

**BEHAVIOR CHANGE INTERVENTION RESEARCH IN INFANT AND  
YOUNG CHILD FEEDING: UNDERSTANDING CAREGIVER  
CAPABILITIES, SELF-EFFICACY, AND THE CRITICAL DECISIONS THAT  
DEFINE INFANT FEEDING TRAJECTORIES IN BANGLADESH**

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Doctor of Philosophy

by

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Behavior change interventions (BCIs) have been used to improve infant and young child feeding (IYCF) practices with varying success. This may result from inadequate consideration of determinants of behavior, including “caregiver capabilities.” We aimed to: 1) examine the extent to which caregiver capabilities are considered in research on complementary feeding BCIs in low- and middle-income countries, 2) describe IYCF trajectories from 0 to 11 months of age and explore caregiver decisions at critical IYCF junctures, and 3) examine the role of caregiver self-efficacy for complementary feeding as part of a program impact pathway to improved behaviors.

We conducted a scoping study of the peer-reviewed complementary feeding BCI literature (objective 1); used ethnographic methods to collect and analyze in-depth qualitative longitudinal interviews from the process evaluation the Alive & Thrive BCI in Bangladesh (objective 2); and conducted structural equation modeling to test the direct and indirect effects of self-efficacy for two complementary feeding behaviors (objective 3) using survey data from a process evaluation of the Alive &

Thrive BCI in Bangladesh.

In the scoping study (objective 1), we found that caregiver capabilities are rarely mentioned, intervened on, or measured in BCI research on complementary feeding, revealing considerable gaps in this literature. In the study of IYCF trajectories (objective 2), we observed substantial intra-cultural diversity, resulting from a combination of child, caregiver, and household factors, suggesting no normative longitudinal patterns for IYCF in this study population. We identified consequential junctures in IYCF, “decision moments,” that determined each child’s IYCF trajectory. These findings indicate the value of individually tailored interventions to effectively target decision moments. The Alive & Thrive BCI improved two complementary feeding behaviors that we analyzed (objective 3). For one behavior, feeding green leafy vegetables, the BCI operated through self-efficacy and mothers with greater self-efficacy were more likely to practice this behavior. For the second behavior, on-time introduction of egg, the BCI did not work through self-efficacy, likely due to women’s lack of resources, autonomy, and access to markets.

The use of multiple methods advanced our understanding of intervention pathways and highlighted the important roles of caregiver capabilities in this context.

## **BIOGRAPHICAL SKETCH**

Amanda Assaro Zongrone was born and raised in Rochester, NY. During her high school years, through her work at homeless shelters and with children in under-served communities, she developed a deep concern for social justice issues, especially poverty, homelessness, hunger, and gender. Following high school she attended Cornell University where she obtained her BS with honors in Nutrition. Her Cornell experience rocked her world. The opportunities on campus and the mentoring she received convinced her that she could find a career where she could work for social justice. It was here that she developed an intense interest in maternal and child nutrition, traveling and working abroad, and program evaluation. After graduating from Cornell as an undergraduate, she volunteered with an HIV and AIDS organization in South Africa. Upon return to the states, she got back to her roots and volunteered at a women's shelter in Rochester, NY. She currently serves on the Board of Directors for this organization. She went on to obtain her masters degree in global public health (MPH) at Emory University and received it in 2010. While at Emory University, she also worked for the Centers for Disease Control and Prevention in the influenza division at the time of the H1N1 outbreak. Her MPH research first brought her to Bangladesh where she fell in love with the country, people, vibrant colors, and contagious energy. It was this experience that solidified her intention to obtain a PhD in International Nutrition, and return to Bangladesh.

For my parents  
who have inspired, encouraged, and supported me in all of my endeavors

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# CHAPTER 1

## INTRODUCTION

### **Background**

*Early childhood undernutrition is a public health problem globally*

Childhood undernutrition is one of the most important public health challenges facing our world today. When considering all causes of global under-five mortality, it is estimated that 35% of these deaths are attributable to malnutrition [2]. The critical “window of opportunity” for child growth is in the first two years of life, and growth faltering during this period is more severe than previously thought [3].

*Undernutrition and complementary feeding practices*

*The evidence linking improved complementary feeding practices to reduced undernutrition*

The way in which a child is fed directly impacts child nutritional status, and ultimately child health and survival. These feeding practices can be divided into two main categories, breastfeeding and complementary feeding. For the maintenance of child health, specific optimal practices for each of these feeding periods have been recommended.

The optimal duration of exclusive breastfeeding is thought to be 6 months (180 days). The introduction of complementary foods is recommended at 6 months with the continuation of breastfeeding [4]. Waiting until 6 months of age to introduce solid foods confers benefits that outweigh any risks of waiting for this time period. Introducing complementary foods too early can minimize the protective effects against

infant gastrointestinal infections [5]. Additionally, growth is not generally improved through the introduction of complementary foods before 6 months of age. Breastmilk is often replaced by complementary foods when they are introduced early, which is problematic because they are often less nutritious than breastmilk [6, 7]. Waiting too long for the introduction of complementary foods (after 6 months) has negative consequences for the child, as a child's nutritional needs often cannot be met with breastmilk alone after this time period [8]. The motor development of the infant at this stage is such that semi-solid and soft foods are appropriate for most infants [9].

The Guiding Principles for Complementary Feeding of the Breastfed Child states that “optimal complementary feeding depends not only on what is fed, but also on how, when, where and by whom the child is fed” [4]. Maintenance of breastfeeding, responsive feeding, safe preparation and storage of complementary foods, the quantity of food given to the child, the food consistency, the meal frequency, energy density, and nutrient content of the complementary foods are all important components of the appropriate introduction of complementary foods [4].

Often these practices are inadequate in developing-country contexts for multiple reasons. These include, but are not limited to, the lack of knowledge about recommended practices, poverty, and socio-economic status. Given what is known about child feeding and poor child nutrition in Bangladesh, it is clear that the use of these recommended practices needs improvement. Recent analysis of the baseline data from the Alive & Thrive intervention found that overall only 50% of mothers reported exclusively breastfeeding children 0-6 months of age, and only 15% of children 6-24 months of age met the requirements for a minimal acceptable diet (a

composite indicator of minimum dietary diversity and minimum meal frequency during the previous day) [10].

*Behavior change interventions to improve complementary feeding practices*

Implementation of interventions that promote breastfeeding and/or behavior change communication (BCC) for improved complementary feeding to address child undernutrition (in the 36 countries where 90% of the world's stunted children live) have sufficient evidence to warrant implementation [11]. Nutrition-education interventions are usually delivered as a package of BCCs that targets the continuum of infant and young child feeding (IYCF) practices. Interventions that address the recommendation for targeting a continuum of IYCF practices were recently reviewed [12]. Among studies that provide nutrition education only [13-20] overall, there were significant effects on both child height and weight gain [12]. However, BCC interventions to improve IYCF practices vary in their ability to affect child health. This is usually because a variety of contextual factors (at the level of the child, the mother, the household or a combination of these) influence the effectiveness of behavioral interventions. These include the level of food insecurity in the household; the prevalence of malnutrition; and the availability, energy density, and micronutrient density of local foods [21]. It is necessary to improve BCC strategies so that they are successful in creating change among caregivers of young children and in ensuring that health workers sustain efforts to improve child feeding and care practices. Improvement in BCC strategies may require better understanding of the underlying behavioral and contextual determinants that influence the effectiveness of behavior change interventions (BCIs).

## **Caregiver capabilities and behavior change interventions**

Over the past several decades, the scope of attention to the factors that influence population responses to BCIs has expanded substantially. For example, the importance of economic resources as determinants of family's abilities to adopt a wide range of new behaviors been recognized for decades and has laid the groundwork for interventions that provide food, cash and/or other resources to support BCIs directed towards improvements in the health of infants and young children [11, 21-25]. When a BCI has an explicit economic component we expect to see it examined in the intervention's evaluation. However, the significance of economic resources is now so widely recognized that it is typically included as a variable in an evaluation, even when there is no direct economic intervention. In effect, it has become part of "good practice."

The development and dissemination of the "UNICEF Conceptual Framework" [26] and the pioneering work of Engle et al. [1] to define the components of "care" in nutrition have provided the rationale for expanding the scope of interventions to include components of "care" and/or to consider care constructs as potential confounders when they are not components of the intervention. For example, in addition to providing caregivers with knowledge, some breastfeeding interventions have endeavored to provide social and technical support to women after delivery to help them initiate breastfeeding [27, 28]. Additionally, some complementary feeding interventions have considered maternal depression when assessing the effectiveness of their intervention [29]. As with economic resources, when care resources are directly involved in the design and implementation of an intervention we expect to see them



assessed in evaluations. However, there is no consensus or standard for what should be expected when they are not explicitly included in interventions.

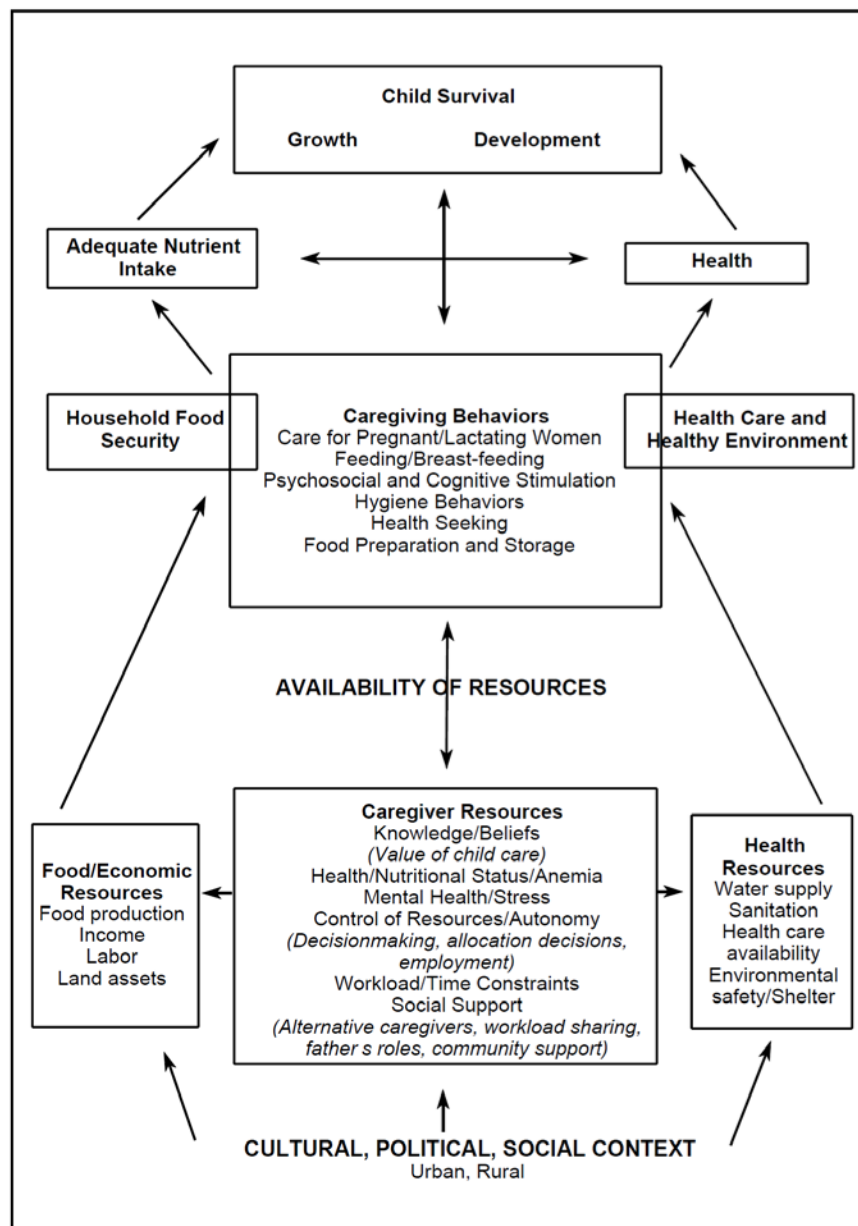
### *Identifying caregiver capabilities constructs*

The 1990 UNICEF framework [26] first named “care for children and women” as one of the underlying causes of malnutrition and death of children. Engle et al. [1] expanded this framework in their 1999 paper that identified “resources for care.” They identified the following “resources for care” a) knowledge/beliefs; b) health/nutritional status/anemia; c) mental health/stress; d) control of resources/autonomy; e) workload/time constraints; and f) social support. These constructs are described at the level of the mother and at the superordinate level of the household (Figure 1) [1]. Care is detailed in two ways, first in the context of needs for the caregiver to provide care as well as the characteristics of the child that may shape the quality and type of care received. The authors highlighted the necessity of understanding the connection between the provision of care and the underlying factors at the level of the mother and household that determine the manifestations of care for an individual child.

A working group at Cornell University led by Rebecca Stoltzfus has developed the concept of caregiver capabilities. Our list of caregiver capabilities consists of constructs that were derived from these “resources for care” constructs [1] as well as from Nussbaum’s central capabilities [30] and from theories in social science [31-34]. Additional theories and frameworks in behavioral change and child health that are relevant for caregiver capabilities are reviewed in Appendix 1 to this chapter. Constructs that comprise the list of caregiver capabilities were deemed measurable, at

the level of the caregiver, and potentially important for interventions that are focused on behavior change in nutrition. Based on a number of considerations, we identified 10 caregiver capabilities to examine here. They are: social support; access to and control over resources; roles; priorities; time; self-efficacy; mental health; stress;

Figure 1: The Extended Model of Care [1]



physical health; and autonomy (Table 1).

Table 1: Definitions of caregiver capabilities constructs in reference to caring for a child

Caregiver capabilities	Definition <i>(note: reference indicates where concept was derived from, definitions have been modified for the purpose of this study)</i>
Access to and control over resources	The caregivers ability to access key resources for child care, if they are available at the community or household level [1, 30]
Autonomy	A caregivers freedom from external control or influence in making decisions about child care [1, 30]
Mental health	Psychological health and emotional well-being that affects thoughts, behavior, and feelings [1, 30]
Physical health	Health and energy level to do daily activities, including caregiving [1, 30]
Priorities	A ranking of how the responsibilities a caregiver holds are valued [31]
Roles	The summary of the responsibilities a caregiver holds and his/her place in the family or society [34]
Self-efficacy	Belief about ability to produce levels of performance to influence events affecting the child's health [1, 32, 33]
Social support	The size of the relational network; the quality of the network in supporting the person in their role as a caregiver [1, 30]
Stress	Physiologic response to negative aspects of life [1, 30]
Time	The time necessary to meet demands of responsibilities (both perceived and actual) [1]

### *The concept of caregiver capabilities*

“Capabilities” have been discussed largely outside of the discipline of nutrition by Amartya Sen (Commodities and Capabilities) and Martha Nussbaum (The Capabilities Approach) [30, 35]. They position capabilities within larger views on

social justice, personal opportunity, and freedoms available to individuals. Nussbaum names 10 “central capabilities” that may be used to assess a person’s quality of life, and her theory has been used to develop the human development index [36], a composite measure of education, life expectancy, and income. Nussbaum’s capabilities approach is built on the question, “What is each person able to do or be?” [30]. She states, “the approach takes *each person as an end*, asking not just about the total or average well-being but about the opportunities available to each person” [30]. We transferred this general understanding of capability to the context of child-rearing, recognizing that a child’s survival and the quality of that survival is also dependent on the physical, psychological, developmental, and emotional care that they receive from a caregiver. In this dissertation we are examining what we have termed, “caregiver capabilities.” The working group at Cornell University that developed the concept of caregiver capabilities broadly defined them as skills and attributes of a caregiver that affect the ability to provide recommended care for a child. This approach to examining care is rooted in a similar question to the one that Nussbaum poses, but specifies it for the context of child nutrition, “What is one able to do or be in the role as caregiver for a young child?”

## **Study context**

### *Child undernutrition and feeding practices in Bangladesh*

In Bangladesh, the problems of underweight, stunting, and anemia in children under 2 years of age are widespread. Approximately 34% of children under 2 years of age suffer from underweight, 20% are wasted, 32% are stunted and 86% are anemic [37, 38]. The adoption of efficacious interventions to improve IYCF practices by

mothers and other household members could reduce stunting by up to 20% and mortality by up to 12% with high coverage [11]. Poverty contributes to the problem of malnutrition, undernutrition, and poor health. However, interventions targeting IYCF practices are efficacious in households with limited resources [11]. All of the WHO core indicators [39] for child feeding practices in Bangladesh are sub-optimal, except for continued breastfeeding at 1 year (Table 2).

Table 2: WHO-recommended IYCF indicators (core and optional) in children 0-23.9 months of age, at baseline for the Alive & Thrive Intervention in Bangladesh adapted from Saha et al. [10]

<b>WHO IYCF Indicators</b>	<b>Percent (n=4,366)</b>
<b>Core Indicators</b>	
Early initiation of breastfeeding	63.9
Exclusive breastfeeding under 6 months	49.9
Continued breastfeeding at 1 year	96.4
Introduction of solid, semi-solid, or soft food	49.8
Minimum dietary diversity	31.1
Minimum meal frequency	39.6
Minimum acceptable diet	14.8
Consumption of iron-rich food	36.2
<b>Optional indicators</b>	
Continued breastfeeding at 2 years	85.6
Age-appropriate breastfeeding	64.9
Predominant breastfeeding under 6 months	62.3
Bottle feeding	14.6
Milk feeding frequency for non-BF	57.6

### *The Alive & Thrive Intervention in Bangladesh*

One strategy to address the issue of childhood undernutrition is to work within the existing community and household resources to change key behaviors that impact

child nutritional status. The Alive & Thrive intervention aims to do this. This section describes the intervention briefly as well as the evaluation “platforms.”

The Alive & Thrive intervention is in three countries, Bangladesh, Ethiopia and Viet Nam. In all three countries Alive & Thrive’s aim is to “facilitate change for improved infant and young child feeding, to document how interventions are delivered and their costs and impact; and to disseminate the evidence and lessons learned so that others can adapt and replicate the cost-effective components” [10].

The three goals of the Alive & Thrive intervention are to 1) “improve the policy and regulatory environment to support IYCF interventions and practices; 2) create, shape and support demand for improved IYCF social norms and practices at the community and family levels; 3) increase supply, demand, and use of fortified complementary foods and related products” [10].

In Bangladesh, Alive & Thrive is working with multiple sectors including the government, non-governmental organizations, and private initiatives to achieve these goals. The leading non- governmental partner is BRAC, the largest non-governmental organization in Bangladesh. Building upon its Essential Health Care Program, BRAC is introducing new IYCF specific interventions and strengthening existing components of the program that address IYCF. Frontline health workers; health volunteers and health workers are delivering age-appropriate IYCF messages (BCC) and support through home visits, antenatal and postnatal visits, group health forums and community mobilization sessions for key stakeholders and opinion leaders in the community (such as religious leaders and teachers). A new line of health workers, IYCF promoters, have been created with the support of the Alive & Thrive

intervention [10].

A TV and radio campaign has been launched to reinforce the BCC delivered by the frontline health workers. The media campaign addresses gaps in current IYCF practices. Alive & Thrive aims to reach 8 million households with children under 2 years of age through both the community-based programs and the media campaign [10].

The advocacy component of the intervention works with journalists at the national level through a fellowship and mentoring program. The program is intended to “cultivate IYCF champions and engage decision makers and development agencies in dialogue to raise awareness and investment in nutrition.” This is through increasing competency in IYCF in other health and social sectors such as education and hygiene and sanitation. The overall goal is to increase the advocacy for IYCF at the national political level [10].

The management structure of the community-based component and the roles of the program staff within the BRAC system are depicted in Appendix 2 to this chapter. In the Alive & Thrive intervention, the Health Workers, Health Volunteers, and Nutrition Promoters are the front-line service providers in 90 sub-districts within the Essential Health Care program. Their specific tasks and key messages are outlined in Appendix 1 to this chapter [10, 40].

#### *The program evaluation context*

The data collected in parts of the process evaluation for Alive & Thrive and a micronutrient powder sub-study with the Global Alliance for Improved Nutrition (GAIN) formed the basis of the data for Chapters 3 and 4. The impact evaluation

design for Alive & Thrive is described in Appendix 3 to this chapter. Both the Alive & Thrive and the GAIN-supported micronutrient powder study are based on detailed program impact pathway models (Appendix 2 to this chapter). They use a mix of quantitative and qualitative methods to build evidence on the pathways through which these interventions achieve their impact along with the multitude of factors that influence the implementation and utilization of the interventions. The specific sub-components of data collection of each of the overarching process evaluation plans for the two interventions are described in Appendix 4 to this chapter. Collaborations with the evaluators of these interventions, the International Food Policy Research Institute, resulted in the primary sources of data used in this study.

Currently, there is no assessment of how caregiver capabilities are used in BCIs in low and middle-income economies (such as Alive & Thrive). Assessing the current landscape for caregiver capabilities in the BCI literature provides a depiction of the current use of caregiver capabilities and gaps in this field of study (Chapter 2). Investigating IYCF behavior as a continuum of behavior, using a “trajectories approach” with ethnographic methods that emphasize underlying factors at the level of the child, caregiver, household, and community may reveal additional determinants of IYCF behavior that can inform future BCIs (Chapter 3). The description of IYCF trajectories in a sample may also uncover patterns that are useful to consider when designing and evaluating BCIs (Chapter 3). Additionally, examining specific caregiver capabilities in the context of BCIs aimed to improve IYCF behavior may lead to better explanation for unexpected intervention outcomes as well as improvements in the design of interventions (Chapter 4).



Overall, the guiding hypothesis for this dissertation is that with a greater understanding of underlying determinants of behavior including caregiver capabilities in multiple contexts, interventions can be more effectively shaped and ultimately have a greater impact on child health.

### **Dissertation research aims**

The first aim resulted from the need to understand the current landscape for caregiver capabilities in the complementary feeding BCI literature. This is necessary to inform recommendations for future research on caregiver capabilities constructs.

Aim 1 is to critically examine the extent to which caregiver capabilities are considered in research on the impacts of complementary feeding BCIs in low- and middle-income economies (Chapter 2).

Aim 2 was developed to apply the caregiver capabilities thinking and measurement of selected constructs to IYCF behaviors within the context of a BCI in Bangladesh. This will provide evidence that will inform improvements in current and future interventions in this context. Aim 2 is to understand how the behavioral and contextual determinants of age appropriate IYCF practices influence the effectiveness of BCIs in the context of the Alive & Thrive intervention in Bangladesh. We used qualitative in-depth longitudinal interviews to identify and describe critical junctures in IYCF by examining decision moments and the resulting IYCF trajectory patterns (Chapter 3). Additionally, we used structural equation modeling to investigate the influence of one caregiver capability, self-efficacy in mediating and modifying the relationship between the Alive & Thrive program and the adoption of two recommended complementary feeding behaviors (Chapter 4).

## **Appendix 1: Achieving behavioral change—theoretical perspectives on behavior change in nutrition**

Several frameworks and theories have been designed to aid in our understanding of behavioral change and how child care practices can translate into in child health outcomes. Interventions in public health have often been designed with these frameworks and theories in mind. This section reviews these relevant frameworks and theories and outlines the need for an updated framework to elucidate child care behaviors in the context of a BCI.

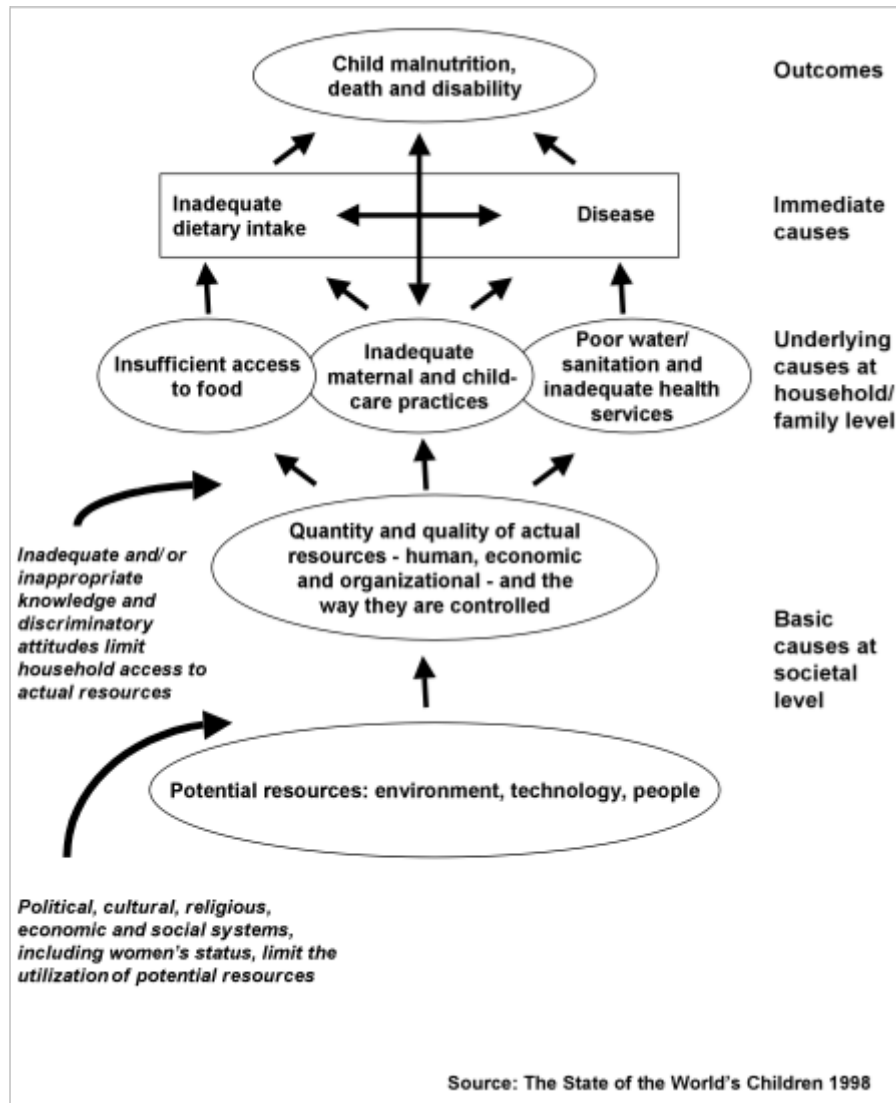
### *The Bronfenbrenner Ecological Systems Theory*

The Bronfenbrenner Ecological Systems Theory [41] serves as a broad theory in which frameworks such as the UNICEF Conceptual Framework (described below) sit. This framework structures the child's environment in multiple layers that each has an effect on the child's development. These are the 1) microsystem, the environment most proximal to the child (school, family, neighborhood); 2) mesosystem, the environment that has contact with the microsystem (town council, church); 3) exosystem, the environment that has an indirect effect on the child (availability of health care); 4) macrosystem, the outermost layer that shapes the child's environment (culture, local values, laws) [41]. This framework highlights the importance of each of these layers as they relate to the child; a change in one layer can have an effect on multiple levels. We must consider these multiple layers when studying the health and development of a child.

### *The UNICEF Conceptual Framework*

The UNICEF conceptual framework is a multi-level social-ecological framework that serves as a specific elaboration of the Bronfenbrenner Ecological Systems Theory [41]. The UNICEF framework summarizes the key factors that influence childhood malnutrition (Figure 1) [26]. At the basic societal level, potential resources such as the environment, technology, and people impact the quantity and quality of actual resources. These resources are all influenced by the political, cultural, religious, economic, and social systems of the area at the time. This includes gender equality and most specifically, the status of women. At the household/family level, the underlying causes of insufficient access to food, inadequate maternal and child care practices, and poor water/sanitation coupled with inadequate health services are all influenced by the adequacy and appropriateness of knowledge and attitudes. The immediate causes of child malnutrition can be divided into two categories: inadequate dietary intake and disease. Disease and inadequate dietary intake influence each other through the infection-immunity relationship. The final outcome of this cascade of causes is child malnutrition, death, and disability. It is important to note that care practices, inadequate dietary intake, disease and the outcome of child malnutrition, death and disability have an integrated relationship as demonstrated by the double arrow. [26]

Figure 1: The UNICEF Framework for Child Malnutrition [26]



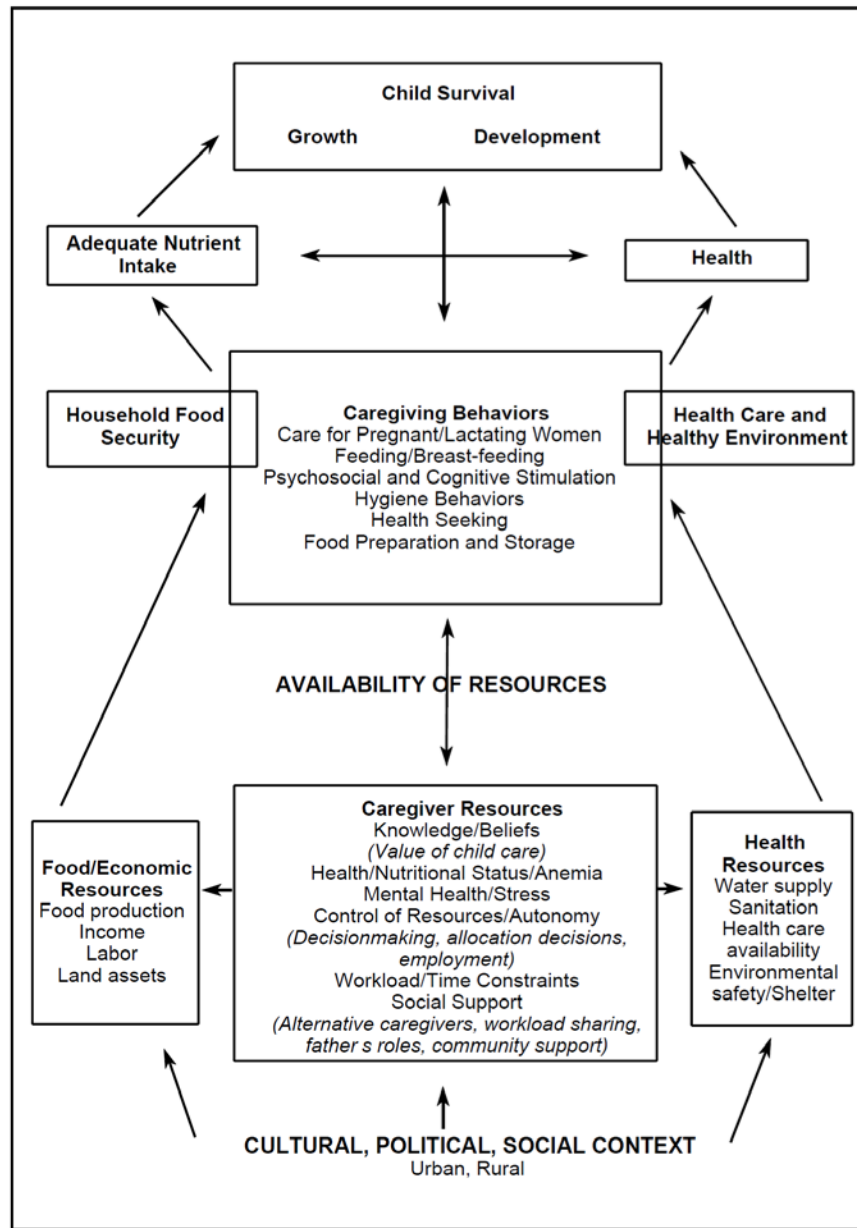
### *The Expanded Care Framework*

Engle, Menon and Haddad (1999) expanded the UNICEF conceptualization of care outlines the constructs and measurement necessary to apply these to child nutrition and feeding practices [1]. They define the resources needed to care for a

child as 1) knowledge/beliefs; 2) health/nutritional Status/anemia; 3) mental health/stress; 4) control of resources/autonomy; 5) workload/time constraints; and 6) social support. These constructs are described in this paper both at the level of the mother and at the super-ordinate level of the household (Figure 2).

Care is detailed in two ways, first in the context of needs for the caregiver to provide care as well as the characteristics of the child that may shape the quality and type of care received. Through the expansion of the UNICEF framework in this way, this paper highlights the necessity of understanding the connection between the provision of care and the underlying factors at the level of the mother and the household that determine the manifestation of aspects of care for an individual child. However, this expanded care framework does not fully capture the potential role of maternal resources for care in shaping the effectiveness of direct health and nutrition interventions.

Figure 2: The Extended Model of Care [1]



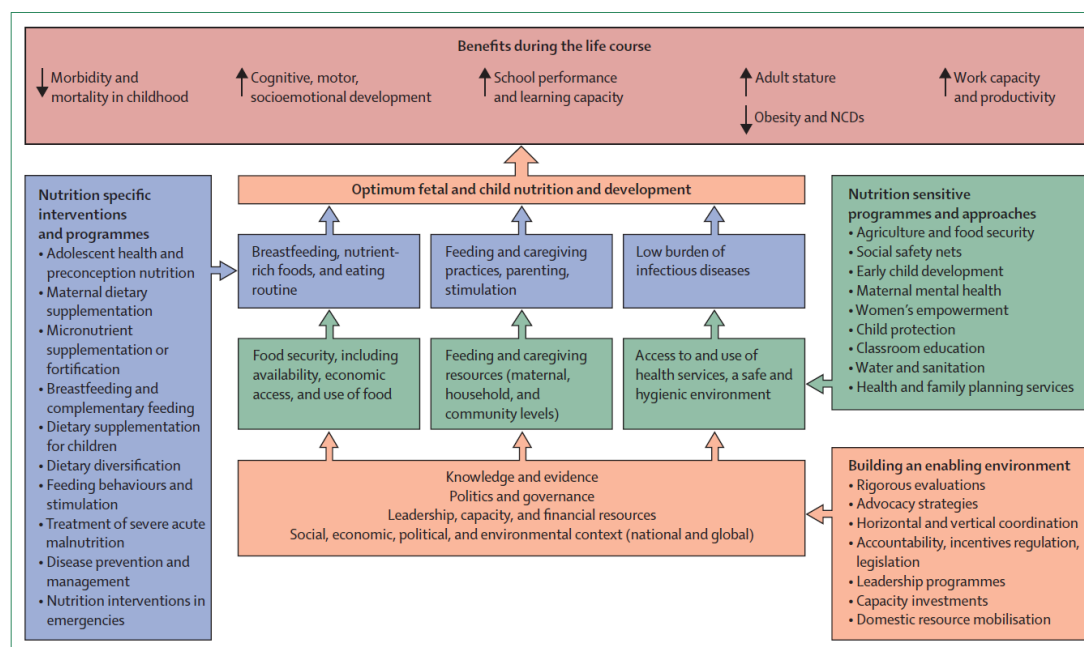
*The 2013 Lancet Maternal and Child Nutrition Series updated UNICEF Framework*

The recent Lancet Maternal and Child Nutrition Series published an update to the 1990 UNICEF conceptual framework [42] (Figure 3). This updated framework replaces the outcome of “child undernutrition” with “benefits during the life course,”

not only changing the paradigm for thinking about the problem from the causes of morbidity and mortality to the determinants of health, but also expanding the “window” that can be improved from childhood to the entire life-course. “Care” is still placed at the level of underlying causes; it has been renamed “feeding and caregiving resources (maternal, household, and community levels).” This re-naming recognizes the multiple levels where care can impact child health.

This framework has now also named nutrition specific interventions that target the immediate causes of growth and development and nutrition sensitive interventions that target underlying causes. This emphasizes that underlying determinants of health throughout the life-course, such as care, require consideration as more than just context for nutrition specific intervention, but can also be targeted by interventions to improve nutrition.

Figure 3: Framework for actions to achieve optimum fetal and child nutrition and development [42]



### *Other parenting and health frameworks*

Several frameworks from the literature in the social sciences have been developed to understand parenting, mothering, and family stress in the context of health and nutrition. This literature is largely based in Western constructs of family, time, and resources. Patterson et al., [43] conceptualize in the Family Adjustment and Adaptation Response Model (FAAR Model) a family's capabilities to respond to stressful events and how they adjust thereafter. The authors look at specific shocks to the household (a death in the family, a loss of income) and parenting capacities [43]. The FAAR model is most applicable in Western contexts and is centered around family emergencies/catastrophic life events [43]. The FAAR framework has also been integrated into another model, family resilience. This combination of the two models further delineates between the outcomes of family systems and family processes that are protective [44].

The Developmental Niche model [45] names three basic components of the household that translate into better health. These include physical and social environment, child-care practices, and the psychological health of caretakers [45]. The focus of this framework is on the level of the child. When this model was developed, it brought the health of the developing child into the household context and out of the isolated individual level of the laboratory paradigm.

The Theory of Planned Behavior, which includes the Theory of Reasoned Action [46] has been used to explain behavioral intention and the process of using information to achieve change in specific behaviors. Similarly, the Transtheoretical Model assesses behavioral intention in three steps; precontemplation, contemplation,



and preparation. It also asserts that behavior change is a dynamic process for individuals [46].

The Health Belief Model [47] provides a framework for understanding why people engage in recommended health or medical care practices. This model contains the following dimensions: 1) perceived susceptibility to a condition/disease; 2) perceived severity of a condition/disease; 3) perceived benefits behavior change; 4) perceived barriers to behavior change. It also postulates that a stimulus is needed to start the decision-making process (cue-to-action). Additionally, it mentions that “diverse demographic, sociopsychological, and structural variables might, in any given instance, affect the individual’s perception and thus indirectly influence health related behavior” [47].

#### *Gaps in frameworks and theories provide rational for a caregiver capabilities framework*

In examining the multiple frameworks and theories applicable to child health, it is clear that a new unifying framework, grounded in theory and the empirical literature, is necessary to fully examine the relationships between caregiver capabilities and care behavior. This is critical to guide analysis that will advance our understanding of how these capabilities influence a caregiver’s ability to adopt recommendations from a BCI.

When reviewing theoretical frameworks for behavioral change in nutrition, several gaps that require an updated framework become evident. The 1990 UNICEF framework [26] doesn’t capture potential interactions with interventions. Specifically, it doesn’t include as part of the framework how these behavioral determinants

intersect with interventions to influence a caregiver's care of the child. Although large-scale interventions aimed at addressing child malnutrition have been designed and implemented with attention to the basic, underlying, immediate causes described in the UNICEF framework, there are still small gains in efforts to improve child nutritional status [2]. This provides more impetus for having a framework to guide our understanding of these underlying caregiver capabilities and how they manifest in the context of a BCI. Although the 2013 update to the UNICEF framework [42] names interventions that can target "caregiving resources," this framework does not describe how caregiving resources act as steps in the pathway and/or as a moderator between an intervention and improved child health.

