5-8 women between 17-45 years of age who had at least one child-rearing experience. These households for FGDs were selected in an opportunistic fashion. We chose key informants based on the in-depth interviews with the mothers where mothers mentioned the role of a particular person or group as influencing their infant feeding decisions.

3.3.3 Data analysis

We used a systematic and iterative method of analysis based on the constant comparative method (23). We open coding of transcripts from the interviews and FGDs using ATLAS.TI to capture emergent themes; created a cognitive map for each interview to understand how these themes were related to each other; used peer debriefing to clarify themes; Conducted iterative development and revision of a conceptual framework based major themes and the relationship between them; e)

When 3 decision points of feeding non-breast milk foods to breastfed infants emerged from the data, charted the presence and absence of each of these decision points and factors leading to them for each mother; Grouped other major and minor themes under each decision point in a matrix; Revised the conceptual model; Determined the fit of each interview with the revised conceptual model; Used peer debriefing with other members of the research team and graduate students in the field; Considered the fit of findings with existing theoretical and empirical research. In this paper, we focused on the discussion of the fit of our findings to the theoretical framework of BSE theory and other theoretical and empirical research, and proposed an expanded conceptual framework that more fully represented the findings from this ethnographic study.

3.4 Aspects of BSE theory reflected in the mothers' experience of breastfeeding

In general, the mothers in Matlab who participated in this study did not practice EBF. They included giving pre-lacteal feeds, water, and other foods and beverages intermittently for reasons than nourishment as a part of 'giving only breast milk for 6 months' (Chapter 2). Those who practiced EBF received information from MINIMat counseling sessions. As mothers did not believe that refraining from giving non-breast milk foods intermittently to young infants was important, we applied BSE theory to describe the mothers' version of EBF. In this section of the paper, we compare each of the major theoretical underpinnings of self-efficacy expectancy proposed by BSE theory (i.e. personal experience, vicarious experience, verbal persuasion and, inferences made from physiological and affective state) with the mothers' actual experiences related to the externally imposed goal of giving only breast milk to their infants.

3.4.1 Personal experience

According to the BSE theory, previous successful experience at breastfeeding would allow mothers to be more confident and perform better at breast feeding their current infant. In keeping with the theory, multiparous mothers were more articulate and expressed greater confidence about breast feeding than primiparous mothers. They were more likely to participate actively in decisions regarding feeding their infants and received less advice and support from household members. This was how one mother described the role of previous experience on her current breastfeeding practice:

I usually feed my baby every 1-1 1/2 hours, but sometimes when he cries, I feed him to make sure that he is not hungry. I try to feed him according to how I feel in my body (*shorirer ojon onujayi*). During my daughter (first child), I had similar feelings in my body, but I did not understand. Someone would teach me and I would depend on that. Now I understand everything.” (ID#5)

3.4.2 Vicarious experience

A role model was an important source of information when women lacked personal experience with breastfeeding. According to BSE theory, a primipara would be more likely to initiate and continue breastfeeding if she observed other breastfeeding women around her. From our data, Matlab has a breastfeeding culture and all mothers initiated breastfeeding. The cultural norms regarding breastfeeding were helpful in terms of creating positive attitudes about breastfeeding among mothers. Mothers reported, however, that merely observing others was inadequate for learning specific breastfeeding skills. In Matlab women followed certain rules of privacy that did not allow a bystander to observe breastfeeding techniques. As a primipara explained:

It is good to be careful about feeding the baby. There are good and bad (*bhalo mondo achena*) (ways of feeding). For example,

when I am feeding a young child might walk in. The elders say that the child might wish to be fed too. That is bad for my child. So I try to be safe. Also, when I am feeding my brothers or other males might come in. This is an embarrassment, isn't it? So I am careful about where I feed. (ID#18)

Although unmarried women were engaged in school or housework and some aspect of childcare if there was a small child in the house, they were excluded from the conversations regarding the specifics of breastfeeding.

3.4.3 Verbal persuasion

According to BSE theory, verbal persuasion from reliable others was an important determinant of maternal self-efficacy. BSE theory also states that verbal persuasion was a less powerful influence on self-efficacy than previous experience and vicarious experience. Mothers in our study who mostly breast fed for 5-6 months received encouragement and help from both family members (i.e. mother, mother-in-law, and sister-in-law). Breastfeeding counselors or other health system sources, however, motivated them to practice EBF by linking non-breast milk foods to illness. One mother who received breastfeeding counseling told us how counseling helped her:

I learnt (from counseling) that you cannot feed anything other than breast milk. If I feed other thing, the baby will have stomach problem (*pete oshukh*). Before I would have given this and that but now I know feeding other things is not good. Before (during previous child) I did the same things without knowledge but now I know why. (ID #22)

Most mothers reported that family members were their most influential source of information and support. Breast feeding counselors and other health workers gained importance when family members supported their advice.

3.4.4 Inferences from physiologic and affective state

According the BSE theory, "People make inferences about their abilities from emotional arousals and other physiologic cues experienced while performing a task or anticipating its performance. Positive interpretation of arousal, like excitement or

satisfaction, enhance self-efficacy, while negative interpretations, pain fatigue or stress, reduce ones self efficacy” (15). In our study, mothers explained that illness either directly reduced breast milk production or affected breast milk production through reducing appetite and therefore reducing food intake.

If I am healthy, I can eat a little more (*dugga khai beshi*) and my baby gets more milk. If I am not healthy, I cannot eat and my baby does not get milk. If I eat properly I don't need to feed other foods (*alga*) to my child. (ID #3)

A few mothers reported that stress from disputes with family members was an indirect influence on breast milk production through decreased appetite resulting in inadequate food intake. In addition, disputes with family members meant that mothers did not receive help with household chores or childcare. Mothers associated a lack of time because of other duties with their inability to care for themselves and eat properly. A few mothers mentioned that increased workload affected breastfeeding frequency, but they did not link this to breast milk inadequacy. Therefore, both BSE theory and mothers' perception linked the physiological and affective state to breastfeeding practice.

3.5 Aspects of mother's experience not addressed in the theory of BSE

Three aspects of maternal experience not addressed by theory of BSE were identified through the ethnographic study: perception of breast milk inadequacy, maternal work load, and social network support. Each is discussed below.

3.5.1 Perception of breast milk inadequacy

The increased confidence from previous successful breastfeeding experience did not always result in more successful breastfeeding behavior during current child. Although some mothers who gave the previous infant only breast milk for up to 5-6 months succeeded in feeding the current infant in the same fashion, others were not

able to do so. The main reason given by the mothers for committed introduction of non-breast milk foods was perceived breast milk inadequacy rather than previous experience. When they faced breast milk inadequacy, all mothers – whether experienced or not – offered non-breast milk foods to infants. For each of their lactation experiences, mothers described different sets of external circumstances that led to breast milk inadequacy. They associated their ill health, inability to eat and use of contraceptives to the breast milk inadequacy. A mother of two said:

My mother always asked me to feed the baby breast milk for 6 months. I knew you don't need to feed other foods at that age. I could not feed that way before (for previous child) because I conceived (*O pete hoiya geche ga*) six months after a miscarriage. I had anemia (*Roktoshunnota chillo shorire*) and felt weak (during the previous child). So I tried to feed this baby only breast milk for 6 months. (ID #5)

Another mother of three, who only experienced breast milk inadequacy for her current child, linked her inability to eat to breast milk inadequacy. She said:

I fed other foods (*alga khabar*) to my sons (older) when they were 7-8 months old, but I couldn't. They only wanted breast milk. I gave my daughter (current child) other foods (*alga khabar*) because she does not get enough milk. I cannot eat anything (*khaite parina kichu*) (reason for breast milk inadequacy). (ID #3)

Mothers generally described their experience during each of the lactation period as unique. Different factors, such as experience of breast milk inadequacy as a result of mothers' ill health, contraceptive use or lack of appetite could compel a mother to change her breastfeeding practice.

Other researchers have shown that infant crying and other behavioral cues often shaped mothers' perception of breast feeding success and self-efficacy (24,25). As reported in Chapter 2, mothers described specific

decision points for feeding non-breast milk foods based on their perception of breast milk adequacy. Similar to our findings, mothers in Mexico based their perception of breast milk inadequacy on infant crying behavior (26,27).

When mothers successfully breast feed, it is possible that several enabling factors, such as workload and network support, provide a foundation for their success by preventing them from experiencing breast milk inadequacy. A previous successful breast feeding experience, therefore, does not prepare mothers to deal with breast milk inadequacy in subsequent lactation periods.

The powerful role of perceived infant satiety in changing breastfeeding practices was not described in the theory of BSE.

3.5.2 Maternal workload

We observed that mothers who successfully managed to feed only breast milk to successive infants were those who also described supportive family circumstances during each lactation period. The meaning and extent of supportive family circumstances changed according to parity. For the first child, it was important that mothers received correct information and hands-on demonstration of breastfeeding techniques as well as adequate time for breastfeeding. Therefore, when primiparas went to their parental homes to stay for the delivery and the first few months of lactation according to the local customs, their only responsibility was childcare and they successfully breastfed. When the primiparas could not go to their parental homes because of increased workload, they often breastfed less frequently and experienced breast milk inadequacy. Most mothers observed that they received more help with household chores when they were at their parental homes compared to their husband's house. One primiparous mother explained relationship between workload and caring for the baby:

If I did not have so much work (agricultural work) I could have taken better care of my baby. In the morning usually mothers clean their baby's face, put on *sono* (cream), *kali* (black spot on the forehead) and fresh clothes. I could not do these things because of work. I fed the baby but could not do it in a timely fashion. I had to finish work and then feed baby a little later. (ID #7)

It is important to note that although this mother thought that her ability to adequately care for the infant was hampered by her workload, she did not associate it with her experience of breast milk inadequacy.

In contrast, the multiparous mothers reported that they could not go to their parental homes for delivery and leave their household responsibilities behind. These women managed to feed mostly breast milk to their infants if they either did not have heavy workload or had help with the household chores from family members. The ideas that contextual factors, such as maternal workload, could negatively affect mothers' ability to breastfeed and that parity was linked with maternal workload were not addressed in the theory of BSE.

Other researchers have reported that maternal workload could affect breast feeding both directly and indirectly. Huffman et al. (28), in a study conducted in Matlab, reported that the infants' suckling duration was significantly lower during the post-harvest season, when women were busy processing rice. Evidence from Melanesia (29,30) and Nepal (31) suggested that domestic or subsistence labor may be incompatible with breastfeeding both because of the beliefs regarding the danger to infants and the perceived inconvenience of having the infant with the mother. On the other hand, Indonesian mothers practiced intensive breastfeeding along with forced feeding of non-breast milk foods for the first 6 months so that they could leave the baby in the care of other family members when they returned to work (32). Therefore, it is important to consider how possible changes in maternal workload affect the relationship between previous experience and current breastfeeding practices.

3.5.3 Network support

When a mother delivered her first baby, the more experienced women from her family and neighborhood gave her hands-on instructions about breastfeeding. A primipara depended on these women for help regarding breastfeeding knowledge and skills. One mother of two explained:

I never knew about feeding and caring for a baby. I got married after 10th grade and then finished 12th grade and I had my first baby. How would I know about these things? After my baby was born, people showed me things. I learnt from radio and television programs. I learnt little by little from watching and hearing.
(ID#5)

In this community, mothers not only received information about social norms regarding breastfeeding from more experienced women in the household, but also received timely practical advice and hands-on demonstration so that they could become skilled at feeding and caring for their infants. Although mothers considered breastfeeding counselors to be an important source of informational support, other older women in the household were considered to be more respected source of informational as well as instrumental support when the mother needed it. One primiparous mother made a distinction between the kinds of help she got from her own mother and the breast feeding counselors:

I couldn't have taken care of my baby without my mother's help. I had no experience, how could I manage? My mother showed me how to do things and now I have gained experience. The counselors just told me things like, feed your baby breast milk and don't feed other foods for six months. They did not show me how to feed. (ID#2)

Primiparous mothers often received help with household chores so that they could have time to master breastfeeding skills. When these first time mothers went to their parental homes for delivery, they were only responsible for childcare which

increased their ability to learn the necessary skills. Although multiparous mothers did not stay with their parental family during delivery, having supportive family members to take care of house work and care of older children helped them to establish and maintain breastfeeding. The supportive family members could be either from her husband's family (mother-in-law, sister-in-law) or from her parental family (mother, sister). Some mothers mentioned that disputes with in-laws could increase a mother's workload and stress resulting in inadequate food intake and breast milk inadequacy. Although network support was essential for successful breastfeeding for primiparous mothers, network support was also crucial during high workload for multiparous mothers.