The Engle, Menon, and Haddad (1999) expansion of the care construct of the UNICEF framework provides a summary of the existing literature and methods for measurement of maternal "resources for care" [1]. However, they do not put these resources for care in the context of behavior change or other interventions.

Additionally, the constructs represented here are both on the level of the individual (caregiver) and at the household level. Although this is not a weakness, we believe that focusing further at the level of the caregiver will allow us to specify the effect of an intervention on the (common) primary target of a child care and nutrition intervention, the caregiver.

The FAAR Model models time, family and resources with a Western perspective. When it is integrated into the Family Resilience model it delineates more protective factors, but still lacks all of the underlying constructs that other theories have deemed important in child care [43]. Most important, these theories surround

responses to stressful events, described as negative events that demand adjustments for a person or family to cope effectively. An intervention can be perceived as a positive demand that is put on a person/household and requires behavior change, which is ultimately a choice. One could argue that coping with a negative event is different from choosing to change behavior when a (positive) demand of an intervention is placed on an individual or household.

The Developmental Niche framework [45], while applicable across multiple cultures, it does not cover details of caregiver characteristics that are essential for child health and intervention uptake such as social support, depression, stress, and autonomy. It also does not provide methods for measurements of the constructs. The Theory of Planned Behavior and the Theory of Reasoned Action [46] include the importance of many underlying capabilities, including aspects of social support, but they do not capture other capabilities of an individual that influence his/her ability to carry out behaviors or successfully adopt an intervention.

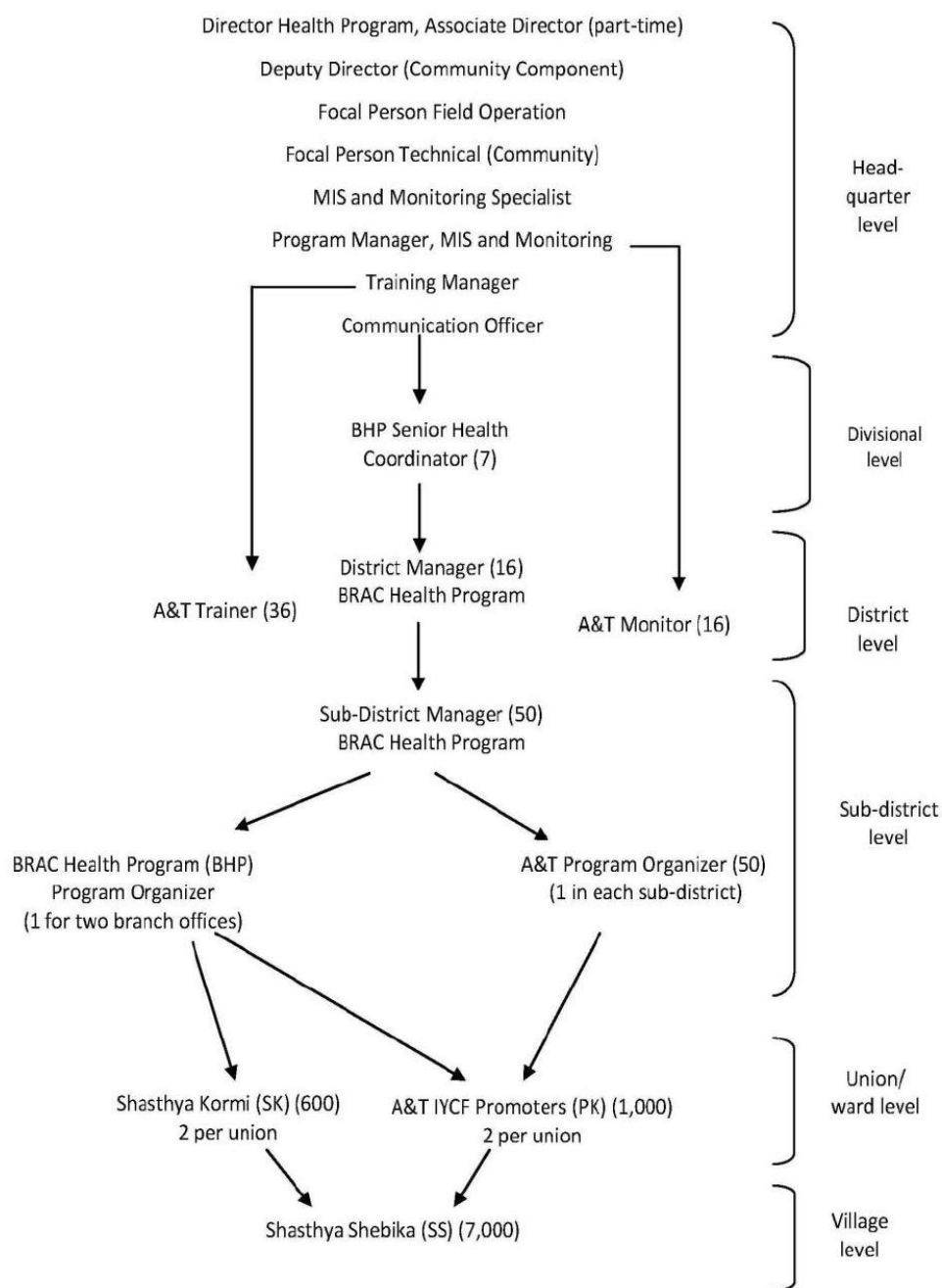
The Health Belief Model [47] provides a basic framework for understanding how beliefs translate into action. One weakness is, however, that it situates itself in the Western biomedical understanding of disease and treatment. This is in the context of the diagnosis of a health condition (not an intervention). Although it has the potential to be applied to the adoption of recommended behaviors in a nutrition intervention in a non-western context, it does not unpack the details of the “socio-psychological variables” that serve as modifying factors in this model for both perceived susceptibility, threat and benefit of behavior change.

A future research goal is to develop a caregiver capabilities conceptual

framework that will fill the gap that exists with current theories and has the potential to provide a globally applicable, measurable model to use in the assessment of the impact of population based interventions. The application of the caregiver capabilities framework to existing BCIs has four possibilities that will lead to a better understanding of how interventions operate to lead to improvements in child health: 1) to describe the variability in caregiver capabilities between and within communities to advance the understanding of the status of caregivers; 2) to explain the variability in child health outcomes in contexts that are similar; 3) to predict the variability of the success of child health and nutrition interventions; 4) to guide the development of interventions that work to increase caregiver capabilities and tailor their interventions to meet the caregiver capability constraints in the target population.

## Appendix 2: Management Model, Roles of Health Workers, and Program Impact Pathways for Alive & Thrive Intervention in Bangladesh

Figure 1: The Alive & Thrive Management Structure [40]



The Alive & Thrive Management Structure Definitions[40]

Name	Definition
Shasthya Kormi (SK)	Health Worker
Shasthya Shebika (SS)	Health Volunteer
Division	The largest administrative unit in Bangladesh, 7 total
District	Divisions are divided into districts, 64 total
Sub-District (Upazilla)	Districts are divided into sub-districts or upazillas, 500 total
Union/Ward	Sub-districts are divided into unions/wards
Village	The smallest administrative region of Bangladesh, unions are divided into villages

Table 1: Shasto Shebeka (SS, Health Volunteer), Shasto Kormi (SK, Health Worker) and Pushti Kormi (PK, Nutrition Promoter)

Age Appropriate Messages and Actions During Home Visits\*[40]

Age Group/Timing	SS (Health Volunteer)	SK (Health Worker)	PK (Nutrition Promoter)
Pregnant Women	<ul style="list-style-type: none"> <li>Advise to initiate breastfeeding within 1 hour of birth and ensure that child is exclusively breastfed for the first 6 months.</li> <li>Discuss the danger of giving water, honey, sugar, sugar mixed with water, animal milk, or canned milk to newborns.</li> </ul>	<ul style="list-style-type: none"> <li>Promote initiation of breastfeeding within the first hour</li> <li>Promote feeding of colostrum and no prelacteals.</li> <li>Promote exclusive breastfeeding for 6 months.</li> </ul>	
During Delivery		<ul style="list-style-type: none"> <li>Some SKs are traditional birth attendants (TBAs) and can support early initiation at the time of delivery.</li> </ul>	
Following Birth		<p><i>Postpartum Visit (within 72 hrs of Birth)</i></p> <ul style="list-style-type: none"> <li>Provide support and encouragement for exclusive breastfeeding.</li> <li>Ensure that there are no problems with positioning and attachment for breastfeeding.</li> <li>Refer to PK if there are feeding problems the SK cannot resolve.</li> </ul>	<p><i>Within the first 48 hours after birth</i></p> <ul style="list-style-type: none"> <li>Encourage exclusive breastfeeding and demonstrate good positioning and attachment to the breast</li> </ul>

Age Group/Timing	SS (Health Volunteer)	SK (Health Worker)	PK (Nutrition Promoter)
0-6 months	<ul style="list-style-type: none"> <li>• Inform PK immediately of birth.</li> <li>• Motivate and advise mother and family members to give baby only breastmilk during the first 180 days and reinforce the message during subsequent monthly visits</li> <li>• Check for positioning and attachment and baby's sucking; help mother learn proper positioning and attachment to prevent problems and stimulate milk production</li> <li>• Teach how to express breastmilk</li> <li>• Identify feeding problems and solve, if possible, or inform IYCF promoter or refer to appropriate health facility/health care provider</li> <li>• Discuss the importance of adding family foods after the child completes six months (180 days)</li> </ul>		<p><i>At 1 and 2 months:</i></p> <ul style="list-style-type: none"> <li>• Inquire if the mother is experiencing any feeding problems, discuss optimal breastfeeding practices that will ensure adequate breastmilk production such as frequent breastfeeds, and help build up the mother's confidence of her ability to provide enough breastmilk for her child.</li> </ul> <p><i>At 3 and 4 months:</i></p> <ul style="list-style-type: none"> <li>• Reassure the mother that she can provide enough breastmilk through exclusive breastfeeding; this is a time when many mothers start having doubts and abandon exclusive breastfeeding.</li> </ul> <p><i>At 5 months:</i></p> <ul style="list-style-type: none"> <li>• Begin discussing the timing for introducing complementary foods, the types of foods that are appropriate as "first foods," and the importance of continued</li> </ul>



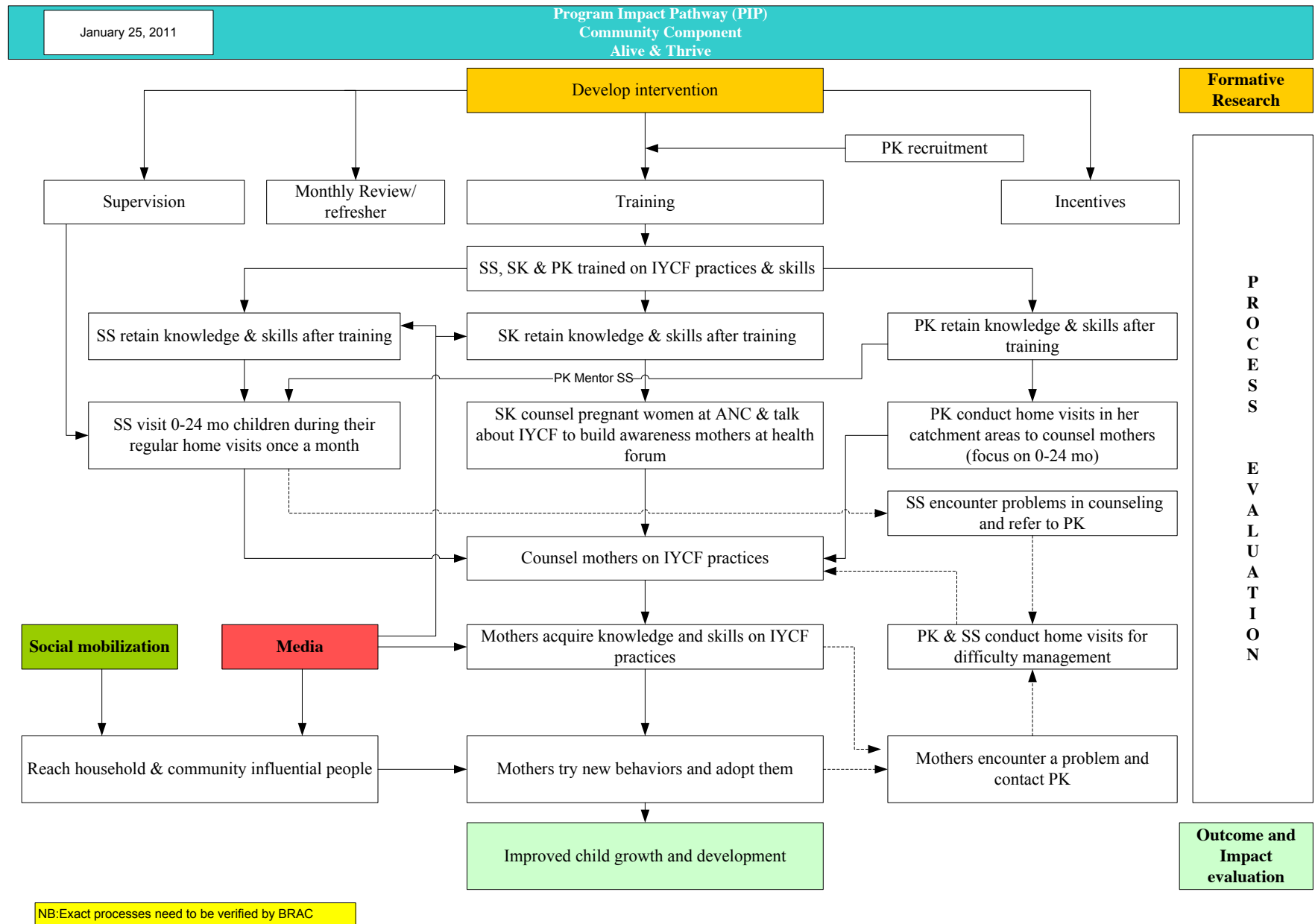
Age Group/Timing	SS (Health Volunteer)	SK (Health Worker)	PK (Nutrition Promoter)
			<p>breastfeeding.</p> <p><i>At 6 months:</i></p> <ul style="list-style-type: none"> <li>Advise on age-appropriate complementary feeding, tailoring the message to the age and condition of the child, the concerns of the mother, and household resources; help SS identify strategies for tackling concerns about a child's "poor appetite" to ensure adequate quantity and quality, including consumption of animal foods</li> </ul>
7-24 months	<ul style="list-style-type: none"> <li>Discuss the amount of food needed by children at different ages and the importance of continued breastfeeding</li> <li>Counsel and motivate the mother and family to add oil to the food and give children animal protein (fish/meat/egg), dairy food, fried or oily food, colored vegetables, and fruits</li> <li>Counsel and motivate the mother and family to let children learn to feed themselves when they are around 9 months of age</li> <li>Discuss feeding of the sick child,</li> </ul>		<p><i>At 7 months, 8 months, 9-10 months, 11-12 months, 15-18 months, and 23-24 months:</i></p> <ul style="list-style-type: none"> <li>Advise on age-appropriate complementary feeding, tailoring the message to the age and condition of the child, the concerns of the mother, and household resources; help SS identify strategies for tackling concerns about a child's "poor appetite" to ensure adequate quantity and quality, including consumption of animal foods</li> </ul>

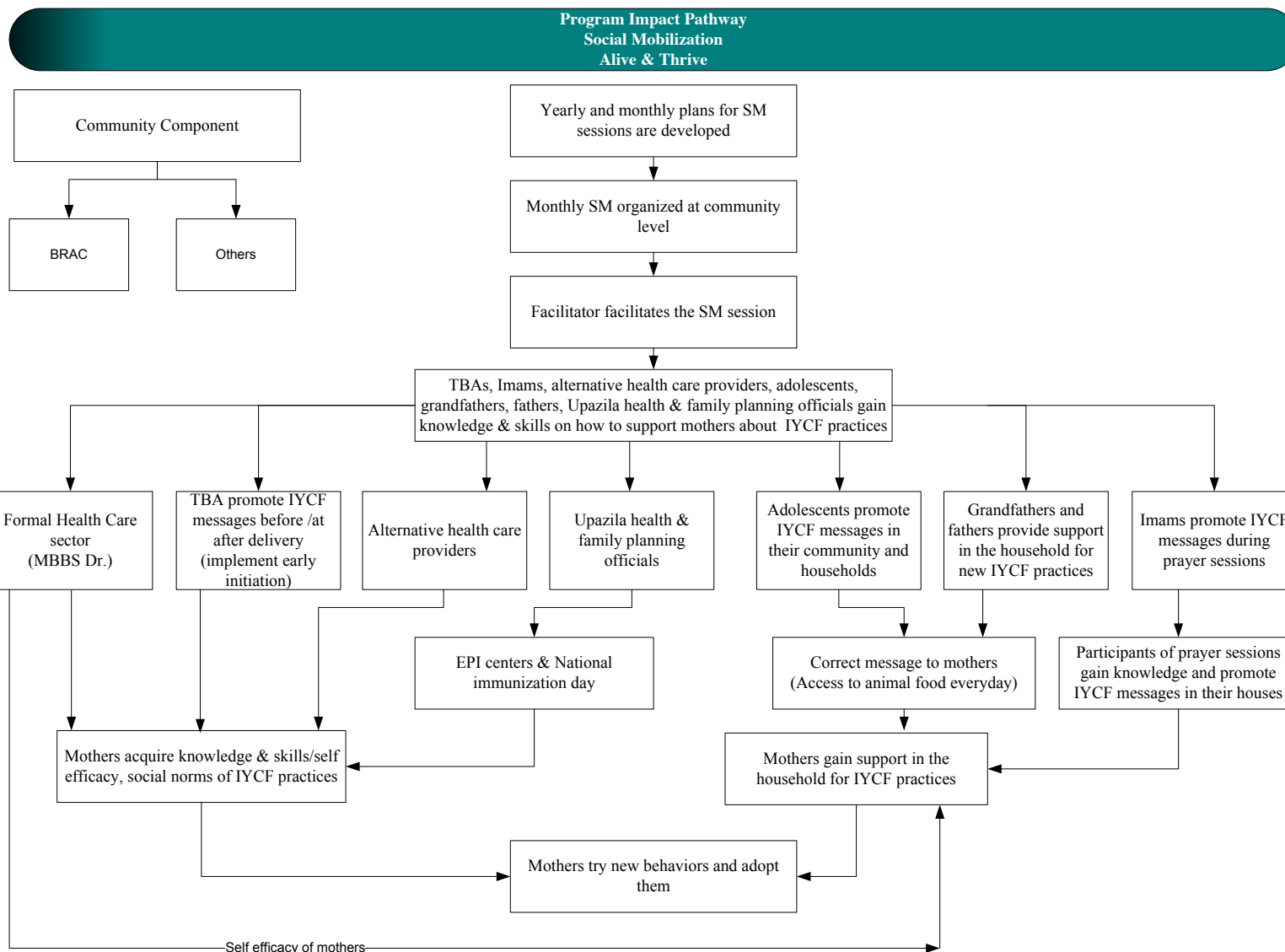
Age Group/Timing	SS (Health Volunteer)	SK (Health Worker)	PK (Nutrition Promoter)
	including frequency and types of food accepted by sick children <ul style="list-style-type: none"> <li>• Encourage washing with soap before preparing food and feeding the child and washing the baby's hands</li> <li>• Solve feeding problems and notify IYCF promoter or ask for her assistance</li> </ul>		
During an Emergency	<ul style="list-style-type: none"> <li>• Notify PK</li> </ul>	<ul style="list-style-type: none"> <li>• Notify PK</li> </ul>	<ul style="list-style-type: none"> <li>• When notified of a feeding problem by the SS, SK, or TBA, go immediately to the household to resolve the problem and later to conduct a follow-up visit.</li> <li>• Alive &amp; Thrive provides IYCF promoters Tk 100/month for mobile phone charges. Because of the phone charges, the call is used to request assistance in handling an IYCF-problem, not for counseling over the phone. An estimated 50 percent of the SS have phones.</li> </ul>

\*Health Volunteers are expected to visit approximately 250-300 households per month, attend a refresher training once monthly, and sell medications. Each Health Worker supervises 10-15 health volunteers, aside from her supervisory and

administrative tasks she also visits all households in her catchment area every 6 months. The IYCF promoters prepare a register of households that include children 0-24 months of age as well as pregnant women. The IYCF Promoters work with the Health Volunteers to deliver nutrition specific information and help with difficult cases. The IYCF Promoter's catchment area will have no more than 350 children 0-24 months of age, no more than 2500 households, and the geographic region will be feasible to visit children 0-24 months of age every two months.

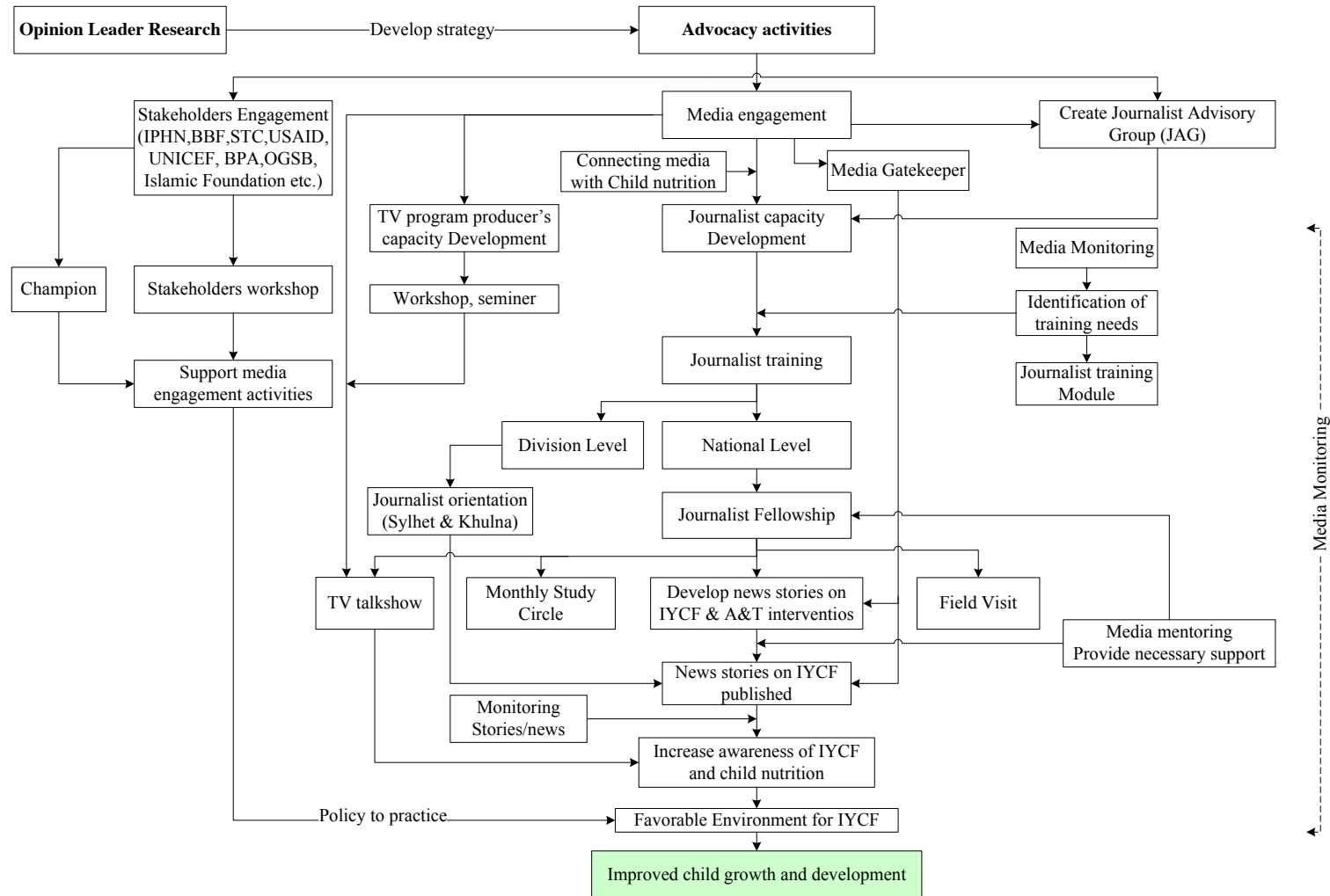
Figure 2: Program Impact Pathways



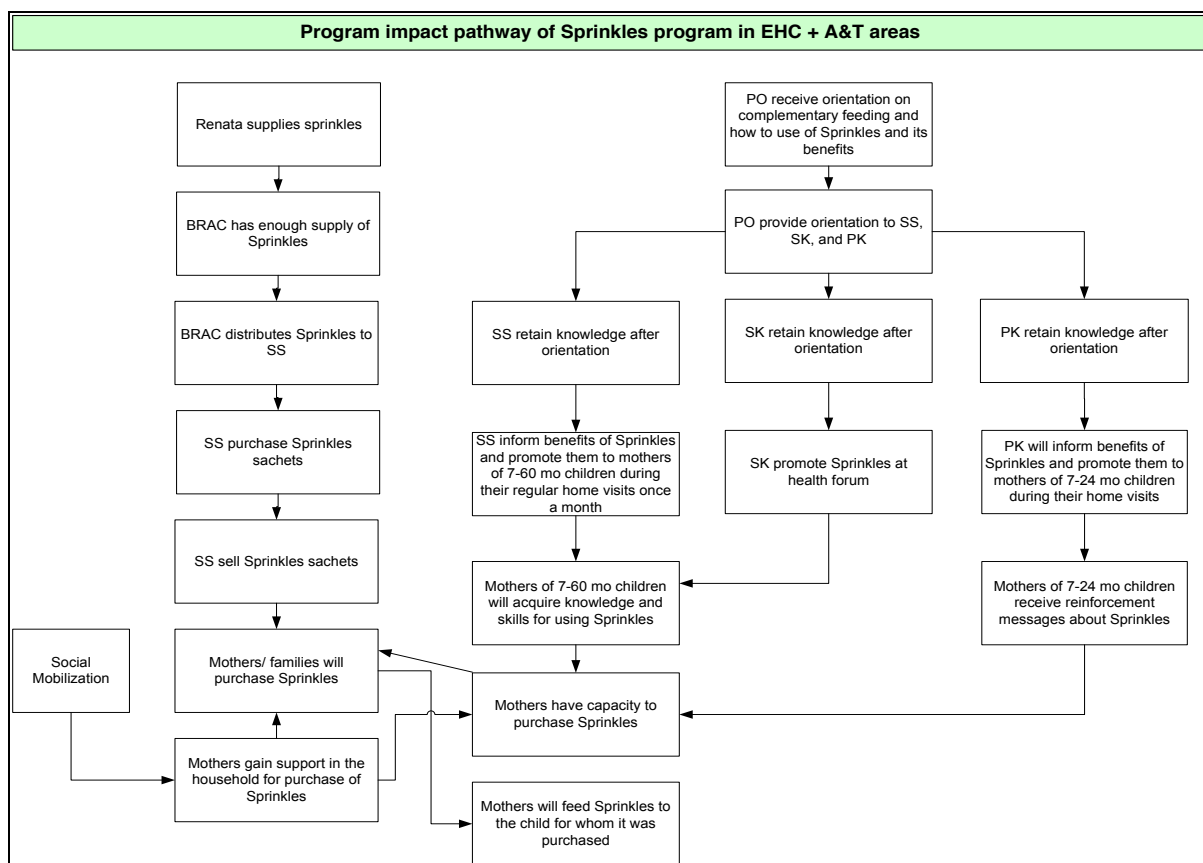


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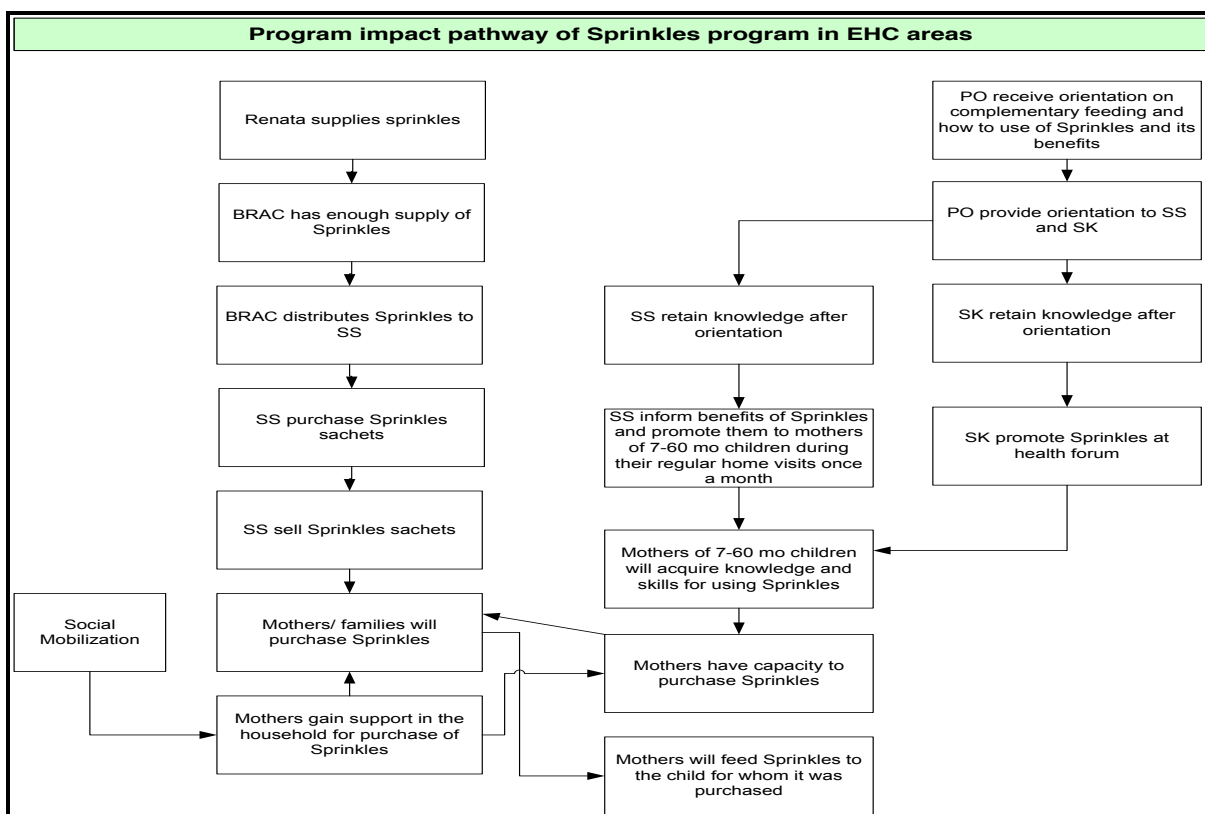
**Program Impact Pathway (PIP)  
Advocacy Component  
Alive & Thrive, Bangladesh**











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<sup>1</sup> Program impact pathways were copied with permission from Alive & Thrive program documents.

### **Appendix 3: The Alive & Thrive Impact Evaluation**

The Alive & Thrive impact evaluation is described in IFPRI's Alive & Thrive baseline report as follows [10]:

The impact evaluation of component Alive & Thrive interventions delivered through the essential health care program (EHC) uses a cluster-randomized design with repeated cross-sectional surveys at the baseline and endline. For the impact evaluation of Alive & Thrive's community-based rural platform, 20 rural sub-districts (upazilas) that were part of BRAC's EHC platform for Alive & Thrive were purposively chosen. The objective of this impact evaluation model is to capture the synergistic impact of Alive & Thrive's community component along with media communications and private sector activities such as the promotion and integration of micronutrient powders.

The impact evaluation is designed to capture impact on all key Alive & Thrive indicators (stunting, infant and young child feeding (IYCF), and anemia). Using a repeated cross-sectional survey design, impact on stunting will be assessed in children 24-59 months old. The impact on other IYCF practices and anemia will be assessed in children 6-23.9 months old; and the impact on exclusive breastfeeding (EBF) will be assessed in children 0-5.9 months old; a double difference impact analysis as well as analysis by exposure level to interventions will be employed to determine the impact of Alive & Thrive interventions.

Randomization of upazilas was done in pairs to align with the Alive &

Thrive management strategy of having 1 manager for 2 Alive & Thrive upazilas. *First*, the selected pairs of upazilas under each division were listed. For each division, random numbers were generated using SPSS for Windows statistical software package version 16.0 (SPSS Inc., Chicago, IL, USA). The selected pairs of upazilas were assigned either to Alive & Thrive intervention or to comparison upazilas, i.e., no Alive & Thrive intervention. Thus, 5 pairs of upazilas were assigned to Alive & Thrive intervention and 5 pairs to comparison. [10]

The GAIN Micronutrient Powder (MNP) Intervention is described in IFPRI's MNP Baseline Report [48] as follows:

The evaluation design for the assessment of the impact of the GAIN-supported MNP intervention in Bangladesh uses a 2 x 2 cluster-randomized design. It takes advantage of the cluster-randomized impact evaluation of the Alive & Thrive initiative, also implemented by BRAC. The MNP evaluation is nested within the main Alive & Thrive impact evaluation, resulting in a 2x2 factorial design with 4 arms: 1) Alive & Thrive + MNP; 2) Alive & Thrive alone; 3) MNP alone; and 4) No Alive & Thrive; No MNP. Approximately 400 children aged 6-11.9 months of age, from 5 different subdistricts (*upazilas*) per arm were recruited into this study, yielding a total of 1600 children in the evaluation sample. At recruitment, a detailed questionnaire based on the UNICEF conceptual framework of the determinants of child undernutrition was administered to mothers of sampled children. All children had their height

and weight measured, and had their blood drawn for micronutrient status measurements. [48]

#### **Appendix 4: Description of the GAIN micronutrient powder uptake survey and Alive & Thrive qualitative research**

The MNP Uptake Survey is described in IFPRI's Pushtikona Uptake Survey [49] document as follows:

“The main objective of the uptake survey is to gather data on awareness, purchase and use of Pushtikona (MNP) in the impact evaluation upazilas (Pushtikona intervention areas only) and on maternal, household and programmatic factors that enable or constrain uptake of the Pushtikona intervention” [49].

The survey was conducted in all 10 Pushtikona evaluation upazilas in households with children 6-23 months old (sample of 400 households): this uses the same sampling frame as the baseline survey.

The survey also oversampled an additional 4 households with children 6-24 months of age in each of the 100 villages, which are clearly identified as ‘purchaser’ households by the BRAC Health Volunteers (SS) who covers the village (sample of 400 households). Total sample size = 800 households with children 6-24 months of age.

The uptake survey collected data on uptake of the MNPs as well as on factors at the level of the child, mother, household and program workers. Interviews were conducted with the households, BRAC SS and the area offices in the uptake survey.

The Qualitative Research is described in IFPRI's Process Evaluation Qualitative Research Protocol [50] as follows:

The main objective of the qualitative research methods to be used in the process evaluation related to the two components noted above is to add depth of understanding to the survey-based data collection that will provide the large-scale findings on Alive & Thrive processes related to the community-based service delivery platforms, the mass media interventions, and supply and demand of fortified complementary foods and products through the BRAC community health worker network.

The following two methods will be the mainstay of the qualitative component of the process evaluation of Alive & Thrive activities related to IYCF service delivery, media campaigns, and building supply and demand for micronutrient powders.

**Focused qualitative research/ethnographic studies:** Focused qualitative/ethnographic methods have been used extensively in relation to child health, in the context of formative research and process evaluation for an IYCF intervention in Haiti [51], in relation to micronutrient powders in Kenya [52], and most recently, in relation to assessing the potential for a fortified complementary food in Ghana (Peltó and Armar-Klemescu, supported by GAIN). These approaches are used to understand factors that influence behaviors related to feeding and health care; they use mix of methods that include traditional qualitative research techniques such as individual and group interviews, as well as small-scale quantitative methods such as brief surveys.

In addition to traditional qualitative interviewing using in-depth techniques, ethnographic methods also include methods such as ranking, pile-sorting, food attribute rating, etc.

To help develop a more detailed methodology for this component of the process evaluation, we revisited our experiences with the use of the process evaluation instruments used in the early phase process evaluation for the BRAC-implemented model (data are currently being analyzed). In addition, we have reviewed the GAIN FES protocol (which has been shared informally with us) for fortified complementary foods, the Alive & Thrive formative research tools, and other qualitative tools to develop a qualitative research protocol that is feasible to implement in this upcoming phase of process evaluation with the human and financial resources available for this component of the research.

**Child/Household case studies:** In addition to the focused qualitative research methods outlined above, we have explored the use of case studies that are focused on a small number of children and households, and that aim to examine the overall influence of the multiple components of the Alive & Thrive strategy in greater depth that is possible through the focused qualitative research methods. Using this methodology, we will explore the feasibility of setting up a small set of longitudinal case studies that follow mothers in late pregnancy, and/or mothers of young infants in different villages in the impact evaluation studies. We plan to follow up these mothers through the critical stages in infancy and early childhood to carefully document their social,

environmental and cultural environments with the goal of understanding with much greater clarity the role, salience and pathways of influence of complex interventions such as Alive & Thrive in these contexts.

Note that both these types of qualitative research methods can also be used to examine perspectives of FHWs, older women, fathers of young infants, etc., and are not just intended for use with mothers. Thus, the overall approach to using qualitative research within the process evaluation plans will enable us to capture and document insights related to multiple components of Alive & Thrive, including perspectives of frontline health workers, and other implementing staff, as well as those of mothers, fathers and other community/household members. [50]



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## CHAPTER 2

### **CAREGIVER CAPABILITIES AND COMPLEMENTARY FEEDING: A SCOPING STUDY OF BEHAVIOR CHANGE INTERVENTIONS IN LOW AND MIDDLE-INCOME COUNTRIES**

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## **Abstract**

*Background:* Improving complementary feeding (CF) practices through behavior change interventions (BCI) can lead to reductions in stunting and increase child growth. However, these interventions vary in their effect on child health outcomes. This could result from determining factors at the level of the child, caretaker, and/or household. “Caregiver capabilities” are a set of psychosocial determinants that have been compiled from research on “care” in nutrition, ethical and economic theorists, as well as from theories in the social sciences.

*Objective:* To systematically scope the extent to which “caregiver capabilities” are considered in research on the impacts of CF BCIs in low- and middle-income countries.

*Methods:* Using systematic searching techniques, we conducted a scoping study of the peer-reviewed literature in English on CF BCIs targeting children 6-23 mo without the provision of food or supplements. PubMed was the primary database used. A total of 1884 abstracts were screened and 43 studies met the inclusion criteria, representing 37 unique interventions. Studies for each intervention were coded for if and how caregiver capabilities (social support; access to and control over resources; roles; priorities; time; self-efficacy; mental health; stress; physical health; and autonomy) were discussed, measured or subjected to intervention.

*Results:* Less than half of the interventions (17/37) mentioned at least one caregiver

capabilities construct. Most of these only mentioned or discussed one construct (n=10). Self-efficacy was mentioned most frequently (n=10) followed by time (n=8). Eight different caregiver capabilities constructs were measured (access to and control over resources; autonomy; mental health; roles; self-efficacy; social support; stress; and time) in 5 interventions. Most constructs were measured using qualitative methods. Five caregiver capabilities constructs were intervention targets (physical health, roles, self-efficacy, social support, and time). Eight interventions stated inferences about caregiver capabilities.

*Conclusions:* The study and targeting of caregiver capabilities constructs in CF interventions is limited. Understanding the generalizability of findings related to caregiver capabilities and the use of these constructs in intervention design and evaluation requires the development of validated measures. By considering caregiver capabilities it may be possible to improve the interpretation of intervention outcomes and design more effective BCIs.

## **Introduction**

Over the past several decades the scope of attention to the factors that influence population responses to behavior change interventions (BCIs) has expanded substantially. For example, the importance of economic resources as determinants of family's abilities to adopt a wide range of new behaviors been recognized for decades and has laid the groundwork for interventions that provide food, cash and/or other resources to support BCIs directed towards improvements in the health of infants and young children [1-6]. When a BCI has an explicit economic component, we expect to see it examined in the intervention's evaluation. However, the significance of economic resources is now so widely recognized that it is typically included as a variable in an evaluation, even when there is no direct economic intervention. In effect, it has become part of "good practice."

The development and dissemination of the "UNICEF Conceptual Framework" [7] and the pioneering work of Engle et al. [8] defining the components of "care" in nutrition have provided the rationale for expanding the scope of interventions to include components of "care" and/or to consider care constructs as potential confounders when they are not components of the intervention. For example, in addition to providing caregivers with knowledge, some breastfeeding interventions have endeavored to provide social and technical support to women after delivery to help them initiate breastfeeding [9, 10]. Additionally, some complementary feeding interventions have considered maternal depression when assessing the effectiveness of their intervention [11]. As with economic resources, when care resources are directly involved in the design and implementation of an intervention there is an expectation to



see them assessed in evaluations. However, there is no consensus or standard for what should be expected when they are not explicitly included in interventions.

## *Background*

### *The nature of a scoping study*

The effort to systematize and codify the review of scientific research in health has been a major development, with profound effects on the practice of epidemiological research. This work has included attention to the nature and characteristics of different types of reviews, including “scoping studies” [12-14]. The concept of a “scoping study” has been introduced, relatively recently, to describe a type of review which is:

...generally conducted to examine the extent, range, and nature of research activity in a particular field, without necessarily delving into the literature in-depth or attempting to assess its quality. Scoping reviews produce a profile of the existing literature in a topic area, creating a rich database of literature that can serve as a foundation for more detailed reviews. These reviews are not intended to assess the quality of the existing literature, but may provide the background for full systematic reviews in a research area, or identify areas in the literature where existing research is sparse. [15]

The assessment of the role of what we have termed “caregiver capabilities” in research on BCC interventions for infant and young child feeding in low- and middle-income countries was, we felt, particularly well-suited to a “scoping study” approach. We suspected that the investigation of caregiver capabilities has not been common or systematic in the context of complementary feeding interventions, but this could not be confirmed except by carrying out the study we proposed to undertake. In fact, our initial search to identify a review paper on the topic did not yield any published material.

### *Identifying caregiver capabilities constructs*

The 1990 UNICEF framework [7] first named “care for children and women” as one of the underlying causes of malnutrition and death of children. Engle et al. [8] expanded this framework in their 1999 paper that identified “resources for care.” They identified the following “resources for care” a) knowledge/beliefs; b) health/nutritional status/anemia; c) mental health/stress; d) control of resources/autonomy; e) workload/time constraints; and f) social support. These constructs are described at the level of the mother and at the level of the household (Figure 2) [8]. Care is detailed in two ways: in the context of needs for the caregiver to provide care as well as the characteristics of the child that may shape the quality and type of care received. The authors highlighted the necessity of understanding the connection between the provision of care and the underlying factors at the level of the mother and household, which determine the manifestations of care for an individual child.

Our list of caregiver capabilities consists of constructs that were derived from these “resources for care” constructs [8], as well as from Nussbaum’s central capabilities [16] and also from theories in social science [17-20]. These constructs and capabilities provide a starting point for selecting specific caregiver capabilities to include in the scoping review. Constructs that comprise the list of caregiver capabilities were deemed measurable, at the level of the caregiver, and potentially important for interventions that are focused on behavior change in nutrition. We identified 10 caregiver capabilities to examine here. They are: social support; access to and control over resources; roles; priorities; time; self-efficacy; mental health;

stress; physical health; and autonomy (Table 1).

### *The concept of caregiver capabilities*

“Capabilities” have been discussed largely outside of the discipline of nutrition by Amartya Sen (Commodities and Capabilities) and Martha Nussbaum (The Capabilities Approach) [16, 21]. They position capabilities into larger views on social justice, personal opportunity, and freedoms available to individuals. Nussbaum names 10 “central capabilities” that may be used to assess a person’s quality of life, and her theory has been used to develop the human development index [22], a composite measure of education, life expectancy, and income. Nussbaum’s capabilities approach is built on the question, “What is each person able to do or be?” [16]. She states, “the approach takes *each person as an end*, asking not just about the total or average well-being but about the opportunities available to each person” [16]. We transfer this general understanding of capability to the context of child-rearing, recognizing that a child’s survival and the quality of that survival is also dependent on the physical, psychological, developmental, and emotional care that they receive from a caregiver.

Here we are examining what we have termed “caregiver capabilities,” which are broadly defined as skills and attributes of a caregiver that affect the ability to provide recommended care for a child. This approach to examining care is rooted in a similar question to the one that Nussbaum poses, but specifies it for the context of child nutrition, “What is one able to do or be in the role as caregiver for a young child?”

## *Context for the scoping study and specific research objectives and questions*

### *The context of the scoping study—complementary feeding behavior change interventions*

Research in recent years has greatly advanced knowledge of “what works” to improve the health and survival of young children [6]. There is a body of evidence that indicates that the care a child receives from birth to 24 months of age is critical for growth and development. This is the time period when the nutritional status of a child is the most precarious because undernutrition is life threatening and poor growth can lead to irreversible stunting. In addition to gestation, these first 24 months of life are often referred to as the “window of opportunity” as interventions during this time period to improve the nutritional status of a child will have the greatest impact on a child’s current and future growth and development.

Complementary feeding interventions target feeding between 6-24 months of age, a time period when children are most vulnerable to nutritional insults. It is estimated that interventions to improve complementary feeding practices could reduce stunting (low height for age) by up to 20% with high coverage [6]. A recent review of interventions that provide behavior change communication for complementary feeding practices found significant pooled estimates of effect on both child height (weighted mean difference 0.21 SD, 95% CI 0.01-0.41) and weight gain (effect size 0.30 SD, 95% CI 0.05-0.54) [23].

Although the overall pooled estimates are promising, individual BCC interventions to improve infant and young child feeding practices vary in effects on child health outcomes. Questions still remain as to why some complementary feeding

BCC interventions don't reach intended benefits for child height and weight. This variability could result from a variety of determining factors at the level of the child, mother, the household or a combination of all three. Caregiver capabilities may be critical "gates" in the pathway to caregivers improving complementary feeding practices in the context of an intervention. Thus, examining the extent to which caregiver capabilities have been applied in the planning, evaluation, and/or discussion of results may provide a literature base for a systematic review of the evidence for caregiver capabilities. It also may generate new hypotheses about the role of caregiver capabilities in complementary feeding BCC interventions.

#### *Objectives of the scoping study*

The objective of this scoping study was to determine the extent to which caregiver capabilities have been studied in the planning, evaluation, and/or discussion of results in behavior change interventions focused on improving complementary feeding of IYCs. Using the published literature as data, we investigated if and how caregiver capabilities have been discussed, measured or subjected to intervention and highlighted the strengths of and gaps in this literature.

We addressed four research questions. In the complementary feeding intervention literature focused exclusively on behavior change at the level of the caregiver in low- and middle-income countries: a) Which caregiver capabilities are mentioned or discussed? b) Which caregiver capabilities are measured? If they are measured, how are they used? c) Which caregiver capabilities are intervention points? d) What inferences are drawn by the authors about caregiver capabilities?

## Methods

### *Framework guiding the review process*

We followed the five-stage framework for conducting a scoping study [12] of Arksey and O'Malley along with the suggestions improvements to this framework outlined by Levac et al. [13]. The five stages are 1) identifying the research question (stated above); 2) identifying relevant studies; 3) study selection; 4) charting the data; 5) collating, summarizing and reporting the results.

### *Identifying Relevant Studies*

#### *Search strategy*

The systematic search strategy used in this review was informed by the Cochrane Collaboration [24] search methods. PubMed was the primary database used and the search terms are listed in Box 1. Recent review articles on complementary feeding [1, 25] were also reviewed for studies that met the inclusion criteria. The “snowball technique” [1] was used on selected studies to include any additional studies that were not found through database searching. Databases were searched

<p>Box 1: Search Terms Used in PubMed: “complementary feeding” behavior change “complementary feeding” nutrition education “complementary feeding” intervention “complementary feeding” “complementary food” “weaning food” weaning intervention</p>
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between January and August of 2014.

### *Study selection*

#### *Inclusion/exclusion criteria*

We used the PICO criteria (Population, Intervention, Comparison, Outcome) to define our inclusion criteria [26]. Studies were included in this review if they were conducted in a country that met the 2014 World Bank definition [27] of either middle or low income economy. They also had to be part of an intervention study on caregiver behavior change for complementary feeding without the provision of food or supplements that included the targeting of children 6-23 months of age, with or without the targeting of children <6 months of age or >23 months of age. Studies were included if they had any or no comparison group (i.e. no criteria for comparison group). The study had to have at least one outcome related to complementary feeding knowledge, beliefs, motivation or behavior of the caregiver, and this could be a primary or secondary outcome. Studies were excluded if they didn't meet any of the above criteria and if they were not peer-reviewed. Only studies that could be accessed in English were included. Formative research papers and studies that were considered "additional studies" that supplemented the primary paper published for a complementary feeding BCC intervention did not need to meet the "outcome" criteria. No date limits were placed on the search.

#### *Selection process*

A total of 1884 abstracts were screened from PubMed database searching and through the "snowball technique" [1] (Figure 3). Two research assistants reviewed all abstracts that resulted from each search and determined if the study met the inclusion

criteria based on the information available in the abstract. Each research assistant created a search table independently and did not discuss or compare their work with the other research assistant assigned to the same search term. Any abstract that was only selected by one research assistant was refereed by AZ to determine if the abstract met the inclusion criteria. We excluded 1696 as a result of this process.

The full text of all studies that were selected by two research assistants as well as those selected by AZ during the referee process were then pulled for review (n=188). All full text articles were reviewed by AZ to determine if they met the inclusion criteria and 145 were excluded because they did not meet the inclusion criteria. A total of 43 papers met the inclusion criteria, these 43 papers represented 37 unique interventions (Table 2).

#### *Charting the data*

##### *Data abstraction and qualitative synthesis of data*

Each study in Table 2 was coded for the caregiver capability constructs (Table 1) and how they were used in the study. They were coded for mention or discussion of the construct; use of the construct as an intervention point; measurement of the construct; and inference drawing about the construct. If the study had an additional intervention besides complementary feeding (e.g. breastfeeding), only the constructs that were mentioned as part of the complementary feeding component of the intervention were considered.

##### *Collating, summarizing, and reporting the results*

As this was a “scoping study,” there was no attempt to synthesize or assess the quality of the evidence for the role of caregiver capabilities in complementary feeding



interventions. We thus presented a descriptive and narrative analysis of each research question. As patterns in the data emerged we described them qualitatively.

We tabulated the results with caregiver capabilities as rows and the research questions as columns. Each cell in the table was populated with the number of interventions. We decided to cluster these studies by intervention to examine the use of caregiver capabilities by an intervention as a whole, not separately in individual papers that resulted from the intervention. This decision favored the interventions, allowing for a fair assessment of the use of caregiver capabilities in the intervention. Presenting the data in this way produced an outcome that was appropriate for the objective of the study. This also facilitated discussion of the findings both by research question and across individual caregiver capabilities, with a holistic treatment of each individual intervention.

We did not limit our discussion of the results to the current state of caregiver capabilities in this body of literature. The discussion also included potential reasons for these findings, including current challenges for this area of research. Additionally, we considered the implications of these findings within current intervention implementation “culture.” We also identified future research priorities.

## **Results**

### *Characteristics of reviewed studies*

Forty-three papers met the inclusion criteria. Among these 43 papers, were 37 unique interventions. Papers for these interventions ranged in publication date from 1992 to 2014 (a 22 year span), with 19 interventions, half of the total sample of the interventions, published after 2008. Most interventions were quantitative (n=30), and

a few interventions (n=7) used both qualitative and quantitative data. Seventeen of these 37 interventions mentioned at least one caregiver capabilities construct (Table 2).

### *Synthesis of the qualitative examination of caregiver capabilities*

#### *Which caregiver capabilities are mentioned or discussed?*

Among the 17 interventions that mentioned or discussed any caregiver capabilities constructs, most interventions only mentioned or discussed one construct (n=10), 3 interventions mentioned or discussed 2 constructs, 1 intervention mentioned or discussed 3, 2 interventions mentioned or discussed 5, and 1 intervention mentioned or discussed 6 constructs (data not shown). The most frequently mentioned construct was self-efficacy (n=10) followed by time (n=8), (Table 3).

#### *Which caregiver capabilities are measured? If they are measured, how are they used?*

Eight of the 10 caregiver capabilities constructs were measured in at least one study: access to and control over resources; autonomy; mental health; roles; self-efficacy; social support; stress; and time (Table 3). Only 5 of the 37 interventions measured these 8 constructs.

#### *Access to and control over resources*

Access to one resource, animal source foods, was measured quantitatively during formative research for the Alive & Thrive intervention [9]. The authors found that household access to animal source foods was not a barrier to feeding animal source foods in Bangladesh and thus they selected this behavior as a “priority behavior” to promote.

### *Autonomy*

Qualitative process evaluation research for Alive & Thrive identified that autonomy could be a constraint to responding to this behavioral intervention [9]. How this measurement of autonomy was used to inform the intervention or interpret the results of the intervention was not yet reported [9, 28].

### *Mental health*

Maternal depression was measured quantitatively using The Center for Epidemiological Survey—Depression scale at baseline, 6, 9, 12 and 15 months postpartum in the “Complementary and Responsive Feeding Caregiver Education Intervention” [11]. The authors modeled maternal depression as a confounding factor and controlled for it in their analysis of intervention effect.

### *Roles*

Qualitative techniques were used to measure roles in the “Senegalese Grandmothers Intervention” [29] the authors determined the general roles of grandmothers in maternal and child health both at the household and community levels during formative research. Additionally, the roles grandmothers held for the specific intervention-targeted nutrition behaviors were investigated. The roles of grandmothers as guardians, consultants, advisors, and delegators for maternal and child health related advice and problem solving were levied throughout the intervention to achieve the desired behavioral change.

### *Self-efficacy*

Self-efficacy was measured qualitatively in two interventions [29, 30]. In the “Senegalese Grandmothers Intervention” [29] self-efficacy was measured as an

outcome of the intervention. In their role as advisors for health and nutrition, grandmothers felt an increased sense of empowerment [29]. In the “Designing Educational Messages Intervention,” [30] self-efficacy was deemed a barrier to achieving the emic trait of “*cuidadosa*,” defined in the intervention through their qualitative ethnography as “[mothers] who are strongly motivated to care for their infant’s nutrition and likely candidates to accept behavioural changes.” The authors found that mothers could become less “*cuidadosa*” if they are experiencing a lack of confidence. [30]

#### *Social support*

Social support was measured qualitatively in three interventions [9, 28-30]. In the “Designing Educational Messages Intervention,” lack of a supportive husband was identified as a barrier to the emic cultural category of “*cuidadosa*” in an interview with a key informant [30]. The “Senegalese Grandmothers Intervention” [29] measured social support as an outcome. They found that their intervention increased support to women of reproductive age from their husbands for health and nutrition related issues. It also increased the support grandmothers provided women of reproductive age both within their household and to other households [29]. In Alive & Thrive, social support was measured during semi-structured interviews that were part of the process evaluation. They found that family support was a facilitator for the adoption of recommended practices [28].

#### *Stress*

In addition to social support and self-efficacy, stress was also deemed a barrier to achieving the emic trait of “*cuidadosa*” in the “Designing Educational Messages

Intervention” [30]. Stress was measured in the qualitative ethnographic portion of this study [30].

#### *Time*

“Perceived time constraint” was measured qualitatively through the ethnographic study in the “Designing Educational Messages Intervention” [30] and was determined to be a barrier to uptake for several intervention-promoted behaviors, and a motivation for two intervention-promoted behaviors. The prevalence of perceived insufficient time was measured quantitatively in those who did not follow the program recommendations in the “Culturally Appropriate Nutrition Education Intervention” [31]. An open-ended question that probed those who did not follow the intervention suggestions for their reasons revealed that many mothers felt that they did not have enough time [31].

#### *Which caregiver capabilities are intervention points?*

Seven interventions explicitly intervened on caregiver capabilities. Five caregiver capabilities constructs were intervention targets: physical health, roles, self-efficacy, social support, and time. Social support was targeted in 4 interventions, self-efficacy in 3, and time, roles, and physical health in one intervention each. (Table 3)

#### *What inferences are drawn by the authors about caregiver capabilities?*

Eight interventions stated inferences about caregiver capabilities. These inferences were about 6 different caregiver capabilities constructs (Table 3).

#### *Time*

Most inferences were about caregivers’ time. The “Weaning Food Messages Intervention” [32] made an inference about time related to the success of the

intervention messages. They postulated that messages that were implemented most frequently, and were the most popular required the least amount of time (and money). Messages that required more time and money met the most resistance [32]. The “Rural China CF Education Intervention” [33, 34] stated that through addressing participants concerns about the time required to prepare the recipes the intervention was able to change caregivers’ food selection behaviors. In the “Complementary and Responsive Feeding Caregiver Education Intervention” [11] the authors supposed that the responsive complementary feeding and play-group could have received too much information and too many behaviors compared to the complementary feeding only group. Too many messages could have put too much strain on available time and limited the mother/caregiver ability to practice “all that the messages recommended,” leading the reader to infer that this could be one reason the results were not as the authors expected.

“Not enough time” was provided as a reason by 56% of mothers who did not practice feeding methods that were promoted in the “Culturally Appropriate Nutrition Education Intervention” [31]. From this the authors concluded that resisting and ignoring the complementary feeding messages was due to time constraints on the mothers in their study who were also involved in agricultural work. They suggested future research on women’s agriculture and other time commitments to design feeding messages that are more readily adaptable. [23]

In the ethnographic study conducted as part of the “Designing Educational Messages Intervention,” [30] the authors inferred that time may have impeded the uptake of the promoted behavioral change for some behaviors and facilitated the

behavioral change for two promoted behaviors. Time was identified as a constraint for the adoption of handwashing; using boiled water for reconstituting powdered milk; feeding with a cup and spoon instead of a bottle; and feeding only freshly prepared gruel/milk. It was identified as a motivation for handwashing and feeding with a cup and spoon instead of a bottle [30].

### *Autonomy*

An inference about women's autonomy was made in the "Food-Health-Care Educational Intervention" [35]. They concluded that the sustainability of the changes resulting from the intervention (even 6 months post intervention) were due to the way in which they circumvented addressing women's autonomy. Since women in this study population "do not have much share in household decision-making" they instead targeted fathers and grandmothers in monthly community mobilization sessions as part of the intervention. They believe that this sensitivity to women's autonomy in Bangladesh led to the sustainability of their program [35].

### *Self-efficacy*

Inferences about self-efficacy were drawn in two interventions [30, 35]. In the "Designing Educational Messages Intervention," the emic construct of "cuidadosa" emerged as an important characteristic and classification of particularly careful and effective caretakers. "Cuidadosa" mothers are "strongly motivated to care for their infant's nutrition and likely candidates to accept behavioral changes" [30]. This classification was used to determine how amenable to change existing behaviors were (e.g. if a "cuidadosa" mother is not able to make a recommended behavior change, then other non-cuidadosa mothers would not either). This intervention found that,

however, this desired caretaking quality could be repressed by lack of confidence [30]. The use of “confidence” by these authors seems closely related to self-efficacy.

The authors of the “Food-Health-Care Educational Intervention” [35] made a claim that the community mobilization sessions in this study were also carried out to circumvent the issue of minimal empowerment of women in their study population (in addition to autonomy, discussed earlier). Addressing self-efficacy in this way led to the same claim that was made for autonomy, that addressing the issues of women’s lack of autonomy and self-efficacy, “confirm the sustainability of the changes, even after 6 months of intervention.”

### *Stress*

In the analysis interviews with women in the “Designing Educational Messages Intervention” [30], the authors found that in addition to confidence interfering with a mother being able to be “cuidadosa,” stress also interfered with a mother’s ability to be a particularly loving, caring and effective caretaker for her child [30].

### *Roles*

Roles were considered heavily in the “Senegalese Grandmothers Intervention” [29] that targeted mother’s behavior change through grandmothers. The authors discussed how a grandmother’s role as advisor to her daughter or daughter-in-law as well as to other community members converged with new knowledge from the intervention and a grandmother’s desire and commitment to promote the well-being of community members. The authors claimed that this convergence strongly supported the conclusion that community nutrition norms, improved by the intervention, were



being promoted actively [29].

### *Social support*

Analysis of early process evaluation data in the Alive & Thrive intervention led the authors to infer that family support was a facilitator for the adoption of recommended practices [9, 28]. Family support was a facilitator specifically for the timely introduction of complementary foods, the provision of good quality complementary foods, giving animal source foods, and adding oil to mashed family foods [28]. In the “Senegalese Grandmothers Intervention” [29], the support that grandmothers provided women of reproductive age for the alternative practices that were promoted led the authors to infer that these have a “determining influence” on nutrition-related practices of women of reproductive age.

### **Discussion**

The use of caregiver capabilities constructs in complementary feeding behavioral change interventions was limited, measurement was often restricted to qualitative methods, and inferences were also limited. Seventeen of the 37 complementary feeding behavior change interventions that were identified mentioned at least one caregiver capabilities construct. Few studies targeted caregiver capabilities as a point of intervention (n=7), and fewer measured these constructs (n=5).

The “knowledge transfer” paradigm typical of many BCIs over the past two decades does not promote the inclusion of caregiver capabilities constructs. Recognizing and planning interventions around a program impact pathway identifies factors that might influence the utilization of the intervention [28]. Among the 5

interventions that measured caregiver capabilities 4 explicitly discussed their use of a process or program impact pathway approach in their study. Examining the process through which the intervention achieved or did not achieve desired outcomes may have facilitated the identification and the measurement of caregiver capabilities constructs.

The limited use of behavioral theory [36] may be another reason that hypotheses about caregiver capabilities were not articulated and were rarely tested in this body of literature. Planning interventions using only a logic model or empirical frame does not readily allow thinking about the theory of how intervention inputs will ultimately result in changes in behavior or child health [36]. Behavioral theory can inform hypotheses about facilitators and barriers between intervention inputs and desired outcomes by identifying caregiver capabilities that might be important in achieving desired intervention changes. Among the 17 interventions that mentioned caregiver capabilities, only 7 explicitly named a behavioral theory that guided the design of the intervention or aided in the interpretation of their results.

Although our list of caregiver capabilities was useful for this scoping review, a unifying theory for caregiver capabilities would enable research that can directly test theorized relationships between caregiver capabilities and intervention inputs, outcomes, and intermediary steps along the pathway to behavioral change in an intervention. This would greatly advance thinking and communication around caregiver capabilities, as the frameworks that were foundational to the development of caregiver capabilities [7, 8] do not adequately specify these relationships.

The lack of validated tools for the widespread measurement of these constructs

is a major barrier to the inclusion of these constructs in BCIs. Neither acceptable measures nor scales have been developed for many of these constructs and we have limited existing quantitative and qualitative techniques for measurement. The favoring of qualitative techniques for measurement of the majority of these constructs might indicate that these constructs were emergent and not determined a priori as necessary to investigate. It also limits the generalizability of findings. Depression, a construct that falls under the broader caregiver capability, “mental health,” is one exception. Depression has quantitative measurement methods that have been validated such as the Edinburg Postnatal Depression Scale (EPDS) [37], and the Center for Epidemiologic Studies Depression Scale (CES-D) [38]. These two quantitative measures have been applied in various contexts are an example of the iterative and careful development of quantitative measures and scales for caregiver capabilities.

BCI research that considers caregiver capabilities, in addition to improving intervention design and evaluation, may also increase sensitivity to the needs and treatment of caregivers (who are typically women) in carrying out intervention-recommended practices to improve child health. Melinda Gates recently published an article in which she discusses the difference between “gender unintentional” and “gender intentional” interventions in public health [39]. She depicted how the lack of identification of inequalities that women face in a given intervention context leads to limitations on effectiveness and unanticipated negative outcomes. Including a “gender lens” as part of a “gender intentional” intervention with sensitivity to inequity of women in that context will avoid exacerbating existing gender issues and have the

potential for greater impact. This can be done through using a “gender lens” in the planning, measurement, and evaluation stages of interventions. The call for gender intentional interventions is a call to attention to the myriad of social factors that affect women along a program impact pathway and the ethical duty we have to “put women and girls at the center of development” by considering them in interventions that affect child health. In doing this we can avoid treating women as vehicles to deliver our interventions and instead as valued society members and partners in change who need support for their capabilities before they can carry out recommended behavior as caretakers. In choosing not to do this we are treating women as if their only value is reproductive—the survival of the next generation. If we don’t evaluate the attributes of the caregiver or try to improve the caregiver’s life and environment, we just see her as the handmaid to the child, and the handmaid between our intervention and desired outcomes.

### *Strengths and limitations*

The scope of our review was limited to complementary feeding behavior change interventions. There may be other bodies of intervention literature within or outside of nutrition that have a different landscape of research on caregiver capability constructs.

Additionally, we only reviewed the peer-reviewed literature. This has two ramifications. The first is related to publication bias. One opportunity to discuss caregiver capabilities is post hoc, to provide explanation and interpretation for study findings. Researchers are more likely to reach for explanation for unexpected study results. If positive results of interventions are more likely to be published, then this

may be why we are not seeing a larger discussion of caregiver capabilities in the published literature. Second, the discussion of caregiver capabilities may exist in unpublished “grey” literature, as these constructs may be explored more frequently in formative and process evaluation research. Our study did not capture this body of literature. This study, however, was informed by systematic searching techniques within the published literature and made a qualitative assessment of the current landscape for caregiver capabilities. This allowed for a more holistic discussion of the existing state of caregiver capabilities in the complementary feeding BCI literature.

Finally, any list of the complex factors that may be required to provide care for a child is necessarily somewhat arbitrary, and it was not our intention to create a definitive list. We wanted this list to be broad enough to encompass a range of factors, short enough to be manageable, and inclusive enough to cover the types of factors that appeared to us to be current in contemporary discourse. We hope that any shortcomings of our selection will encourage others to examine additional caregiver capabilities and thus expand the scope of analysis.

### *Conclusions*

Considering caregiver capabilities in the design and evaluation of behavior change interventions may lead to better explanation for unexpected intervention outcomes as well as improvements in the design of interventions. To do this, prioritizing the development and testing of measurement techniques for caregiver capabilities constructs is paramount. This will allow us to evaluate the state of caregiver capabilities in a variety of contexts. Refining and validating measures of these constructs will lead to questions and scales that can be more widely adopted.

This type of refinement is also needed for methods used in improving caregiver capabilities in a variety of contexts. In this way a paradigm shift can occur in how we view women in interventions to improve the complementary feeding of their children, thus improving the lives of women as well as the care of their children.

## Figures and Tables

Figure 1: The UNICEF Conceptual Framework for Child Malnutrition, Death and Disability [7]

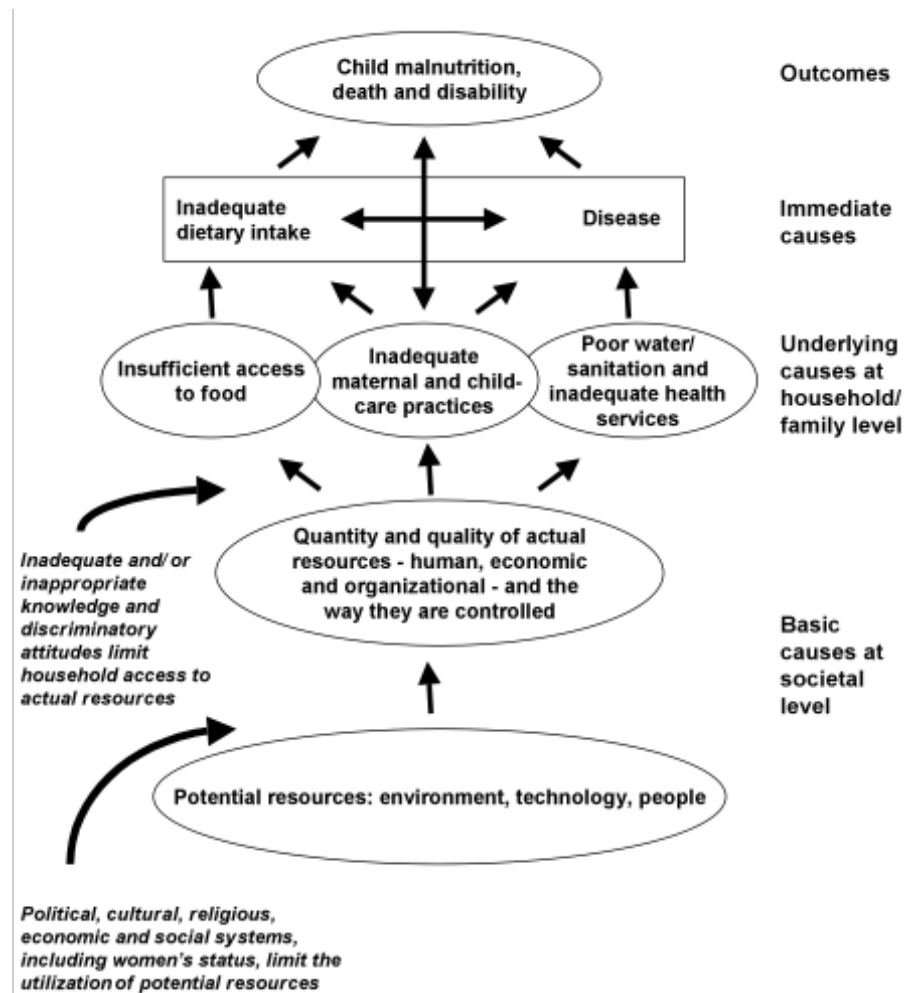


Figure 2: The Resources For Care Framework [8]

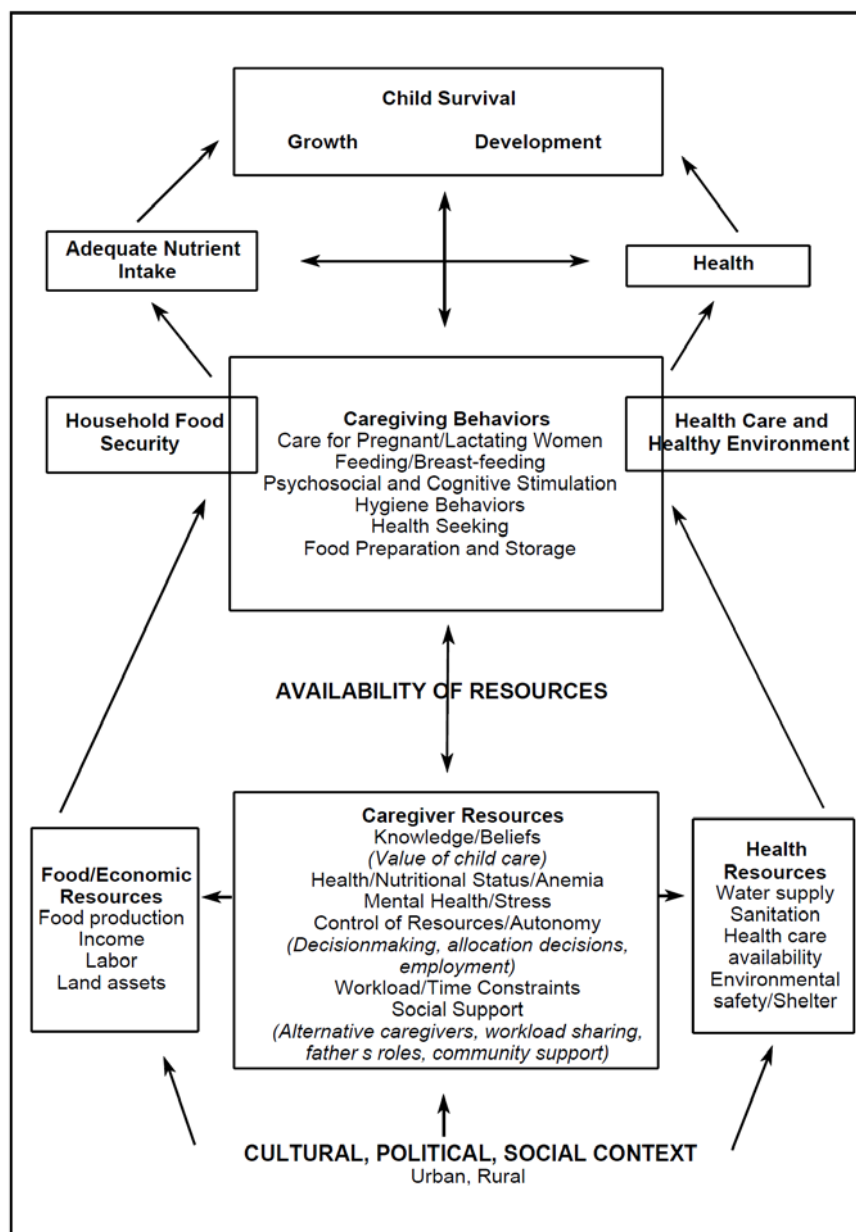




Figure 3: Flow diagram of papers and interventions identified, screened, assessed, and reviewed as part of the scoping study

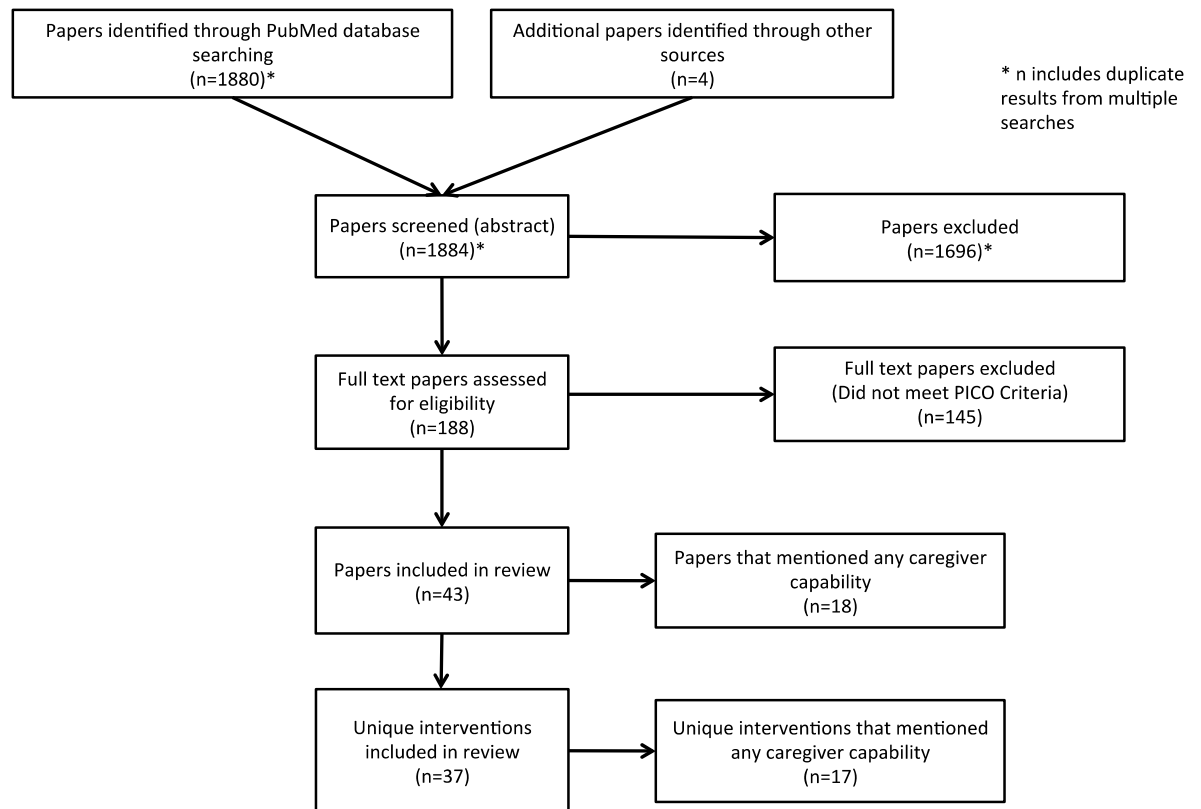


Table 1: Definitions of caregiver capabilities constructs in reference to caring for a child