Mothers' social network played an important role in the identification of breast milk inadequacy and providing suggestions about remedial measures. Healthcare professionals were rarely consulted for either detection or remedial measures. Mothers mentioned that their family members helped them to feed non-breast milk foods when they experienced breast milk inadequacy (Chapter 2). Although theory of BSE specified the importance of network support for mothers with no personal experience by linking vicarious experience to maternal self-efficacy, our study indicated that the network support from family members played a more important role in shaping breastfeeding practices than articulated in the theory.

In one study done among Bedouin mothers, researchers observed that Bedouin Arab mothers observed 40 days of seclusion with their baby after delivery. During this period mother were surrounded by paternal kinswomen and relieved of household and childcare responsibilities. The strength of such network support was related to the duration of EBF (33). Although researchers have generally linked increased social support with better breastfeeding practice of mothers (7-9), and some researchers have focused on the effect of network support on the breast feeding practice of primiparous

mothers (34), not much is known about how network support changed with increased parity.

Failing to consider the effect of contextual factors on breastfeeding practices may lead to a misunderstanding about relationship between BSE and breastfeeding practices. In the literature, the effect of previous experience of breast feeding (the most important source of self efficacy) on current practice was unclear. In accord with BSE theory, some researchers have reported positive associations between multiparity and breastfeeding initiation and duration (18,35). Other researchers have associated multiparity with reports of breast milk inadequacy (26,33) leading to early supplementation with non-breast milk foods. Our results indicated that complexities in the relationship between previous experience and current breast feeding practice were due to the changing circumstances in the mother's life during different lactation periods.

From the discussion above, it can be said that although the use of the theory of BSE to explain mothers' experience of breastfeeding was informative, it was incomplete in terms of allowing us to consider contextual factors, such as perception of breast milk inadequacy, workload and network support, that have important influence on mothers' breastfeeding practices. An expanded theory is needed that considers the determinants of BSE as well as the contextual factors to explain mothers' experience of breastfeeding. Furthermore, the expanded theory should also be able to link the contextual factors specifically to either mothers' behavior or biology that leads to breast milk production.

3.6 Existing theories that complement BSE theory

Four theoretical and conceptual frameworks have been identified that address the contextual factors identified by our ethnographic study of breast-feeding practices. Each of these frameworks is discussed briefly below.

3.6.1 Social cognitive theory

Considering the effect of contextual factors on individual behavior is an important idea in sociological research. Although BSE theory gave us specific pathways to understand the effect of maternal self-efficacy on breastfeeding practices, it did not allow us to separate the effects of contextual factors that confound or modify that effect. From the theoretical perspective, however, BSE is a component of social cognitive theory that emphasized the link between self-efficacy and behavior. The social cognitive theory (16) allows a more holistic understanding of forces that shape behavior as it depicts a reciprocal relationship between environmental factors, cognitive factors (self-efficacy) and behavior. It is possible therefore, to consider perception of infant satiety, workload and network support as environmental factors that directly affect behavior. In addition to viewing contextual factors as the determinants of BSE, social cognitive theory allows for a general reciprocal relationship between environmental and cognitive factors. However, it does not address the fact that all of the environmental factors that either affect breastfeeding directly or indirectly through mothers' cognition may also relate to each other in some way. Furthermore, social cognitive theory does not distinguish between the different levels of influence that environmental factors may have on the mothers' ability to breastfeed her child. Therefore, a more comprehensive theoretical model was needed to understand the complexity of the relationship between environment factors and breastfeeding practices.

3.6.2 Ecological theory

Ecological theory allows us to understand the complexity of the relationship between an individual and his context and has been used to describe breastfeeding practices in different communities. Although the research using the ecological theory varies in terms of the terminologies used and areas of emphasis, all the researcher involved make the point that, to understand human behavior better, one must understand the context in which such behavior takes place (36,37). Belsky (38) described a model where parental contribution, children's characteristics and contextual sources of stress and support were the determinants of parenting skills. Harkness and Super (39) developed a concept of "developmental niche", which includes the social and cultural setting in which a child is placed, cultural rules of childcare and the caregivers' individual beliefs about development. Bentley et al. (34) used parental contribution, child's characteristics, contextual sources of stress and support and cultural beliefs in the model to understand infant feeding decision-making among adolescent mothers. In ecological theory, environments are analyzed in systems terms and the innermost and most basic unit of analysis is a dyad, or a two-person system. As the relationship between the dyad (in this case mother and the child) is described as reciprocal, this theory is much more suitable for the description of breastfeeding practices (40). It is, however, a broad theory that does not specifically deal with breastfeeding and therefore, needs to be operationalized in terms of conceptual frameworks that link both the maternal contextual and cognitive factors to the biology of lactation.

3.7 Operationalization of ecological theory

We explored the literature to find conceptual frameworks that met the broad guidelines of the ecological theory but linked maternal contextual and cognitive

factors to the biology of lactation. The final conceptual framework was used for choosing variables for data analysis for chapter 4.

3.7.1 UNICEF conceptual framework

In the UNICEF (1990) model of care, child survival, growth and development are influenced by three underlying factors: household food security, availability of health services and healthy environment and care for children and women. Care for the infant is defined as the practices of the caregiver that affect the nutrient intake, health and the cognitive and psychosocial development of the child. Appropriate infant feeding is therefore a crucial part of the care component. In an adaptation of the UNICEF framework (41), six major categories of resources for care were identified from the literature: appropriate education, knowledge and beliefs; health and good nutritional status; mental health, self confidence and lack of stress; autonomy, control of resources and control of intra-household allocation; reasonable workloads and adequate time available; and social support from the family members and community. Although this conceptual framework was helpful for identifying important resources that enable a mother to practice breastfeeding, it was not intended to specify the pathways through which these factors affect mothers' breast milk supply. Furthermore, this conceptual framework does not allow infants to influence the breastfeeding behavior of the mother, which is contrary to mothers' experience of breastfeeding. Therefore, a conceptual framework that acknowledged that breastfeeding is a reciprocal relationship between the mother and the child was needed.

3.7.2 Conceptual framework of Insufficient Milk Supply (IMS)

The conceptual framework of IMS proposed by Hill and Humenick (42) was designed specifically to describe breastfeeding practices. According to the IMS framework, factors that have direct and indirect effects on breast milk production are

classified as the potential determinants of IMS. The factors that contribute directly to mothers' breast milk production include a) breastfeeding behavior (i.e. initiation, feeding frequency), b) maternal psychological factors (i.e. attitude, knowledge, BSE) and c) maternal physiological factors (i.e. nutrition, age, medication use). In the IMS conceptual framework the factors that indirectly affect breast milk production by influencing the direct influences include a) maternal time restraint (i.e. workload), b) socio-cultural factors (i.e. SES, education, network support), c) maternal comfort factors (i.e. nipple tenderness, engorgement, privacy) and d) infant factors (i.e. birth weight, temperament, health). This framework specifically addresses how both BSE and contextual factors can be linked to IMS and therefore, provides a model for expanding the scope the theory of BSE.

IMS conceptual framework has only been tested in US populations so far (43). It is important to note, however, that all the potential indicators have been linked with breast milk volume in studies in other populations as well (44). As perception of breast milk inadequacy played such a prominent role in affecting breastfeeding practices in our qualitative study (Chapter 2), and almost all the factors that mothers described as important in their conceptualization of breast milk inadequacy could be accommodated with the use of the IMS conceptual framework, we consider it adequate as an expanded conceptual paradigm to use to identify the determinants of long-term breastfeeding patterns. Therefore, we used the IMS conceptual framework to select variables from the existing MINIMat dataset to identify potential factors that might determine long term breastfeeding patterns. The results of the use of this expanded theoretical model, and its potential applications in the design of intervention programs, are presented and discussed in Chapter 4.

3.8 Conclusion

Our analysis showed that the theoretical framework of breastfeeding self-efficacy was not adequate to address the determinants of mothers' experience of breastfeeding. Ecological theory provided a broad and appropriate theoretical basis which incorporates both self-efficacy and important contextual factors. To operationalize ecological theory to study breastfeeding practices we further examined different conceptual frameworks. The IMS conceptual framework provided a link between socio-cultural factors, infant factors and factors related to maternal time restraints. Therefore, it was considered an adequate conceptual model for selecting the determinants of breastfeeding practices. However, there are some aspects of the other conceptual models discussed above that could contribute to expanding the model further in the future. The idea of having different interacting levels of factors in the mothers' environment proposed by ecological model could be used to unpack the socio-cultural factors in IMS conceptual framework further. The specific maternal resources proposed by UNICEF conceptual framework could be used to link the different socio-cultural forces such as education, network support to maternal physiological, psychological and behavioral factors as proposed by IMS conceptual framework. In the future, the expanded theoretical framework could help us to understand breastfeeding practices and develop supportive interventions to help mothers to choose what is best for their children.

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CHAPTER 4

THE DETERMINANTS OF MATERNAL BREASTFEEDING TRAJECTORIES DURING 0-6 MONTHS OF LACTATION IN MATLAB, BANGLADESH

4.1 Abstract

Women's breastfeeding patterns are quite complex and the existing definitions of breastfeeding patterns are inadequate for their assessment. We used monthly infant feeding information to construct 3 trajectories that represented exclusive breastfeeding (EBF) and non-normative and normative breastfeeding practices from mothers' perspective. Mothers who fed breast milk and water were in the full breastfeeding trajectory (FBT); mothers who started mixed feeding continuously between 0-4 months were in the committed mixed feeding trajectory (CMFT); and mothers who practiced any other type of breastfeeding were in the intermittent mixed feeding trajectory (IMFT). We used the data for 1472 women from Maternal and Infant Nutrition Initiatives in Matlab to explore the individual, household and infant-level determinants of being in the FBT and CMFT when compared to being in the IMFT using logistic regression. The results demonstrated that, compared to being in the IMFT, mothers in the FBT were poorer and lived in rural areas; and, mothers in the CMFT were more likely to feed pre-lacteals, were older, employed, and richer, and lived in semi-urban areas. Pre-pregnancy BMI and infant birth weight were negatively associated with the odds of being in the CMFT. In conclusion, while mothers in the FBT differed from those in the IMFT in terms of socio-cultural factors, mothers in the CMFT differed in terms of biological, socio-cultural and behavioral factors that could be barriers to successful breastfeeding. Programs to promote EBF should separately target women in the IMFT and CMFT with strategies that address mothers' reasons for practicing these trajectories.

4.2 Introduction

Exclusive breastfeeding (EBF) for 6 months has been promoted as the ideal breastfeeding practice by the World Health Organization (WHO) (1). In developing countries, the practice of EBF (giving nothing but breast milk and medicine) proffers maximum benefits in terms of infant health because of the inadequate quality and quantity of breast milk supplements that are often used (2). In Bangladesh, however, 70% mothers feed non-breast milk foods to infants before they are 6 months of age (3).

Despite a high prevalence of non-exclusive breastfeeding in different communities, very little attention has been paid to identifying other patterns of breastfeeding that exist in the first 6 months of lactation. It is important to identify these patterns as they represent mothers' chosen breastfeeding practices in response to different forces or factors. The standard definitions used to describe breastfeeding practices include EBF (breast milk only), predominant breastfeeding (breast milk and non-food based liquids) and partial breastfeeding (mixed feeding with breast milk and any other sources of energy and nutrients) (4). Although these definitions are adequate for the assessment of breastfeeding practices "in the moment" they are not suitable for longitudinal descriptions of breastfeeding patterns (5). The long-term breastfeeding practices are often quite complex as mothers move in and out of different types of breastfeeding over time (6).

Mothers' perception of the experience of breastfeeding has a powerful effect on shaping their breastfeeding practices. In a review by Gussler and Briesemeister (7), inadequate milk supply (IMS) was a major reason reported by mothers in developed and developing countries for both introducing non-breast milk foods and discontinuing breastfeeding altogether. Similar findings emerged in our qualitative study in Matlab

(Chapter 2) and also have been reported from other places in Bangladesh (8). Some researchers suggested that IMS was a bio-cultural phenomenon caused by lack of constant contact between a mother and a child (7), while others have suggested that it is purely a cultural phenomenon during EBF and is a physiological response due to lack of nipple stimulation when supplemental feeding has begun (9). It is generally agreed, however, that whether the causes of IMS are biological or socio-cultural, it leads to sub-optimal feeding practices and needs to be addressed.

According to our qualitative research in Matlab (Chapter 2), if breastfeeding was going well, mothers intermittently fed non-breast milk foods to their infants between 0-4 months and usually started regular complementary feeding between 5-6 months as a norm. This kind of breastfeeding practice has been associated with increased diarrhea, but it does not significantly affect infant growth when compared to EBF (2). When mothers perceived that their breast milk was inadequate, they described giving non-breast milk foods continuously (non-normative breastfeeding). Thus the observation of breastfeeding practices during 0-4 months of lactation can be used to distinguish the mothers who practice normative breastfeeding practices from those who do not. Regular introduction of non-breast milk foods to 0-3 month old infants has been associated with significant increase of diarrhea (10) and growth faltering (11,12). Although neither of the breastfeeding patterns described by the mothers in our qualitative study conformed to the WHO recommendation of EBF for 6 months, normative breastfeeding practices were less likely to have been harmful than non-normative breastfeeding practices. It is important, therefore, to understand how mothers who practice EBF and non-normative breastfeeding differed from those who practiced normative breastfeeding.

In this study, we used the WHO recommendation and mothers' perspectives of normative and non-normative breastfeeding practices to define 3 breastfeeding

trajectories (breastfeeding practices over time). The objective of our study was to explore the household-, infant- and individual-level determinants of these breastfeeding trajectories. We used the biological and socio-cultural determinants of IMS to focus on factors that have been shown to affect breastfeeding practices negatively in previous research (13).

4.3 Methods

4.3.1 Subjects and study design

The data that were used in this study were collected as a part of Maternal and Infant Nutrition Intervention in Matlab (MINIMat). In MINIMat, all pregnant women who were willing to participate were followed during pregnancy and for 2 years postpartum. In addition to their nutritional treatments that were randomly assigned during pregnancy, MINIMat subjects were individually randomized during pregnancy to receive either intensive breastfeeding counseling or general health counseling. We used the information from the 1607 women assigned to the health-counseling group. To be eligible for this investigation, women also had to give birth to a live infant, live in the study area and consent to participate in the infant follow-up. 1510 women met these criteria. We excluded women from the analysis if the baby was a second child born into the MINIMat study and if any feeding information for first 6 months was missing. As a result, 1472 mothers were included in the analysis (Figure 4.1)

4.3.2 Ethical consideration

Ethical clearance for this secondary analysis was obtained from the ICDDR,B Ethical Review Committee and University Committee on Human Subjects at Cornell University.

4.3.3 Definitions of breastfeeding practices used

We used several definitions describe maternal breastfeeding practices in this study.

They are follows:

WHO feeding recommendation = EBF for 6 months

Breast feeding patterns = Cross-sectional assessment of breastfeeding practices such as EBF, predominant breastfeeding and partial breastfeeding.

EBF = Feeding of breast milk and medicine

Predominant breastfeeding = Feeding of breast milk and non-milk liquids

Partial breastfeeding = Feeding of breast milk and any other foods of liquids

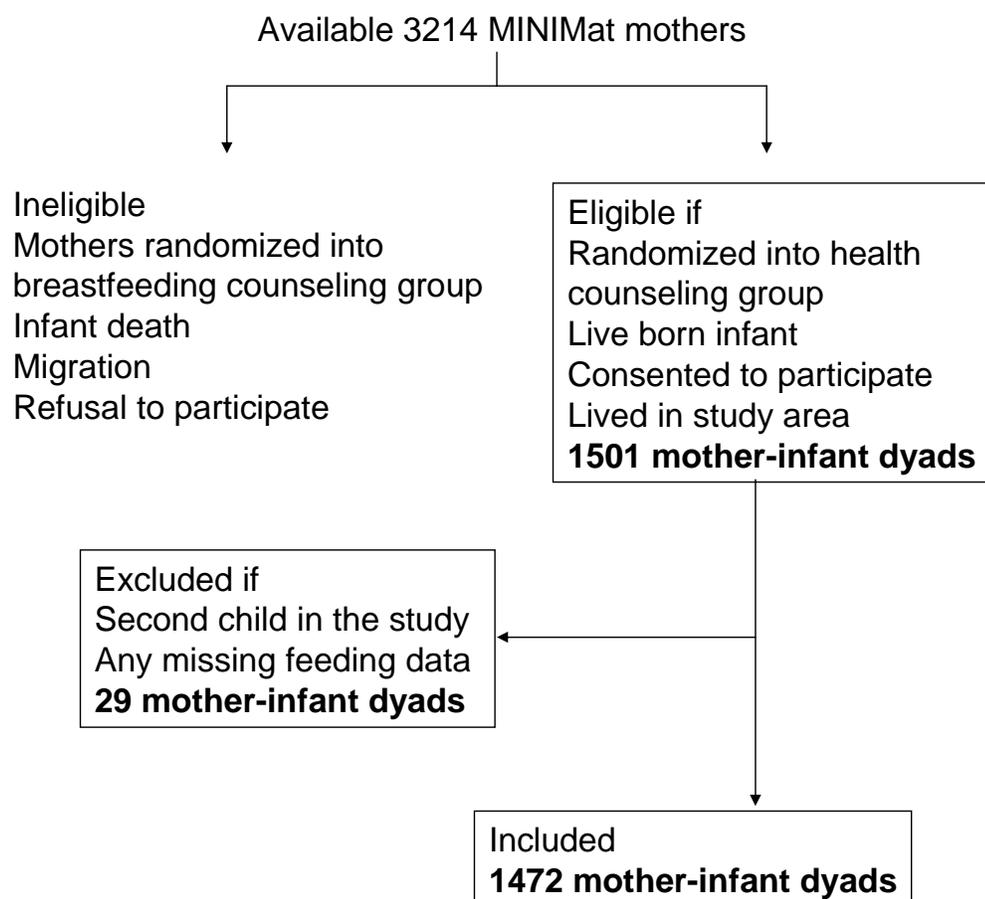


Figure 4.1: Mother-infant dyads included in the analysis

Breastfeeding trajectory = Assessment of breastfeeding practices during 0-6 months based on monthly recalls of breastfeeding practices

4.3.4 Construction of the dependent variable

In MINIMat, infant feeding information was collected during monthly home visits. Mothers were asked to recall whether they fed any of the 7 types of foods during the last month. The 7 food types were: breast milk, water, fruit juice, other liquids (sugar water, tea and honey), other milk, semi-solid and solid foods. If the answer was yes, they were asked whether these foods were given during first or second two-week periods of the month. This information was recorded on a feeding card. For our analysis, we used the feeding information for the first 6 months. No information was available about the amounts of non-breast milk foods and beverages given to the infants.

To summarize the way each infant was fed during the first 6 months of life, we constructed 3 breastfeeding trajectories. The first type was based on WHO recommendation of EBF for 6 months. If an infant received only breast milk and water from 0-6 months, he was categorized into full breastfeeding trajectory. In the qualitative study (Chapter 2), mothers who perceived that they had adequate breast milk practiced intermittent mixed feeding 0-4 months followed by continuous mixed feeding during 5-6 months (Decision point 2). This kind of feeding was considered normative. The infant feeding data of the mothers who had adequate breast milk in the qualitative study informed the formulation of intermittent mixed feeding trajectory which included mothers who intermittently fed non-breast milk foods during 0-4 months followed by intermittent or continuous feeding of non-breast milk foods during 5-6 months. In the qualitative study (Chapter 2) mothers who perceived breast milk inadequacy started continuous mixed feeding (Decision point 3). As continuous mixed feeding was normative during 5-6 months, the difference in feeding patterns

between mothers who perceived breast milk inadequacy and mothers who did not was only distinguishable during 0-4 months. Also, mothers who perceived breast milk inadequacy used food-based liquids, semi-solids and solids as breast milk substitute. The infant feeding data of the mothers who had inadequate breast milk in the qualitative study informed the formulation of committed mixed feeding trajectory where mothers fed non-milk liquids (water fruit juice and sugar water was not considered), cow's milk, semi solids or solids continuously starting from 0-4 months.

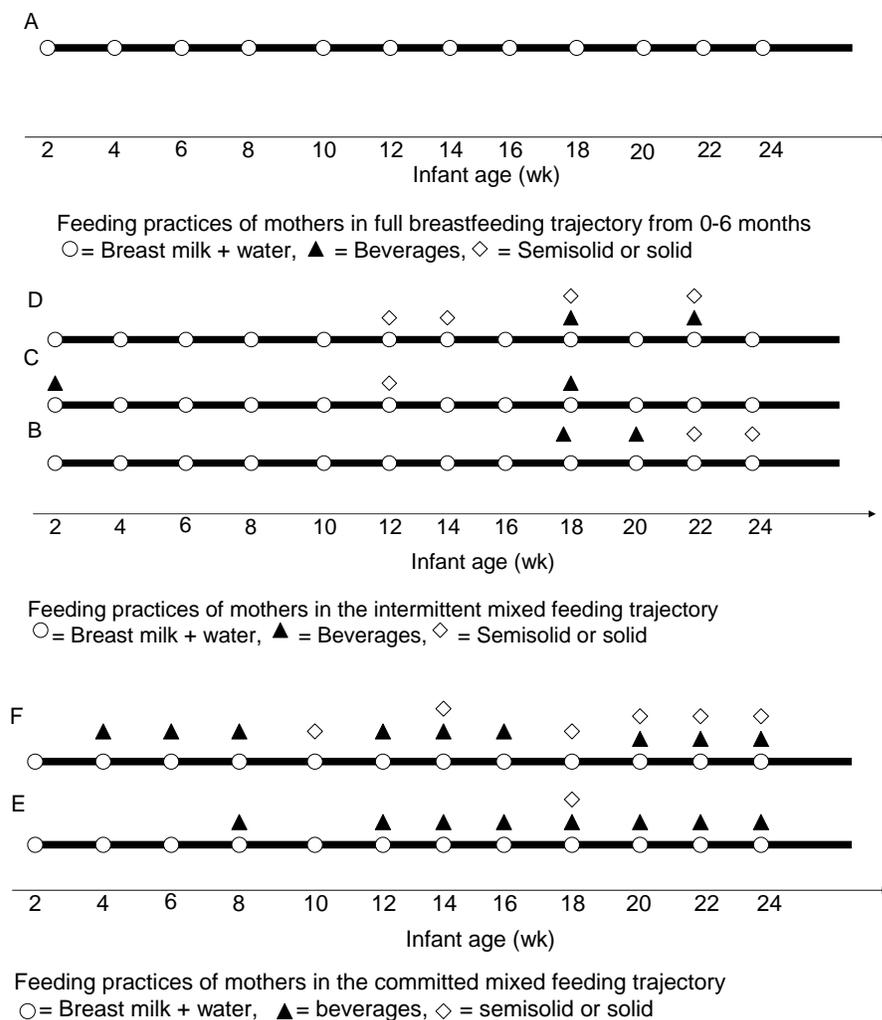


Figure 4.2 Feeding practices of mothers in the 3 breastfeeding trajectories during 0-6 months

All mothers in the full breastfeeding trajectory fed breast milk and water for 6 months (Figure 4.2, top). Mothers in the intermittent mixed feeding trajectory fed non-breast milk foods and beverages intermittently until 4 months and then continued intermittent or continuous mixed feeding (Figure 4.2, middle). Mothers in the committed mixed feeding trajectory offered other foods continuously from 0-4 months (Figure 4.2, bottom).