Caregiver Capabilities	Definition <i>(note: reference indicates where concept was derived from, definitions have been modified for the purpose of this study)</i>
<b>Access to and control over resources</b>	The caregivers ability to access key resources for child care, if they are available at the community or household level [8, 16]
<b>Autonomy</b>	A caregivers freedom from external control or influence in making decisions about child care [8, 16]
<b>Mental health</b>	Psychological health and emotional well-being that affects thoughts, behavior, and feelings [8, 16]
<b>Physical health</b>	Health and energy level to do daily activities, including caregiving [8, 16]
<b>Priorities</b>	A ranking of how the responsibilities a caregiver holds are valued [17]
<b>Roles</b>	The summary of the responsibilities a caregiver holds and his/her place in the family or society [20]
<b>Self-efficacy</b>	Belief about ability to produce levels of performance to influence events affecting the child's health [8, 18, 19]
<b>Social support</b>	The size of the relational network; the quality of the network in supporting the person in their role as a caregiver [8, 16]
<b>Stress</b>	Physiologic response to negative aspects of life [8, 16]
<b>Time</b>	The time necessary to meet demands of responsibilities (both perceived and actual) [8]

Table 2: Interventions that met the study inclusion criteria, the first author of the study, the date published, type of data analyzed, and notation of any mention of caregiver capabilities constructs

<b>Intervention</b>	<b>First Author</b>	<b>Date Published</b>	<b>Country</b>	<b>Type of Data Analyzed</b>	<b>Any mention of Caregiver Capabilities</b>
10 Steps Intervention 1	Vitolo, et al. [40]	2008	Brazil	Quantitative	No
	Bortolini, et al. [41]	2012	Brazil	Quantitative	No
10 Steps Intervention 2	Louzada, et al. [42]	2012	Brazil	Quantitative	No
10 Steps Intervention 3	Broilo, et al. [43]	2013	Brazil	Quantitative	No
Alive & Thrive	Avula, et al. [28]	2013	Bangladesh	Quantitative & Qualitative	Yes
	Sanghvi, et al. [9]	2013	Bangladesh, Ethiopia, Vietnam	Quantitative & Qualitative	Yes
An Educational Intervention to Promote Appropriate CF practices	Bhandari, et al. [44]	2004	India	Quantitative	No
	Bhandari, et al. [45]	2005	India	Quantitative & Qualitative	No
CF Guidelines Emphasizing Red Meat Consumption Intervention	Olaya, et al. [46]	2013	Colombia	Quantitative	Yes
Community Based Maternal and Child Health Nutrition Project	Vir, et al. [47]	2013	India	Quantitative	No

<b>Intervention</b>	<b>First Author</b>	<b>Date Published</b>	<b>Country</b>	<b>Type of Data Analyzed</b>	<b>Any mention of Caregiver Capabilities</b>
Community Interventions to Reduce Child Mortality	Shrestha, et al. [48]	2011	Nepal	Quantitative	No
Community-based Nutrition Education Intervention	Kilaru, et al. [49]	2005	India	Quantitative	Yes
Complementary and Responsive Feeding Caregiver Education Intervention	Vazir, et al. [11]	2013	India	Quantitative	Yes
Culturally Appropriate Nutrition Education Intervention	Guldan, et al. [31]	2000	China	Quantitative	Yes
Designing Educational Messages Intervention	Monte, et al. [30]	1997	Brazil	Quantitative & Qualitative	Yes
Educational Intervention Delivered Through Health Services	Penny, et al. [50]	2005	Peru	Quantitative	No
	Waters, et al. [51]	2006	Peru	Quantitative	No
Food-Health-Care Educational Intervention	Roy, et al. [35]	2007	Bangladesh	Quantitative & Qualitative	Yes

<b>Intervention</b>	<b>First Author</b>	<b>Date Published</b>	<b>Country</b>	<b>Type of Data Analyzed</b>	<b>Any mention of Caregiver Capabilities</b>
Growth Charts for Maternal Learning Intervention	Ruel, et al. [52]	1992	Lesotho	Quantitative	No
Health Education Pamphlets Intervention	Singh, et al. [53]	1993	India	Quantitative	No
IMCI Nutrition Counseling Intervention	Santos, et al. [54]	2001	Brazil	Quantitative	No
	Valle, et al. [55]	2003	Brazil	Quantitative & Qualitative	No
Integrated Child Nutrition Intervention	Pachon, et al. [56]	2002	Vietnam	Quantitative	Yes
Integrated Nutrition Package at Large Scale Intervention	Guyon, et al. [57]	2009	Madagascar	Quantitative	Yes
Intensive Nutrition Education Intervention	Palwala, et al. [58]	2009	India	Quantitative	Yes
Malnutrition Improvement Intervention	Li, et al. [59]	2007	China	Quantitative	No
Nutrition Education Intervention for Iranian Nomadic Children	Salehi, et al. [60]	2004	Iran	Quantitative	No

<b>Intervention</b>	<b>First Author</b>	<b>Date Published</b>	<b>Country</b>	<b>Type of Data Analyzed</b>	<b>Any mention of Caregiver Capabilities</b>
Nutrition Education of Mothers Intervention	Sethi, et al. [61]	2003	India	Quantitative	Yes
Participatory Nutrition Education Intervention	Hotz, et al. [62]	2005	Malawi	Quantitative	No
Personalised, Home-based Counseling Intervention	Kimani-Murage, et al. [63]	2013	Kenya	Quantitative & Qualitative	Yes
Planned Teaching Programme Intervention	Dsouza, et al. [64]	2009	India	Quantitative	No
Responsive Feeding Intervention 1	Aboud, et al. [65]	2008	Bangladesh	Quantitative	Yes
Responsive Feeding Intervention 2	Aboud et al. [66]	2009	Bangladesh	Quantitative	Yes
Rural China CF Education Intervention	Shi, et al. [33]	2009	China	Quantitative	Yes
	Zhang, et al. [34]	2013	China	Quantitative	No
Senegalese Grandmothers Intervention	Aubel, et al. [29]	2004	Senegal	Quantitative & Qualitative	Yes
Teaching Program Given to Mothers Intervention	Youssef, et al. [67]	1993	Egypt	Quantitative	No

<b>Intervention</b>	<b>First Author</b>	<b>Date Published</b>	<b>Country</b>	<b>Type of Data Analyzed</b>	<b>Any mention of Caregiver Capabilities</b>
The Double Task of Preventing Malnutrition and Overweight Intervention	Navarro, et al. [68]	2013	Dominican Republic	Quantitative	No
Training in Complementary Feeding Counseling of Healthcare Workers Intervention	Zaman, et al. [69]	2008	Pakistan	Quantitative	No
Two Methods of Advising Mothers on Infant Feeding Intervention	Jacoby, et al. [70]	1994	Peru	Quantitative	No
Weaning Food Hygiene Intervention	Islam, et al. [71]	2013	Bangladesh	Quantitative	No
Weaning Food Messages Intervention	Brown, et al. [32]	1992	Bangladesh	Quantitative	Yes
WHO Training Course on CF Counseling Intervention	El-Sayed, et al. [72]	2014	Egypt	Quantitative	No

Table 3: Number of interventions that mentioned or discussed, used as a point of intervention, measured, or made inferences about 10 caregiver capabilities constructs

Caregiver Capabilities Constructs	Mentioned or Discussed	Measured	Point of Intervention	Inference(s) Made
Access to and Control over Resources [References]	1 [9]	1 [9]	0	0
Autonomy [References]	4 [9, 29, 35, 49]	1 [9]	0	1 [35]
Mental Health [References]	1 [11]	1 [11]	0	0
Physical Health [References]	2 [57, 63]	0	1 [63]	0
Priorities [References]	1 [29]	0	0	0
Roles [References]	2 [29, 30]	1 [29]	1 [29]	1 [29]
Self-Efficacy [References]	10 [9, 29-32, 35, 46, 56, 58, 61]	2 [29, 30]	3 [9, 29, 46]	2 [30, 35]
Social Support [References]	5 [9, 28-30, 65, 66]	3 [28-30]	4 [9, 29, 65, 66]	2 [28, 29]
Stress [References]	1 [30]	1 [30]	0	1 [30]
Time [References]	8 [9, 11, 29-33, 35]	2 [30, 31]	1 [30]	5 [11, 30-33]



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**CHAPTER 3**  
**INFANT AND YOUNG CHILD FEEDING TRAJECTORY PATTERNS IN**  
**BANGLADESH ARE DIVERSE AND DETERMINED BY DECISION**  
**MOMENTS**

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## **Abstract**

*Background:* Behavior change interventions improve infant and young child feeding (IYCF) with varying success. Behaviors result from critical decisions that caregivers make that determine what and how children are fed and, thus, their “IYCF trajectory.”

*Objectives:* We aimed to describe IYCF trajectories from 0 to 11 mo of age and to explore decisions made by caregivers at critical junctures for breastfeeding (BF) and complementary feeding (CF).

*Methods:* We conducted 93 in-depth qualitative interviews with mothers, fathers, and grandmothers in 17 households in two intervention-exposed sub-districts at two critical child-feeding time-points (T1 & T2): 0-6 (T1) and 7-11 months of age (T2). We imposed a set of etic codes on these data by coding for 12 WHO-recommended practices. We used a 3-category scale (“non-optimal,” “semi-optimal,” and “most-optimal”) for the 12 WHO-recommended BF and CF practices to classify households into 9 IYCF trajectory patterns. We also coded for emic themes around decision-making for the 12 WHO-recommended BF and CF practices that determined shifts in a child’s IYCF trajectory. NVivo v10 was used for coding and analysis.

*Results:* IYCF trajectories varied widely across children and most children maintained sub-optimal trajectories from 0-11 mo. The concept of “decision moments” emerged during analysis. These decisions determined the child’s longitudinal pattern of feeding or IYCF trajectory. Salient decision moments for not maintaining optimal

IYCF trajectories emerged around giving breastmilk substitutes.

*Conclusions:* We conclude that there appears to be no normative IYCF trajectory that characterizes this study population. A variety of factors determine these variable trajectories. These findings suggest that interventions that aim to influence critical decisions for IYCF must be structured so that they target improvements in behavior given the high variability of IYCF trajectories appropriately. Moreover, interventions may need to be designed in a way that is more individually tailored to meet divergent caregiver and child needs.



## **Introduction**

Caregiving behaviors comprising breastfeeding and complementary feeding are determinants of nutrient intake, health, child survival, growth, and development [1]. In Bangladesh and many other countries, these infant and young child feeding (IYCF) practices are often sub-optimal [2], constraining physical and social development of children and therefore societies. Improving these practices are important to increase nutritional status and to reduce stunting, underweight, and wasting in Bangladesh and globally [3, 4].

Behavior change interventions (BCI) have been used to improve IYCF practices with varying success [5, 6]. In study by Bhutta et al., [5] in the Lancet undernutrition series, the authors determined that both the promotion of breastfeeding and communication for improved complementary feeding (with additional food in food insecure populations) are effective in preventing stunting, as well as death and disability related to early childhood malnutrition. However, the effects of these interventions vary, and some interventions have had little or no effect. Interventions that were designed to change complementary feeding practices achieved improvements in linear growth ranging from 0.04 to 0.64 z-scores [6]. This wide range of impact could arise in several ways, including variability in the delivery of these interventions, the household member's understanding and acceptance of the changes, and/or their ability to implement recommended changes. Understanding patterns of IYCF practices and the behavioral determinants of these patterns could provide critical insights into the potential for BCI to improve feeding behaviors, and identify needs for auxiliary interventions.

We investigated the patterns of IYCF practices and the processes underlying them in the context of Alive & Thrive (A&T), a large-scale behavior change intervention to improve IYCF practices in Bangladesh. A&T is designed to improve infant and young child nutrition by increasing rates of exclusive breastfeeding and improving complementary feeding practices in three countries: Bangladesh, Ethiopia, and Viet Nam. In this study we focused on the community based component [7] of the intervention in Bangladesh, which was delivered and implemented at the household level. Previous research has highlighted that the intervention was delivered at the scale intended [8], that intervention quality was robust [9], and that behavior-specific constraints could be impeding impact [9]. These studies highlighted the need for deeper ethnographic research at the level of the individual child and household to describe specific factors and patterns that might be constraining behavior change during the process evaluation for A&T.

To understand the patterns of IYCF practices in this intervention context, we investigated the series of feeding practices in individual children that formed a continuum over time, which we called a “trajectory.” The concept of trajectories has been used previously to describe IYCF behaviors in Bangladesh [10] and Sweden [11]; however, these studies applied trajectories in relation to breastfeeding and did not extend them to the continuum of IYCF practices in the period of complementary feeding.

The objective of this paper was to describe and explain variability in IYCF trajectories by illuminating the underlying processes that determined these trajectories in the context of A&T Bangladesh. We also aimed to demonstrate the utility of a

trajectories approach in understanding IYCF behavioral patterns to pinpoint when critical decisions for IYCF behaviors are made. We also aimed to analyze the longitudinal continuum of IYCF to strengthen both intervention development and program evaluation.

## **Methods**

### *Study sample*

We used data from the qualitative research in the A&T process evaluation, conducted approximately 1.5 years after the baseline survey data was collected for time-point 1 (T1), between November 2011 and January 2012, and approximately 2 years after the baseline survey data was collected for time-point 2 (T2), between June and July 2012. The sample contained 90 households from 3 sub-districts (*upazillas*) in the A&T evaluation; i.e. 30 households from each sub-district. The full methods for sampling of the qualitative research for the A&T process evaluation is discussed elsewhere [7]. Of the three sub-districts chosen, one had been exposed to the A&T intervention as well as a micronutrient powder intervention, one was exposed to the A&T intervention but no micronutrient powder intervention, and the third had no exposure to interventions (Figure 1). In all 90 households, in-depth, semi-structured interviews were conducted with mothers, fathers, and grandmothers regarding breastfeeding or complementary feeding practices, depending on the age of the child (T1).

Households were selected for follow up interviews (T2) if they were located in an A&T intervention exposed sub-district and had a child between the ages of 0 and 6 months at T1 (the index child). Mothers, fathers and grandmothers in each of these

households were approached for interviews approximately 6 months after the T1 interview.

At T1, 20 households in the two A&T-exposed sub-districts were available for interview (defined as any member available). At T2, 18 of these households were again available for interview; one household had moved and one refused to participate. In these 18 households, 17 interviews were conducted with mothers, 14 with fathers, and 15 with grandmothers. Households that were missing a T2 interview from the mother were dropped from this analysis. Thus, the final sample for this study comprised of 17 households and 93 total interviews, with interviews at T1 from 17 mothers, 15 fathers, and 15 grandmothers and at T2 from 17 mothers, 14 fathers and 15 grandmothers. The sample scheme is shown in Figure 2.

T1 and T2 were selected because of their importance for child feeding. Zero to 6 months is the recommended period for exclusive breastfeeding (EBF), and 7-11 months is when children should be introduced to complementary foods and then transition to complementary feeding.

#### *Data collection*

We used the ethnographic method of in-depth interviewing to elicit a rich description of individual IYCF trajectories. We define ethnography using Handwerker's definition, "the process and products of research that document what people know, feel, and do in a way that situates the phenomena at specific points in time in the history of individual lives, including pertinent global events and processes" [12]. The pertinent processes in this study were trajectories of IYCF. We situated the behaviors and experiences of individual caregivers as determinants of a child's feeding

trajectory (individual life history). We considered the caregiver behaviors that determine a child's feeding experience as personal cultural phenomena [13] that existed within the context of the household and community.

The research team consisted of six interviewers (two male and four female), all native Bengali speakers and educated in anthropology at the masters degree level. They were provided with extensive training in IYCF as well as qualitative interviewing. The female staff conducted all of the interviews with mothers because of local gender norms. We also matched the interviewer and the respondent by gender for the father and grandmother interviews whenever possible. MIB supervised the team throughout all of the interviews and AZ and MIB co-supervised this team during the T2 interviews.

Individual in-depth semi-structured qualitative interviews were conducted in Bengali and recorded in situ. The average interview length for T1 was 17.4 min  $\pm$  8.0 min and ranged from 6.8 min to 37.0 min. For T2 the average interview length was 38.9 min  $\pm$  16.2 min and ranged from 10.5 min to 83.3 min. The same interviewer usually conducted the T2 interviews in a given household. Before the T2 interview, the team reviewed, summarized and discussed the T1 interview (Appendix 1), highlighting important points for follow-up and reinforcing the material in the interviewer's mind. The interviewers followed a semi-structured narrative interview guide (Appendix 1), asking the household member to take them step-by-step through the child's feeding from birth to the present time, probing for program exposure, and other barriers and facilitators for that particular behavior as they moved along the child's feeding trajectory. Upon return from the field site, the audio files were copied

to computers and then transcribed into Microsoft Word documents in Bengali.

Transcripts were double checked for the accuracy of transcription. The transcripts were then translated into English, but the original Bengali was retained in lines above the translated portion. Hired translators outside of the research team translated the majority of transcripts. The research team checked transcripts for the accuracy of translation. Human subjects approval was obtained from the IFPRI and Cornell Institutional Review Board.

### *Data analysis*

IYCF behaviors in each household were evaluated against 12 World Health Organization (WHO) recommended breastfeeding and complementary feeding practices used as a priori etic codes. The 12 practices are: attempting to give breastmilk in the first hour; successfully breastfeeding in the first hour; not giving prelacteals; not giving breastmilk substitutes; not giving non-breastmilk liquids for other reasons besides breastmilk substitution; initiating CF on time; continuing breastfeeding after 6 months; introducing animal source foods between 6 and 8 months and sustaining that practice; feeding mashed family foods; feeding homemade snacks to the child; avoiding giving store-bought snack foods for the child; and feeding food to the child that has oil added after cooking. Each child was assigned a “yes” or “no” for each behavior based on reported practices rather than intended behaviors. For instance, if animal source foods were offered to the child at 6 months of age, but the child refused to eat these foods, this was considered non-consumption of animal source foods when determining the appropriate CF category. AZ developed the a priori descriptive code list, assigned codes to the text, and conducted the analysis

of the coded output. Data were coded using NVivo v. 10.

#### *IYCF categories*

Based on these behaviors, each child was assigned one of three BF categories for the period of 0-6 mo, and one of three CF categories for the period of 7-11 mo, defined as follows:

For the period of recommended exclusive breastfeeding (0-6 months):

- *Most-Optimal BF*: The recommendations on early initiation of BF and EBF were followed nearly perfectly. Something other than breastmilk was consumed by the child for a maximum of 3 times. Initiation of BF may be delayed within a few hours, but occurred as soon as the mother's milk came in.
- *Semi-Optimal BF*: Initiation of BF may be delayed, but colostrum was given. Something other than breastmilk was consumed by the child more than three times but for a maximum of 1 month duration.
- *Non-Optimal BF*: Initiation of BF may be delayed, and colostrum may or may not have been given. Something other than breastmilk was given for more than 1 month duration.

For the period of complementary feeding (6-11 months):

- *Most-Optimal CF*: CF recommendations were followed nearly perfectly. From 6-8 months, a variety of foods including animal source foods, vegetables and fruits was introduced and continued to be fed afterwards.
- *Semi-Optimal CF*: A few foods were introduced from 6-8 months or these foods were introduced after 8 months. Child only ate a few nutrient dense foods after introduction.

- *Non-Optimal CF*: Non-nutritionally dense foods were fed, and the child did not consume a variety of foods. A few nutrient dense foods were introduced to the child, but they were not regularly consumed.

We observed that each behavior was guided by an action or activity, which we call “decision moments.” These varied from instant and non-cognitively processed behavior to highly deliberative decisions. Decision moments formed the underlying process that determined the BF and CF behaviors and thus the course of a child’s IYCF trajectory. The term decision moments has some similarity to the “transient lactation crises” that Hillervik-Lindquist et al. [14] discuss in their study of breastfeeding trajectories in Swedish infants but it is necessarily different. In this study, the authors used “transient lactation crises” to refer specifically to a feeling that a mother had about perceived breast milk insufficiency or the perception that she was unable to meet the needs of her infant. These crises differ from decision moments in three ways. First, decision moments can occur during any point in a child’s IYCF trajectory, not just during breastfeeding. Second, decision moments can result in behavior that is compatible with recommendations or not. Finally, decision moments do not necessarily emanate from factors at the level of the mother. In this study, we examined decision moments that were articulated by mothers but could have resulted from any number of factors—from larger societal norms to determinants at the level of the household, mother or child. They were all examined here in reference to our etic structure of an ideal feeding trajectory.

We extracted emic themes around these decision moments and examined the timing of the decisions themselves. We presented one behavior that was influential in



determining a non-optimal category for BF. This was the feeding breastmilk substitutes. This behavior is critical to improvement of IYCF in the Bangladeshi context and is biologically important for child growth and development. Furthermore, it was heavily targeted by the A&T intervention, and therefore of high importance to the process evaluation.

## **Results**

### *Description of the sample*

The average age of the child at T1 was 3.7 mo (range: 1 - 5.3 mo) of age. At T2 the average age of the child was 9.8 mo (range: 7 - 11 mo) of age. The sample had slightly more male children (58.8%) than female children. The average age of the mother was 23.6 years (range: 17 - 35 years) old. The mean number of children was 2.5 (range: 1 - 8 children). Mother's education ranged from illiterate to class 10 (secondary school certificate) completion, with a mean highest class completed of 5.4.

In this sample of 17 children, the majority of mothers attempted to give breastmilk in the first hour (n=14), although for some this attempt was not successful (n=8). Six children received prelacteals. Many received foods/liquids as a substitute for breastmilk (n=9) and 14 received other liquids that were not intended to substitute for breastmilk before 6 months.

The entire sample reported continued breastfeeding after 6 months of age. All but one child received complementary foods on-time (defined as 6 months of age). The introduction of animal source foods followed by the sustained feeding of these foods was difficult for caregivers. Only 4 children received the sustained feeding of animal source foods (i.e. feeding animal source foods to the child more than twice).

Success in feeding mashed family foods to the child was high with all but 3 households able to achieve this. It is important to note, however, that the composition of these mashed family foods is not reflected in this count. Few children received homemade snacks (n=4) or had oil added to their food (n=4). The majority of caregivers were not able to avoid giving store-bought snack foods to their children (n=13) (Figure 3). The combinations of adherence and non-adherence to these practices determined each of the trajectory categories and thus the trajectory patterns observed (Figures 3 and 4).

A wide variety of trajectory patterns were found in this sample (Figure 4). Most households (10 out of 17) began their feeding trajectory with non-optimal BF. Five households exhibited semi-optimal BF, and only 2 had most-optimal BF. We observed a more even distribution in the CF categories, with 6 households in the non-optimal CF category, 7 in the semi-optimal CF category, and 4 in the most-optimal CF category. Overall, when the BF and CF trajectory categories were combined to form the IYCF trajectory, the most common pattern was non-optimal BF followed by semi-optimal CF (n=5). We observed no household with most-optimal BF and CF.

When the trajectory patterns are arranged from the most ideal to the least ideal we found that 14 children had one of the 5 least-ideal trajectory patterns characterized by either non-optimal BF or CF (or both). Ten children had one of the three least-ideal trajectory patterns (semi-optimal BF to non-optimal CF; non-optimal BF to semi-optimal CF; or non-optimal BF to non-optimal CF) (Figure 5).

#### *Trajectories and their characteristics*

By combining the categories for BF and CF, we defined nine possible

trajectories, eight of which occurred in our sample. Below we summarize the main characteristics of each trajectory pattern for this sample. Although we find some similarities, these summaries provide evidence of the variability within and between trajectory patterns.

*Most-Optimal Breastfeeding to Most-Optimal Complementary Feeding*

No children exhibited this trajectory pattern.

*Most-Optimal Breastfeeding to Semi-Optimal Complementary Feeding*

This trajectory pattern contains only one child and exemplifies the best feeding trajectory we observed. The mother of this child successfully breastfed during the first hour after birth, and did not give prelacteals, breastmilk substitutes or non-breastmilk liquids. She initiated CF on time and gave the child mashed family foods while continuing to BF in the second half of infancy. However, she struggled to consistently give animal source foods to the child, to avoid store-bought snack foods, and to add oil to the child's food.

*Semi-Optimal Breastfeeding to Most-Optimal Complementary Feeding*

This trajectory pattern provided an example of how households navigate different influences and barriers depending on the age of the child. The mother of the child that fell into this pattern attempted to give breastmilk in the first hour and was successful. Prelacteals and breastmilk substitutes were not given to this child. However, other non-breastmilk liquids for reasons other than to substitute for breastmilk were given to the child. The child then went on to a near-ideal CF situation; initiated complementary foods on-time, continued BF, and consumed animal source foods regularly and frequently as well as mashed family foods. The mother also

prepared homemade snacks. However, the child was fed store-bought snack foods, and oil was not added to food prepared for the child.

#### *Semi-Optimal Breastfeeding to Semi-Optimal Complementary Feeding*

The semi-optimal BF followed by semi-optimal CF trajectory pattern exhibited a different manifestation of BF practices than the previous pattern, even though these two trajectory patterns share the semi-optimal BF category. The mother did not attempt to give breastmilk within the first hour and thus did not successfully breastfeed in the first hour. No prelacteals were given to the child, but small amounts of breastmilk substitutes and non-breastmilk liquids (given for reasons other than to substitute for breastmilk) were given to the child. The child initiated CF on-time, BF was continued, and mashed family foods were consumed by the child. However, this household had difficulty providing animal source foods regularly and frequently for the child. They also did not avoid giving store-bought snack foods, did not make homemade snacks for the child nor add oil to the child's food.

#### *Most-Optimal Breastfeeding to Non-Optimal Complementary Feeding*

The child in this pattern started off well in the most ideal BF category and then transitioned into the least ideal CF category. BF was successfully initiated in the first hour, and no breastmilk substitutes were given. A very small amount of prelacteals and non-breastmilk liquids for reasons other than breastmilk substitution were given to the child, still allowing the child to remain within the bounds of the most-optimal BF category. When transitioning to CF, the mother continued to breastfeed the child and complementary foods were given on-time, however, this family faced challenges with giving animal source foods regularly and frequently as well as with making

homemade snacks for the child, avoiding store-bought snack foods, and adding oil to the child's food. Mashed family foods were given to the child, but these foods were not of very high nutritional value.

#### *Non-Optimal Breastfeeding to Most-Optimal Complementary Feeding*

These children began in the least ideal BF category mainly because they were fed breastmilk substitutes during the BF time period. Initiation of BF was a non-issue for these mothers; all attempted to give breastmilk in the first hour after birth and successfully breastfeed within that first hour. One of the three children in this trajectory pattern was given prelacteals, and two children were given non-breastmilk liquids for reasons other than substituting for breastmilk.

These children then transitioned into the most ideal CF pattern. The practice that set this trajectory pattern apart was the provision of animal source foods. In this group, animal source foods were introduced between 6 and 8 months of age followed by the regular, frequent feeding of these foods and the child's acceptance of animal source foods. All of these households introduced complementary foods close to when the child turned 6 months of age and continued BF. Additionally, these children ate mashed family foods. Despite these positive practices, none of the households made homemade snacks for the child or added oil to the child's food, and only one of the three households avoided giving store-bought snack foods to the child.

#### *Semi-Optimal Breastfeeding to Non-Optimal Complementary Feeding*

Three children followed this trajectory pattern. All mothers attempted to give breastmilk within the first hour of birth, and two out of the three were successful in early BF initiation. These two children were not given prelacteals. The child that was

not successfully breastfed within the first hour was given prelacteals. Two out of three were given breastmilk substitutes, and two out of three gave liquids to the child for other reasons. All initiated CF on time and continued BF. None were able to feed animal-source foods regularly and frequently, mashed family foods, homemade snacks or add oil to the child's prepared foods. In one household, an effort was made to avoid giving store-bought snack foods to the child, while in the others no effort was made to avoid these foods.

#### *Non-Optimal Breastfeeding to Semi-Optimal Complementary Feeding*

This trajectory pattern had the most children (n=5). In this pattern, mothers had a difficult start to child feeding, while four attempted to give breastmilk, only one mother breastfed successfully in the first hour after birth. Three children were given prelacteals, and all were given non-breastmilk liquids for reasons other than breastmilk substitution. Only one child was given breastmilk substitutes. All initiated CF on time, continued BF, and successfully fed mashed family foods to the child. However, none of the children were fed animal source foods regularly and frequently. Two children were fed homemade snacks, and in these two households, family members avoided giving shop foods to the child. Three children were also fed prepared food with added oil.

#### *Non-Optimal Breastfeeding to Non-Optimal Complementary Feeding*

The two children in this trajectory pattern were fed in a manner that deviated the most from recommended IYCF practices. Only one mother attempted to initiate BF in the first hour after birth. In one household the mother did not breastfeed successfully in the first hour because of a c-section delivery. In the other household

the mother faced insurmountable difficulties in her first attempts to feed the child. Neither of these children, however, were given prelacteals. One child was given non-breastmilk liquids for reasons other than to substitute for breastmilk, and both households gave liquids for the purpose of breastmilk substitution. These practices were the driving force for classification in the non-optimal BF category. Mothers gave breastmilk to their children during the 0-6 month period and continued breastfeeding after 6 months of age. CF was initiated on-time for one household in this category but delayed for the other. For both of these children it was difficult for their caregivers to feed animal source foods regularly and frequently. They also faced difficulties in feeding mashed family foods to the child. In one household, the mother struggled with the child refusing to eat mashed family foods as well as the child's poor appetite. In the other household, the child was fed few mashed family foods that were of low nutritional quality; however, this mother added oil to the child's food after preparation occasionally. Store-bought snack foods were provided commonly to the children, and neither household prepared homemade snack foods.

#### *Decision moments drive the course of the trajectory*

The trajectories approach helped us to identify and pinpoint when critical decisions for IYCF are made. Here we present the decision moments that were made for one behavior, giving breastmilk substitutes. We selected this behavior because it was salient in determining the breastfeeding category for the IYCF trajectories. These decision moments were all identified from the mother's narratives in the in-depth interviews and viewed in relation to the child's trajectory. They resulted in either a child deviating from the ideal trajectory or adhering to recommended practices.

### *Decision moments for breastmilk substitutes*

All of the decisions that were articulated by mothers in this sample for breastmilk substitutes are described in Box 1. Most decisions about breastmilk substitutes were made following birth before a child was 1 month old (n=13) (Table 2), these decisions were driven by delayed lactogenesis, fears about breastmilk insufficiency, and advice from doctors and family members (Box 1). We expected that most decisions for breastmilk substitutes would be made following birth, as this is when a mother must begin feeding her child and navigate many challenges that surround the initiation of breastfeeding.

We identified up to 4 decision moments for breastmilk substitutes in the mother's interviews when their child was between 0 and 6 months of age. In most mother's interviews we identified 1 or 2 decision moments (Table 2). The large number of decisions that were made following birth in this sample decreased when the child was 1 and 2 months of age and then increased again when children were 3 months of age or older. At this time, a child's increased development, coupled with the perception that breastmilk may not be enough for the growing child, drove many decisions to give breastmilk substitutes. Many expressed fear that breastmilk was unable to "fill the child's stomach." This was usually indicated by a child screaming and crying (Box 1). An example from Household 3 illustrates the process through which the decision moments for breastmilk substitutes occurred:

The mother heard on TV and from her family members that breastmilk is enough for the child up to 6 months of age. "These [foods] should be given after 6 months of age. My husband, my mother-in-law all tell me not to give those things...only breastmilk is enough for the child until 6 months." However, this mother faced an exception to this rule, in her opinion. When the



child was 3 months old, the mother felt that her breastmilk was insufficient and she informed her husband. They then sought advice from the village “doctor.” “After my child received a decreased amount of breastmilk, I went to the doctor and he suggested that I feed him “Baby Care” (infant formula), then I followed his instruction and started to feed “Baby Care” to the child.” The mother knew that the child was not getting enough breastmilk because he was always crying. She began to feed him “Baby Care” when he was 4 months old along with breastmilk, however, after about a month of feeding “Baby Care” the mother returned to exclusive breastfeeding because the child developed a cold, cough, and fever. The mother wasn’t sure if “Baby Care” was the reason the child fell ill, but she thought the two might be associated. After terminating “Baby Care” the mother now believes that the child is getting enough breastmilk. She blamed her lack of milk production on her improper eating. “If I eat properly then enough milk will be produced, and the child will also get [enough]. Now I only have 2 months remaining [until the child is 6 months old], I will be able to do that.”

Overall, in this sample, the decision to give breastmilk substitutes involved a struggle between discordant beliefs and actions among mothers. The decision making process to give breastmilk substitutes was usually initiated either by a mother’s perception that she was not producing enough breastmilk or that the breastmilk she was producing was not sufficient to meet the child’s needs and “fill the child’s stomach.” Women would often attribute insufficient breastmilk production to inadequacies in their own diet—that they “weren’t eating properly.”

Although many mothers believed that only breastmilk should be given up to 6 months of age, and stated this outright, mothers would also explain that there were exceptions to the recommended practice of giving only breastmilk until 6 months of age. Situations where the “rule” didn’t apply included if the mother felt that her breastmilk was not sufficient or if the child was exhibiting symptoms that (s)he was not full with the breastmilk that the mother was supplying. One mother said, “If the child doesn’t get breast milk then you could arrange other food....and if the child gets

breastmilk you have to feed him breastmilk.” (Household 19) If the child was perceived to be hungry, mothers were fearful of not giving other foods to the child even if they knew that only breastmilk should be given up to 6 months of age. The mother in Household 4 explained: “On TV, it said that mother’s milk is sufficient for a newborn until 6 months of age, it is forbidden to give any other kind of food during this period...I realized that my child was not getting enough milk; saving her life from hunger was the priority. That’s why I gave a small amount of extra food.” This mother gave her child rice gruel.

It was common for mothers to say that they “just knew” if they were not producing enough breastmilk or if their child was not getting enough breastmilk to meet the child’s needs. “How could I understand that? I am a mother, so I could understand. The child’s stomach was not fulfilled. The child did not get [enough] breastmilk.” (Household 3) Mothers also named cues from children that indicated that it was necessary to consider something to replace breastfeeding. These include screaming, crying, and sounds from a baby’s stomach. Mothers also described relying on the child’s cues to see if giving something other than breastmilk was the appropriate thing to do. They would offer the substitute to the child and “check” to see if the child would accept this. If the child ate it they would take it as a sign that this was necessary to give this to the child as a substitute for breastmilk.

In the process of deciding to give breastmilk substitutes, consultation and advice was sought from elders, village “doctors,” and health-workers. Occasionally a mother would decide on her own what to feed her child. A mix of advice was received, but most frequently a mother was advised to give something else to her child

including infant formula, powdered cow's milk mixed with water, watery rice or wheat flour based gruels (with or without sugar added), and fresh cow's milk boiled and mixed with water.

## **Discussion**

This study illuminates the many ways in which mothers and households navigate the continuum from breastfeeding to complementary feeding. We found substantial variability in practices across this sample, demonstrating that there is perhaps no norm for infant feeding in the dynamic landscape of changing knowledge and practices in this setting. Our qualitative and longitudinal data provide insights into feeding transitions that are often missing in cross-sectional surveys.

### *Variability in IYCF trajectory patterns*

Patterns of IYCF behavior are sometimes assumed to be similar across caregiver-child dyads within cultures, and infant and young child diets are assumed to be largely homogenous during key child feeding periods (e.g. the exclusive breastfeeding and the complementary feeding time periods). Intra-cultural diversity in behavior is often not considered [15]. Interventions targeting IYCF behaviors will often assess the broad cultural context in which IYCF is operating, but not account for potential variability in IYCF practices and patterns of behavior on the regional and household level in both the design and evaluation stages. This is reflected in the typical cross-sectional approach to evaluating IYCF behaviors, in which one IYCF behavior (e.g. provision of animal-source foods) or a set of behaviors (e.g. breastfeeding) is examined at a single time. Although this approach may provide depth, it doesn't allow one to see the full continuum of IYCF practices across time.

In this study, we found that households displayed a broad range of trajectory patterns and that, within these trajectory patterns, households practice different combinations of IYCF behaviors that led to deviations from recommended practices. At the individual household and child level, variability in practices and underlying determinants were still present.

Notably, not a single child in the sample was fed appropriately across the IYCF continuum and, for all children, either BF or CF or both was suboptimal. This has implications for the extent to which individual children can fully benefit from the full package of IYCF practices and for the way targeting is considered during IYCF BCI program planning. To address this high variability, interventions may need to be more individually tailored to meet divergent caregiver and child needs.

#### *Decision moments*

To influence trajectories, we must understand the decisions that shape them. Analysis of decision moments for breastmilk substitutes highlights the individual nature of the interpretation of messages, household interpersonal dynamics, and beliefs. It also suggested that there are some observable similarities across households. Despite knowledge that breastmilk was enough for the child up to 6 months, there were times when mothers believed that there were exceptions to this rule. Overall, mothers feared that they were not caring well for their child if they continued to try to exclusively breastfeed when they felt that breastmilk was not meeting the needs of the child. Fears about breastmilk insufficiency are still the major driver of many of the decisions to feed breastmilk substitutes. Pervasive beliefs about breastmilk insufficiency have been well documented in studies on breastfeeding in

Bangladesh [16-19]. Our findings suggest that exclusive breastfeeding messaging need to be investigated further and possibly refined to target perceptions of insufficiency by mothers. In this study we found that in general, mothers believe that exclusive breastfeeding is best and the right thing to do *if* breastmilk is perceived to be sufficiently produced and meets the needs of the current developmental stage of the child. In this way, exclusive breastfeeding is considered conditional, where fears of insufficiency and inadequacy frequently trump this recommendation.

Feeding a child is not a one-way interaction, but a two-way transactional relationship [1]. Harkness and Super [20] discuss how child characteristics can mediate child health outcomes as part of the co-evolution of the growing child and the developmental niche. The behavior and characteristics of a child can determine the care that a child receives [1] and as we observed in this study of the decision moments that determine the course of a child's trajectory. For example, we found that child refusals played a large role in the inconsistent feeding of animal-source foods. If a child refused a particular animal-source food, many mothers would discontinue feeding that food immediately or try once or twice more before deciding not to feed a child the food. Another example that was observed in this sample is that screaming and crying was sometimes interpreted as an indication of insufficient breastmilk or the inadequacy of the mother's breastmilk to "fill up the child's hunger."

Having a summary landscape of decision moments for specific behaviors and across a spectrum of IYCF practices in a population can inform the further tailoring of IYCF BCI interventions. However, it is clear that decision moments for a behavior occur for a diversity of reasons, indicating the need for individually tailored,

interpersonal behavioral-change communication to address the wide variety of behaviors in this setting.