4.3.5 Selection of independent variables

We adopted the Hill and Humerick's IMS conceptual framework (13) (Figure 4.3) to identify variables (or their proxies) from the MINIMat dataset. In the qualitative study (Chapter 2) mothers identified inadequate foods intake, illness and contraceptive use as the proximal factors that directly affect breast milk production while workload and stress indirectly affect breast milk production through inadequate foods intake. Although infant crying was the primary indicator of breast milk inadequacy, mothers did not link either infant's ability to breastfeed or early food supplementation to breast milk inadequacy. In the IMS conceptual framework, the concepts mothers used as determinants of breast milk inadequacy were considered as proximal (stress, illness and contraceptive use) and distal (workload) determinants of IMS based on the biological understanding of the process of lactation. In the IMS conceptual framework, maternal time restraint, socio-cultural factors and infant factors are related to IMS through maternal physiological and psychological factors as well as breastfeeding behavior. Other researchers have shown that maternal physiological factors such as BMI (14,15); psychological factors such as stress and self-efficacy (7); and breastfeeding behavior such as pre-lacteal feeding (16) affect breast milk volume and have a negative impact on the duration of EBF. As the IMS conceptual framework allowed us to consider mothers' ideas regarding the determinants of breast milk inadequacy while linking these determinants with the biology of lactation, we used

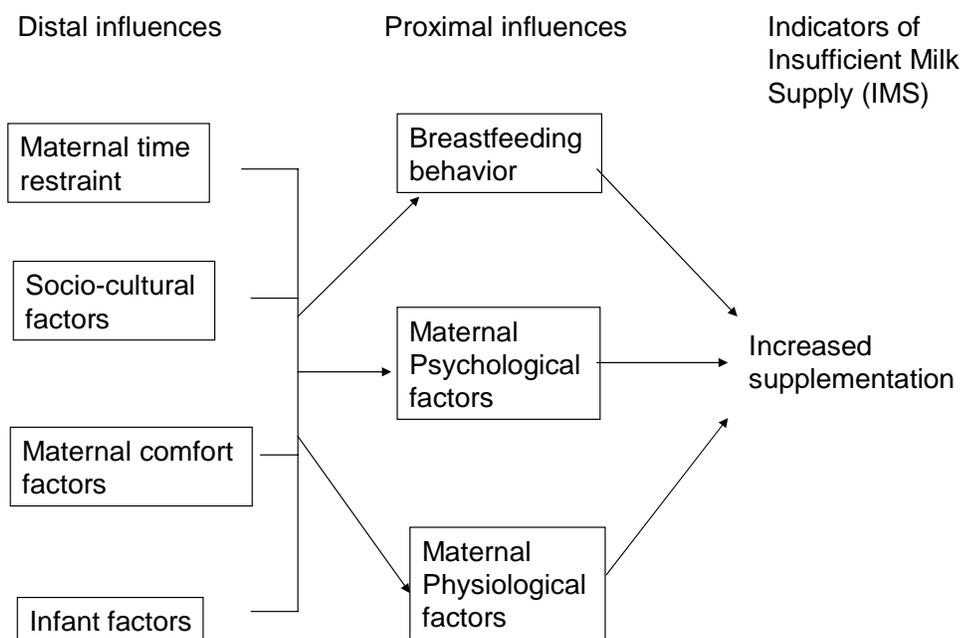


Figure 4.3 Conceptual framework adapted from the potential determinants and indicators of Insufficient Milk Supply (IMS) by Hill and Humenick, 1989

this conceptual framework to select variables from MINIMat dataset that served as the independent variables in our analysis (Table 4.1).

Description of variables created for use in this study: A wealth index was constructed by MINIMat staff members using landholding, material for the walls of the house, ownership of household items excluding beds and clothing for ceremonial use. The scores for all these variables were added and principle component analysis was used to create an index with 5 groups with equal number of households in each group. In the index, 1 represented the poorest and 5 represented the richest households.

Maternal distress was measured at 30 weeks of pregnancy using a Self Reporting Questionnaire of 20 items (SRQ20) (17). This questionnaire has not been previously used in Bangladesh. A cut-off of 7/8 out of 20 questions to separate the

Table 4.1 MINIMat data chosen to represent the factors in the conceptual model

Factors from conceptual framework	MINIMat data	Form of the variable
Distal factors		
Time restraint	Maternal employment	Categorical (yes/no)
	Family structure	Categorical(joint/nuclear)
Socio-cultural factors	Wealth index	Scale
	Maternal education	Continuous
	Father's education	Continuous
	Area of residence	Categorical (A,B,C,D)
Infant factors	Birth weight	Continuous
	Gender	Categorical (male/female)
Proximal factors (Maternal)		
Breastfeeding behavior	Pre-lacteal given	Categorical (yes/no)
Psychological factors	Distress	Categorical (yes/no)
	Primipara	Categorical (yes/no)
Physiological factors	Pre-pregnancy BMI	Continuous
	Maternal age	Continuous

probable non-cases/cases was used in our study as suggested by the previous validation against clinical assessment in other developing countries (17). We validated the distress measured by SRQ20 against measurement of known stressors, such as household food insecurity and domestic violence, available in the MINIMat dataset and found that the correlations between them were highly significant.

4.3.6 Statistical methods

To test whether the characteristics of included and excluded mothers were different from one another, we used a chi-square test of association. To test the bivariate differences between the feeding trajectories and the independent variables, we conducted the chi-square test of association for categorical variables and ANOVA for continuous variables. To test whether the independent variables were associated with the odds of being in one trajectory compared to other, we used logistic regression.

In this study, we wanted to understand how mothers who practiced normative breastfeeding (intermittent mixed feeding trajectory) differed from those who either adhered to WHO recommendation of EBF for 6 months (full breastfeeding trajectory) or practiced non-normative breastfeeding (committed mixed feeding trajectory). The comparison of mothers in the full breastfeeding trajectory with those in the intermittent mixed feeding trajectory provided valuable information about why some mothers followed the WHO infant feeding recommendation in a community where EBF was not a norm. From the biological consideration, although both the intermittent and committed mixed feeding trajectories were not recommended patterns of infant feeding, the committed mixed feeding trajectory was more likely to be harmful for the growth of infants than intermittent mixed feeding trajectory (12). Thus, we decided to consider these 3 trajectories separately. We tested 3 hypotheses.

Hypothesis 1: Mothers in the full breastfeeding trajectory from 0-6 months were significantly different from those who were in the intermittent mixed feeding trajectory in terms of their household, personal and infant characteristics. To test this hypothesis we ran 3 models. Model 1 contained the distal factors, Model 2 contained the proximal factors, and Model 3 contained all the variables from the 2 previous models.

Hypothesis 2: Mothers in the committed mixed feeding trajectory were significantly different from those in the intermittent mixed feeding trajectory in terms of their household, personal and infant characteristics. We constructed Models 4, 5 and 6 with distal, proximal and all independent variables as described earlier.

Hypothesis 3: Among mothers in the intermittent mixed feeding trajectory, those who practiced intermittent mixed feeding during 0-6 months were different from those who started mixed feeding continuously between 5-6 months according their personal, household, infant characteristics. A similar regression analysis with models 7, 8 and 9 were performed to compare the mothers who practiced intermittent mixed feeding to those to practiced committed mixed feeding after 4 months. A similar method of using different layers of independent variables to predict the dependent variable separately and together was described by Milman et al. (18).

We used SPSS for Windows version 14 (SPSS Inc. 2004) for the analysis.

4.4 Results

4.4.1 Sample characteristics

Compared to those excluded from the study, mothers who were included were significantly less educated, lived in poorer households and lived in Blocks B and D (Table 4.2). When we assessed the monthly feeding patterns of the mothers in the three trajectories, we found that mothers in the full breast feeding trajectory practiced

EBF until 5 months. During the sixth month, almost half of them practiced predominant feeding which means they started feeding water along with breast milk (Figure 4.4). Mothers in the intermittent mixed feeding trajectory mostly practiced EBF from 1-4 months and then from 5-6 months partial feeding increased dramatically in this group (Figure 4.5). Mothers in the committed mixed feeding trajectory increasingly practiced partial breastfeeding from 1-3 months. By the fourth month, none of the mothers from this feeding trajectory was practicing EBF (Figure 4.6).

We explored the relationship between the breastfeeding trajectories and the individual, household or infant characteristics and found that pre-lacteal feeding, mother's employment, household wealth, parental education and area of residence were significantly associated with the breastfeeding trajectories (Table 4.3).

4.4.2 Hypothesis 1

We compared mothers in the full breastfeeding trajectory with those in the intermittent mixed feeding trajectory by their individual, household or infant characteristics. Mothers living in block A and from the richest households had lower odds of being in the full breast feeding trajectories compared to those who lived in other blocks and poorer households (Table 4.4, Model 1). None of the proximal factors was significantly associated with the odds of being in full breastfeeding trajectory (Table 4.4, Model 2). In the full model, both household wealth and area of residence remained important predictors of being in full breastfeeding compared to intermittent mixed feeding trajectory (Table 4.4, Model 3).

Table 4.2 Characteristics of mother-infant dyads included and those excluded from the analysis ¹

Characteristics	Excluded (%) (n=38)	Included (%) (n=1472)
Mother's education (y)		
0	15.8 ³	29.4
1-5	78.9	68.5
6+	5.3	1.5
Mother's age (y)		
		(n=1470)
<20	18.4	3.1
20-25	28.9	2.0
26+	52.6	2.7
Mother's BMI (kg/m ²)		
	(n=37)	(n=1468)
<18.5	24.3	27.7
≥18.5	75.7	72.3
Parity		
	(n=37)	(n=1471)
Primiparous	43.2	31.8
Multiparous	56.8	58.2
Mother employed		
Yes	86.8	91.7
No	13.2	8.3
Family structure		
	(n=37)	(n=1400)
Joint family	70.3	70.9
Nuclear family	29.7	29.1
Wealth Index		
1	7.9 ²	19
2	10.5	20
3	13.2	19
4	34.2	20.2
5	34.2	21.8
Area of residence (block)		
A	39.5 ²	26.8
B	26.3	28.1
C	31.6	23.4
D	2.6	21.7

¹ Number of mother-infant dyads in the brackets.

^{2,3} Significantly different from included dyads (chi-square test): ² P<0.05, ³ P<0.001

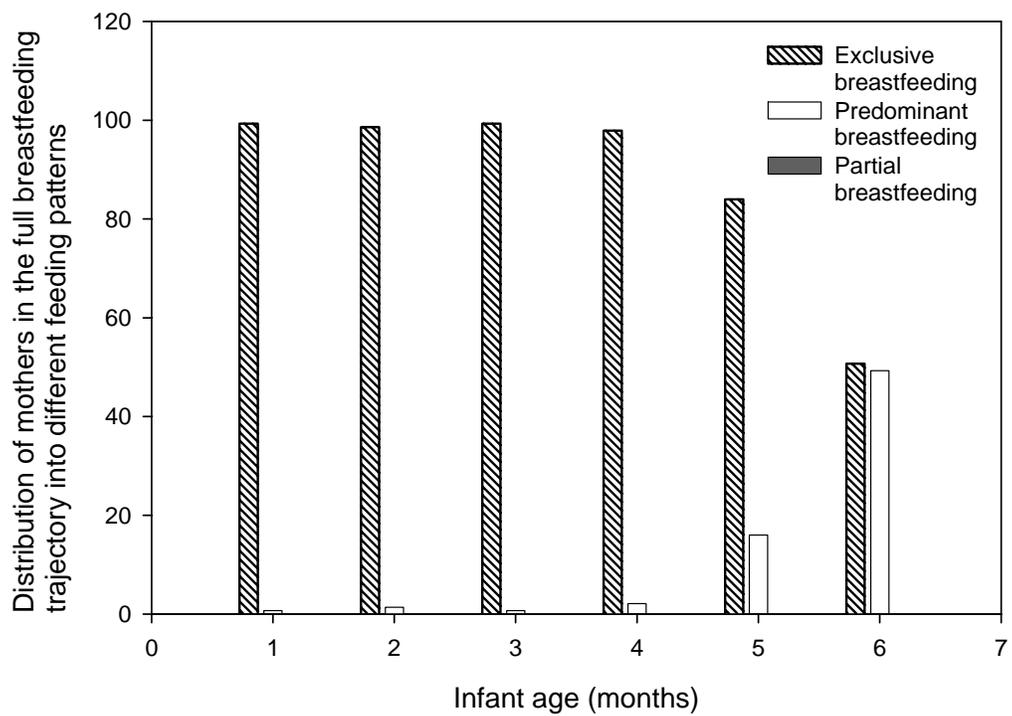


Figure 4.4 The monthly feeding patterns of mothers in the full breast feeding trajectory according to standard definitions

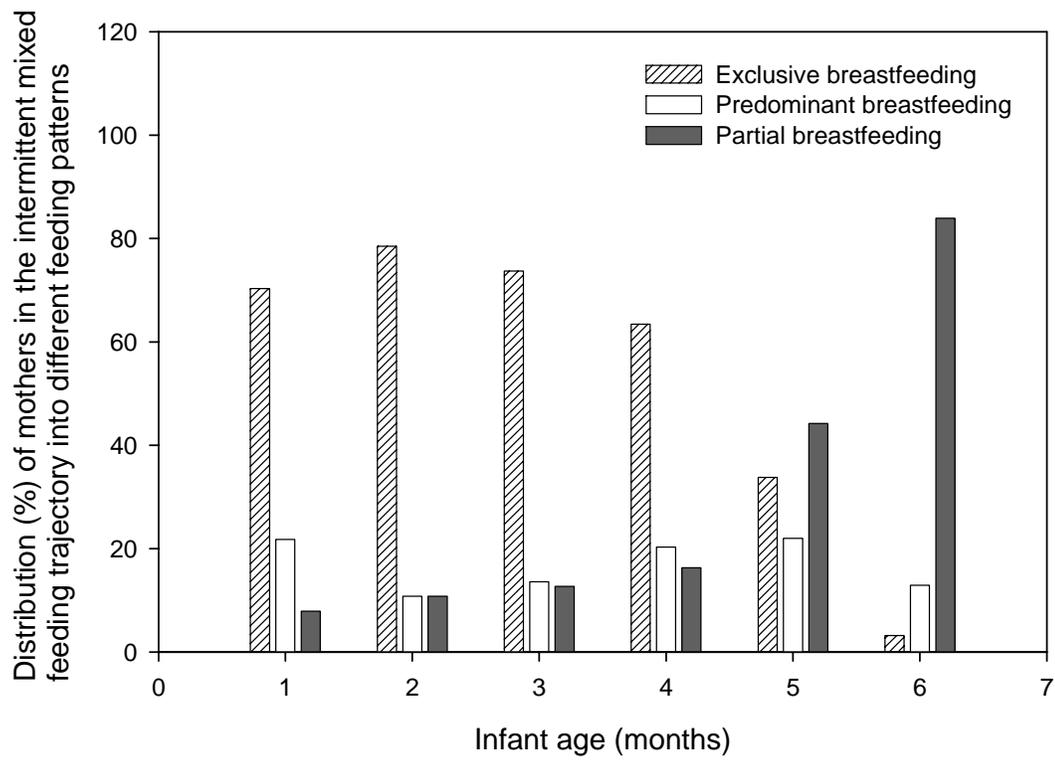


Figure 4.5 The monthly feeding patterns of mothers in the intermittent mixed feeding trajectory according to standard definitions

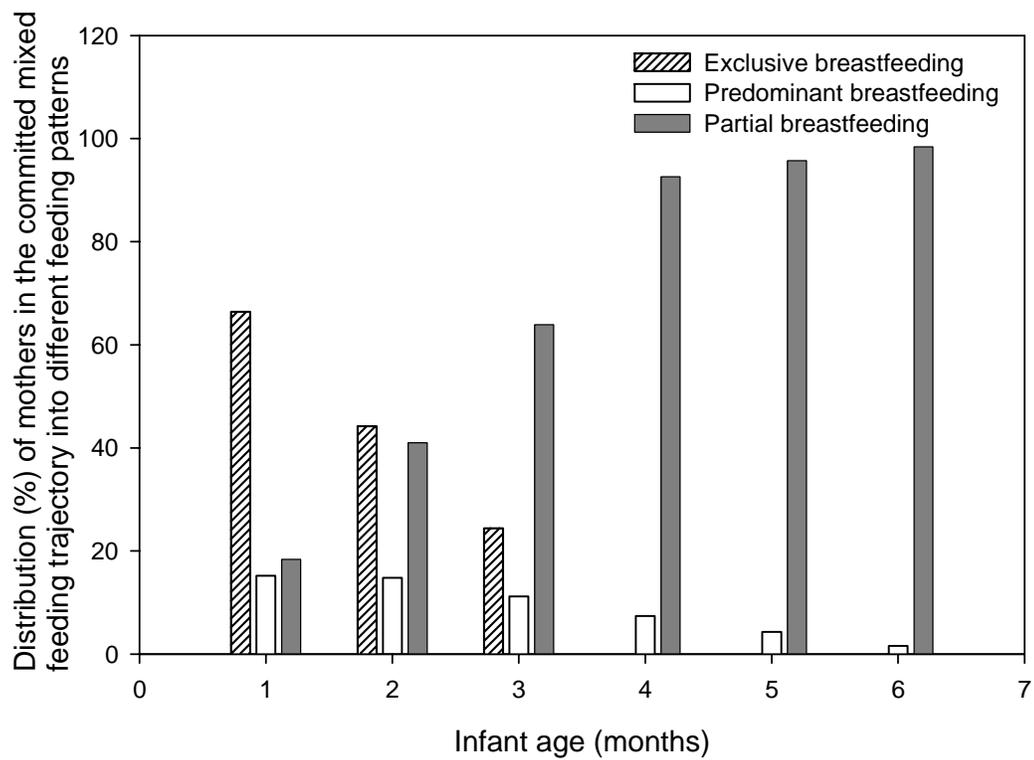


Figure 4.6 The monthly feeding patterns of mothers in the committed mixed feeding trajectory according to standard definitions

Table 4.3 Bivariate associations between mothers in the different feeding trajectories and the proximal and distal factors ¹

Independent variables	Full breastfeeding (N=144)	Intermittent mixed feeding (N=809)	Committed mixed feeding (N=519)
Pre-lacteal given (%) ³	18.5 (135)	24.1 (764)	29.9 (488)
Maternal age (y) ²	26.2 ± 4.3	25.4 ± 5.8 (808)	26.1 ± 5.6 (518)
Pre-pregnancy BMI (kg/m ²)	19.9 ± 2.5	20.3 ± 2.6 (808)	20.0 ± 2.6
Maternal distress (%)	19.1 (136)	18.8 (777)	16.3 (502)
Primipara (%)	31.9	32.5	27.8 (518)
Mother employed (%) ⁵	4.2	6.4	12.3
Joint family (%)	64.3 (140)	71.1 (772)	72.5 (488)
Wealth Index (%) ⁵			
1	29.2	20.1	14.5
2	25.0	17.9	21.8
3	14.6	20.0	18.7
4	20.8	19.9	20.4
5	10.4	22.0	24.7
Mother's education (y) ⁶	4.2 ± 3.9	5.0 ± 4.0	5.7 ± 4.1
Father's education (y) ⁶	4.4 ± 4.4	5.7 ± 4.5 (802)	6.23 ± 4.7 (516)
Area of residence (%) ⁴			
A	18.1	26.1	30.3
B	34.7	29.4	24.3
C	19.4	22.9	25.4
D	27.8	21.6	20.0
Birth weight (kg)	2.66 ± 0.38 (135)	2.72 ± 0.39 (755)	2.66 ± 0.38 (477)
Infant gender (%) male	54.5 (143)	49.4 (802)	48.0 (515)

¹ Number of mother-infant dyads in brackets

² Mean ± SD (all such values)

^{3,4,5} Overall chi-square tests: ³ P<0.05, ⁴ P<0.01, ⁵ P<0.001

⁶ One-way ANOVA: ⁶ P<0.001

4.4.3 Hypothesis 2

We compared mothers in the committed mixed feeding trajectory with those in the intermittent mixed feeding trajectory according to their individual, household and infant characteristics. In the model with distal factors (Table 4.5, Model 4), a mother's odds of being in the committed mixed feeding trajectory increased if she lived in block A and decreased if she was not employed outside her home and with every kg increase in infant birth weight. In the model with proximal factors, a mother's odds of being in the committed mixed feeding trajectory increased with pre-lacteal feeding or older maternal age, and decreased with increasing pre-pregnancy BMI (Table 4.5, Model 5). In the final model (Table 4.5, Model 6), in addition to all the variables that were important in previous models, household wealth attained significance. Mothers in poorest households had significantly lower odds of being in the committed mixed feeding trajectory compared to other mothers.

4.4.4 Hypothesis 3

Among the mothers in the intermittent mixed feeding trajectory, we compared mothers who did not start committed mixed feeding during 5-6 months with those who started committed mixed feeding between 5-6 months according to their individual, household and infant characteristics. In the bivariate analysis, significantly higher proportion of primiparous mothers started committed mixed feeding from 5-6 months (Table 4.6). In the logistic regression (Table 4.7), however, none of the proximal or distal variables distinguished the 2 groups. Therefore, it was appropriate to have combined them for the earlier analysis.

Table 4.4 The odds of being in the full breastfeeding trajectory by distal factors (Model 1), proximal factors (Model 2), and all the factors (Model 3) ¹

Indirect influences	Model 1 Odds ratio (n= 845)	Model 2 Odds ratio (n=866)	Model 3 Odds ratio (n=814)
Mother not employed	1.91 (0.73-4.96)		1.81 (0.69-4.74)
Joint family	0.19 (0.59-1.40)		0.87 (0.55-1.38)
Wealth index			
1	3.00 (1.27-7.05) ²		3.21 (1.31-7.87) ²
2	2.93 (1.31-6.53) ³		3.04 (1.31-7.05) ³
3	1.64 (0.75-3.58)		1.74 (0.79-3.99)
4	2.35 (1.15-4.80)		2.31 (1.10-4.86) ²
5	Reference		Reference
Maternal education (y)	1.01 (0.94-1.08)		1.00 (0.93-1.08)
Father's education (y)	0.97 (0.91-1.03)		0.98 (0.92-1.04)
Area of residence			
Block A	0.46 (0.35-0.82) ²		0.40 (0.21-0.74) ^b
Block B	0.88 (0.53-1.45)		0.79 (0.48-1.32)
Block C	0.68 (0.38-1.20)		0.62 (0.34-1.12)
Block D	Reference		Reference
Infant gender (male)	0.78 (0.53-1.15)		0.78 (0.53-1.16)
Birth weight (kg)	1.22 (0.75-2.01)		1.18 (0.92-1.08)
Pre-lacteal given		0.64 (0.39-1.05)	0.65 (0.39-1.03)
Maternal age (y)		1.02 (0.98-1.06)	1.01 (0.79-1.06)
Pre-pregnancy BMI (kg/m ²)		0.94 (0.87-1.01)	0.98 (0.90-1.06)
No distress		0.98 (0.61-1.58)	1.13 (0.68-1.88)
Primipara		0.82 (0.48-1.39)	1.06 (0.60-1.84)

¹ Intermittent mixed feeding trajectory is the reference category and confidence intervals are in parentheses

^{2,3} Significant difference: ² P<0.05, ³ P<0.01

Table 4.5 The odds of being in the committed mixed feeding trajectory by distal factors (Model 4), proximal factors (Model 5), and all the factors (Model 6)¹