*Understanding IYCF: the methodological contribution of a trajectories approach with an ethnographic perspective*

A trajectory approach can be used to articulate IYCF behavioral data, and can depict a continuum of IYCF practices across time. In describing behavioral patterns over time, a trajectory approach has aided in understanding aspects of IYCF in studies of breastfeeding in Bangladesh [10] and Sweden [11]. Rasheed et al. [10] demonstrated the inadequacy of using the standard definitions that describe breastfeeding practices and instead employed a trajectory approach to derive three new categories of breastfeeding behavior that acknowledge the complexity of long-term breastfeeding patterns in this population. The authors found that these patterns were associated with distinct factors on the infant, maternal, and household level (such as birth weight, maternal age, and poverty). In Sweden, Hornell et al. [11] investigated breastfeeding trajectories and their association with breastfeeding duration and patterns. They divided their sample into two groups, mothers that introduced solids and those that introduced infant formula at specified time periods. They found that the age at which an infant was introduced to solid foods was not associated with breastfeeding duration. In contrast, the introduction of formula was associated with a rapid decline in BF frequency and inversely associated with breastfeeding duration.

Focused qualitative/ethnographic methods have a substantial history in IYCF and nutrition intervention literature. These methods have been used extensively in relation to child health [21], in the context of formative research and process

evaluation for an IYCF intervention in Haiti [22-25], in relation to micronutrient powders in Kenya [26, 27] and most recently, in relation to assessing the potential for a fortified complementary food in Ghana [28]. These approaches were used to understand factors that influenced behaviors related to feeding and health care. Focused ethnographic methods use a mix of methods that include traditional qualitative research techniques such as individual and group interviews, as well as small-scale quantitative methods such as brief surveys. In our study, individual in-depth semi-structured qualitative interviewing was used to elicit rich description of individual IYCF trajectories.

Our approach was unique because we brought an ethnographic perspective to the trajectories approach across a full spectrum of IYCF from BF to CF, which allowed us to gain a greater understanding of decision moments and the social and behavioral conditions that produce a trajectory pattern. Also, examining trajectories using qualitative in-depth interviews permitted us to construct a trajectory with more accuracy of measurement for the behaviors that comprise an individual trajectory. Providing the opportunity for respondents to describe IYCF behaviors that they carried out may have revealed some behaviors (and underlying decision moments) that a survey designed a priori could not.

#### *Strengths and weaknesses*

This study employed a unique approach that documented IYCF patterns and classified them relative to an ideal IYCF trajectory. The trajectory approach used in this study, across a full spectrum of IYCF, is a methodological advancement in the evaluation of IYCF.

Through our analysis, we were able to reveal decision moments, important drivers of an IYCF trajectory. Decision moments have not been articulated outside of this study. This articulation of decision moments provides those who study IYCF behavior with the language to describe and evaluate consequential decisions in a child's feeding trajectory. Decision moments allows for the identification of the moments that are critical in relation to our etic superimposed recommendations (the ideal IYCF trajectory). This identification of decision moments begs the question, what do decision moments look like in other contexts? What do they consist of? How do they manifest within the lives of women within a community? How can we design interventions that target decision moments and support caregivers at these critical time-points?

Although this study contributed methodologically and substantively to research for IYCF, it is not without weaknesses. We did examine a full spectrum of IYCF practices, but mothers recalled nearly all of these practices. The recollection of the timing and practice of IYCF behaviors, as well as the perspective about the influences on those behaviors, could have been distorted. Conducting interviews more frequently could have reduced this recall bias.

Social desirability bias could have tainted reported practices, although every effort was made to ensure trust and a non-judgmental atmosphere between the interviewer and the study participants. Direct observation could have increased the reliability of measurement, but it could have also influenced behavior.

#### *Recommendations for future research*

The data used in this analysis were generated as part of the process evaluation



for A&T. However, we did not evaluate trajectory patterns in relation to the uptake of the intervention. In the analysis of decision moments, we chose to investigate one problematic behavior in this sample, but did not explore this behavior in relation to individual intervention exposure. Understanding how the results found here relate to program exposure and implementation is the next necessary step to make recommendations for improving large-scale behavior change interventions such as this one. The results of this study also support the need for further designing and testing of individually tailored, interpersonal behavior change communication to address the wide variety of behaviors and determinants of behavior.

### *Conclusions*

This study identified a great deal of variability in IYCF trajectories across individual children. Most importantly, it highlighted that no single child was fed according to recommended practices across the trajectory, despite living in an A&T intervention-exposed area. The study, therefore, highlights the continuing challenge to support the full spectrum of IYCF practices in individual children and the need for more individually-tailored behavior change communication.

## Figures and Tables

Figure 1: Overall qualitative sampling scheme for the Alive & Thrive process evaluation research

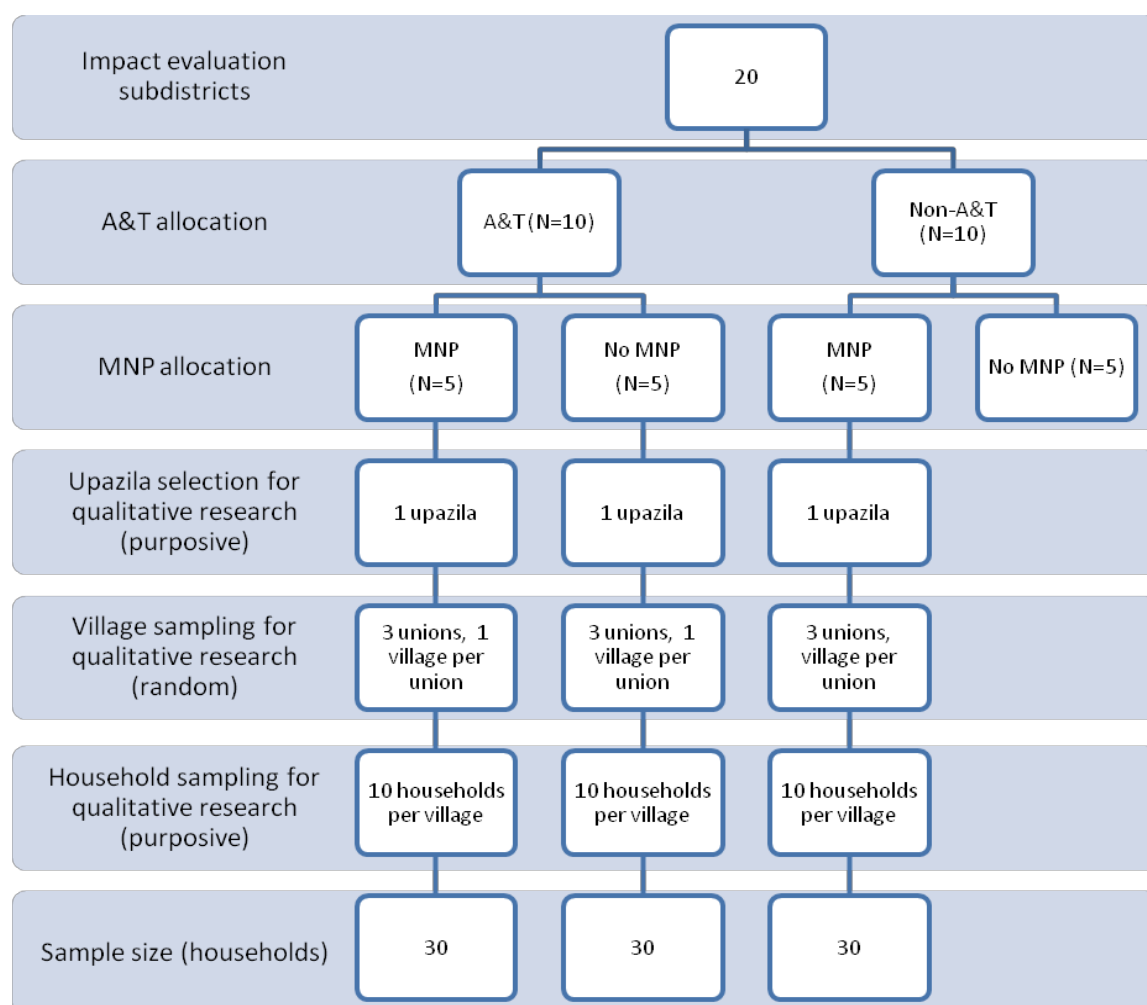


Figure 2: Sampling scheme for this study of IYCF trajectories

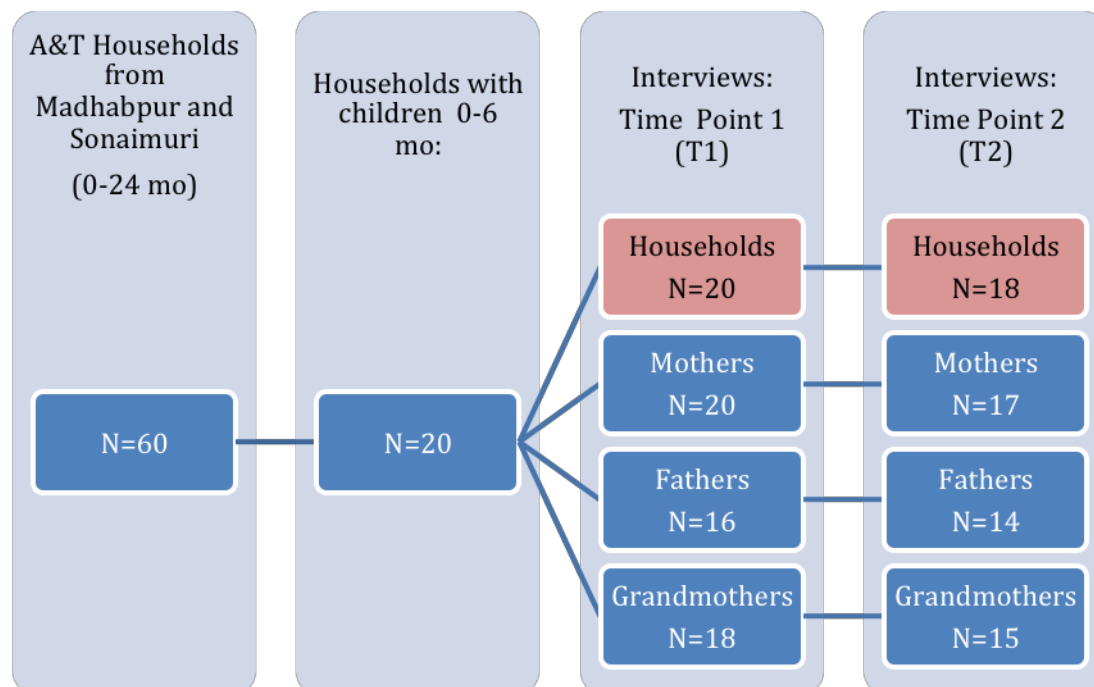


Table 1: Sample characteristics of participants in this study

Characteristic	(n=17 children and mothers)
Child age mean (range)	Time Point 1: 3.7 mo (1 mo – 5.3 mo) Time Point 2: 9.8 mo (7 mo – 11 mo)
Child gender (percentage)	Male: 58.8% Female: 41.2%
Maternal age mean (range)	23.6 (17 yrs – 35 yrs)
Mother's parity mean (range)	2.5 (1 – 8 children)
Mother's education (highest class completed)	5.4 (Illiterate to class 10)

Figure 3: Breastfeeding & complementary feeding practices and categorizations

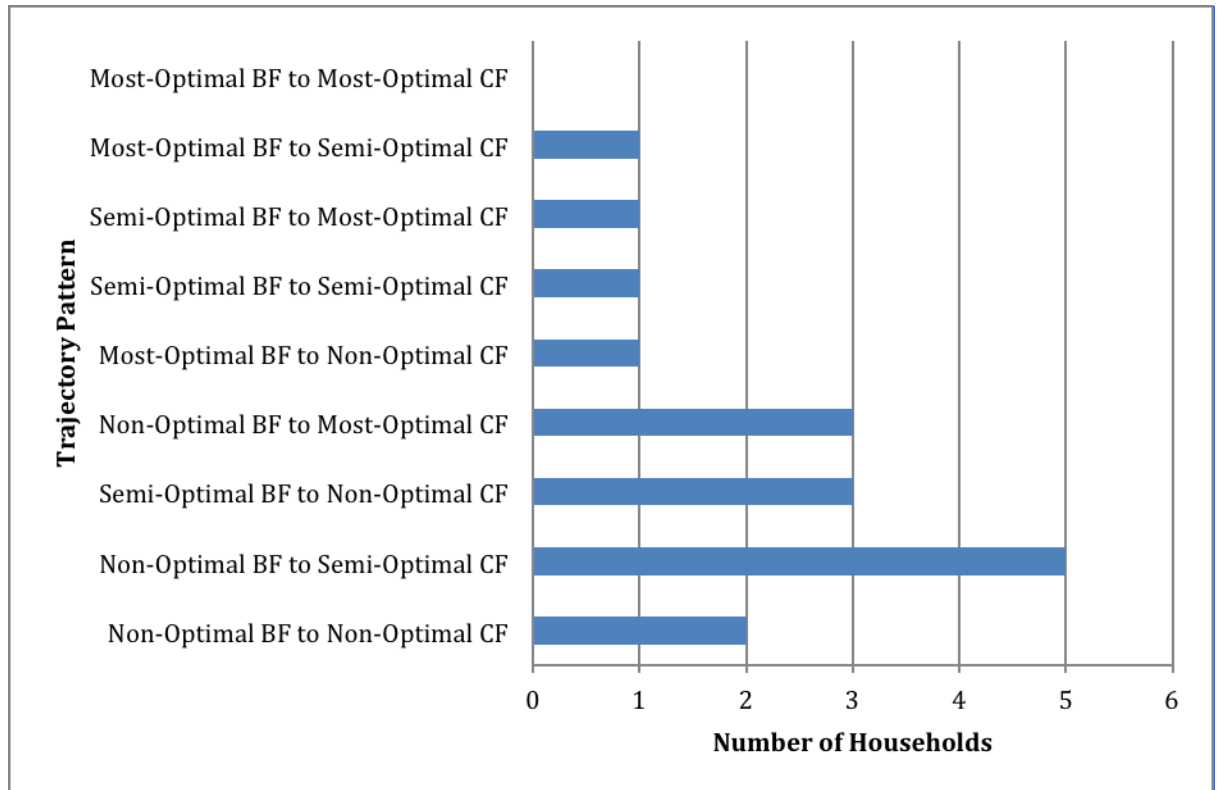
Each number represents the assigned household number. Grey boxes indicate a “yes” for the respective practice. White boxes indicate a “no” for the respective practice. An “//” in the box indicates that the practice is unknown based on the data available. Definitions of categories (e.g. most-optimal) are given in the text.

BF Category	CF Category	Household (HH) Number	Breastfeeding Practices					Complementary Feeding Practices						
			<i>Attempted to Give BM in 1<sup>st</sup> Hour</i>	<i>Successfully Breastfed in 1<sup>st</sup> Hour</i>	<i>Did NOT Give Prelacteals</i>	<i>Did NOT Give Breastmilk Substitutes</i>	<i>Did NOT give Non-Breastmilk Liquid for Other Reasons</i>	<i>Initiates CF On Time</i>	<i>Continues BF</i>	<i>Introduces Animal Source Foods between 6 and 8 mo and child eats regularly &amp; frequently</i>	<i>Feeds Mashed Family Foods &amp; Child Eats</i>	<i>Makes Homemade Snacks for the Child</i>	<i>Avoids Giving Shop Food to the Child</i>	<i>Adds Oil to the Child's Food &amp; Child Eats</i>
Non-Optimal	Most-Optimal	11										//		
		3												
		4												
	Semi-Optimal	12												
		13												
		6												
		8												
		9												
	Non-Optimal	20												
		5											//	
Semi-Optimal	Most-Optimal	16												
	Semi-Optimal	7												
	Non-Optimal	14												
		10												
		18												
Most-Optimal	Semi-Optimal	15												
	Non-Optimal	19												

Figure 4: Summary of trajectory patterns

Breastfeeding (BF) Category	Complementary Feeding (CF) Category			
	Number of Households	Non- Optimal CF	Semi- Optimal CF	Most- Optimal CF
		Non- Optimal BF	Semi- Optimal BF	Most- Optimal BF
		2	5	3
		3	1	1
		1	1	0

Figure 5: Number of households in each trajectory pattern (from most ideal to least ideal)



**Box 1: Decision moments for breastmilk substitutes by age of the child across the entire sample (HH = Household)**

***0 months old***

**HH 5:** During the first 4 days after birth the child was not able to take breastmilk at the breast. The mother tried expressing breastmilk and giving it with a medicine dropper. The child was still not taking enough breastmilk and was crying so they knew that the child wasn't getting enough milk. The family consulted a homeopathic doctor. The doctor advised to give infant formula and they gave this to the child.

**HH 6:** The mother sought advice from a doctor about giving formula to her child. The doctor advised her not to give formula, stating that there was no need for this. The doctor instead gave the mother some tablets to increase her breastmilk production. The mother continued breastfeeding.

**HH 9:** Breastmilk wasn't coming in for three days so the family consulted a doctor, asking what to feed the child. The doctor forbade them to give anything else besides breastmilk. Despite this, the maternal grandmother brought over water to feed the child for three days.

**HH 10:** The mother decided not to give tinned milk to the child because the child was getting sufficient breastmilk. Also, the mother expressed that it was too much of a hassle to prepare tinned milk for the child.

**HH 11:** The mother was diagnosed with Hepatitis B and was forbidden to give breastmilk by her doctor, the doctor instructed her to give infant formula and she gave this to the child.

**HH 12:** For the three days following birth, the mother's breastmilk had not yet come in well enough, as perceived by the mother. The mother felt that the baby was not getting a lot of breastmilk so sugar candy water was given to the child instead of breastmilk.

**HH 12:** After three days of feeding sugar candy water the mother decided to give only breastmilk. The mother felt that her breastmilk was flowing and that the child was getting enough breastmilk.

**HH 13:** Sugar water was given to the child for 4 days after birth because breastmilk was not coming in.

**HH 14:** Breastmilk was delayed for 3 days after birth so sugar candy water was given to the child.

**HH 15:** The child's grandmother is involved with a local maternal and child health program so she knew that giving only breastmilk until 6 months is what should be done. The mother also received supportive advice from a BRAC healthworker. The mother decided only to give breastmilk to her child.

**HH 18:** The mother knows from watching TV commercials that she should only give breastmilk to her child up to 6 months of age. She decided to exclusively breastfeed her child.

**HH19:** The mother had an aspiration to give breastmilk as long as she could and not to give any other food. The mother decided that when her breastmilk "reduced" she would feed other things to the child, but before that she would only give breastmilk.

**HH 20:** The mother decided to exclusively breastfeed.

***1 month old***

**HH 9:** The mother felt that the child was not getting enough breastmilk. The mother consulted the doctor and the doctor advised to feed powdered milk. The mother felt that the family didn't have enough money to purchase the powdered milk so she didn't even request her husband to purchase it for the child. All of the mother's aunties as well as her mother told her only to give breastmilk.

**HH 14:** The mother felt that breastmilk wasn't enough so rice flour porridge and shagu (gruel) with sugar was given to the child. Bananas were also given to the child but the child didn't eat these things.

**HH 16:** The mother's health was not good and the baby was having problems getting breastmilk. The father of the child suggested giving powdered cows milk to the child but the mother refused and continued breastfeeding.

**Box 1 (continued): Decision moments for breastmilk substitutes by age of the child across the entire sample (HH = Household)**

***2 months old***

**HH 14:** The mother felt that breastmilk was not enough for the child so she tried giving boiled cow's milk but the child didn't eat it. She also tried khichuri (lentils, vegetables, rice) but the child didn't eat that, so she started giving water to the child.

***3 months old***

**HH 4:** The baby was given 1 bottle of water daily to get rid of kidney problems.

**HH 5:** Suji (gruel) was added to infant formula and fed using a bottle. The mother felt that only giving breastmilk was not enough to meet the child's hunger and that the child couldn't get any breastmilk from the mother. The maternal grandmother of the child instructed the mother to add suji with the infant formula and feed using the bottle.

**HH 11:** The mother decided on her own to disobey a doctor's earlier orders to give her child infant formula and switched the baby back to exclusive breastfeeding.

**HH 14:** The mother felt that breastmilk was not enough for the child so she tried giving the child rice, but the child refused to eat it.

***4 months old***

**HH 3:** The mother felt that her breastmilk was insufficient so she fed infant formula.

**HH 4:** Cerelac (infant rice cereal) was given to the child because the mother believed that her breastmilk was insufficient and the child remained hungry after feeding breastmilk.

**HH 13:** The baby's uncle brought a bottle and powdered cow's milk to feed to the baby. They tried giving it to the baby with sugar candy but the baby didn't like it so they stopped feeding it. The baby was crying a lot and they were worried that the child was not getting full so they prepared suji (gruel) with the powdered cow's milk and put it in the bottle.

**HH 20:** The mother decided to give cow's milk to the child. The cow's milk was from a cow that they have at home. The mother boiled the cow's milk then added water and fed it to the child. The mother felt that after a child reaches 4 months of age, you know that they are not getting enough breastmilk. She believed that the breastmilk the child was getting at this age was not filling up the child's stomach, so supplementary food has to be given to the child. The mother knew that the child wasn't getting enough to eat because the child was screaming.

***5 months old***

**HH 3:** The child had diarrhea, a cough, and a fever. Some believed that she had "pox." Breastfeeding was stopped.

**HH 7:** The husband told the mother of the child to give infant formula. The mother tried it but the child refused to take it, so she stopped trying despite the father's advice.

**HH 18:** The mother fed boiled cow's milk. A doctor told the mother that feeding breastmilk was not enough for the child, and that powdered milk should be given to the child. The mother didn't want to purchase the powdered milk. Since cow's milk is available in the household, she gave that to the child after discussing it with her husband. The child developed mouth sores after the mother gave cow's milk for some time so, they stopped giving it.



Table 2: Summary of the timing of decision moments for breastmilk substitutes

*An “x” indicates a decision moment articulated by a mother during the in-depth interview.*

Household #	Age of Child (months)						Total Decision Moments
	0	1	2	3	4	5	
3					x	x	2
4				x	x		2
5	x			x			2
6	x						1
7						x	1
8							0
9	x	x					2
10	x						1
11	x			x			2
12	xx						2
13	x				x		2
14	x	x	x	x			4
15	x						1
16		x					1
18	x					x	2
19	x						1
20	x				x		2
Total Decision Moments	13	3	1	4	4	3	28

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## **Appendix 1: Interview guides used for individual qualitative in-depth interviews**

### **1.1 Interview guide for time-point 1 interviews**

#### **Questions for mothers**

##### **Experience of birth and initiation of BF**

1. Where did you deliver your child?
2. How was the child's health when born?
3. Who helped you at child's birth?
4. Did anyone suggest what needed to be done after child birth? If 'yes', who advised you and what advice did they give? (Probe-start BF, give the child any other liquids)
5. During pregnancy did mother receive any information regarding breast feeding?
  - a. If 'yes', what information and from whom?

##### **Recommended practice: not feeding pre-lacteals to the child:**

1.
  - a. Immediately after child's birth did you or any of your family members feed or try to feed any liquids (honey, sugar water, sugar, water, mustard oil, goats, cows or any other animal's milk, or anything else)?
  - b. If fed, what liquid did you feed and why? Who fed?
2.
  - a. Did you ever hear, other than breast milk no other liquid(honey, sugar water, sugar, water, mustard oil, goats, cows or any other animal's milk, or anything else) should be given/put to the child's mouth from child's birth to next several days?
  - b. If heard, from where/from whom you heard about this?
  - c. What is your opinion about this?

##### **Recommended practice: initiate BF within one hour of birth:**

1.
  - a. When breastfeeding should begin?
  - b. When should child starts breast feeding- did anyone tell you about this? / Did you learn it from anywhere?
  - c. If yes', from whom/ where did you hear about this?
2.
  - a. How long after child birth did you start BF your child?
  - b. What was your experience about breast feeding your child for the first time?
  - c. If it was a difficult experience, then-

Why was it like this ? What did you do at that time? Did anyone support you or give any advice? Who was it? What type of support or advice that was?

- d. What did your family members think about giving breast milk to the child right after birth?
3. If you did not give your child breast milk within an hour of your child's birth, then tell us the reasons behind that? (explore in detail)
4. Why it is so important to give only breast milk right after birth?

**Recommended practice: exclusive BF up to 6 months of the child:**

1. Tell me about your breastfeeding experience so far ?
2.
  - a. Did you give anything else to your child other than breast milk from birth till now? If 'yes', then what did you give? From what age did you start to give? Why did you start to give?
  - b. Did anyone give any other foods to your child (milk, juice etc. )?If 'yes', what did they give? From what age did they start to give? Why? (cultural practice, beliefs about child growth, insufficient breast milk etc.)
  - c. When another family member introduced other food to your child, what did you do then? Why?
  - d. At what age did you start to give anything else other than Breast-milk to your child?
3.
  - a. Do you think you can raise your child with feeding only breast milk up to 6 months of age?
  - b. If you think breast milk is not sufficient then what is the reason behind that?( probe: own Idea of not having sufficient breast milk)
  - c. How do you understand you don't have enough breast milk for your child (child stomach is not filled)? Why do you think so? What was your child's age at that time? As you said just now that your Idea you do not have enough breast milk , is this your own idea or someone else's? If the idea is somebody else's then whose? What did s/he tell you about this?
  - d. When you had this idea that you don't have sufficient breast milk, Did you discuss this anyone else? If you did then with whom? What advice did s/he give? What did you do after hearing this advice?
4.
  - a. Have you heard that only breast milk and not even a drop of water to be given to child till completion of six months of age?

- b. If you heard, where/from whom did you hear about this? What did you hear? What did you do after hearing this advice? What is your opinion of this advice? What do the other people in the HH say about this or what is their opinion about this?

### **Mother's work, time and feeding the child up to 6 months**

- 1.a. Does anyone help you to do the housework?
- b. Are you able to manage all your household work and breastfeed your child properly?
- c. Who takes care of your child when you do household work?
- d. Who feeds the child when you do household work?
- e. If mother is involved with any income activities outside the house, in that case -
  - I. When you go outside for work (job), then who takes care of/feeds your child? What is the child fed during that time?
  - II. What do you feed him/her after coming back from work (job)? Tell us in detail?

### **Breastfeeding questions for older women and TBAs**

1. What kind of suggestion or support did you give to your daughter/daughter-in-law/ the mother?
  - a. Probe to understand advice and support (for example: to help in the household work, help in taking care of child, etc.)
2. What kind of suggestion did you give at different times/stages :
  - a. During pregnancy
  - b. At the time of delivery and immediately after
  - c. When the child grows a little older (within 6 months)?
3. Learn about elderly woman's and the TBA's beliefs about breastfeeding the child right after birth.
  - a. When do you think breastfeeding should be started?
  - b. If you think breastfeeding should be started right after birth, then did you help mother breastfeed?
  - c. If you think BF should not be started right after birth then what are the reasons behind that?
  - d. Do you think the newborn should be given any liquids other than breast milk?
  - e. When should a child be fed for the first time? What should be fed at that time?
  - f. What other issues are important during child delivery (prayers, rituals etc.)?

- g. Do you believe that a mother can give enough breast milk to the child right after birth? Tell us your opinion/suggestion about this?
  - h. Did you hear any messages related to **initiation of breastfeeding** (from health workers, the media, other people in the community or HH). If the respondent heard this then probe as follows:
    - a. What BF messages did you hear?
    - b. Where did you hear it from?
    - c. Do you agree with this advice?
    - d. If you do not agree then what are the reasons behind?
4. Ask the elderly lady and the TBA about insufficient breast milk :
- a. Do you think only breast milk is enough for the child till six months of age?
  - b. If no then why?
  - c. What do you suggest?
  - d. Do you think only breast milk is able to fulfil the requirement of water for a child ?
  - e. If no, what do you suggest?
  - f. Did you hear anything related to **exclusive breastfeeding** (from health workers, the media, other people in the community or HH). If you heard , then probe the following:
    - a. What information did you hear about breast feeding?
    - b. From where did you hear this?
    - c. Do you agree with this advice?
    - d. If do not agree then why? Explain why?

### **Breastfeeding questions for men**

- 1. Did you give any advice or support to help your wife breastfeed?
  - a. Probe to understand advice and support
- 2. What kind of support did you give at different times/stages:
  - a. During pregnancy
  - b. When the child grows a little older (within 6 months)?
- 3. Learn about father's belief about breastfeeding the child right after birth.
  - a. When do you think breastfeeding should be started?
  - b. If you think breastfeeding should not be started right after birth then what are the reasons behind that?
  - c. Do you think the new born should be given any liquids other than breast milk?
  - d. Do you believe that a mother can give enough breast milk to the child right after birth? Tell us your opinion/suggestion about this?
- 4. Ask the husband about insufficient breast milk :
  - a. Do you think only breast milk, without a single drop of water, is enough for the child till six months of age?
  - b. If no then why?
  - c. What do you suggest giving to the child?

- d. Do you think only breast milk is able to fulfil the requirement of water for a child ?
- e. If no, what do you suggest giving to the child?
- f. Did you hear anything related to **exclusive breastfeeding** (from health workers, the media, other people in the community or HH) over the last 6 months? If you heard , then probe the following:
  - a. What types of things did you hear about breastfeeding?
  - b. From where did you hear this?
  - c. Do you agree with this advice?
  - d. If do not agree then why? Explain why?
- g. Have you ever experienced a situation with your baby where you felt the baby was not getting enough breastmilk?
  - a. How did you know/understand that?
  - b. What did you do when you felt that way? Why?
- h. Have you ever bought formula, tinned milk or cows milk from the market for your baby?
  - a. When did you first do this? Why?



## 1.2 Interview guide for time-point 2 interviews

SUMMARY TABLE

Topics	Description
Feeding trajectory	What has happened since the last visit?
Complementary feeding	What is happening currently
Probing for maternal & household capabilities that influence decision-making along feeding trajectory	The team will be trained to follow up on MCaps issues as they come up in the interview.
Exposure to A&T interventions	Assessing the role of the media & A&T community interventions in shaping feeding decisions

**Feeding Trajectory**  
**Trajectory of Feeding Since Last Visit**

It has been a long time since I last spoke with you, how are you?  
How is (index child name) doing?  
How old is (index child name) now?

Last time I was here I spoke with you about your breastfeeding practices, you told me (refer to table below that you filled out in advance):

*FRO—please fill in the TABLE 1 in the annex table in advance of the second round of data collection before visiting the household.*

## INTERVIEW GUIDE

### Child feeding since the last interview:

**What happened in terms of feeding your child in the month after we last interviewed you? What happened in the next month? The next? The next? Etc . . .**

NOTE TO FRO: Please probe along each age specific feeding practice and event that the mother mentions as she talks you through her child's feeding trajectory. If the mother doesn't mention that feeding practice then ask her about these after she is done telling you her child's feeding trajectory story (and you have probed her along the way). The table below lists the *recommended* ages for the following IYCF practices, the mother might mention other ages, even in that case use the same probes listed below for that IYCF practice.

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
0-6 Months	Breastfeeding <ul style="list-style-type: none"> <li>• Exclusive Breastfeeding</li> <li>• Prelacteals</li> <li>• Positioning and attachment</li> </ul> CAPACITIES/DETERMINANTS <ul style="list-style-type: none"> <li>• Norms/beliefs/culture</li> <li>• Family and social support</li> <li>• Roles Priorities and Time</li> <li>• Self Efficacy</li> <li>• Autonomy</li> <li>• Stress</li> <li>• Access to &amp; Control over Resources</li> <li>• Locus of Control</li> <li>• Depression</li> </ul>	<ul style="list-style-type: none"> <li>• How did this go since I last saw you?</li> </ul> FOR EBF BABY <ul style="list-style-type: none"> <li>• How did EBF go for you?</li> <li>• Did you face any problems?</li> <li>• What did you do to solve those problems?</li> <li>• At what age did you stop EBF?</li> <li>• What influenced your decision to do this?</li> </ul> FOR NON-EBF BABY <ul style="list-style-type: none"> <li>• What influenced your decision to give the baby things other than breastmilk?</li> <li>• What did you give him/her?</li> <li>• What made you decide to give those things?</li> </ul>	<ul style="list-style-type: none"> <li>○ Can you tell me more about that?</li> <li>○ Why did you decide to do that?</li> <li>○ Did anyone advise you to do that?               <ul style="list-style-type: none"> <li>○ Who?</li> </ul> </li> <li>○ Where did you hear about</li> </ul>

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
	<ul style="list-style-type: none"> <li>Physical Health</li> </ul>		that?
6-8 months	<p><i>Age of Introduction of CF &amp; Continuation of BF</i></p> <ul style="list-style-type: none"> <li>Introduction of CF</li> <li>Continuing breastfeeding               <ul style="list-style-type: none"> <li>Frequent, on-demand breastfeeding</li> </ul> </li> </ul> <p>CAPACITIES/DETERMINANTS (see first row)</p>	<ul style="list-style-type: none"> <li>When did you first introduce solid/semi-solid foods?               <ul style="list-style-type: none"> <li>What made you decide to do this then?</li> <li>How did this go?</li> </ul> </li> <li>When did you first introduce liquids?               <ul style="list-style-type: none"> <li>What made you decide to do this then?</li> <li>How did this go?</li> </ul> </li> <li>Can you please name all of the foods that you first introduced to the child?</li> <li>What does the child like to eat?</li> <li>After you first introduced CF, did you continue breastfeeding the child?               <ul style="list-style-type: none"> <li>What influenced your decision to do that?</li> <li>How did this go?</li> <li>When do you breastfeed your child?</li> <li>How do you know the child is hungry?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Probe for TV, radio.</li> <li>Did anyone within your household or outside of your household support you in doing that?               <ul style="list-style-type: none"> <li>How did they support you?</li> <li>How didn't they support you?</li> </ul> </li> <li>Can you name some things that you wanted to do in terms of feeding your child that someone prevented you from doing?               <ul style="list-style-type: none"> <li>Who prevented you from doing this?</li> <li>Why did they prevent you from doing this?</li> </ul> </li> </ul>
6 mo – 2 years	<p><i>Responsive Feeding</i></p> <ul style="list-style-type: none"> <li>Responsive feeding               <ul style="list-style-type: none"> <li>Feed slowly and patiently, do not force feed but encourage child to eat</li> </ul> </li> </ul> <p>CAPACITIES/DETERMINANTS (see first row)</p>	<ul style="list-style-type: none"> <li>Does your child like to eat?</li> <li>Is it easy or difficult to get your child to eat?</li> <li>What techniques do you use to get your child to eat?</li> </ul>	
6 mo – 2 years	<p><i>Quantity and Frequency of Food Given</i></p> <ul style="list-style-type: none"> <li>Amount of food given to child</li> </ul>	<ul style="list-style-type: none"> <li>How many times you feed your child solid or semi-solid food in day?</li> <li>How has the frequency in which the child is</li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
	<ul style="list-style-type: none"> <li>○ 6-8 mo—1/2 baati, 2x</li> <li>○ 9—12 mo—1/2 baati, 3x</li> <li>○ 13-24 mo—1 baati, 3x</li> <li>○ Snacks—1-2x</li> </ul> <p>CAPACITIES/DETERMINANTS (see first row)</p>	<p>fed changed over time since our last visit?</p> <ul style="list-style-type: none"> <li>○ How has the amount that the child is fed changed over time since our last visit?</li> <li>○ Who feeds mostly?</li> <li>○ Does your child eat with the rest of the family or at separate times?</li> </ul>	<ul style="list-style-type: none"> <li>○ Do you have a lot of tension/stress about this? <ul style="list-style-type: none"> <li>○ How does it make you feel?</li> </ul> </li> </ul>
6 mo – 2 years	<p><i>Food Consistency, Energy Density</i></p> <ul style="list-style-type: none"> <li>● Food consistency and content <ul style="list-style-type: none"> <li>○ Mashed family foods</li> <li>○ Adding oil to foods</li> </ul> </li> </ul> <p>CAPABILITIES/DETERMINANTS (see first row)</p>	<p><i>Questions for Mothers</i></p> <p><b>Feeding mashed family foods to children older than 6 months &amp; adding oil to mashed food</b></p> <p>Did you or anyone else in the family ever try feeding your child mashed foods from what was cooked for the family? What about adding oil to the child's food – did you or anyone else ever try doing that?</p> <p><b><u>IF NEVER TRIED: Inquire about reasons for never having tried to feed mashed family foods?</u></b></p> <ol style="list-style-type: none"> <li>1. Did you ever hear about feeding your child mashed family foods (e.g., mashed lentil, vegetables, meat/fish with rice) after completion of 6 months? Where did you hear about this? <ol style="list-style-type: none"> <li>a. What do you think about this? Is this something that you could do for your child? Why? Why not?</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>○ How does your health influence how you carry out this practice for your child?</li> </ul> <p>PROGRAM ADVICE/SUPPORT</p> <ul style="list-style-type: none"> <li>○ Did you ever ask advice from anyone outside your family?</li> <li>○ From whom? Is s/he BRAC staff? [Where did you hear this advice? (Probe to specifically identify the person who advised them . . . which NGO etc.)]</li> </ul>

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<ol style="list-style-type: none"> <li>2. Did you ever hear about adding extra oil to a baby's mashed food? Where did you hear about this?               <ol style="list-style-type: none"> <li>a. What do you think about this? Is this something that you could do for your child? Why? Why not?</li> </ol> </li> <li>3. Family support: in giving child family food               <ol style="list-style-type: none"> <li>a. What types of discussions have you had with family members about feeding your child family foods (or special foods for the child) and/or adding oil to the child's food? How do you think your family members would feel about feeding your child mashed family foods and/or adding oil?</li> </ol> </li> </ol> <p><b>IF TRIED:</b></p> <ol style="list-style-type: none"> <li>1. What types of foods did you mash for the baby? What types of foods did you decide not to mash? What do you think about mashing meat, fish, etc. (ask even if they have not used those foods yet) <b>Did you add any extra oil to the mashed food?</b></li> <li>2. When did you first try this?</li> <li>3. What other foods did you try feeding the baby?</li> <li>4. How many times did you <u>try</u> feeding mashed</li> </ol>	<ul style="list-style-type: none"> <li>○ Why?</li> <li>○ What did s/he advise?</li> <li>○ Did anyone visit your home to advise you on what to do with child feeding since our last visit?               <ul style="list-style-type: none"> <li>○ What was the child's age at each time they visited?</li> <li>○ Which NGO were they from?</li> <li>○ What did they say?</li> <li>○ What did you think of this advice?</li> </ul> </li> <li>○ Have you ever contacted an NGO worker to visit your home about this?               <ul style="list-style-type: none"> <li>○ How did you contact them?</li> <li>○ Which NGO were they from?</li> <li>○ What happened after you contacted them?</li> <li>○ What did they say?</li> </ul> </li> </ul>