Indirect influences	Model 4 Odds ratio (n= 1159)	Model 5 Odds ratio (n=1213)	Model 6 Odds ratio (n=1121)
Mother not employed	0.51 (0.33-0.79) ³		0.56 (0.36-0.88) ²
Joint family	1.07 (0.80-1.43)		1.13 (0.83-1.54)
Wealth index			
1	0.63 (0.38-1.06)		0.54 (0.32-0.93) ²
2	1.09 (0.69-1.71)		0.93 (0.58-1.48)
3	0.82 (0.54-1.23)		0.73 (0.48-1.11)
4	0.91 (0.63-1.33)		0.90 (0.61-1.32)
5	Reference		Reference
Maternal education (y)	1.02 (0.97-1.06)		1.04 (0.99-1.09)
Father's education (y)	1.00 (0.96-1.04)		0.99 (0.95-1.03)
Area of residence			
Block A	1.62 (1.31-2.31) ³		1.58 (1.09-2.29) ²
Block B	1.03 (0.72-1.48)		1.04 (0.72-1.51)
Block C	1.41 (0.97-2.04)		1.43 (0.97-2.12)
Block D	Reference		Reference
Infant gender (male)	1.01 (0.86-1.40)		1.06 (0.83-1.37)
Birth weight (kg)	0.64 (0.47-0.88) ³		0.58 (0.92-0.98) ³
Pre-lacteal given		1.35 (1.03-1.75) ²	1.35 (1.02-1.79) ²
Maternal age (y)		1.03 (1.01-1.06) ³	1.04 (1.01-1.07) ³
Pre-pregnancy BMI		0.95 (0.91-0.99) ²	0.93 (0.89-0.98) ²
No distress		1.19 (0.88-1.62)	1.18 (0.84-1.65)
Primipara		1.23 (0.89-1.69)	1.01 (0.71-1.44)

¹ Intermittent mixed feeding trajectory is the reference category and confidence intervals are in parentheses

^{2,3} Significant difference: ² p<0.05, ³ p<0.01

Table 4.6 Associations between 2 groups of mothers in the intermittent mixed feeding trajectory and the proximal and distal factors ¹

Independent variables	Intermittent mixed feeding 0-6 months (N=168)	Committed mixed feeding between 5-6 (N=641)
Pre-lacteal given (%)	24.7 (154)	23.9 (610)
Maternal age (y)	26.2 ± 5.8 ² (167)	25.2 ± 5.7
Pre-pregnancy BMI (kg/m ²)	20.2 ± 2.6 (167)	20.3 ± 2.6
No distress (%)	80.9 (157)	81.3 (620)
Primipara (%)	25.6 ³	34.3
Mother not employed (%)	91.7	94.1
Joint family (%)	69.2 (159)	71.6 (613)
Wealth Index (%)		
1	22.0	19.7
2	22.6	16.7
3	22.6	19.3
4	14.3	21.4
5	18.5	22.9
Mother's education (y)	4.7 ± 4.1	5.1 ± 4.0
Father's education (y)	5.1 ± 4.6 (165)	5.8 ± 4.4 (637)
Area of residence (%)		
A	22.6	27.0
B	26.8	30.1
C	26.8	21.8
D	23.8	21.1
Infant birth weight (kg)	2.68 ± 0.46 (165)	2.73 ± 0.38 (602)
Infant gender (%) male	44.8 (165)	52.1 (637)

¹ Number of mother-infant dyads in brackets.

² Mean ± SD (all such values)

³ Chi-square tests: ³ P<0.05

Table 4.7 The odds of intermittent mixed feeding during 5-6 months by distal factors (Model 7), proximal factors (Model 8), and all the factors (Model 9)¹

Indirect influences	Model 7 Odds ratio (n= 714)	Model 8 Odds ratio (n=737)	Model 9 Odds ratio (n=688)
Mother not employed	0.69 (0.34-1.41)		0.71 (0.33-1.48)
Joint family	1.03 (0.66-1.61)		1.15 (0.71-1.86)
Wealth index			
1	1.31 (0.59-2.89)		1.31 (0.57-3.04)
2	1.89 (0.92-3.86)		1.94 (0.91-4.13)
3	1.27 (0.66-2.45)		1.32 (0.66-2.62)
4	0.84 (0.43-1.64)		0.82 (0.40-1.68)
5	Reference		Reference
Maternal education (y)	1.03 (0.96-1.10)		1.03 (0.96-1.11)
Father's education (y)	0.96 (0.91-1.03)		0.97 (0.95-1.03)
Area of residence			
Block A	0.71 (0.41-1.25)		0.71 (0.39-1.28)
Block B	0.75 (0.44-1.28)		0.77 (0.44-1.35)
Block C	1.14 (0.66-1.96)		1.16 (0.65-2.09)
Block D	Reference		Reference
Infant gender (male)	0.73 (0.50-1.06)		0.80 (0.54-1.19)
Birth weight (kg)	0.92 (0.88-1.01)		0.89 (0.90-1.01)
Pre-lacteal given		0.99 (0.64-1.53)	0.93 (0.58-1.49)
Maternal age (y)		1.01 (0.97-1.05)	1.03 (0.98-1.07)
Pre-pregnancy BMI		0.98 (0.92-1.06)	0.98 (0.90-1.06)
No distress		1.05 (0.66-1.70)	1.16 (0.69-1.95)
Primipara		0.72 (0.43-1.19)	0.79 (0.45-1.38)

¹ Committed mixed feeding during 5-6 months is the reference category and confidence intervals are in parentheses

4.5 Discussion

We created breastfeeding trajectories based on mothers' perspectives from our qualitative study of normative and non-normative breastfeeding as well as on WHO EBF recommendation. For the first time, this gives us a meaningful way of distinguishing between different prevalent breastfeeding patterns and permits us to compare the WHO recommendation with existing breastfeeding norms. The breastfeeding trajectories that we used were developed from the analysis of longitudinal infant feeding data based on the insights from a qualitative study. These breastfeeding trajectories allow us a way to conduct longitudinal assessments of breastfeeding practices for the first time. The conceptualization of these trajectories opens the possibility, in the future studies, to evaluate the long- and short-term risks associated with these breastfeeding trajectories in terms of infant morbidity and growth.

We used mothers' perspective of breastfeeding experience to identify breastfeeding trajectories. The existing ways of assessing breastfeeding practices are only designed for short-term assessment of breastfeeding practices (4). Our study provided an example of how to assess long-term breastfeeding patterns. Although the criteria for assessing long term breastfeeding patterns may differ from community to community, our study provides a good starting point for thinking about different long-term breastfeeding patterns.

Furthermore, the strength of our study rests on the availability of the monthly infant feeding data that we used to construct breastfeeding trajectories. Some researchers have shown that collecting infant feeding information based on 24-hour recalls over-estimated the prevalence of EBF and predominant breastfeeding compared to infant feeding recall since birth (19,20). When mothers were asked to recall their feeding practices since birth during cross-sectional studies, however, their

recall period is often quite long, resulting in the opportunity for recall bias (19,21). In the present study, breastfeeding information was collected every month, which probably yielded more reliable data than 24-hour assessments or one time cross-sectional assessment of the whole period of lactation.

Although this study joins a small number of other studies where breastfeeding practices have been assessed over a period of time (6,22), it has some limitations. The infant feeding data did not include information about the amounts of foods or how regularly these foods were given in each two-week period. If a mother fed small amount of non-breast milk foods just once during each two-week period, she was put into committed mixed feeding trajectory. This kind of feeding may not be as harmful in terms of breast milk replacement or pathogen introduction compared to when mothers used non-breast milk foods regularly with the intention of replacing breast milk. Such misclassification may have weakened the relationship between the independent variables and breastfeeding trajectories. In addition, if this kind of misclassification could be avoided in future studies, we would be able to accurately quantify effects of early committed mixed feeding on the morbidity and growth of infants.

We created the breastfeeding trajectories based on the breastfeeding practices of small purposive sample of mothers in previous qualitative study. It is possible that we did not identify all possible breastfeeding trajectories and the meanings behind them. In addition, we did not ask the mothers about their reasons for feeding non-breast milk foods during the monthly assessments. In the future studies, it will be useful to assess mothers' reasons for offering non-breast milk foods at the same time as the assessment of breastfeeding practices. The simultaneous assessment of breastfeeding practices and the reasons for them will provide a greater understanding of the various important reasons for offering non-breast milk foods to infants.

4.5.1 The comparison of mothers in the full breastfeeding trajectory with those in the intermittent mixed feeding trajectory

The fact that majority of the mothers in our study did not practice EBF for 6 months is not surprising. Researchers from Bangladesh and other countries have reported that mothers do not adhere to the recommendation of EBF (3,19,21). It is interesting, however, that mothers in the full breastfeeding trajectory, who conformed closely to WHO recommendation of EBF, were poorer than mothers in the intermittent mixed feeding trajectory. Other researchers have also reported a negative association between household socioeconomic status and EBF (3,23). One explanation of this finding was that mothers who fed only breast milk and water to their infants for 6 months probably did so because they could not afford acceptable breast milk substitutes. This association between household wealth and full breastfeeding was problematic as mothers who do not offer non-breast milk foods because of poverty may also not be able to provide safe and adequate non-breast milk foods to their infants after 6 months as recommended. Researchers have reported the negative association between socioeconomic status and feeding recommendations during the first half of infancy, and the positive association between socioeconomic status and feeding recommendations in the second half of infancy in Matlab and elsewhere (21,24).

Mothers in the full breastfeeding trajectory were least likely to live in Block A as compared to other blocks. The fact that block A consists of semi-urban areas and the other blocks are rural may have influenced these differences. Other researchers have consistently reported a negative association between living in urban areas and duration of breastfeeding (3,23,25,26). In a survey conducted among Bangladeshi mothers urban who lived in the urban slums, Haider et al. (27) reported that mothers did not properly understand the meaning of EBF and believed that breast milk cannot adequately meet the needs of infants. Although Block A is not as urban as Dhaka (the

capital city) where the study by Haider et al. (27) was conducted, it is possible that the association between the area of residence and full breastfeeding was related to the influence of urban living conditions on breastfeeding in terms of beliefs, constraints and accessibility of breast milk substitutes. Whether other aspects of living in Block A were responsible for this relationship could be explored in future studies.

4.5.2 Comparison of mothers in the committed mixed feeding trajectory with those in the intermittent mixed feeding trajectory

Mothers in the committed mixed feeding trajectory were significantly different from those in the intermittent mixed feeding trajectory in terms of both distal and proximal factors. Mothers from poorest households were less likely and those who resided in semi-urban block A were more likely to be in committed mixed feeding trajectory compared to intermittent mixed feeding trajectory. Other researchers have reported similar associations between household wealth and rural residence with length of EBF (24,28) as discussed above. Mothers in the committed mixed feeding trajectory were more likely to be employed than those in the intermittent mixed feeding trajectory. Mother's employment could either curtail the opportunities for breastfeeding if the infant was left behind (29) or mothers could start sustained introduction of non-breast milk foods in anticipation of resuming work (30). In either case, maternal employment could result in sustained introduction of non-breast milk foods.

The use of pre-lacteal feeds and maternal age were positively associated with being in committed mixed feeding trajectory and mother's pre-pregnancy BMI was negatively associated with being in the committed mixed feeding trajectory. Other researchers have reported a positive association between pre-lacteal feeding and both early supplementation and weaning (16). Also, researchers have indicated that stress during labor may delay the onset of lactation (31), which has been associated with

early supplementation (32). In our qualitative study (Chapter 2), mothers reported feeding pre-lacteals either as a ritual or to respond to delayed onset of lactation. It is possible that pre-lacteal feeding in response to the delayed onset of lactation was an indicator of early problems of breastfeeding that could have consequences for the duration of EBF. To understand how pre-lacteal feeding affects subsequent breastfeeding practices, however, it is important that future studies distinguish between pre-lacteal feeding as ritual (33) and pre-lacteal feeding as a response to the delayed onset of lactation.