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<p>family foods to the baby?</p> <ul style="list-style-type: none"> <li>a. How did your child react to the mashed foods when you tried these foods? How much did he/she like the mashed family foods? Tell us in comparison to the other foods you had tried feeding him/her?</li> <li>b. How much time did it take to feed the mashed foods, compared to the other foods you were feeding the child at that time?</li> <li>c. Did anyone in your family (MIL, husband, etc.) say anything about the mashed foods you fed the baby?</li> </ul> <p>5. Are you currently feeding mashed family foods to the baby?</p> <ul style="list-style-type: none"> <li>a. If not currently feeding mashed foods: <ul style="list-style-type: none"> <li>1. Could you tell me why you're not <u>currently</u> feeding the mashed foods to your child? Have you had any problems with the child refusing the food or not being</li> </ul> </li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<p>interested in mashed foods? Did anyone in your family (MIL, husband, etc.) say anything about the mashed foods you fed the baby? Anything else?</p> <p><i>b.</i> If currently feeding mashed foods, how often are you <u>currently</u> feeding these mashed family foods to the baby?</p> <p>Are you able to do it every day? How much time per day do you spend to feed mashed family foods to the child? How has your child reacted to eating these foods every day? Have you had any problems with the child refusing the food or not being interested in mashed foods? How do you manage to find the time to do this work? Does anyone help you with this task? Who? What other foods do you currently feed the child (e.g., semolina, roti, bread, fruits, etc.)? How does the child like those foods? How can that be compared to the mashed family foods?</p> <p>6. Are you currently adding oil to the baby's food?</p>	



Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<ul style="list-style-type: none"> <li>a. <b>If not:</b> Have you had any problems with the child refusing/not interested in the food with the oil in it? Did anyone in your family (MIL, husband, etc.) say anything about adding oil to the food for the baby? Was there ever a problem with not having oil at home to add to the food? Anything else?</li> <li>b. <b>If yes:</b> How often do you usually add oil to the baby's food (every day? Occasionally? Just a few times?)</li> <li>7. Before we end, could you tell me a little about how many times/how often you cook for the whole family? This doesn't have to be by time of day, but just broad time periods (on waking up, early morning, late morning, etc.) <ul style="list-style-type: none"> <li>a. At what times of day does the family (i.e., the adults and older children) eat?</li> <li>b. How many times a day do you cook the family meals?</li> <li>c. What types of foods do you cook each of these times? [ask respondent to talk about foods cooked at each of</li> </ul> </li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<p>the times]</p> <p>d. How many times a day do you light a fire to cook the family meals, or other things like tea, snacks, foods for the baby, etc.?</p> <p><i>Questions for Grandmother</i> Feeding mashed family foods to children older than 6 months &amp; adding oil to mashed food</p> <ul style="list-style-type: none"> <li>• Have you heard about feeding babies mashed family foods (e.g., mashed lentil, vegetables, meat /fish with rice)? At what age it should be started with your grandchild? What types of food should be given to a child?</li> <li>• Where did you hear about this from? What is your opinion about this practice?</li> <li>• Did you think this is something that is good for your grandchild? Do you think this is something that can be done every day?</li> </ul>	
6 mo – 2 years	<p><i>Food Variety &amp; Energy Density</i></p> <ul style="list-style-type: none"> <li>• Food variety and energy density <ul style="list-style-type: none"> <li>○ Animal source foods</li> <li>○ Vitamin A rich fruits and vegetables</li> </ul> </li> </ul>	<p><i>Questions for Mother</i> Did you, or anyone else in the family, ever try giving animal foods (fish/meat/chicken/liver/eggs) to your child?</p> <p><b><i>IF NEVER TRIED FEEDING MEAT, FISH,</i></b></p>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
	CAPACITIES/DETERMINANTS (see first row)	<p><b><i>EGGS, ETC.:</i></b></p> <ol style="list-style-type: none"> <li>1. Have you ever heard of giving animal foods (fish/meat/chicken/liver/eggs) to your child? Where did you hear about this? [PROBES: health workers, TV, etc.] How many times animal foods should be given to the child in a day?</li> <li>2. Have you tried this with your child? <ol style="list-style-type: none"> <li>a. When did you try this?</li> </ol> </li> <li>3. What do you think about giving babies who are 6 months and older animal source foods like fish, eggs, liver, etc.? Do you think this is something you could do? At what age do you think children can start eating these foods (<i>food specific questions?</i>)?</li> <li>4. What do other family members think about feeding animal foods to your child?</li> <li>5. ..How frequently do you cook these foods (fish, eggs, meat, and liver) for the whole family? <ol style="list-style-type: none"> <li>a. If not every day, ask: what are some reasons why you are not able to cook these every day? <i>Probe for issues related to lack of money, frequency of market days/shopping, food preferences</i></li> </ol> </li> </ol>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<ul style="list-style-type: none"> <li>• <b>FOR THOSE WHO TRIED FEEDING ANIMAL SOURCE FOODS, FIND OUT:</b></li> <li>1. What types of animal source foods did you try feeding the baby? What types of foods did you decide not to try feeding? Why? <ul style="list-style-type: none"> <li>• When did you try this?</li> </ul> </li> <li>2. How many times did you <u>try</u> feeding meat, fish, eggs, liver etc. to the baby? <ul style="list-style-type: none"> <li>b... How did your child react when you tried feeding these foods? What happened then? How much did he/she like these foods? Tell us in comparison to the other foods you had tried feeding him/her? Were there any issues with being sick or vomiting after trying certain foods? What did you do when that happened?</li> <li>a. How much time did it take to feed the fish/meat/eggs, compared to the other foods you were feeding the child at that time?</li> <li>b. Did you feel any barriers or constraints in feeding these types of food?</li> <li>c. Did anyone in your family (MIL, husband, etc.) say anything about</li> </ul> </li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<p>feeding fish/meat/eggs to the baby?</p> <p>3. Are you currently feeding these animal source foods to the baby?</p> <ul style="list-style-type: none"> <li>• If not currently feeding: <ul style="list-style-type: none"> <li>i. Could you tell me why you're not <u>currently</u> feeding these animal foods to the child?</li> <li>ii. Have you had any problems with the child refusing the food or not being interested in meat/egg/fish/liver?</li> <li>iii. Did anyone in your family (MIL, husband, etc.) say anything about these foods? Were there any problems related to buying or getting these foods?</li> <li>iv. Anything else?</li> </ul> </li> <li>• If currently feeding animal source foods, how often are you <u>currently</u> feeding these to the baby? <ul style="list-style-type: none"> <li>i. Are you able to do it every day? How has your child reacted to eating these foods every day? Have you had any problems with the child</li> </ul> </li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<p>refusing the food or not being interested in these foods? How did you manage to find the time to do this work?</p> <ul style="list-style-type: none"> <li>• ... What other foods do you currently feed the child (e.g., semolina, roti, bread, fruits, etc.)? How does the child like those foods? How does that compare to the animal source foods?</li> <li>• ...How frequently do you cook foods such as fish, eggs, meat, liver, for the whole family? <ul style="list-style-type: none"> <li>i. If not every day, ask: what are some reasons why you are not able to cook these every day? <i>Probe for issues related to lack of money, frequency of market days/shopping, food preferences, time, workload (some foods easier to make than others, frequency of cooking)</i></li> </ul> </li> <li>• What do other family members think about feeding animal foods to your child every day? What does your husband think? To what extent do you and he talk about what should be brought home when he shops for food?</li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<ul style="list-style-type: none"> <li>time, workload, limitation in scheduling, (routine work)</li> <li>a day do you cook the family meals?</li> </ul> <p><u>Questions for Father</u></p> <p><u>Feeding babies and young children animal source foods like meat, fish, egg, chicken liver</u></p> <ul style="list-style-type: none"> <li>Have you heard anything about feeding young babies meat, fish, liver, and eggs? <ul style="list-style-type: none"> <li>Where did you hear about this? (Probe: on TV or through the health workers in your communities)</li> </ul> </li> <li>What do you think about feeding children fish/eggs/liver/meat? How many times these should be fed in a day? At what age do you think this it is good/possible to feed these foods to children (<i>ask for each food separately?</i>)</li> <li>Did you think this is something that is good for your grandchild? Are there some of these types of foods that are beneficial for babies? And are there any foods that young babies should not be fed at all?</li> <li>Would you feed these foods yourself to your grandchild? Why? Why not?</li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<p><u>Questions for Grandmother</u></p> <p><u>Feeding babies and young children animal source foods like meat, fish, egg, chicken liver</u></p> <ul style="list-style-type: none"> <li>• Have you heard anything about feeding young babies meat, fish, liver, and eggs? (Probe: on TV or through the health workers in your communities) Where did you hear about this from?</li> <li>• What do you think about feeding children fish/eggs/liver/meat? How many times in a day should these be fed? At what age do you think this it is good/ possible to feed these foods to children? Why?</li> <li>• What do you think <u>you</u> could do to help ensure your child eats these foods every day?</li> <li>• What would make it difficult to ensure that your child eats these foods every day? [Market days, costs of foods, child preferences, and older women don't think it's good, etc.]</li> </ul>	
6 mo – 2 years	<p><i>Food Variety and Energy Density</i></p> <ul style="list-style-type: none"> <li>• Giving purchased snacks (chips, biscuits, chanachur) vs. home-made snacks</li> </ul>	<p><u>Questions for Mother</u></p> <p><i>Recommended CF Practice 3: Feeding snacks such as milk/milk products and/or fried vegetables/ripe</i></p>	



Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
	<ul style="list-style-type: none"> <li>Giving tea, juice</li> </ul> <p>CAPACITIES/DETERMINANTS (see first row)</p>	<p><i>fruits.</i></p> <p><b>Types of snacks <u>currently</u> fed:</b></p> <ul style="list-style-type: none"> <li>What types of snacks do you currently feed your baby? Why? How do you decide what types of snacks to give your child? <ul style="list-style-type: none"> <li>When did you first start giving snacks to your baby?</li> </ul> </li> <li>Are you the only person who gives the child snacks? Who else gives the child snacks?</li> <li>Where do you get snack foods for your child from? [Explore whether they purchase snack foods, prepare snack foods, etc.]</li> <li>Who feeds the child these snacks? [probe about self-fed snacks versus snacks fed by the caregiver to the child]</li> <li>Did you ever <u>try</u> giving your child <u>home-prepared</u> snacks such as milk products, fried/oily foods (potato/banana/pumpkin fry/ripe papaya, and snacks prepared with cow's milk)</li> <li>Have you heard anything on TV or through the health workers in your communities about feeding young babies home-prepared snacks like fried vegetables, milk products, etc. every day? Where did you hear about this from?</li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<ul style="list-style-type: none"> <li>What did you think about it when you first heard it? What do you think of the idea of doing this?</li> </ul> <p><u>Questions for Grandmother</u></p> <p><i>Feeding snacks such as milk/milk products and/or fried vegetables/ripe fruits</i></p> <ul style="list-style-type: none"> <li>Have you heard anything about feeding young babies homemade snacks like fried vegetables, milk products, etc. every day? From where did you hear about this? (Probe: on TV or through the health workers in your communities)</li> <li>What do you think of giving these types of snacks to babies/young children? Did you think this is something that is beneficial for your grandchild? Are there any other of these snacks that are better for babies? And are there any that young babies should not be fed as snack at all?</li> <li>Do you feed these snack foods yourself to your grandchild? Why? Why not? What are some other good snacks for babies?</li> </ul> <p><u>Questions for Father</u></p>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
		<p><i>Feeding snacks such as milk/milk products and/or fried vegetables/ripe fruits</i></p> <ul style="list-style-type: none"> <li>• Have you heard anything about not feeding young babies store-bought snacks? Where did you hear about this? ( Probe: on TV or through the health workers in your communities )</li> <li>• What did you think about this?</li> </ul> <p>What do you think you could do to help ensure your child doesn't eat unhealthy snacks?</p>	
6 mo – 2 years	<p><i>Illness</i></p> <ul style="list-style-type: none"> <li>• Feeding during and after illness               <ul style="list-style-type: none"> <li>○ Increase fluid intake during, more frequent BF</li> <li>○ Encourage child to eat</li> <li>○ After illness give food more often and encourage child to eat more</li> </ul> </li> </ul> <p>CAPACITIES/DETERMINANTS (see first row)</p>	<ul style="list-style-type: none"> <li>○ What do you do in terms of feeding your child when your child is sick?</li> <li>○ How does this go?</li> <li>○ What made you decide to do this?</li> </ul>	
6 mo – 2 years	<p><i>Hygiene and Sanitation</i></p> <ul style="list-style-type: none"> <li>• Handwashing before preparing food and feeding child</li> </ul>	<ul style="list-style-type: none"> <li>○ Can you take me through step by step all of the things that happen before you feed your child?               <ul style="list-style-type: none"> <li>○ Probe for handwashing of both the</li> </ul> </li> </ul>	

Recommended practice, by age	Topics	Behavior Specific Questions/ Probes	General Probes (USE THESE THROUGHOUT ALL OF THE BEHAVIORS)
	<ul style="list-style-type: none"> <li>○ Handwashing of both the person feeding and the child</li> <li>● Use of bottles or a feeder</li> </ul> <p>CAPACITIES/DETERMINANTS (see first row)</p>	<p>person feeding and the child if not mentioned.</p> <ul style="list-style-type: none"> <li>○ Probe on use of soap, location of handwashing station, running water, in a bowl, on the plate.</li> <li>○ Do you ever feed your child out of a bottle or feeder? <ul style="list-style-type: none"> <li>○ Why did you decide to do this?</li> </ul> </li> </ul>	

**SUMMARY OF FEEDING PRACTICES INFORMATION FOR HOUSEHOLD  
FROM TIMEPOINT 1.**

Village and HH ID	
IYCF practices at the time of interview round 1	
Child's health at birth	
Early initiation of BF	
EBF	
Support from other HH members and HH capabilities	
Mother's work, time and child feeding	
Normative practices from Free Listing	
Other important findings from first round	

**CHAPTER 4**

**THE ROLE OF MOTHER’S SELF-EFFICACY IN IMPROVING YOUNG  
CHILD DIETS IN A LARGE-SCALE CLUSTER RANDOMIZED IYCF  
BEHAVIOR CHANGE INTERVENTION IN BANGLADESH**

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## **Abstract**

*Background:* Behavioral interventions have been used to improve infant and young child feeding (IYCF) with varying success. Understanding and addressing key determinants of recommended IYCF behavior is important for effective interventions. Maternal self-efficacy may be a key determinant for specific IYCF practices.

*Objective:* We examined the role of maternal self-efficacy for complementary feeding as an intervention pathway to complementary feeding behaviors in the context of Alive & Thrive (A&T), a cluster-randomized behavior change intervention in Bangladesh.

*Methods:* We used data from the mid-line process evaluation survey for A&T (n=457 mothers of children 6-24 mo of age), and developed a specific set of questions to measure self-efficacy for complementary feeding. We chose two behaviors as outcome variables, based on program theory and the juxtaposing conditions required to achieve them: reported feeding of green leafy vegetables in the last 24 hours (GLV) and the on-time introduction of egg. We tested whether complementary feeding self-efficacy mediated the intervention effect on these two outcomes and whether it modified the effect, using ordinary least squared regression, logistic regression, and structural equation modeling.

*Results:* The A&T intervention significantly increased both behaviors (11 percentage-point increase in the predicted probability for egg ( $p=0.036$ ); 16 percentage-point increase in the predicted probability for GLV ( $p<0.001$ ). We found that self-efficacy for complementary feeding both mediated and potentiated (positively modified) the effect of the intervention on GLV. In contrast, self-efficacy for complementary feeding did not mediate or modify the effect of the intervention on egg.

*Conclusion:* In the A&T intervention in Bangladesh, self-efficacy for complementary feeding was a significant mediator and potentiator of the program impact pathway to feeding GLV, but not for the on-time introduction of egg. These divergent findings indicate the value of formative research for IYCF interventions to customize intervention strategies for different behaviors. Qualitative and quantitative research is needed to understand why and how self-efficacy matters in the design of IYCF interventions.



## **Introduction**

Adequate and appropriate Infant and Young Child Feeding (IYCF) practices are important for child growth and development [1, 2]. The World Health Organization (WHO) recommends the early initiation of breastfeeding and exclusive breastfeeding for 6 months. Continued breastfeeding with complementary feeding of highly nutrient-dense infant foods is recommended in the second half of infancy [2]. In Bangladesh, continued breastfeeding rates after 6 months are high, with 96% of the population reporting continued breastfeeding at 12 months of age [3]. However, highly nutrient-dense complementary foods are usually introduced late and the nutrient quality of these foods is often poor [3].

Multiple types of interventions have been used to improve complementary feeding practices, including behavior change communication (including education) with or without provision of food, and improvements in staple foods using fortification or other technologies [4]. In a recent review of complementary feeding interventions in both food-secure and food-insecure populations, Lassi et al. [5] found that education on complementary feeding alone significantly improved height-for-age z-score, weight-for-age z-score, the uptake of recommended foods, and reduced rates of stunting. Overall, they estimated that, in food-secure populations, providing education on complementary feeding alone would lead to a 30% decrease in stunting [5]. However, designing effective behavior change communications for complementary feeding requires an understanding of the key factors that determine behavioral change at the level of the caregiver.

Behavioral theories can guide and expedite both the design and evaluation stages

of the intervention. Behaviorists rely heavily upon the Health Belief Model, the Theory of Planned Behavior, and Social Cognitive Theory (collectively, cognitive-behavioral theories) to explain behaviors and also to guide behavior change interventions [6]. To translate the science of child nutrition to implementation at the household level by caregivers, researchers need to use and strengthen these theories, especially at scale.

One construct, self-efficacy, is central to all of these theories. Bandura is considered the originator of the theoretical construct of self-efficacy, which is central to his Social Cognitive Theory [7]. Bandura defines self-efficacy as, “beliefs in one’s capabilities to organize and execute the courses of action required to produce given levels of attainments” [7] (p. 624). Self-efficacy is also specifically named in the Health Belief Model, while the Theory of Planned Behavior employs a similar construct, perceived behavioral control. Ajzen (2002), a seminal proponent of the Theory of Planned Behavior defines this construct as “perceived control over performance of a behavior” [8].

For Bandura (and Ajzen), self-efficacy (or perceived control over behavior) is behavior-specific and measures of “generalized” self-efficacy (i.e. not specific to a task) are not very useful because people differ in their self-efficacy across different activities and functions. Critics of Bandura’s theory have questioned the relevance of this Western-generated concept outside of Western contexts. They argue that self-efficacy theory is rooted in individualism, does not consider social injustice and the inequity in agency that many individuals experience or the “collective efficacy” that acts in decision making in collective societies [9]. However, because self-efficacy is

proximal to behavior, prominent in current behavioral theory, and was specifically named as an intervention point on the pathway to achieving behavior change in the behavior change intervention examined here [10], we studied self-efficacy specific to complementary feeding or “domain-specific” self-efficacy with attention to these potential pit-falls.

We used mixed methods (quantitative and qualitative) to measure and examine the role of self-efficacy in specific complementary feeding behaviors that were promoted by the Alive & Thrive (A&T) intervention in Bangladesh, a six-year initiative to improve infant and young child feeding practices [10]. The qualitative findings will be presented elsewhere. We used process evaluation data from the cluster-randomized evaluation to test whether or not the program’s effect on complementary feeding behaviors was mediated through domain-specific self-efficacy for complementary feeding, as predicted by theory. We focused on two foods specifically targeted by the intervention: green leafy vegetables and egg. We hypothesized that: a) mothers in the A&T intensive intervention area would have a greater likelihood of practicing recommended behaviors; b) the A&T intensive intervention group would be associated with higher self-efficacy; c) self-efficacy would at least partially mediate the relationship between the A&T intensive intervention and the recommended behaviors; and d) higher self-efficacy would be associated with the recommended feeding behaviors.

## **Methods**

### *Data source and study sample*

Twenty paired rural sub-districts in Bangladesh were randomized to either

receive the A&T intensive intervention or the A&T non-intensive intervention, which started in August of 2010 [3, 11]. The 10 rural subdistricts in each arm were then randomly assigned to receive either a micronutrient powder intervention or no additional intervention (Figure 1). As part of the process evaluation in July 2012, the two arms with the micronutrient powder intervention were surveyed (Figure 1) for a total of 10 randomized units. The two behaviors of interest to this study are unrelated to the use of micronutrient powders. Therefore, throughout this paper we refer to the two arms as “A&T intensive” (intervention) and “A&T non-intensive” (comparison).

We used data from this cross-sectional process evaluation survey for the A&T program that occurred in July of 2012, the midway point for the intervention. The respondents were mothers randomly sampled from the A&T sites [11] who answered survey questions about child feeding behavior for an index child who was between 6 and 24 months of age. If the mother had more than one child between 6 and 24 months of age, then the youngest child in this age range was assigned to be the index child. A total of 457 mothers were included in this sample, 213 in the A&T intensive areas, and 244 in the A&T non-intensive area. Human subjects approval for this study was obtained by IFPRI and Cornell University’s institutional review board.

### *Measures and variables*

#### *Creation of self-efficacy questions and index*

A set of self-efficacy questions was designed in English and Bengali based on self-efficacy theory [12], the feeding behaviors that were part of the A&T intervention’s theory of change [10], and with attention to appropriate scale development [13]. Self-efficacy questions were then subjected to cognitive testing

[14], a method of rigorously pre-testing questions to determine if the constructs, terminology and translation of questions are appropriate to the respondents. In this phase, native Bengali-speaking interviewers conducted individual qualitative interviews with mothers not in the study sample. They asked respondents to “think aloud” as the question was asked, systematically going through each part of the question, the lead-in, the terminology, the response scale, and how well the translation reflected the original English questions. We discovered that mothers were most easily able to interpret our scales by first answering “yes”, “no” or “don’t know” to the question. “Yes” answers were then followed up by asking “always” or “sometimes.” In this way we were able to generate a 3-point response scale “yes—always”, “yes—sometimes” or “no.” Four questions comprised the scale on the following topics: self-efficacy for feeding family-cooked foods; the avoidance of feeding store-bought snack foods; self-efficacy for being able to decide the types of foods fed to the child; and self-efficacy for raising the child to be a healthy child. The responses from 4 questions were added to generate a scale for complementary feeding self-efficacy with a range from 0 to 8. A “no” response was given a value of 0, “yes—sometimes” a value of 1, and “yes—always” a value of 2. None of the respondents gave “don’t know” as their reply to the questions that comprised the self-efficacy scale. The Cronbach’s Alpha test was used to determine the internal consistency of the self-efficacy scale. The scale had a scale reliability coefficient of 0.60 in this study sample.

#### *Selection of outcome variables*

We selected outcome variables based on qualitative research we conducted as

part of the A&T process evaluation. Our first criterion was to select complementary feeding behaviors that were heavily promoted by the A&T intervention. It was also important to identify two behaviors that had contrasting attributes in terms of the mother's control over these behaviors, ease of implementation, and cultural classification. We selected one behavior that involved resources that were typically available within the household complex and another that often required making a purchase from the market. Additionally, these two behaviors differed in terms of relative expense and in their cultural classification as a "family food" versus a "special food" for the child.

*Outcome variable—consumption of green leafy vegetables in the last 24 hours*

Green leafy vegetables were selected for examination in this study. They were specifically targeted (along with four other foods—chicken liver, egg, fish, and oil) to improve dietary diversity in the A&T intervention via caregiver behavior change. As part of the A&T-intensive intervention, mothers were instructed by frontline health workers to mix green leafy vegetables in with *khichuri* (a common first complementary food typically consisting of rice, lentils, spices, oil and vegetables) as well as to give green leafy vegetables with rice as part of "mashed family foods" that they were also told to give to the child. Additionally, our observations in the field indicated that many mothers had potential control over whether this food could be fed to their young child, as green leafy vegetables (especially "*pui shack*") were often gathered within the household complex and from the area surrounding the household. This is especially important because mothers in Bangladesh do not often travel to the market to purchase foods for the household [3].

Mothers were asked if the child ate green leafy vegetables in the last 24 hours using the question “Did your child eat green leafy vegetables yesterday (during the day or night)?” A binary variable was constructed from the yes/no responses to this question.

*Outcome variable—the on-time introduction of egg*

We selected a second outcome variable that was also heavily promoted by the A&T-intensive intervention but had attributes different from those associated with green leafy vegetables. Eggs were chosen because of their higher accessibility compared to other animal-source foods heavily promoted by the A&T-intensive intervention [chicken liver, fish, and flesh meats (chicken and beef)]. Some households own hens or ducks while others have to purchase eggs from the market. Eggs are less expensive than the other animal-source foods. However, they are often not fed as a family food as fish is a preferred animal-source food among Bangladeshi adults. This positions egg in direct contrast to green leafy vegetables as a potential “special food” for young children, one that is less accessible to mothers than to green leafy vegetables.

The program encouraged earlier age of introduction of egg (specifically between 6-7 mo) because animal-source foods are often introduced late in Bangladesh. We analyzed the timeliness of the age of introduction of egg using the question, “At what age did you start giving eggs to [index child’s name]?” They had the option of giving the response, “not yet given.” Mothers who reported giving their child egg between 6 and 8 months of age were coded as “on-time.” Those who gave egg at 9 months of age or older were considered “not on-time.” For those who responded, “not

yet given,” when the child was 9 months of age or older, were coded as “not on-time.” If the child was between 6 and 8 months of age and the mother responded, “not yet given,” the value was set to missing (n=49). The one “don’t know” response was set to missing. As a result, there were 407 subjects for this analysis.

#### *Socio-demographic variables*

We decided a priori on the covariates to be included in regression and structural equation models based on potential influences in the Bangladeshi context on the two behavioral outcomes. These variables were: child age and gender; maternal education and socio-economic status (SES); household food security, and the consumption of green leafy vegetables or egg by any household members in the last 24 hours. Maternal education was calculated based on the highest level of schooling that a mother had achieved. SES was assessed using an index of 32 assets which included both durable assets and livestock assets [15]. Household food insecurity was assessed using the household food insecurity access scale (HFIAS) [16].

The consumption of green leafy vegetables or egg by household members in the last 24 hours was included in the respective model of infant feeding as a proxy for the household availability of either green leafy vegetables or egg—a strong but not absolute determinant of whether the food was available in the household to be given to the young child. The program did not deliver targeted messages encouraging the consumption of these foods by the household, and the program had no detectable effect on household consumption of them. Thus, the program likely affected child consumption of these foods by one of two pathways: increased feeding of a family food to the infant (in consuming households) or by special provisioning for the infant



of a food not consumed by the family. Importantly, controlling for household consumption of these foods did not “over-control” by statistically adjusting for a pathway of program effect.

### *Analysis*

#### *Examining the program effects*

Although randomization was at the unit of cluster (sub-district), we used a modified intention-to-treat analysis that analyzed the data at the level of the household. We examined the A&T intervention effects on the young child’s consumption of green leafy vegetables in the last 24 hours and the on-time introduction of egg after adjusting for pairing and clustering alone, and also controlling for all covariates (without including the self-efficacy index) using the logit command in STATA (Appendix 1).

#### *Examining the role of self-efficacy for the consumption of green leafy vegetables in the last 24 hours and the on-time introduction of egg*

#### *A&T Intervention associations with self-efficacy and the mediation of the program effect through self-efficacy*

We determined the association between the A&T intervention and self-efficacy by examining self-efficacy as an outcome variable in ordinary least squares (OLS) regression. To examine the mediation of the intervention effect through self-efficacy we conducted two additional tests to complete the Baron and Kenny 4-step test for mediation [17]. These were the self-efficacy scale score predicting either the on-time introduction of egg or the young child’s consumption of green leafy vegetables in the last 24 hours, without including the intervention variable (logistic regression) and a

model with the intervention predicting the two recommended practices including the self-efficacy variable (logistic regression). All of these regressions were run twice, once without controlling for any covariates (adjusting for only pairing and clustering) and a second time controlling for all socio-demographic control variables described earlier along with pairing and clustering. Predicted probabilities were calculated to improve the interpretability of the results in all logistic regression analyses (Appendix 1).

#### *Intervention effects on the outcome variables with self-efficacy*

The logistic regression model with the intervention predicting the two recommended practices (including the self-efficacy variable) was examined outside of the 4-step test for mediation to determine role of self-efficacy in the consumption of green leafy vegetables in the last 24 hours and the on-time introduction of egg (outcome variables).

#### *Self-efficacy as a moderator*

To examine moderation by self-efficacy, we added a multiplicative interaction term (self-efficacy and the A&T program) to the multiple regression model that had self-efficacy and the A&T program predicting the outcome variables. This model was run once without controlling for any covariates (adjusting only for pairing and clustering) and again controlling for all socio-demographic control variables along with pairing and clustering (Appendix 1). We then investigated any moderated confounding by placing a multiplicative interaction term between every covariate and the program into the model.

### *Structural equation modeling*

As a final step, we combined the regression equations described above into one model using structural equation modeling (Figure 2). Structural equation modeling allows us to model both the indirect and direct effect of the A&T program on feeding green leafy vegetables in the last 24 hours as well as the interaction term simultaneously all while correctly estimating standard errors. As part of this model, we generated a beta coefficient with a corrected standard error for the mediation term.

All analysis used STATA v. 13. For OLS regression we used the reg command, for logistic regression we used the logit command, and to generate predicted probabilities, we used the margins command. For structural equation modeling we used the gsem command, followed by the nlcom command to generate the mediation term.

## **Results**

### *Sample characteristics*

In our analytic sample, 47% of the children were in households in the A&T intensive group and 53% in the A&T non-intensive group (Table 1). Children were on average  $13.8 \pm 5.3$  mo old, and evenly distributed by gender. The mean self-efficacy index score was  $6.5 \pm 1.5$  (range: 1-8). The self-efficacy index score was higher in the A&T intensive group ( $6.9 \pm 1.2$ ) compared to the A&T non-intensive group ( $6.1 \pm 1.7$ ) ( $p < 0.05$ , controlling only for clustering).

### *Green leafy vegetables*

#### *Green leafy vegetables—regression results*

More children were reportedly fed green leafy vegetables in the last 24 hours

in the A&T intensive group compared to children in the A&T non-intensive group, 41% v. 23%, respectively. In a fully adjusted model, before introducing complementary feeding self-efficacy (results not shown), mothers in the A&T intensive group were more likely to report feeding green leafy vegetables in the last 24 hours (1.00 increase in the log odds  $p < 0.001$ ). These log odds correspond to a 16 percentage-point increase in the predicted probability of giving green leafy vegetables in the last 24 hours between the A&T-intensive group and the A&T-non-intensive group.

The A&T-intensive intervention was associated with a higher self-efficacy score than the A&T-non-intensive intervention in fully adjusted OLS regression (0.78,  $p = 0.001$ ). When we included self-efficacy in the full model for the association between the A&T intervention and feeding green leafy vegetables in the last 24 hours, we found that the beta coefficient for the A&T intervention was attenuated, but still significant (0.88 increase in the log odds,  $p = 0.001$ ). This translates to a 14 percentage-point increase in the predicted probability of giving green leafy vegetables in the last 24 hours between the program groups. The self-efficacy index variable was significant in the model for green leafy vegetables ( $p = 0.016$ ). We saw a marked decrease in the A&T intervention beta coefficient when we added self-efficacy to the green leafy vegetable model.

As the final step in the 4-step test for mediation [17], we used logistic regression to examine the association of self-efficacy with the reported feeding of green leafy vegetables in the last 24 hours. We found a significant association between the self-efficacy index and the feeding of green leafy vegetables in the last 24

hours ( $\beta = 0.28$ ;  $p=0.003$ ) (Appendix 1, Table 1). We thus found partial mediation through self-efficacy between the A&T intervention and the reported feeding of green leafy vegetables in the last 24 hours. These results do not support full mediation because the A&T intervention variable was still significant when self-efficacy was controlled. To determine which portion of the mediation resulted from the simultaneous potentiation of self-efficacy, we then added a multiplicative interaction term between the program and self-efficacy to the logistic regression model (first centering self-efficacy). We found a 0.39 ( $p=0.032$ ) increase in the log odds of giving green leafy vegetables in the last 24 hours with each one-unit increase in the self-efficacy index (Appendix 1, Table 2).

#### *Green leafy vegetables—structural equation model results*

In the fully adjusted structural equation model, receiving the A&T intensive intervention compared to not receiving the A&T non-intensive intervention was associated with a 0.77-point increase in self-efficacy ( $p<0.001$ ) and associated with a 0.76 increase in the log odds of feeding green leafy vegetables in the last 24 hours ( $p=0.005$ ). A one-unit increase in self-efficacy was associated with a 0.46 increase in the log odds of feeding green leafy vegetables in the last 24 hours in the A&T intensive group ( $p=0.003$ ) and was not associated with an increase in the log odds of feeding green leafy vegetables in the last 24 hours in the A&T non-intensive group ( $\beta = 0.07$ ,  $p=0.531$ ). There was a significant interaction between the A&T intervention and self-efficacy ( $\beta =0.39$ ,  $p=0.039$ ). This indicates that, when exposed to the A&T intensive intervention, the association between self-efficacy and feeding green leafy vegetables increases. The mediation coefficient was significant in the A&T intensive

group ( $\beta=0.36$ ,  $p=0.010$ ) and not in the A&T non-intensive group ( $\beta=0.05$ ,  $p=0.534$ ). In the A&T intensive group, for every one-unit increase in self-efficacy, there was a 0.355 increase in the log odds of feeding green leafy vegetables in the last 24 hours. Overall, this indicates partial mediation through self-efficacy in the A&T intensive group, and in addition, the potentiation of this partial mediation, indicated by the significance of the interaction. Statisticians call this "moderated mediation" [18]. Moderation is also referred to in both the statistical and epidemiologic literature as potentiation, effect modification, and interaction. Figure 3 depicts the "moderated mediation" phenomenon graphically. The increase in the mean value of self-efficacy between the A&T non-intensive group and the A&T intensive group is indicative of the mediation through self-efficacy (marked "A" in Figure 3). Not only was there a shift in the mean value of self-efficacy in the intervened group, but also this increase in self-efficacy corresponds to higher predicted probabilities of feeding green leafy vegetables in the last 24 hours in the A&T intensive group as self-efficacy rises. In the absence of moderation, the lines would be parallel.

### *Egg*

On-time introduction of egg was reported for 52% of children in the A&T intensive group compared to 48% in the non-intensive group. For the on-time introduction of egg, in a fully-adjusted model without self-efficacy we found a 0.57 ( $p=0.036$ ) increase in the log odds of reporting the on-time introduction of egg in the last 24 hours in the intensive group vs. the non-intensive intervention group (results not shown). These log odds correspond to an 11 percentage-point increase in the predicted probability for the on-time introduction of egg, associated with the A&T

intensive intervention group compared to the non-intensive intervention group.

When we included complementary feeding self-efficacy in the full model, the beta coefficient for the A&T intervention is only slightly attenuated. While we found a 0.52 increase in the log odds of the reported on-time introduction of egg in the program group compared to the non-program group ( $p=0.034$ ), the self-efficacy index variable was not significant in the model ( $p=0.552$ ). Therefore, we did not examine any possible mediating and potentiating role of self-efficacy in the on-time introduction of egg model.

## **Discussion**

Using data from a large-scale, cluster randomized intervention in Bangladesh, we found that self-efficacy for complementary feeding both moderates and mediates the association between the A&T intensive intervention and one recommended complementary feeding practice, feeding green leafy vegetables in the last 24 hours. This means that the A&T intensive intervention affected the feeding of green leafy vegetables in the last 24 hours indirectly via self-efficacy. Simultaneously at higher levels of self-efficacy in the A&T intensive group, self-efficacy was associated with a greater likelihood of giving green leafy vegetables in the last 24 hours. We did not find a meditating or potentiating effect of self-efficacy on the on-time introduction of egg.

These results provide evidence to suggest that the measure of domain-specific self-efficacy for complementary feeding is important to IYCF behaviors and behavior-change interventions, but differed in its relationship with two different behaviors, feeding egg and feeding green leafy vegetables. It also demonstrated that measuring

self-efficacy at the level of the domain (i.e. complementary feeding) achieves a level of specificity that is general enough to avoid the creation of measures that are tautological, i.e. asking about the action of a particular behavior when the intention was to ask about the self-efficacy surrounding that behavior. Additionally, domain-specific self-efficacy is refined enough to prevent the treatment of self-efficacy as a generalized attribute that can be applied to a person as a whole, which Bandura cautioned against [12].

The level of the domain is where self-efficacy resides for complementary feeding in this setting. If mothers feel confident that they can feed their child complementary foods in accordance with “best practice,” this translates into a set of specific behaviors such as feeding green leafy vegetables or eggs, barring any other barriers that block this pathway. We could also define self-efficacy at one domain-level higher, at the level of infant and young child feeding. However, breastfeeding is so fundamentally different from complementary feeding, it would be erroneous to measure self-efficacy for breastfeeding and complementary feeding as one construct and expect it to have predictive capacity with individual breastfeeding or complementary feeding behaviors.

Identifying critical variables, such as self-efficacy, along the pathway between a program and its outcomes, is essential for both program design and evaluation. If we are able to identify variables along the program impact pathway and test if the program works through or differently at higher or lower levels of those variables, we can bring greater understanding of intervention outcome results [19]. The A&T intervention specifically targeted the self-efficacy of mothers, viewing it as a



“behavioral determinant” that is needed in addition to knowledge to achieve behavior change [10].

Our divergent findings with regard to two recommended feeding behaviors highlight the complex determinants of infant feeding behaviors. In Bangladesh, elders and men are typically the designated market shoppers for the household. In the A&T baseline survey, only 3.6% of mothers reported that they purchase most of the food consumed by the family [3]. Men manage the household finances and often make the decisions about what to purchase in the market, and women’s reported control over the purchase of foods, clothes, and medicines was low [3]. This household role structure has major implications for what is fed to the child. Green leafy vegetables can often be gathered from surrounding fields or from household gardens that a mother would have access to and control over, thus not requiring collective agency from other members of the household to provide these items to the child. Additionally, green leafy vegetables are relatively easy to grow and are part of a typical family meal, usually consisting of rice, lentils, mixed vegetables, and fish or other animal-source flesh foods (if financially possible).