In our study, the odds of being in committed mixed feeding trajectory increased with increasing maternal age. This is contrary to the findings reported by researchers in Brazil (29) and the U.S. (34). Our qualitative study revealed that although primiparous mothers were supported to initiate and continue breastfeeding, multiparous mothers (who were older than primiparous mothers) did not receive much help with household chores. In a study by Huffman et al. (35) that was conducted in Matlab, high workload was associated with reduced suckling frequency. It is possible that older mothers, constrained by workload, reduced feeding frequency. As a result, breast milk volume might have decreased to levels that are inadequate to meet their infants' needs, requiring early complementary feeding. The positive association between multiparity and perceived breast milk inadequacy has been reported by other researchers (28,36).

Maternal pre-pregnancy BMI was negatively associated with the odds of being in committed mixed feeding trajectory according to our analysis. It is known that maternal malnutrition can negatively affect both the quantity and composition of breast milk (15). It is possible, that mothers who were malnourished when entering pregnancy lacked the ability to produce enough milk to satisfy their infants and, if increasing breastfeeding frequency was not a part of their coping strategy (Chapter 2),

had to resort to sustained complementary feeding to meet their infants' needs. As all the MINIMat participants received food and micronutrient supplements during pregnancy, it will be important to understand how this might have affected the relationship between pre-pregnancy BMI and committed mixed feeding trajectory in future studies.

Our finding that the risk of committed mixed feeding decreased with increasing birth weight has also been reported in other studies. Some researchers have proposed that lower birth weight infants may not be able to suck very well and thus may not be able to establish an optimal milk supply (14), while others stated that infants of smaller size were more likely to be supplemented or weaned, because mothers perceived that small infants were not receiving adequate breast milk (37). These biological and socio-cultural factors that distinguished non-normative breastfeeding practices from the normative breastfeeding practices indicate that mothers in the committed mixed feeding trajectory may have had compelling reasons for breastfeeding the way they did.

Finally, comparing mothers' conceptual model and the IMS conceptual model used in our study points to the fact that there were some differences between mothers' understanding and nutrition experts understanding of the process of lactation. Although both conceptualized maternal psychological and physiological factors affecting breastfeeding, mothers did not link early supplementation or breastfeeding frequency as a determinant of IMS. It is important that breastfeeding intervention programs address this disconnect between mothers' conceptual framework and nutrition experts' conceptual framework through their programs.

4.6 Conclusion

In Matlab the normative breastfeeding practices (from mothers' perspective) do not conform to WHO recommendation of EBF for 6 months as few mothers practiced EBF for this long. Those whose breastfeeding practices were closest to WHO recommendations probably did so because they could not afford non-breast milk foods. This finding could mean that the existing messages and/or system of delivery of the messages promoting EBF for 6 months have not been able to influence the breastfeeding norms in Matlab. If future studies reveal that the normative breastfeeding practices have serious consequences in terms of the morbidity and growth of infants, innovative programs may be needed that combine the reasons why mothers practice intermittent mixed feeding with the consequences of such behavior in the strategy to influence the breastfeeding norms.

Despite the prevalent breastfeeding culture, mothers in the committed mixed feeding trajectory practiced early and sustained introduction of complementary foods. It is encouraging to note that both the mothers and the nutrition expert view this kind of feeding as non-normative. Mothers in the committed mixed feeding trajectory had both biological and socio-cultural constraints that could be barriers to successful breastfeeding experience. It is important to target these mothers for breastfeeding support interventions.

The breastfeeding trajectories give us a new way of meaningfully distinguishing different longitudinal breastfeeding patterns. In future studies, impact of these trajectories on the morbidity and growth of infants should be studied.

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CHAPTER 5

CONCLUSIONS

In Bangladesh, the median duration of breast feeding is quite long (30 months) but mothers rarely practice exclusive breastfeeding (EBF) (1). As EBF for 6 months has been promoted by WHO as the recommended feeding practice (2), the way Bangladeshi mothers practice breastfeeding is far from this recommendation. Sub-optimal breastfeeding practices are of great importance for Bangladeshi infants as they suffer from wide-spread malnutrition (3) and growth faltering starts as early as three months of age in developing countries of Asia with similar patterns in Bangladesh (4). Improving the breastfeeding practices of the mothers could protect infant health by providing adequate nutrition and preventing illness for the first 6 months (5).

In an effort to improve breastfeeding practices, EBF for 5 months have been promoted since 1989 through national campaigns (6). Hospital-based interventions, such as UNICEF's Baby Friendly Hospital Initiatives (7), and community-based counseling initiatives have been shown to result in improved breastfeeding practices (8). Despite the development and testing of different successful programs to support breastfeeding, rates of EBF have remained quite low in Bangladesh (1) and very little is known about how mothers viewed their breastfeeding experiences. In seeking to understand why mothers offered non-breast milk foods to their infants during the first 6 months of age, the specific goals of our research were threefold. First, we wanted to gain an in-depth understanding of how the decisions regarding introducing non-breast milk foods are made from the mothers' perspective. Second, we wanted to examine the adequacy of the theory of breastfeeding self-efficacy and extend the conceptual model based on mothers' experience of breastfeeding practices. Finally, we wanted to

test the extended conceptual model against empirical data from Maternal Infant Nutrition Initiative in Matlab (MINIMat).

5.1 Breastfeeding decision points from mothers' perspectives

To understand how mothers viewed their breastfeeding experience, we conducted a qualitative study, where mothers of young infants and other community members were interviewed for an in-depth understanding of their feeding decisions during the 0-6 month period. Our study revealed (Chapter 2) that mothers recognized three points when they introduced non-breast milk foods. The first decision point was regarding pre-lacteal feeding just after delivery and before breast milk came down. After lactation was established however, mothers' decisions to introduce non-breast milk foods were based on their perception of breast milk adequacy. At the second decision point, mothers gave non-breast milk foods intermittently during 0-4 months for various reasons and then started regular complementary foods during 5-6 months, even when they thought their breast milk was adequate. This decision point represented normative feeding practice for these mothers. At the third decision point, mothers introduced non-breast milk foods regularly between 0-4 months when they experienced breast milk inadequacy. This decision point represented non-normative breastfeeding practices.

The fact that Bangladeshi mothers do not practice EBF for very long is not news. Our study revealed for the first time that mothers did not consider EBF breastfeeding for 6 months normative. Some researchers have reported that Bangladeshi mothers did not really understand the meaning of EBF and considered it necessary to feed water (6). Our research revealed that non-breast milk foods had many utilities to mothers other than nourishment, which lead them to feed other foods intermittently. Similar findings have been reported in other countries (9,10). Little is

known about the effect of intermittent feeding of other foods on morbidity and growth of infants as researchers have often failed to adequately account for intermittent feeding (11). In the case of regular feeding of complementary foods between 5-6 months, it is important to remember that EBF for 5 months have been promoted through the health care system in Bangladesh since 1989 while the WHO recommendation of EBF for 6 months is a fairly recent change. It will probably take some time and effort to shift mothers' understanding of the best time to introduce complementary foods from 5 to 6 months. As regular introduction of non-breast milk foods during 4-6 months has been associated with significant rise in diarrhea episodes but did not result in better growth (5,12-14), it is important to find out how messages related to EBF could be formulated and delivered to affect normative practices.

One strategy to influence normative breastfeeding practices may be to articulate more clearly the link between feeding non-breast milk foods and morbidity. The public health messages promoting EBF at present encourage mothers to practice EBF but fail to articulate why mothers should do so. When opportunities for individual counseling arise during pregnancy or the early lactation period, health care workers should talk about the meaning and value of EBF from the perspective of infant morbidity but also provide advice about making intermittent feeding safe and less deleterious in terms of breast milk replacement.

Our study was the first to articulate the profound effect of perceived breast milk inadequacy on early and regular introduction of non-breast milk foods in Bangladesh. Zeitlyn and Rawshan (15) reported that mothers introduced non-breast milk foods in response to perceived breast milk inadequacy in a qualitative study of Bangladeshi mothers, they did not elucidate the effect of such perception on long-term breastfeeding practices. It is important to address the perception of breast milk

inadequacy as it often leads to early and regular introduction of non-breast milk foods that have deleterious effects on the morbidity and growth of infants (5).

We developed a conceptual framework of the determinants of perceived breast milk inadequacy from mothers' perspective. Only one similar conceptual framework have been described in Mexican mothers (16). Our conceptual framework showed that mothers believed that their illness, inadequate food intake and contraception use was associated with breast milk inadequacy. As mothers did not understand the effect of feeding frequency on breast milk volume, their measures for remedying inadequate breast milk did not include increasing breastfeeding frequency. This is an important insight as the most effective measure for increasing breast milk volume, increasing breastfeeding frequency, did not have cultural validity. Any intervention to improve breastfeeding practices should take into account the reality of mothers' perception of breast milk inadequacy. These mothers are in need of more knowledge related to breastfeeding and supportive interventions can be designed to respond to mothers' needs more effectively with this new understanding of the gap between mothers' understanding and the biology of breastfeeding.

The observations from this paper were used to expand the scope of the theoretical constructs of breastfeeding self-efficacy in Chapter 3 and to define breastfeeding practices during 0-6 months based on breastfeeding decision points in Chapter 4.

5.2 Theory of self-efficacy and mothers' breastfeeding experience

We wanted to examine and strengthen the theory of breastfeeding self-efficacy to extend the inquiry regarding breastfeeding practices. In our effort to understand breastfeeding practices from the mothers' perspective, we used the theory of self-efficacy, which emphasizes the role of an individual in affecting behavior (17).

Maternal breastfeeding self-efficacy is an important concept to understand as most of the interventions that have been used to promote EBF were designed around the mother. In developed countries, breastfeeding self-efficacy was a significant predictor of breastfeeding practices and it is considered a modifiable factor (18). Our constant comparative method of analysis revealed that, although some aspects of theory of breastfeeding self-efficacy (BSE) were relevant in describing mothers' breastfeeding experience, contextual factors could complicate the relationship between self-efficacy and breastfeeding practices. In Chapter 3, the similarities and differences between the theoretical constructs of BSE theory and mothers' experience of breastfeeding are described in detail.

In keeping with the theory, multiparous mothers were more articulate and expressed greater confidence about breast feeding than primiparous mothers and were more likely to participate actively in decisions regarding feeding their infants. For primiparous mothers, observation of others or vicarious experience imbued the mother with positive attitude about breastfeeding. Verbal persuasion from breastfeeding counselors and family members were helpful in providing informational support for the mothers. Furthermore, both physical and affective states were linked to mothers' ability to breastfeed both in the theory and in mothers' experience.

It was clear from the qualitative data that the BSE theory did not adequately deal with a) the perception of breast milk inadequacy that was formed from mothers' perception of infant satiety; b) the effect of increased workload with increased parity its consequence on mothers' ability to breastfeed; and c) the need and availability of different types of support for mothers' social network necessary for both primiparous and multiparous mothers to successfully breastfeed. Therefore, we concluded that although the use of BSE theory to explain mothers' experience of breastfeeding was informative, it was incomplete in terms of allowing us to consider contextual factors

such as perception of breast milk inadequacy, workload and network support that have important influence on mothers' breastfeeding practices. An expanded theory was needed, one that considered the determinants of BSE as well as the contextual factors to explain mothers' experience of breastfeeding.

In our qualitative study (Chapter 2), the perception of breast milk inadequacy had a prominent role in affecting breastfeeding practices and mothers described stress, workload, inadequate food intake, contraceptive use and illness as important factors in their conceptualization of breast milk inadequacy. As the conceptual framework of Insufficient Milk Supply by Hill and Humenick (19) allowed us to directly or indirectly link these factors to breast milk supply, we considered it adequate as an expanded conceptual paradigm to identify the determinants of long-term breastfeeding patterns (Chapter 3). IMS conceptual framework was, therefore, used in Chapter 4 to select the determinants of different types of breastfeeding practices during 0-6 months.