In a recent study, Nguyen et al. [20] found that maternal and child dietary diversity was associated in Bangladesh. Importantly, vitamin A-rich fruits and vegetables (which includes green leafy vegetables) are consumed by mothers [20]. Additionally, there was concordance between a mother’s consumption of vitamin-A rich fruits and vegetables and the consumption of these fruits and vegetables by her children [20]. Approximately 70% of mothers reported consuming vitamin-A rich fruits and vegetables in the last 24 hours and approximately 55% reported feeding

these foods to their children in the last 24 hours [20]. In contrast, the consumption of eggs was reported by 25% of mothers in the last 24 hours and for 20% of children [20]. The low percentage consumption of egg by mothers and children may indicate a lack of access to eggs, and/or a lack of preference for eggs. Unless a household has the financial resources to be able to keep a hen or a duck, eggs must enter the household from the market. Eggs are relatively expensive in rural Bangladesh (around 12 US cents per egg at the time of this study). Furthermore, our qualitative research and observations in the field indicated that in many households, eggs are not a preferred food for adults. Eggs, therefore, may fall into the category of being a “special food” for a child and a request must be made by a mother to bring this “special food” from the market for her baby. This requires that she is able to influence the household shoppers and also collective agency.

Thus mothers’ perceived self-efficacy for the on-time introduction of egg may be blocked. Factors such as the access to and availability of egg supersede and thus negate any translation of self-efficacy a caregiver may have for complementary feeding to the action of feeding a child egg “on-time.” As Bandura, 2012 so aptly puts it, “under forcible disincentives or imposed social and physical constraints, individuals are disinclined to act on their self-efficacy beliefs” [12].

Bandura’s sociocognitive structural model of self-motivation and self-regulation of action [12] indicates the direct effect of self-efficacy on behavior as well as the indirect effects of self-efficacy on behavior through outcome expectations, goals, and sociostructural factors. The potential discrepancies we observed between giving green leafy vegetables in the last 24 hours and the on-time introduction of egg

could result from physical and social outcome expectations, namely differences in cost and the mother's direct access to the food. The sociostructural factors that facilitate self-efficacy to feed green leafy vegetables including her direct access to green leafy vegetables, contrast with the impediments the sociostructural environment provides for egg. This differential relationship between self-efficacy for complementary feeding for two is consistent with prior recommendations for the conceptualization and measurement of self-efficacy and was distinguishable with the measurement and modeling of domain-specific self-efficacy.

The diets consumed by children in Bangladesh often lack diversity [3], an essential feature of healthy diets [2]. Thus, understanding the role of self-efficacy in improving the two behaviors examined in this study is essential for the larger goal of improving child diets. Foods used in the transition to complementary feeding typically lack nutrient density and consist of starchy gruels and rice [21]. Increasing the diversity of child diets can improve a child's micronutrient status, dietary adequacy and growth [22-24]. Our findings suggest that caregiver's self-efficacy is a critical consideration and possible target when trying to improve child diets. Specifically targeting self-efficacy in an intervention could lead to greater adherence to some program-recommended behaviors (e.g. feeding green leafy vegetables) and thus increase the impact of the program on child health. However, changing some child feeding behaviors, such as introducing egg on-time, may require other interventions in addition to improving self-efficacy, if self-efficacy is the proximal variable to feeding egg on-time.

The finding that self-efficacy is relevant for complementary feeding in rural

Bangladesh is novel, because the construct of self-efficacy arose in North American culture, which is well known to be highly individualistic. Questions have been raised about the relevance of Bandura's theory of self-efficacy in non-Western contexts [9]. However, the construct of self-efficacy was relevant for this complementary feeding intervention in Bangladesh and, thus, may also be relevant for other complementary feeding interventions in other non-Western contexts.

Measuring domain-specific self-efficacy is difficult and although our questions were extensively tested using cognitive testing, our measure of self-efficacy for complementary feeding may not be ideal. The Cronbach's Alpha score for our scale was on the low end of acceptable. Refinement of the questions, responses, or the set of questions comprising the scale might further improve the internal consistency. Further testing of questions and scales for self-efficacy in this context as well as others could improve future research in this area.

The use of structural equation modeling allowed us to simultaneously model the indirect and direct effect of the A&T program while correctly estimating standard errors. Also, it allowed us to estimate a beta coefficient with a corrected standard error for the mediation term (self-efficacy). The alternative approach would have relied on the use of ordinary least squared and logistic regression equations. It would have been necessary to compile the results of the 4-step test for mediation [17], as well as a separate examination of the interaction between the A&T intervention and self-efficacy to determine if the A&T program was in fact both moderated and mediated through self-efficacy. This examination would not have provided corrected estimates of standard errors for the model. By using structural equation modeling we were able

to simultaneously test all hypothesized relationships and correctly estimate standard errors.

### *Conclusions*

Self-efficacy is purported to be foundational for behavior change interventions, including infant feeding interventions, and requires specificity for both behaviors and context. This largely Western-derived construct was relevant in the context of rural Bangladesh. It is possible that self-efficacy is manifested differently in different contexts and within those contexts for different behaviors. Recognizing the temporal, task, and contextual factors in the design of self-efficacy questions will advance our understanding of the specific manifestations of self-efficacy and how we can work to improve the self-efficacy of caregivers and achieve greater improvements in child health.

## Figures and Tables

Figure 1: Sampling scheme for the Alive & Thrive Intervention

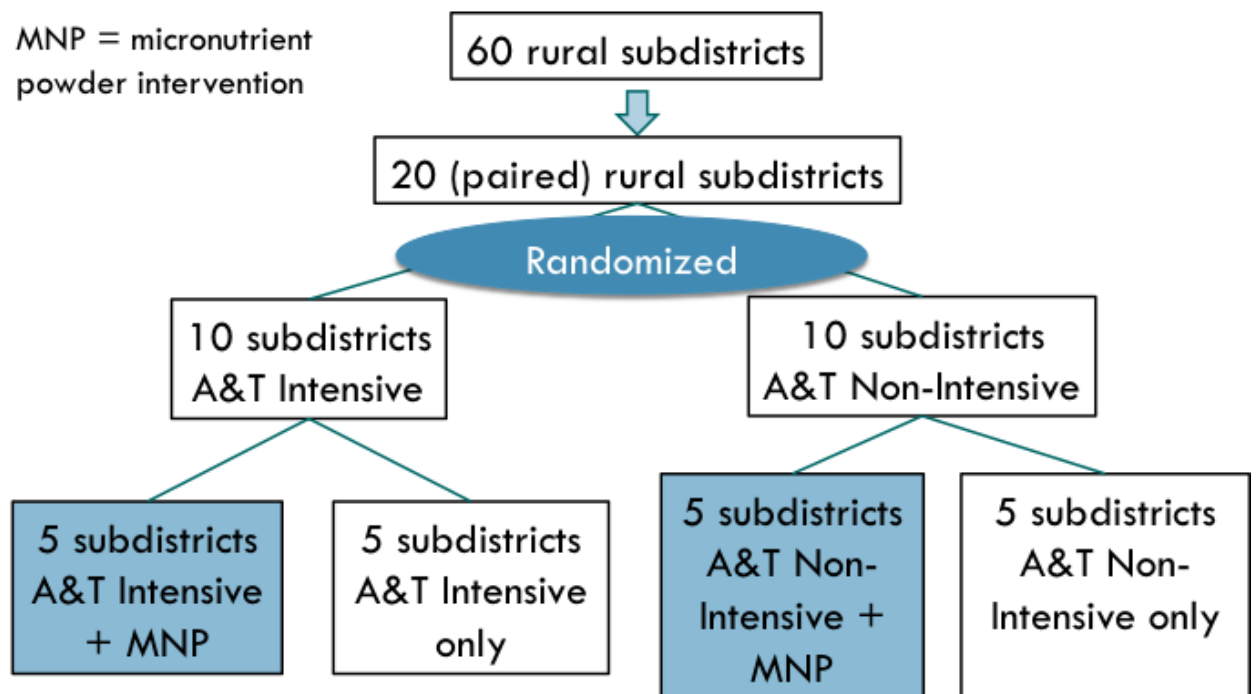


Table 1: Characteristics of participants in the survey sample

Intervention group	A&T Intensive	A&T Non-Intensive	All
Age of child	14.0 $\pm$ 5.2 n=213	13.6 $\pm$ 5.3 n=244	13.8 $\pm$ 5.3 n=457
Gender of child (% female)	50.7 n=213	52.5 n=244	51.6 n=457
Percentage young children consuming green leafy vegetables in the last 24 hours	41.3 n=213	23.4 n=244	31.7 n=457
Age of introduction of egg	7.3 $\pm$ 2.5 n=196	8.1 $\pm$ 3.0 n=211	7.7 $\pm$ 2.8 n=407
Percent reporting on-time introduction of egg (6-8 mo)	78.1 n=196	66.4 n=211	72.0 n=407
Self-efficacy index score	6.9 $\pm$ 1.2 n=213	6.1 $\pm$ 1.7 n=244	6.5 $\pm$ 1.5 n=457

Note: Values are expressed as mean  $\pm$  SD or %

Figure 2: Structural equation model for the partial mediation through self-efficacy in the A&T intensive group and the simultaneous moderation of self-efficacy for the feeding of green leafy vegetables in the last 24 hours

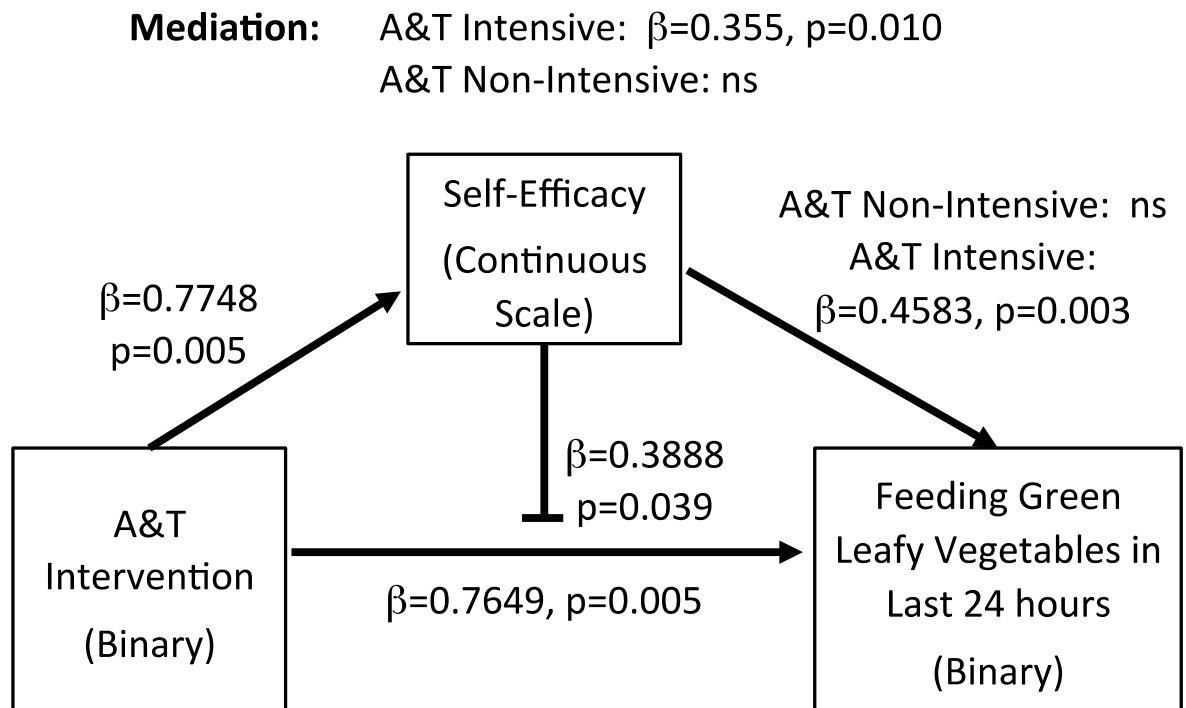
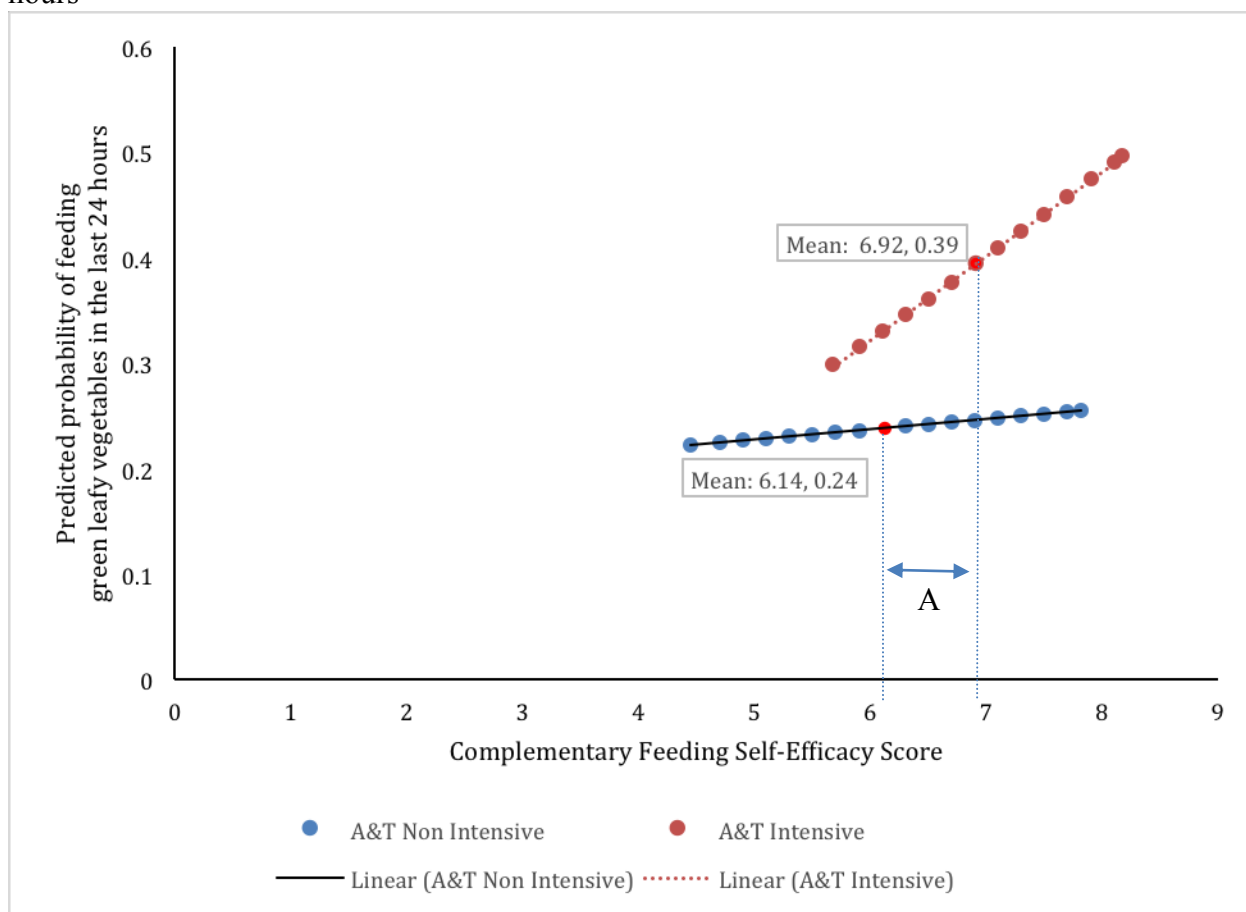




Figure 3: A graphic depiction of the structural equation model for the partial mediation through self-efficacy in the A&T intensive group and the simultaneous moderation of self-efficacy for the feeding of green leafy vegetables in the last 24 hours



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## Appendix 1: Baron and Kenny 4-Step Test for Mediation

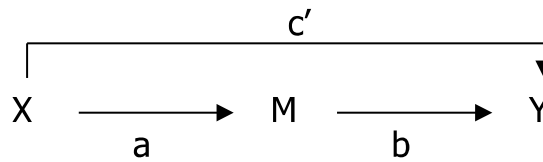


Figure 1: Where X=the A&T program, M=self-efficacy scale, Y= feeding green leafy vegetables in the last 24 hours OR the on-time introduction of egg (note for logistic regression  $Y = \ln(p'/1-p')$  where  $p'$ =the probability that  $Y = 1$ )

### *Examining the program effects*

Model 1) The A&T program and the two behavioral outcomes ( $c'$ )

A&T program  $\rightarrow$  Behavioral Outcome

We began with a logistic regression examining the association between the A&T program and giving green leafy vegetables in the last 24 hours controlling for the variables described above. This is depicted as path  $c$  in Figure 1,  $Y = B_0 + B_1X + e$ .

### *A&T Intervention associations with self-efficacy and the mediation of the program effect through self-efficacy*

Model 2) The A&T program and the self-efficacy scale ( $a$ )

Program  $\rightarrow$  Self-efficacy

We ran an OLS regression to examine the association between the program and self-efficacy scale to test for path  $a$  alone (Figure 1)  $M = B_0 + B_1X + e$ .

3) The self-efficacy scale and the two behavioral outcomes ( $b$ )

Model 3) Self-Efficacy  $\rightarrow$  Behavioral outcome

We then tested for path  $b$  alone (Figure 1) to examine self-efficacy's association with the two behavioral outcomes.  $Y = B_0 + B_1M + e$

Model 4) The A&T Program, the self-efficacy scale and the two behavioral outcomes

A&T Program & Self-Efficacy  $\rightarrow$  Behavioral outcome

We then ran a multiple regression with both the A&T program & self-efficacy predicting the behavioral outcomes, paths b and c in Figure 1.

$$Y = B_0 + B_1X + B_2M + e$$

*Self-efficacy as a moderator*

A&T Program, Self-Efficacy, & Self-Efficacy\*A&T Program → Behavioral outcome

Model 5) The A&T Program, the self-efficacy scale, multiplicative interaction term between self-efficacy and the program, and the two behavioral outcomes

$$Y = B_0 + B_1X + B_2M + B_3XM + e$$

\*\*All equations were run twice, once adjusting for only pairing and clustering and once controlling for all socio-demographic control variables as well as pairing and clustering.

Table 1: Testing for mediation using the full model for green leafy vegetables in the last 24 hours

<b>Outcome Variable</b>	<b>Green Leafy Vegetables 24 hrs</b>	<b>Self-Efficacy Scale</b>	<b>Green Leafy Vegetables 24 hrs</b>	<b>Green Leafy Vegetables 24 hrs</b>
<i>All controlled for clustering (,cluster (th_code) in stata)</i>	Model 1 Logistic Regression	Model 2 OLS Regression	Model 3 Logistic Regression	Model 4 Logistic Regression
<i>A&amp;T Program</i>	1.0148 (p=0.000)	0.7786 (p=0.001)	--	0.8775 (p=0.001)
<i>Self-Efficacy</i>	--	--	0.2775 (p=0.003)	0.2147 (p=0.016)
<b>Child Variables</b>				
<i>Child age</i>	0.1147 (p=0.000)	-0.0197 (p=0.211)	0.1167 (p=0.000)	0.1187 (p=0.000)
<i>Sex</i>	-0.0618 (p=0.852)	-0.0197 (p=0.211)	-0.0784 (p=0.814)	-0.0664 (p=0.841)
<b>Maternal Variables</b>				
<i>Maternal Education</i>	-0.0039 (p=0.260)	-0.0028 (p=0.207)	-0.0025 (p=0.572)	-0.0038 (p=0.334)
<b>Household Variables</b>				
<i>SES (HH Asset Index)</i>	0.0408 (p=0.326)	-0.0109 (p=0.515)	0.0540 (p=0.187)	0.0426 (p=0.335)
<i>HH Food Insecurity Asset Index</i>	0.0588 (p=0.132)	-0.0670 (p=0.002)	0.0699 (p=0.093)	0.0743 (p=0.067)
<i>HH consumption of Green Leafy Veg in last 24 hrs</i>	1.9794 (p=0.000)	0.3219 (p=0.081)	1.8278 (p=0.000)	1.9369 (p=0.000)
<i>Pairing</i>	0.3480 (p=0.001)	0.1264 (p=0.015)	0.3156 (p=0.059)	0.3261 (p=0.002)
<i>Constant</i>	-5.5631 (p=0.000)	6.2434 (p=0.000)	-6.9364 (p=0.000)	-6.9345 (p=0.000)
<i>R<sup>2</sup></i>	0.2351	0.1249	0.2213	0.2437
<i>n</i>	461	457	457	457

\*\*All equations were run twice, once adjusting for only pairing and clustering and once controlling for all socio-demographic control variables as well as pairing and clustering.

Table 2: Testing for interaction using the full model for green leafy vegetables in the last 24 hours

<b>Outcome Variable</b>	<b>Green Leafy Vegetables 24 hrs</b>
<b>All controlled for clustering (,cluster (th_code) in stata)</b>	<b>Model 5</b>
	<b>Logistic Regression</b>
<i>Program</i>	-1.7940 (p=0.154)
<i>Self-Efficacy</i>	0.0688 (p=0.213)
<i>Program*Self Efficacy (Interaction Term)</i>	0.3934 (p=0.032)
<b>Child Variables</b>	
<i>Child age</i>	0.1262 (p=0.000)
<i>Sex</i>	-0.0624 (p=0.848)
<b>Maternal Variables</b>	
<i>Maternal Education</i>	-0.0039 (p=0.291)
<b>HH Variables</b>	
<i>SES (HH Asset Index)</i>	0.0462 (p=0.307)
<i>HH Food Insecurity Asset Index</i>	0.0750 (p=0.048)
<i>HH consumption of Green Leafy Veg in last 24 hrs</i>	1.9260 (p=0.000)
<i>Pairing</i>	0.3255 (p=0.001)
<i>Constant</i>	-6.1513 (p=0.000)
<i>R<sup>2</sup></i>	0.2517
<i>n</i>	457

\*\*All equations were run twice, once adjusting for only pairing and clustering and once controlling for all socio-demographic control variables as well as pairing and clustering

**Appendix 2: Survey used in this study—mother’s questionnaire for the “Pushtikona Uptake Survey 2012”**

**Pushtikona Uptake Survey 2012**  
**HOUSEHOLD QUESTIONNAIRE**  
**International Food Policy Research Institute (IFPRI)**  
*Global Alliance for Improved Nutrition (GAIN)*  
*Data analysis and Technical Assistance Limited (DATA)*

*Confidential: For Research Purpose Only*

Version: June 24, 2012

**MODULE A. IDENTIFICATION**

Name	Code	
A.01 Household Number: .....	<div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black;"></div>	A.15. Religion: <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-left: 10px;"></div>
A.02 Census Number.....	<div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black;"></div>	Muslim.....1
AA.03 Index Child’s Name and ID: .....		Hindu .....2
	<div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black;"></div>	Christian.....3
AA.04 Name of the Respondent Mother (Index Child’s Mother)/Caregiver:	<div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black;"></div>	Buddhist.....4
A.05 Name of the Household Head		Other[specify] .....5
AA.06 Name of the father of the HH head[husband if female headed]: .....		
AA.xx Para/Location/ Landmark : .....		F.1 ..... 16Sample Type
AA.07 Village: .....	<div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; margin-right: 5px;"></div> <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black;"></div>	6-23.9 month old children (Random Sample) .....1
		6-23.9 month old children who have been fed Pushtikona (Purposive Sample).....2



AA.08 Mauza: .....

AA.09 Union: .....

AA.10 Thana/Upazila: .....

AA.11 District: .....

AA.12 Household Mobile Number.....

AA.13 Interviewer's Name and Code: .....

AA.14 Supervisor's Name and Code: .....

--	--

A.17 Status of Father's Interview

Interview Completed.....1

Interview Partially Completed...2

Refused to Interview.....3

Not Available at Household...4

Disabled (Mental/Physical).....5

Not living in the Household/Diseased....6

A. 18 Satatus of Grandmother's Interview

Interview Completed.....1

Interview Partially Completed...2

Refused to Interview.....3

Not Available at Household...4

Disabled (Mental/Physical).....5

Not living in the Household/Diseased....6

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First Visit			Second Visit		
Day	Month	Year	Day	Month	Year

Date of  
Interview:

				1					1	2
--	--	--	--	---	--	--	--	--	---	---

Signature of Supervisor

### CONSENT OF RESPONDENT

Good morning/afternoon. I am \_\_\_\_\_ from the Data Analysis and Technical Assistance Limited (DATA), a Research organization based in Dhaka. Together with the International Food Policy Research Institute (IFPRI) and Global Alliance for Improved Nutrition (GAIN), we are conducting an evaluation of a BRAC's Pushtikona (Sprinkles) project in this area. We want to talk with you about the health status of mother and child of your area. We want to talk with you about your health and the health of your child. The information that you will provide us will be used to set up a good health program in this community and in similar settings in other parts of the world. We will measure your child's weight and length/height.

We are inviting you to be a participant in this study. We value your opinion. You will only be identified through code numbers. Your identity will not be stored with other information we collect about you. Your responses will be assigned a code number, and the list connecting your name with this number will be kept in a locked room and will be destroyed once all the data has been collected and analyzed. Any information we obtain from you during the research will be kept strictly confidential. We will use approximately 2 hours of your time to collect all the information. There will be no cost to you other than your time. Your participation in this research is completely voluntary. You are free to withdraw your consent and discontinue participation in this study at any time. You also have the right to refuse to answer specific questions. There will be no risk as a result of your participating in the study.

The International Food Policy Research Institute (IFPRI) and DATA are jointly conducting this survey. Your participation will be highly appreciated. The answers you give will help provide better information to policy-makers, practitioners and program managers so that they can plan for better services that will respond to your needs.

---

The researcher read to me orally the consent form and explained to me the purpose of this survey. I agreed to take part in this research voluntarily. I understand that all information given by me will not be disclosed, that I am free to discontinue

participation at any time if I so choose, and that the investigator will gladly answer any question that arise during the course of the research.

Contact information of the investigator:

Dr. Kuntal Kumar Saha

IFPRI, Alive & Thrive Office,

8 Gulshan Avenue (4<sup>th</sup> Floor), Gulshan -1, Dhaka - 1212

Tel: 880-2-9880623 ; Email: [k.saha@cgiar.org](mailto:k.saha@cgiar.org)

Interviewer's signature: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Do you agree to answer the survey questions?  
(Please tick mark on the right box depending on the respondent consent) Consent given:

Yes, agreed

☐

Not agreed

☐

## TABLE OF CONTENTS/TOPICS

<b>Mother's HH Modules</b>	<b>Module Name</b>	<b>Type of Data Collected</b>	<b>Page Number</b>
Module A	Identification	→	
Module B	HH composition	→ Basic demographic and socioeconomic data of the HH members (HH roster can be streamlined/shortened)	
Module C	Pregnancy and postnatal care	→ Antenatal care seeking → Nutrition/IYCF counseling during ANC → Place of birth → Mode of delivery (C/S) → BF advice/help immediately after delivery	
Module D	IYCF practices	→ Data on core WHO indicators (very short module) → Early initiation of breast milk → Feeding immediately and 3 days after birth → Continuation/current status of BF → Age of introduction of liquids/foods → Feeding practices from 24-hours recall → Current feeding problems and care seeking	
Module E	Mother's IYCF knowledge, attitudes and practices	→ BF <ul style="list-style-type: none"> <li>○ Initiation</li> <li>○ Exclusivity</li> <li>○ Continuation</li> </ul> → CF	

<b>Mother's HH Modules</b>	<b>Module Name</b>	<b>Type of Data Collected</b>	<b>Page Number</b>
		<ul style="list-style-type: none"> <li>○ Timing of introduction</li> <li>○ Frequency</li> <li>○ Quantity</li> </ul> → Feeding during and after illness <ul style="list-style-type: none"> <li>○ Hand washing</li> </ul>	
Module F	Hand washing	→ Knowledge → Practice → Observation	
Module G	Sprinkles knowledge, purchase and use	→ Knowledge – <ul style="list-style-type: none"> <li>○ Benefits</li> <li>○ Dosage</li> <li>○ How to feed</li> </ul> → Source of information on Pushtikona → Purchase information (SS and/or other retail sources) → Use of Pushtikona	
Module H	Use of A&T and BRAC program services	→ Contacts with FHWs → Advice received from FHWs → Purchase of products from FHWs	
Module I	Market access and use of information	→ Type of market → Distance to nearest market → Type of food/special food purchase → Decision making for food purchase	
Module J	Woman's decision making, & other behavioural determinants/capacities that could influence adoption of recommended IYCF and MNP practices	→ HH decision-making (selected decisions) → Self-perceived health (expanded module) → Maternal stress → Social support for use of MNPs and IYCF/child care → Self-Efficacy	

<b>Mother's HH Modules</b>	<b>Module Name</b>	<b>Type of Data Collected</b>	<b>Page Number</b>
		→ Roles, priorities and time → Perceived social norms related to IYCF behaviors → Social networks for health and IYCF information	
Module K	HH food security and diet diversity	→ HFIAS → HDDS questions	
Module L	Socioeconomic status and assets	→ HH construction → List of assets and control over assets	
Module M	Media exposure	→ TV/Radio viewing habits → Type of programs viewed → Viewing of advertisements on child feeding → Recall from memory (unaided) → TVC questions <ul style="list-style-type: none"> <li>○ If viewed</li> <li>○ Recall story (Aided recall)</li> <li>○ Main message</li> <li>○ Use of message</li> </ul>	
Module N	Anthropometry	→ Height → Weight	

## MOTHER'S QUESTIONNAIRE

### MODULE B: HOUSEHOLD COMPOSITION

Note to Enumerator: Circle Member ID of all Children 6-23.9 months old

Among the member ids circled, put a tick mark next to the youngest child between 6-23.9 months. This is the index child.

Member ID	Name Now we would like information on the different persons who usually live in your household.  Please tell me the name of all the persons who live in your house, starting with yourself  (Starting with Respondent Mother)	Relation to Respondent Mother (Code-1)	Respondent Mother = 1  Main caretaker, if mother is not present here=2  Other Member= 0	Sex Male..1 Female...2	Age* (in years)		Marital status? (Code -2)	Occupation (Code -3)	Education (highest class completed) (Code-4)	Do you know how to read and write? Yes, both...1 Yes, read....2 Can sign only...3 No. . .not reading or writing...4	Currently attending school /madrasa Yes.....1 No .....2
					Years	Month					
B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8	B.9	B.10	B.11	B.12
1		1									
2											

3											
4											



**NOTE: IF RESPONDENT MOTHER IS ALSO HH Head, REPEAT INFORMATION FROM LINE 1 ON LINE 2,  
Collect “months” information about age in column 6.2 for all Children 0-23.9 months old  
Note; record the age in months for children aged 0-23.9 months and keep the “years” box blank. For children older than  
24 months record in years and keep the “months” box blank.**

Code 1 : Relationship to the respondent	Code 2 : Marital	Code 3: Main Occupation		Code -4 : Education
mother	Status	Farmer (Crops).....	Household Work	Never attended school ..... 99
Respondent Mother..... 1	Unmarried.....1	Agricultural day labor .....	/Housewife	reads in class I ..... 0
Spouse ..... 2	Married .....2	Non Agricultural day labor ...	.....	Completed class I..... 1
Son or daughter..... 3	Widowed .....3	Service/Salaried worker .....	9	<b>Put number of highest completed class.</b>
Son in-law or daughter-in-law ..... 4	Divorced .....4	Small/cottage industry.....	Maid servant	<b>For</b>
Grand child ..... 5	Separated .....5	Business/Traders .....	.....	<b>example, if currently in class III, put 2</b>
Father or mother ..... 6		Rickshaw/van pulling.....	10	<b>as</b>
Father in law or mother in law..... 7		Other Self-employment .....	Student	<b>class II is completed)</b>
Brother or sister ..... 8		1.1.1.1.1.1.1.1 ..... 11	.....	Completed Secondary School/Dakhil ... 10
Brother in law or sister in law..... 9			Retired/Old age	Completed Higher Secondary/Alim..... 12
Other relatives (including cousins) ..... 10			.....	BA/BSC pass/Fazil ..... 14
Foster/step/adopted children ..... 11			12	BA/BSC honors/Fazil (Hons) ..... 15
Not related ..... 12			Physically challenged	MA/MSC/Kamil & above..... 16
			.....	SSC Candidate..... 22
			13	HSC Candidate ..... 33
			Jobless	Preschool class (general) ..... 66
			.....	Hafezia/Kiratia/Nurani madrasa ..... 67
			14	
			Child (age <5)	
			.....	
			15	
			Other	
			.....	
			16	

**MODULE C: PREGNANCY AND POSTNATAL CARE (Ask these questions for the INDEX CHILD)**

Sl. No	Questions	Response	Code
C.1	Name of Index Child and Member ID. Name_____		Write Member ID
C.2	<p>When you were pregnant with [index child's name], did you consult any health personnel?</p> <p>If YES, who was this person?</p> <p>(Probe to get all persons consulted) (Multiple responses possible)</p>		<p>Hospital/Upazila Health Center, Clinic .....1</p> <p>Doctor.....2</p> <p>Midwife/nurse .....3</p> <p>Govt. Health Worker (FWA/HA)....4</p> <p>BRAC SS .....5</p> <p>BRAC SK.....6</p> <p>Pushti Kormi .....7</p> <p>Others NGO Worker .....8</p> <p>TTBA .....9</p> <p>TBA.....10</p> <p>Village Doctor.....11</p> <p>Homeopath Doctor.....12</p> <p>Kabiraj/herbal healer.....13</p> <p>Pharmacy.....14</p> <p>Husband.....15</p> <p>Mother/Mother-in-Law.....16</p> <p>Any other family member.....17</p> <p>Relative/Friends.....18</p> <p>Myself.....19</p> <p>Nobody/Never need advice .....20&gt;&gt;</p> <p><b>C4</b></p> <p>Others (specify).....77</p>
C.3	When you were pregnant with [index child's name], how many months pregnant were you the first time you consulted a health professional?		<p>[ ] Number of Month</p> <p>Don't know .....99</p>

Sl. No	Questions	Response	Code
C.4	During your pregnancy with [index child's name], did you receive any counseling about breastfeeding infants and young children?		YES .....1 NO .....2>> <b>Q C6</b> Don't know .....99>> <b>Q C6</b>
C.5	Who did you receive this counseling from?  (multiple responses possible)		Hospital/Upazila Health Center, Clinic .....1 Doctor.....2 Midwife/nurse .....3 Govt. Heath Worker (FWA/HA)....4 BRAC SS .....5 BRAC SK.....6 Pushti Kormi .....7 Others NGO Worker .....8 TTBA .....9 TBA.....10 Village Doctor.....11 Homeopath Doctor .....12 Kabiraj/herbal healer .....13 Pharmacy.....14 Husband.....15 Mother/Mother-in-Law .....16 Any other family member.....17 Relative/Friends.....18 Myself.....19 Nobody/Never need advice .....20 Others (specify).....77

Sl. No	Questions	Response	Code
C.6	<p>Who attended the delivery of [index child's name]?</p> <p>(Multiple responses possible)</p> <p>Probe to obtain all possible answers</p>		<p>Hospital/Upazila Health Center, Clinic .....1</p> <p>Doctor.....2</p> <p>Midwife/nurse .....3</p> <p>Govt. Heath Worker (FWA/HA)....4</p> <p>BRAC SS .....5</p> <p>BRAC SK.....6</p> <p>Pushti Kormi .....7</p> <p>Others NGO Worker .....8</p> <p>TTBA .....9</p> <p>TBA.....10</p> <p>Village Doctor.....11</p> <p>Homeopath Doctor .....12</p> <p>Kabiraj/herbal healer .....13</p> <p>Pharmacy.....14</p> <p>Husband.....15</p> <p>Mother/Mother-in-Law .....16</p> <p>Any other family member.....17</p> <p>Relative/Friends.....18</p> <p>Myself.....19</p> <p>Nobody/Never need advice .....20</p> <p>Others (specify).....77</p>
C.7	<p>While you gave birth to [index child's NAME], did anyone help or give advice you about breastfeeding?</p>		<p>YES .....1</p> <p>NO</p> <p>.....2&gt;&gt;</p> <p><b>Next Module</b></p>
C.8	<p>What did they do regarding breastfeeding?</p> <p>[multiple responses possible]</p>		<p>Talking to you about breastfeeding .1</p> <p>Showing you ways to breastfed properly...2</p>

Sl. No	Questions	Response	Code
C.9	How many hours after [index child's name]'s birth did you first get help with breastfeeding?	hours  days	Just after the baby's birth , if < 1 hour write , "0" if < 24 hours, write , "in hours" if > 24 hours, write , "in days"
C.10	Who helped you with breastfeeding? [multiple responses possible]		Hospital/Upazila Health Center, Clinic .....1 Doctor.....2 Midwife/nurse .....3 Govt. Heath Worker (FWA/HA)....4 BRAC SS .....5 BRAC SK.....6 Pushti Kormi .....7 Others NGO Worker .....8 TTBA .....9 TBA.....10 Village Doctor .....11 Homeopath Doctor .....12 Kabiraj/herbal healer .....13 Pharmacy.....14 Husband.....15 Mother/Mother-in-Law.....16 Any other family member.....17 Relative/Friends.....18 Myself.....19 Nobody/Never need advice .....20 Others (specify).....77

## MODULE D: IYCF PRACTICES

INSTRUCTIONS: ASK THE FOLLOWING FOR THE INDEX CHILD CHOSEN FOR THE SURVEY

Sl #	Questions	Response	Code
D.1	Copy the child's name and ID from B1 and B2 column of Module B	INDEX CHILD Name: _____ Member ID	Name and Member ID
D.2	Where was [index child name] delivered?		YOUR HOME ..... 1 NATAL HOUSE..... 2 Other house..... 3 HEALTH FACILITY (Public or private) 4 OTHER (SPECIFY)..... 77
D.3	What was put in the [index child name] mouth IMMEDIATELY after birth?  Probe to ask everything that was given to the child, even if someone else gave it to the child?		Honey..... 1 Mustard oil..... 2 Plain water ..... 3 Sugar/glucose water..... 4 Tea..... 5 Cow's/Goat's milk ..... 6 Breast milk ..... 7 Powder Milk..... 8 Other (specify)..... 77 Do not remember ..... 99
D.4	During the first 3 days after [index child name] was born, what was given to the him/her by you or anyone else?  [multiple response possible]		Honey..... 1 Mustard oil..... 2 Plain water ..... 3 Sugar/glucose water..... 4 Tea..... 5 Cow's/Goat's milk ..... 6 Breast milk ..... 7 Powder Milk..... 8 Other (specify)..... 77 Do not remember ..... 99