Chapter 3 showed that mothers' breastfeeding practices are a complex interplay between their self-efficacy and the context. Contextual factors such as network support could directly shape mothers' understanding of normative breastfeeding practices and thus affect BSE. On the other hand contextual factors could modify the relationship between BSE and breastfeeding practices. We found that for some mothers providing just breastfeeding counseling may not be enough. It would also be important to find ways to involve other people in the mothers' support network to help her with informational, instrumental and emotional support above and beyond what a lactation counselor could provide. A similar observation was made in Senegal, when nutrition education program targeted either women from reproductive age or grandmothers in the household to increase the support during pregnancy (20). Twelve months after the intervention 91% of young mothers in the villages with the grandmother initiative reported reducing workload during pregnancy compared to only

34% of young mothers in villages where grandmothers were not involved. Thus, involvement of the important advisors from mothers' network in breastfeeding promotion and support could be crucial for the sustainable promotion of EBF.

5.3 Determinants of breastfeeding trajectories

In Chapter 4 we used the expanded conceptual model described in Chapter 3 to explore the determinants of 3 breastfeeding trajectories (breastfeeding practices over a period of time) in a large dataset. The breastfeeding trajectories were constructed based on a) WHO recommendation of EBF for 6 months, b) normative and c) non-normative breastfeeding practices constructed from breastfeeding decision points mentioned in Chapter 2. The large quantitative dataset allowed us to test the insights about breastfeeding decision points and their determinant in a more representative sample of mothers. We drew several conclusions from this study.

We found that EBF was not a normative in this community as very few mothers practiced it. As discussed earlier, this is not surprising finding as in the nationally representative Demographic and Health Survey, the median duration of EBF was only 3.7 months (1). Researchers have also reported that at different communities mothers' breastfeeding practices did not conform to the WHO recommendation (21,22). In all of these studies, however, infant feeding practices were assessed once and the mothers' recall period was between 6-12 months. Although this kind of assessment provides an overall idea about mothers' breastfeeding practices, it is subject to substantial recall bias. In our study, breastfeeding practices were assessed based on monthly infant feeding recalls, which is a more sensitive measurement compared to other studies.

In addition, we compared mothers whose breastfeeding practices were closest to the recommendation of EBF to those who practiced normative breastfeeding

(intermittent mixed feeding trajectory). In some studies, researchers have compared mothers who practiced EBF with those who did not (10,21,22). This comparison has two advantages: a) we can finally assess the determinants of EBF when compared to normative breastfeeding from mothers' perspective; and b) we will be able to assess the effect of normative breastfeeding practices on the morbidity and growth of infants.

According to our analysis, mothers from richest households and who resided in Block A were significantly less likely to practice EBF compared to intermittent mixed feeding, which is the norm. One explanation for this finding is that mothers who fed only breast milk and water to their infants for 6 months probably did so because they could not afford acceptable breast milk substitutes. This means that our messages regarding EBF have failed to convince substantial number of mothers whose infants could benefit from EBF and innovative messages to target them should be developed. On the other hand, mothers in poor households, who may also suffer from malnutrition, are most likely to produce inadequate quality and quantity of breast milk. For these mothers, EBF may not result in optimum infant growth. In the future it will be important to assess the effect of EBF on the growth of infants who lived in the poorest households.

We compared the mothers in the committed mixed feeding trajectory (non-normative feeding) with those in the intermittent mixed feeding trajectory (normative breastfeeding) and found that maternal pre-pregnancy body mass Index and infant birth weight were negatively associated with the committed mixed feeding trajectory, which indicated that maternal malnutrition affected mothers' ability to practice breastfeeding. Other significant factors associated with committed mixed feeding trajectory included high household wealth, living in Block A, use of pre-lacteal feeds, and being older and employed. Therefore, mothers who practiced non-normative breastfeeding had important socio-cultural and biological barriers to successful

breastfeeding. Committed mixed feeding during 0-4 months (practiced by mothers in the committed mixed feeding trajectory) has been associated with significant infant morbidity (13) and growth retardation (12). Thus, it is important that interventions designed to provide breastfeeding support target these mothers and address their individual needs.

5.4 Future research priorities

Although our research has introduced some interesting ideas about understanding breastfeeding practices using the mothers' perspective, there were some limitations. Our qualitative study was conducted among a small sample of purposively selected mothers. Although this small sample allowed us to make some assessments of what is normative and non-normative from the mothers' perspective, it did not allow us to test how mothers' perception of breast milk inadequacy was manifested in a larger, more representative sample of mothers. In the quantitative study mothers were not asked about their reasons for offering non-breast milk foods which did not allow us to link perception of inadequate breast milk to non-normative breastfeeding practices. It is important that the idea of perceived breast milk inadequacy, its causes and remedial measures be validated in a larger sample of mothers. For this study, mothers could be interviewed monthly during 0-6 months and asked to recall their breastfeeding practices. If mothers offered non-breast milk foods, they could be asked about the amounts, regularity and mode of feeding as well as their reasons for feeding them. This kind of study would allow us to understand how other reasons for offering non-breast milk foods and the perception of breast milk inadequacy could affect breastfeeding practices of the mothers. Furthermore, this kind of study could allow us to discover other breastfeeding trajectories that the mothers practiced. If the mother mentioned breast milk inadequacy, as her reason for

introducing non-breast milk foods, she could be asked about the causes and remedial measures. This approach would allow us to find out whether our conceptual framework worked out in a larger sample and if we have missed any key determinants.

The expanded conceptual framework developed in Chapter 3 was used to select variables from an existing dataset for the analysis in Chapter 4. Many of the variables chosen were proxies for the concepts that existed in the framework. To cite an example, mother's employment was a proxy for the concept of maternal time restraint in the model. As a very small number of mothers in Matlab worked outside home, employment status may not adequately account for household workload that may also lead to time restraint. Also, there is a seasonal dimension of household workload for families involved in agricultural production that needs to be explored when accounting for maternal workload. In fact, in a study by Huffman et al. (23) mothers who were busy with post-harvest activities had reduced breastfeeding frequency. We also did not have good proxies or measurements for different types of network support, and stress was measured during pregnancy rather than during the lactation period. It will be important in the future, to collect data on the different concepts in the IMS conceptual framework to understand how well the conceptual framework predicts perceived breast milk inadequacy.

Inasmuch as the mothers of this cohort of children in the MINIMat study were randomly assigned to health counseling, they also received various other nutrition interventions during both pregnancy and lactation. As their treatments and assignment to the treatment were not available for this study, it may be helpful to investigate how the foods provided at different periods during pregnancy and lactation affected mothers' ability to breastfeed. In fact, in a study conducted in Guatemala, food supplementation during lactation was associated with increased breast milk intake and higher rates of EBF among mothers (24). Furthermore, half of the MINIMat mothers

were randomly assigned to receive intensive breastfeeding counseling (not part of our analysis). It is important that the direct or modifying effect of counseling on mothers' breastfeeding practices was investigated in future.

For a long time, we have promoted EBF as the best practice in Bangladesh from the biomedical perspective with, unfortunately only limited success. Nutrition messages that have been formulated in the predominant transmission-persuasion paradigm were usually succinct and were intended to persuade people to adopt the behaviors proposed by the experts. The delivery of the message was top-down and one-way. In a recent review of developing country nutrition interventions researchers concluded that programs using this top-down method have not been effective in the long-run (25). Furthermore, the programs and messages have primarily focused on individual mothers' behavior change, disregarding the influence of social structure and collective socio-cultural values on mothers' beliefs and behavior. An alternative way of orienting programs is to promote changes in the community norms that can lead to changes in the individuals' behavior. In the effort to understand breastfeeding practices from mothers' perspective, this dissertation is a first step in that direction.

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APPENDIX 1

In-depth interview guide:

The purpose of this interview is to learn more about your life now that you have a new child. But before we talk about this can you please tell me all the tasks in the household that need to be performed in order to run the house well?

(Make a list of these tasks with the participant)

How many members do you have in the household? Who is responsible for which task?

Please make a pile of cards with the tasks under each person.

(Take the pile of tasks that the woman identifies as her responsibility)

There are many jobs in the household that are our responsibility. However we often rely on other people's judgment, advice and help to actually perform these tasks. Please sort the task according to those tasks for which you rely on others for judgment, advice or help, and tasks that you do not rely on anyone else to perform.

(Pick up the list of tasks that she can perform by herself, ask about how she decided this, probe for the role of support, information and advice she received and how she decides to use this information if she does, and why not if she does not. Talk about a relevant adverse situation and see how she decides to perform this task.)

Similarly now lets talk about feeding your children.

Pre-lacteals- probe (cultural norm, authority, feeling, support, barriers)

First let me ask you about the birth of your child. Where was your child born? Tell me a little about your experience of child birth. (Probe: length of labor, place of delivery, type of delivery, her state of health after birth, state of child's health)

When your child was born what was given to him first by mouth?

Probes: What were some of the reasons for that?

Who fed him?

How did the feeding go?

(If pre-lacteals were given) How was the decision about giving pre-lacteals made?

(Who was responsible, who advised, who actually performed the task?)

How do you feel about that? (Probe: power structure, role in decision making)

What did you think at the time about pre-lacteals being good or bad for the baby

(Probe: advice received and how she felt about this advice)?

Breastfeeding initiation and colostrum feeding (Probe: culture, social norm, authority, source of information, and change due to program input)

Think back about when you started breastfeeding your child. I would like to know about your experience with breastfeeding.

When did you first put your child to breast (hours after birth)?

How did that happen?

How did that first feeding go?

What happened to the first milk?

Probes: What were some of the reasons for that? (feed / throw away the first milk)

Where did you learn of this?

What kind of advice did you get about this? Who from?

How did you make this decision? (Probe: Information she received, how she chose to use this information and why, whose responsibility is it to decide, what help her to decide if any, what the barriers are).

How long did you / do you intend to breastfeed your child?

How did you make that decision (Probe: child health, culture, advice, support, how she feels about this)?

When did you start / intend to start introducing other liquids or solids to your child?

How did you make that decision (Probe: child health, culture, advice, support, how she feels about this)?

Feeding behavior

How is the breastfeeding going now?

Probe: baby response, mother health, fatigue

All together how would you say it has gone so far?

Probe: successes, problems

How easy do you find breast feeding your child?

What are some of the things you have done to make breastfeeding go well?

Probe: (technique)

Which of these was most difficult for you?

Which of these was easiest for you?

What are some of the reasons for that?

Do you know when the child is hungry? How?

Do you know when the child has had enough to eat? How?

Are you comfortable breast-feeding your baby?

Where are you comfortable breastfeeding?

Probe: (home, All over the home, or only in certain places, public places)

Do you feed your child in a schedule? If so what is your child's feeding schedule?

If the child doesn't want to eat, what do you do?

Social support

Many times mothers depend on other family members, friends or health workers to be able to look after their children. I'm interested in knowing about the help you get with feeding your child.

Do you get any help that allows you to take care of your child better?

What kinds of help do you get in feeding your baby? (Probe: information, advice, material support)

Who helps you? (Probe: information, advice, material support)

How is this person related to you?

Is this help enough or do you wish you had more help?

How do your family members feel about breast feeding?

What makes it difficult for you to feed your baby well? (Probe: fatigue, workload, social support, baby response)

Probe: Who are some of the people?

How are they related to you?

How does that make you feel?

Counseling

The next questions have to do with the advice you have received from other people apart from your family about feeding the child.

Have you received any help or advice from people outside your family about breast feeding?

What kind of help or advice have you received from people outside your family on breastfeeding?

Probe: Health workers?

What did you learn from them? Was this new to you?

What did you think of their advice?

Probe: What worked, what didn't work, what was hard, what was easy?

From your experience what are in your opinion the benefits and costs of breastfeeding that way?

Aspiration for the child's future

Now I would like to know about your child. Most parents have some visions about what they want their children to be. What are your dreams for your child?

Do you think it is possible to realize this dream?

What are some of the things that need to happen to realize this dream?

What are some of the things you are doing now to move towards that dream?

What are there some things you'd like to be doing, but cannot do right now?

What are some of the reasons for that?

(Probe: about the perception of control)