Sl #	Questions	Response	Code
D.5	Did you give [index child name] colostrum?	<input type="checkbox"/>	Yes (gave to child) ..... 1 No (did not give to child)..... 2
<b>NOW WE WOULD LIKE TO ASK YOU ABOUT WHAT THE CHILD IS EATING NOW</b>			
D.6	Is [index child name] still breastfeeding?	<input type="checkbox"/>	Yes..... 1>> <b>D9</b> No ..... 2 Never ..... 3>> <b>D9</b>
D.7	If no, at what age did you stop breastfeeding [index child name]?	<input type="checkbox"/>	Month Don't Know/cannot remember ..... 99
D.8	Why did you stop breastfeeding [index child name]? (Multiple response possible)	<input type="checkbox"/>	Problems with breast (pain) .....1 Child not suck well .....2 Not enough time to feed child .....3 Child already grown up/ No need for breast feeding .....4 Mother got pregnant .....5 New baby born .....6 Cracked nipples .....7 Felt not enough breastmilk .....8 Others (specify)..... .....7 7

Sl #	Questions	Response	Code
D.9	<p>At what age did you start giving the following to [index child name]?</p> <p>[note: If mother fed her child any of the following food within the first 30 days (less than 1 months of age), this can be noted as “0” month.]</p>		<p>Month</p> <p>At “0” month of age..... 0</p> <p>At “1” month of age..... 1</p> <p>At “2” months of age ..... 2</p> <p>At “3” months of age ..... 3</p> <p>At “3” months of age ..... 3</p> <p>At “4” months of age ..... 4</p> <p>At “5” months of age ..... 5</p> <p>At “6” months of age ..... 6</p> <p>At “7” months of age ..... 7</p> <p>At “8” months of age ..... 8</p> <p>At “9” months of age ..... 9</p> <p>At “10” months of age ..... 10</p> <p>At “11” months of age ..... 11</p> <p>At “12” months of age ..... 12</p> <p>At “13” months of age ..... 13</p> <p>At “14” months of age ..... 14</p> <p>At “15” months of age ..... 15</p> <p>At “16” months of age ..... 16</p> <p>At “17” months of age ..... 17</p> <p>At “18” months of age ..... 18</p> <p>At “19” months of age ..... 19</p> <p>At “20” months of age ..... 20</p> <p>At “21” months of age ..... 21</p> <p>At “22” months of age ..... 22</p> <p>At “23” months of age ..... 23</p> <p>At “24” months of age ..... 24</p> <p>Don’t Know ..... 99</p> <p>Not given yet ..... 8</p> <p>8</p>
D.9.1	Water		



Sl #	Questions	Response	Code
D.9.2	Other non breast milk liquids (sugar/glucose water, tea, fruit juice etc.)		
D.9.3	Cow/Buffalo/Goat milk		
D.9.4	Sooji, rice gruel, etc.		
D.9.5	Semi-solid foods (soft rice, khichuri, mashed potato, ripe banana, other mashed family foods etc.)		
D.9.6	Solid foods (such as rice, wheat, puffed/ pressed rice etc.)		
D.9.7	Fish		
D.9.8	Meat (chicken, mutton, beef, etc., khichuri with meat)		
D.9.9	Eggs		
D.9.10	Legumes (pulse, peas, etc)		
D.9.11	Green vegetables		
D.9.12	Snack foods (chanachur, chips, biscuit)		
<b>THE FOLLOWING QUESTIONS ARE BASED ON PREVIOUS DAY RECALL, i.e., yesterday during the day and the night.</b>			
D.10	How many times did you breastfeed [index child NAME] yesterday, during the day or night?	<input type="text"/>	Number of times Stopped breast feeding.....88 Never breast fed .....99
D.11	Did your child eat (or drink) any of the following foods yesterday (during the day or night)?		Yes ..... 1 No.....2
D.11.1	Rice	<input type="text"/>	
D.11.2	Cereals such as wheat, pressed rice, puffed rice, suji	<input type="text"/>	
D.11.3	Purchased baby cereals (NAME: such as <b>Cerelac</b> ) Add name of most common food that iron fortified. Country specific	<input type="text"/>	

Sl #	Questions	Response	Code
D.11.4	Legume: daal	<input type="checkbox"/>	
D.11.5	Green leafy vegetables	<input type="checkbox"/>	
D.11.6	Pumpkin, orange yam, orange-red-flesh sweet potato, carrots, tomato (vitamin-A rich)	<input type="checkbox"/>	
D.11.7	Any other vegetables (starchy vegetables: potatoes, yam, plantain)	<input type="checkbox"/>	
D.11.8	Ripe papaya or mango	<input type="checkbox"/>	
D.11.9	Other fruits such as oranges, banana, grapefruits	<input type="checkbox"/>	
D.11.10	Any other fruits	<input type="checkbox"/>	
D.11.11	Meat such as beef, mutton	<input type="checkbox"/>	
D.11.12	Chicken, duck, pigeon	<input type="checkbox"/>	
D.11.13	Liver, heart, kidneys	<input type="checkbox"/>	
D.11.14	Fish	<input type="checkbox"/>	
D.11.15	Eggs	<input type="checkbox"/>	
D.11.16	Peanuts, groundnuts, other nuts	<input type="checkbox"/>	
D.11.17	Milk (non-human milk – cow, goat or powder)	<input type="checkbox"/>	
D.11.18	Milk products (yogurt, rice pudding etc.)	<input type="checkbox"/>	
D.11.19	Fat (oil, butter, ghee)	<input type="checkbox"/>	
D.11.20	Chips or chanachur	<input type="checkbox"/>	
D.11.21	Bread, buns or biscuits	<input type="checkbox"/>	
D.11.22	Candies, chocolates or packaged juices	<input type="checkbox"/>	
D.11.23	Any iron containing tablet, syrup or MNP (Pushtikoa, MoniMix, MyMix)	<input type="checkbox"/>	

Sl #	Questions	Response	Code
D.12	<p>Other than breast milk, how many times did [index child name] drink other milk, formula or milk products, yoghurt yesterday, during the day or night?</p> <p>[Note: DO NOT INCLUDE NUMBER OF TIMES THE CHILD WAS BREASTFED IN THIS QUESTION. THIS VARIABLE IS ONLY TO CAPTURE MILK OR MILK PRODUCTS <b><u>OTHER THAN BREAST MILK</u></b>]</p>	<input type="text"/>	<p>Number of times</p> <p>Not given yet.....88</p>
D.13	<p>How many times did [index child name] eat mashed family food,solid, semi-solid or soft foods other than liquids yesterday, during the day and night?</p> <p>[Note: <b>Semi-solid</b> foods such as soft rice, mashed potato, ripe banana, other mashed family foods etc. <b>Solid</b> foods such as rice, wheat, puffed/pressed rice etc. MEALS include both MEALS and SNACKS (other than minor amounts)]</p>	<input type="text"/>	<p>Number of times</p> <p>Not given yet.....88</p>
D.14	<p>What is the amount (show the measuring cup) of mashed family food, solid, semi-solid or soft foods other than liquids yesterday you offered to [index child name], during the day and night?</p> <p>[Note: <b>Semi-solid</b> foods such as soft rice, mashed potato, ripe banana, other mashed family foods etc. <b>Solid</b> foods such as rice, wheat, puffed/pressed rice etc. MEALS include both MEALS and SNACKS (other than minor amounts)]</p> <p>[Note to Enumerator: Please ask the mother to show the bowl and measure it in mL using water]</p>	<input type="text"/>	<p>ml</p> <p>Not given yet.....88</p>
D.15	Yesterday (during the day and the night), did you use a baby bottle to feed the [index child name]?	<input type="text"/>	<p>Yes ..... 1</p> <p>No ..... 2</p>

Sl #	Questions	Response	Code
D.16	Do you currently face any types of problems with feeding [index child name]? Please think of any problems you might have faced in the last <b>one month</b>		YES..... 1 NO.....2>> <b>Next Module</b>
D.17	What kind of problems do you currently face? (Multiple response possible)		Problems with breast (pain) ..... 1 Child not suck well ..... 2 Not able to breastfeed well ..... 3 Not enough time to feed child..... 4 Cracked nipples..... 5 Feel not enough breastmilk ..... 6 Poor appetite ..... 7 Child runs around too much..... 8 Child does not like solid foods..... 9 Child sick ..... 10 Other (specify) ..... 77
D.18	Did you seek help from anyone to help address this problem?		YES..... 1 NO..... 2>> <b>Next Module</b>

Sl #	Questions	Response	Code
D.19	Who did you seek help from? (Multiple response possible)		Hospital/Upazila Health Center, Clinic 1 Doctor .....2 Midwife/nurse.....3 Govt. Heath Worker (FWA/HA) ...4 BRAC SS .....5 BRAC SK .....6 Pushti Kormi.....7 Others NGO Worker .....8 TTBA .....9 TBA .....10 Village Doctor.....11 Homeopath Doctor.....12 Kabiraj/herbal healer.....13 Pharmacy .....14 Husband.....15 Mother/Mother-in-Law.....16 Any other family member.....17 Relative/Friends.....18 Myself.....19 Nobody/Never need advice .....20 Others (specify).....77
D.20	What advice did the person give you? (Multiple response possible)		Showed how to position the baby ...1 Showed how baby's mouth should be when feeding .....2 Told to express breast milk .....3 Advised to feed other milk/formula 4 Advised to feed other foods .....5 Advised to feed frequently .....6 Feed favourite foods .....7 Referred to doctor .....8 Other (specify).....77

## MODULE E: MOTHER'S IYCF KNOWLEDGE ATTITUDES AND PRACTICES

Sl. No	Questions	Response	Code
E.1	How long after birth should a baby start breastfeeding?		Immediately ..... 1 Less than 1 hour after delivery ..... 2 Some hours later but less than 24 hrs ..... 3 1 day later ..... 4 More than 1 day later ..... 5 Do not think baby should be breastfed ..... 6 Don't know ..... 99
E.2	What should a mother do with the “first milk” or colostrum?		Throw it away and start breastfeeding when the real milk comes in ..... 1 Give it to her baby by breastfeeding soon after birth ..... 2 Other (specify) ..... 77 Don't know ..... 99
E.3	How often should a baby breastfeed? (multiple responses possible)		Whenever baby wants ..... 1 When you see the baby is hungry ... 2 When the baby cries ..... 3 Other (specify) ..... 77 Don't know ..... 99
E.4	If a mother thinks her baby is not getting enough breast milk, what should she do?  (Multiple responses possible)		Breastfeed more often/more frequently ..... 1 Give other liquids/foods ..... 2 Mother needs to drink more water.. 3 Mother needs to eat more food ..... 4 Other (specify) ..... 77 Don't know ..... 99
E.5	Do you think that infants under 6 months of age should be given water if the weather is very hot?		Yes ..... 1 No ..... 2 Don't know ..... 99

E.6	Do you think that a breastfeeding mother of an infant under 6 months of age should stop breastfeeding if she becomes pregnant?		Yes..... 1 No ..... 2 Don't know ..... 99		
E.7	Is there any reason a mother should stop breastfeeding if she becomes ill?	<input type="checkbox"/>	Yes..... 1 No ..... 2 Don't know ..... 99		
E.8	What are some reasons why a young baby should be exclusively breastfed?  (Multiple responses possible)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Protects baby from illness..... 1 Helps baby grow better..... 2 Breast milk contains everything a baby needs for the first 6 months.... 3 Mother less likely to get pregnant .. 4 Delays return of mother's monthly bleeding ..... 5 Breast milk is clean, safe, convenient. .... 6 Breast milk is affordable..... 7 Reduces health care costs ..... 8 Other (specify) ..... 77 Don't know ..... 99		
E.9	Until about what age should a baby continue to be breastfed?	<input type="checkbox"/>	Months Don't know ..... 99		
E.10	At what age should a baby first start to receive liquids (including water) other than breast milk?	<input type="checkbox"/>	Months Don't know ..... 99		
E.11	At what age should a baby first start to receive foods (semi-solid and solid) in addition to breast milk?	<input type="checkbox"/>	Don't know ..... 99		
E.12	How many times per day should a child “ _____ ” old eat a meal (without including breastmilk as a meal)?	7-8 month Times <input type="text"/>	9-12 month Times <input type="text"/>	13-24 month Times <input type="text"/>	

E.13	<p>At meal times, how much food should a child be offered/served each time you feed him/her? Can you please show me using this baati?</p> <p>(instruction; show the respondent the food bowl/baati (250 ml) and ask her to indicate how much to offer/serve at each feed)</p>	<p>Less than ½ Baati...1</p> <p>½ Baati.....2</p> <p>2/3 Baati.....3</p> <p>1 Baati.....4</p> <p>1.5 Baati.....5</p> <p>2 Baati.....6</p> <p>More than 2 Baati....7</p> <p>Don't know....99</p>	<p>Less than ½ Baati..1</p> <p>½ Baati.....2</p> <p>2/3 Baati.....3</p> <p>1 Baati.....4</p> <p>1.5 Baati.....5</p> <p>2 Baati.....6</p> <p>More than 2 Baati....7</p> <p>Don't know....99</p>	<p>Less than ½ Baati..1</p> <p>½ Baati.....2</p> <p>2/3 Baati.....3</p> <p>1 Baati.....4</p> <p>1.5 Baati.....5</p> <p>2 Baati.....6</p> <p>More than 2 Baati....7</p> <p>Don't know....99</p>	<p>..... 88</p>
E.14	<p>What are some of the things we can do to encourage young children to eat their food?</p> <p>(Multiple responses possible)</p>	<p><input type="checkbox"/> Feed slowly and patiently ..... 1</p> <p><input type="checkbox"/> Talk to the child ..... 2</p> <p><input type="checkbox"/> Force the child ..... 3</p> <p><input type="checkbox"/> Reduce distractions..... 4</p> <p><input type="checkbox"/> Feed other foods ..... 5</p> <p><input type="checkbox"/> Change flavour of the food ..... 6</p> <p><input type="checkbox"/> Other (specify) ..... 77</p> <p><input type="checkbox"/> Don't know ..... 99</p>			
E.15	<p>What should you do (in relation to feeding) AFTER your child has recovered from diarrhoea or another illness?</p> <p>(Multiple responses possible)</p>	<p><input type="checkbox"/> Feed less than usual ..... 1</p> <p><input type="checkbox"/> Feed as much food as usual ..... 2</p> <p><input type="checkbox"/> Feed more than usual ..... 3</p> <p><input type="checkbox"/> Feed an extra meal every day for 2 weeks ..... 4</p> <p><input type="checkbox"/> Give more liquids than usual ..... 5</p> <p><input type="checkbox"/> Continue breastfeeding..... 6</p> <p><input type="checkbox"/> Other (specify) ..... 77</p> <p><input type="checkbox"/> Don't know ..... 99</p>			
<p><b>Now, I would like to ask you whether you have heard any of the following things about feeding your child in the last ONE YEAR.</b></p>					



Sl. no	Questions	Yes ..... 1 No .. 2	From whom did you hear (Multiple response possible)	Code
16.1	Putting baby to breast immediately after birth	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Hospital/Upazila Health Center, ... 1 Private Clinic ..... 2
16.2	Giving only colostrum in the first day or two until breastmilk comes in	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Doctor ..... 3 Midwife/nurse ..... 4
16.3	No pre-lacteals (honey/mustard oil/glucose water)	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Govt. Health Worker (FWA/HA) ... 5 BRAC SS ..... 6
16.4	Feed only breast milk up to six months	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	BRAC SK ..... 7 IYCF Promoter (Pushti Kormi)..... 8
16.5	Not giving the child any water or other liquids up to six months	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	NGO health worker ..... 9 TTBA/CSBA ..... 10
16.6	How to hold the baby at the breast so he/she can breastfeed easily?	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	TBA ..... 11 Village Doctor..... 12
16.7	How to put the baby's mouth at the breast so that he/she can feed easily?	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Homeo Doctor..... 13 Kabiraj ..... 14
16.8	Emptying one breast before giving to the other side	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Spiritual healer ..... 15 Pharmacy ..... 16
16.9	Feeding mashed family food after 6 month	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Husband ..... 17 Mother/Mother in law ..... 18
16.10	Feeding eggs, meat, fish, and other animal source foods to children older than 6 months	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Other Family members ..... 19 Neighbors/ Friends..... 20
16.11	Cooking children's food with oil (or adding oil to children's food)	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Union Parishad Female Member..... 21 School Teacher ..... 22
16.12	Adding Pushtikona/Monimix/MyMix/Sprinkles to the child's food	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Religious Leader ..... 23 Political Leader ..... 24
16.13	Washing hands with water and soap before prep/feeding child	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Nobody/Never need advice ..... 25 Radio ..... 26
16.14	How to help your child eat better	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	TV ..... 27 Books/News Paper/Poster/Bill Board
16.15	How to feed your child when he/she is sick	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	..... 28 Internet/Website..... 29

16.16	Feeding the child an extra meal or extra food after illness					Jatra/Pala/Cinama Hall ..... 30 Others (specify)..... 77
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## MODULE F: HAND WASHING

F.1	When should you wash your hands?  (Multiple responses possible)	Before eating.....1 After using the toilet.....2 Before feeding the child.....3 After cleaning a child who has defecated.....4 After work.....5 After handling animals.....6 Before/after cooking.....7 After touching something dirty.....8 Before prayers.....9 Others (specify).....77 Don't know.....99
F.2	OBSERVATION: Please check the child's finger pads, is dirt present?	Yes.....1 No.....2

F.3	Mother can you show us how you wash your hands at your usual handwashing station?	Yes.....1 No.....2 >> Q F4
F.3.1	OBSERVATION: Does the mother wash both of her hands?	Yes.....1 No.....2
F.3.2	OBSERVATION: Does the mother use soap?	Yes.....1 No.....2
F.3.3	OBSERVATION: Does the mother pour water over her hands or use running water? (Faucet, tube well or pouring water from a cup)	Yes.....1 No.....2

F.3.4	OBSERVATION: Does the mother air dry her hands?		Yes.....1 No.....2
F.4	OBSERVATION: Is water present within the household or courtyard for handwashing?		Yes.....1 No.....2
F.5	OBSERVATION: Is the handwashing station convenient to the food preparation area? (note: convenient is defined as the hand washing area being adjacent to the food preparation area)		Yes.....1 No.....2
F.6	OBSERVATION: Is soap present at the handwashing station?		Yes.....1 No.....2
F.7	OBSERVATION: Is water present at the handwashing station?		Yes in a bucket or bowl with no mug....1 Yes in a bucket or bowl with a mug....2 Yes from the tube well...3 Yes from a faucet.....4 Yes from a pitcher (kolosh)....5 No.....6
F.8	OBSERVATION: Where is the handwashing station?		Inside the kitchen.....1 Outside the kitchen.....2 Inside the bathroom.....3 Outside the bathroom.....4 Others (specify).....77
F.9	Where do you wash your hands before cooking?		Inside the kitchen.....1 Inside the bathroom..2 On the plate.....3 At the tube well .... 4 Others (specify).....77

F.10	Where do you wash your hands before feeding the child?	Inside the kitchen.....1 Inside the bathroom..2 On the plate.....3 At the tube well .... 4 Others (specify).....77
F.11	Before feeding the child what do you do regarding hand washing? (multiple response possible)	Wash my hands with only water.....1 Wash the child's hands with only water.....2 Wash my hands with soap and water.....3 Wash the child's hands with soap and water.....4 Others (specify).....77

## MODULE G: MNP KNOWLEDGE, PURCHASE AND USE

KNOWLEDGE OF MNP			
No	Questions and Filters	Response Codes	
G.1	<p>What foods does a young child (&lt;24 months) need in order to grow and develop their brain?</p> <p>[multiple responses possible]</p>	<p>Gruels/bread/rice..... 1</p> <p>Gruel with milk .....2</p> <p>Animal foods such as meat or chicken .....3</p> <p>Fish..... 4</p> <p>Eggs..... 5</p> <p>Fruits..... 6</p> <p>Vegetables..... 7</p> <p>Cow's/Goat's milk..... 8</p> <p>Powdered Milk.....9</p> <p>Breastmilk.....10</p> <p>Pulses (daal)..... 11</p> <p>Family food.....12</p> <p>Others (specify)..... 77</p> <p>Don't know..... 99</p>	
G.2	<p>Name <u>things</u> that can happen to children if they do not get enough iron (either in their diet or via iron supplements).</p> <p>(Multiple responses possible)</p>	<p>Impaired learning.....1</p> <p>Impaired development.....2</p> <p>Lower height.....3</p> <p>Weakened immune defense.....4</p> <p>Feel tired/ weak.....5</p> <p>Become anemic.....6</p> <p>Others (specify).....77</p> <p>Don't know.....99</p>	

G.3	What are some of the foods that contain vitamin A – a nutrient necessary to protect the body from illness?  (multiple responses possible)	Orange colored fruits/vegetables .... 1 Green leafs ..... 2 Eggs..... 3 Liver ..... 4 Breast milk ..... 5 Cow's milk ..... 6 Others (specify).....77 Don't know..... 99	
G.4	Have you ever heard of any nutrition powder to put in the food of young children?	Yes.....1 No.....2	

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
<b>Note to Enumerator: First ask all questions of Pushtikona and then return to the beginning (i.e. G.5) and ask all questions for Monimix. Follow the same pattern for MyMix.</b>						
G.5	Have you heard about _____ and/or have you seen this sachet? (note: please show specific sachet separately for each MNP)	Yes.....1 No.....2>> Go to next MNP product (note: if no for all products then go to next module)				
G.6	Where did you hear about _____ or see _____?  [multiple responses possible]	Television advertisement.....1 Pharmacy/shop in village.....2 From doctor (MBBS/Village doctor).....3 From BRAC volunteer or worker.....4 From other NGO worker.....5				

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
		From neighbour or family member.....6 Hospital.....7 Others (Specify).....77				
G.7	Can you name some benefits of _____ for the child?  [multiple responses possible]	Child will not be anemic.....1 Good for child's brains and intelligence/good in studies or school .....2 Child will grow well (height or weight) .....3 Increases child's appetite .....4 Child suffers less from illness.....5 Child cries less.....6 It has vitamins and minerals.....7 Prevents diarrhea.....8 Treats diarrhea.....9 Others (Specify).....77 Don't know.....99				
G.8	From which age can children be given _____?	Age .....[ ][ ] MONTHS Do not know.....99				
G.9	How many _____ sachets in how many days should be given to children?	One sachets every alternate day .....1 Sixty sachets in 120 days.....2 One sachet every day.....3 Two sachets every day.....4 Others (Specify).....77 Don't know.....99				



No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
<b>PURCHASE OF MNP (These questions are for purchases for any child in the household)</b>						
G.10	Is _____ purchased for children in your household (any children in the household)?	Yes.....1 >> Q G12 No.....2				
G.11	Why is _____ not purchased for your child/ren?  (note: next please ask Q D26)  (Multiple responses possible)	Don't think that it is useful for the child.....1 Child doesn't like Pushtikona.....2 Child gets constipation/black stool.....3 Child gets stomach ache.....4 Not affordable/too expensive.....5 Family barriers/family members discourage.....6 It is medicine, only needed if child is ill.....7 It is like sugar, not needed.....8 Doctor/SS/Other health official did not prescribe....9 Buy another brand of MNP (Pushtikona, Monimix, Mymix etc.) 10 Received it for free.....11 Others (specify).....77 Don't know.....99				
G.12	Did <i>you</i> ever buy any _____?	Yes .....1>>Q G14 No.....2				

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
G.13	If no, then who ever purchases it?  (Multiple responses possible)	HH roster ID _____ Not household member.....51	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	
G.14	How many months ago was _____ first purchased for the child?	[_____] months ago				
G.15	When you first purchased/or when it was first purchased by someone else, how many sachets of _____ were bought?	Number of sachets [____][____][____]				
G.16	How many days ago did you or someone else last purchase _____?	[____][____] days ago				
G.17	At the last purchase, how many sachets of _____ were bought by you or someone else?	Number of sachets [____][____][____]				
G.18	At the last purchase, where did you or someone else purchase _____ from?	BRAC SS/PS.....1 Other BRAC health workers (SK/PK/PO).....2 From other NGO worker.....3 Local/nearby shop.....4 Shops in local/nearby market.....5 Local/nearby pharmacy.....6 Doctor's chamber.....7 Others (Specify).....77				
G.19	Could you please name all the places you or someone else have ever purchased _____ from?  [multiple responses possible]	BRAC SS/PS.....1 >> G20 Other BRAC health workers (SK/PK/PO).....2 >> G20 From another NGO worker .....3 >> G20 Local/nearby shop.....4 >> G23				

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
		Shops in local/nearby market.....5 >> G23 Local/nearby pharmacy.....6 >> G23 Doctor's chamber.....7>> G23 Others (Specify).....77 >>G26				
<b>Note: please ask the following 3 questions only if the response codes were 1,2,3 for G.19</b>						
G.20	Since you started purchasing _____ from SS/SK/PK/PS/PO or another NGO worker/volunteer, how many sachets of _____ have you purchased?	Number of sachets [ ][ ][ ]				
G.21	Among those, how many sachets of _____ were bought only for the index child from SS/SK/PK/PS/PO or another NGO worker/volunteer ?	Number of sachets [ ][ ][ ]				
G.22	When you purchased from SS/SK/PK/PS/PO or another NGO worker/volunteer , how much did you pay per sachet?	[ ] Taka				
<b>Note: please ask the following 3 questions only if the response codes were 4,5,6,7 for G.19</b>						
G.23	Since you started purchasing _____ from shops/markets/pharmacies, how many sachets of _____ have you purchased?	Number of sachets [ ][ ][ ]				
G.24	Among those, how many sachets of _____ were bought only for the index child from shops/markets/pharmacies?	Number of sachets [ ][ ][ ]				
G.25	When you purchased from	[ ] Taka				

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
	shops/markets/pharmacies, how much did you pay per sachet?					
<b>Note: questions onwards should be asked to all</b>						
G.26	Have you received any _____ for free?	Yes.....1 No.....2>> Q G31				
G.27	From where did you receive these free _____ sachets? (Multiple Responses Possible)	BRAC SS/PS/PK/SK/PO/BM.....1 Doctor.....2 Pharmacy/shop.....3 NGO worker/Health worker.....4 Company representative.....5 Others (specify).....77 Don't know.....99				
G.28	How many _____ sachets did you receive for free?	Number of sachets [ ][ ][ ]				
G.29	How many months ago did you receive these free sachets of _____?	[ ] months ago				
G.30	Who consumed these free sachets of _____ and how many sachets did each person consume? (note: first record the roster IDs for those that consumed and then record the number of sachets each consumed)	HH roster ID: _____; No. of sachets _____ Non-Household Member.....51 No one consumed them.....71	____; ____ ____; ____ ____; ____	____; ____; ____; ____;	____; ____; ____; ____;	
G.31	In general are you willing to pay for _____?	Yes.....1 No.....2>>> G33				
G.32	How much is the maximum you are willing to pay per sachet of _____?	[ ] Tk ..... As much as needed.....77 Don't know.....99				
<b>USE OF MNPs</b>						

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
G.33	Is _____ ever given to anyone in your household?	Yes.....1 >>>> Q G35 No.....2				
G.34	Why is _____ not given to anyone in your household?  (Go to the next brand of MNP, once reaching MyMix go to the next module)	Don't think that it is useful for the child.....1 Child doesn't like Pushtikona.....2 Child gets constipation/black stool.....3 Child gets stomach ache.....4 Not affordable/too expensive.....5 Family barriers/family members discourage.....6 It is medicine, only needed if child is ill.....7 It is like sugar, not needed.....8 Doctor/SS/Other health official did not prescribe....9 Give another brand of MNP (Monimix, Mymix etc.) 10 Others (specify).....77 Don't know.....99				
G.35	Please name the people in your household that _____ is given to.  (Multiple response possible) (note: if only one person is mentioned then move to Q G 37)	HH roster ID: _____;	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	
G.36	How do you share _____ sachets	They each get an individual sachet during one				

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
	among those mentioned in G35?	meal...1 One sachet is combined in the family pot.....2 One sachet is split among them during one meal...3 Food containing MNP is shared with others...4 Partial sachet is given to one person and the remainder is saved for later to give to others.....5 Others (specify).....77				
G.37	Is _____ ever given to [index child name]?	Yes.....1 >> Q G39 No.....2				
G.38	Why is _____ not given to [index child's name]?  (Go to the next brand of MNP, once reaching MyMix go to the next module)	Don't think that it is useful for the child.....1 Child doesn't like Pushtikona.....2 Child gets constipation/black stool.....3 Child gets stomach ache.....4 Not affordable/too expensive.....5 Family barriers/family members discourage.....6 It is medicine, only needed if child is ill.....7 It is like sugar, not needed.....8 Doctor/SS/Other health official did not prescribe....9 Buy another brand of MNP (Monimix, Mymix etc.) 10 Planning to start but haven't yet started.....11				

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
		Others (specify).....77 Don't know.....99				
G.39	How many sachets of _____ did you feed to [index child name] in the last 4 days?	Number of sachets [ ][ ]				
G.40	How do you prepare the food for [index child name] that you mix _____ with?	In a separate bowl/dish for infant with mashed family food....1 In a separate bowl/dish for infant with other solid dry food.....2 Combine it with the family pot of food (for sharing with infant and other family members).....3 With water or other liquid.....4 Alone (without any other food or liquid).....5 Other (Specify).....77				
G.41	How much of the _____ sachet do you usually mix with the [index child name] food at one meal?	Full sachet.....1 Half sachet.....2 Less than half sachet.....3 Others (specify) .....77				
G.42	Within how much time do you still give the food to the [index child name] after adding _____?	Within 30 minutes.....1 Others [ ][ ] mins.....77 Don't know.....99				
G.43	How much of the [index child name] food bowl (baati) do you mix with	One quarter of total food given.....1 One half of total food given.....2 Full amount of food				

No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
	_____ during one meal?	given.....3 Others (specify) .....77				
G.44	How hot or cold is the [index child name] food when you add _____ to it?	Hot (just cooked).....1 Warm/room temperature (after cooking allow the food to cool).....2 Cold.....33 Others (specify).....77 Don't know.....99				
G.45	Which meal of the day do you prefer to add _____ to your [index child name] food?	Breakfast.....1 Lunch.....2 Dinner.....3 Midday snack.....4 Afternoon snack.....5 Evening snack.....6 No preference.....7 Others (Specify).....77				
G.46	Have you seen any changes in [index child name] after feeding him/her _____?	Yes .....1 No.....2 >> Q G48 Not yet.....3 >> Q G48 Don't know/not noticed.....77 >> Q G48				
G.47	If yes, what changes have you seen in [index child name] after feeding him/her _____?  [multiple responses possible]	Increased appetite.....1 Child plays more.....2 Child growing well.....3 Child gets sick less often.....4 Child cries less.....5 Others (specify).....77				
G.48	After feeding _____ to [index child name] , has he/she faced any problems?	Yes .....1 No.....2 >> Q				



No	Questions and Filters	Response Codes	Pushtikon a	Monimix	MyMix	Comments
		G52 Not yet.....3 >> Q G52 Don't know/ not noticed .....77 >> Q G52				
G.49	If yes, what were the problems?	Darkening of the stool.....1 Constipation.....2 Child refused to eat food.....3 Food became dark in colour.....4 Diarrhea.....5 Others (specify).....77				
G.50	What did you do to resolve the problem?	Stopped giving to the child.....1 Consulted a health professional, volunteer or worker.....2 >> Q G52 Others (specify).....77 >> Q G52				
G.51	After you stopped giving _____ to [index child name], did you ever give it again to him/her afterwards?	Yes .....1 No.....2				
G.52	Does [index child name] like _____?	Yes .....1 >> next module No.....2				
G.53	If no, why?	It changed the color of the food.....1 It changed the taste of the food.....2 The child does not like anything new added to the food...3 Others (specify).....77				

## MODULE H: USE OF A&T & BRAC PROGRAM SERVICES

**Note to Enumerator:** First ask all questions for SS/PS, then ask all questions for SK, then ask all questions for PK

Question #	Questions and Filters	SS/PS	SK	PK	Response options
H.1	Have you ever been visited at home by a BRAC _____?				Yes .....1 No.....2 Don't know.....99
H.1.1	Has anyone come to your house from BRAC that gives advice on nutrition and child feeding and also sell's medicine?				Yes .....1 No.....2 Don't know.....99
H.1.2	Has anyone come to your house from BRAC who does pregnancy tests, check-ups with pregnant mothers, and conducts health forums?				Yes .....1 No.....2 Don't know.....99
H.1.3	Has anyone come to your house from BRAC that gives advice on nutrition and child feeding?				Yes .....1 No.....2 Don't know.....99
H.2	Do you know who the BRAC _____ in your area is?				Yes.....1 No.....2
H.3	What is her name? (Note to eumerator: Please verify the name of from the list provided by BRAC)				Don't know.....99
H.4	Do you recognize this woman? (show photo)				Yes .....1 No.....2 >> go to H1 for SK/PK, if all are "no" then go to H39
H.5	What kind of job does this woman do?  [multiple responses possible]				Check up on pregnant women.....1 Checks up on children.....2 Gives health advice.....3 Gives nutrition or child feeding advice.....4 Sells Pushtikona .....5 Conducts shasto forum.....6

Question #	Questions and Filters	SS/PS	SK	PK	Response options
					Sells medicines.....7 Others (specify).....77 Don't know.....99
H.6	In her capacity as a BRAC _____, where have you seen this woman?				Visiting my home.....1 In the para/village.....2 Other (specify).....77
H.7	Have you ever been visited at home by this woman?				Yes..... 1 No ..... 2 >> Q H31
H.8	How many days or months ago were you first visited by the Pushti Kormi?				Days [ ] Months [ ]
H.9	How old was [index child's name] at that first visit?				Mo [ ]
H.10	From the first visit, until now, how many times after that did the PK visit you?  If the child is <8 months old then go to question H16.				Times [ ]
H.11	From when the [index child's name] was born until he/she was 8 months old how many times did the PK visit you?				Times [ ] n/a....88
H.12	When the [index child's name] was 9-10 months old how many times did the PK visit you?				Times [ ] n/a....88
H.13	When the [index child's name] was 11-12 months old how many times did the PK visit you?				Times [ ] n/a.....88
H.14	When the [index child's name] was 15-18 months old how many times did the				Times [ ] n/a....88

Question #	Questions and Filters	SS/PS	SK	PK	Response options
	PK visit you?				
H.15	When the [index child's name] was 23-24 months old how many times did the PK visit you?				Times [    ] n/a.....88
H.16	How many days ago did _____ vist u last?				[    ][    ] days ago
H.17	During _____ last home visit, how much time did she spend with you?				[    ] Minutes
H.18	During the last visit, did you receive any advice from _____ on feeding your child?				Yes..... 1 No..... 2>>H21
H.19	What advice did you receive from _____ on feeding your child? (multiple responses possible)				Putting baby to breast immediately after birth ..... 1 Giving only colostrum ..... 2 No pre- or post lacteals (honey/mustard oil/glucose water) ..... 3 Feed only breast milk up to six Months ..... 4 Positioning & Attachment for breastfeeding..... 5 Feeding mashed family food after 6 months ..... 6 Feeding animal source foods..... 7 Cooking/adding with oil..... 8 Adding MNP to child's food..... 9 Washing hands with water and soap before prep/ feeding child ..... 1 0 Feeding during illness/extra after illness ..... 1 1 Other (specify) ..... 7 7

Question #	Questions and Filters	SS/PS	SK	PK	Response options
					Don't know ..... 9 9
H.20	During ____ last home visit, how much time did she spend with you talking about only nutrition and child feeding?				[ ] Minutes
H.21	Last time you saw the SK, did she give you any advice about your own health?				Yes..... 1 No ..... 2
H.22	In the last six months what kinds of health services/information did you receive from SK?  (multiple responses possible)				Received advice about family planning ..... 1 Received advice about pregnancy ..... 2 Took weight when pregnant ..... 3 Checked blood pressure ..... 4 Tested for pregnancy ..... 5 Told me about maternal nutrition ..... 6 Told me about EIBF after delivery ..... 7 Told me about EBF for 6 months ..... 8 Mother should eat well ..... 9 Received no service in the last six months ..... 10 Other (specify) ..... 77 Don't know ..... 99
H.23	Did you purchase any kind of medicine or health items from SS?				Yes..... 1 No ..... 2 >> Q H25
H.24	What kind of medicine or health items did you purchase from SS in last month? [multiple responses possible]				Paracetamal ..... 1 Vitamin ..... 2 Anti-Histamin ..... 3 Family planning material ..... 4 Soap ..... 5 Sanitary Napkin ..... 6 Delivery kits ..... 7 Salt (with iodine) ..... 8 Syrup ..... 9

Question #	Questions and Filters	SS/PS	SK	PK	Response options
					Pushtikona.....10 Monimix.....11 MyMix.....12 ORS.....13 Didn't buy anything in last month.....14 Other (specify) ..... 77
H.25	During the last visit, did you receive any advice from _____ on Pushtikona?  (note: show the different sachets of MNP)				Yes..... 1 No..... 2
H.26	Have you ever bought Pushtikona from _____?				Yes..... 1 No ..... 2 >> Q H29
H.27	Did you buy any Pushtikona from _____ last time she visited you at home?				Yes..... 1 No..... 2
H.28	How many days ago did you last purchase Pushtikona from the _____?				Days [____] Months [____]
H.29	Have you ever attended a health education forum ( <i>Shasto Forum</i> ) organized by SK?				Yes..... 1 No..... 2>> Q H1 (in PK column)
H.30	During your last Health Forum with the SK, how much time did you spend there?				[____] Hours [____] Minutes
H.31	Last time you attended a health forum, what did the SK talk about?				Advice on family planning..... 1 Advice on water and sanitation ..... 2 Immunization ..... 3

Question #	Questions and Filters	SS/PS	SK	PK	Response options
	(Multiple responses possible)				Maternal nutrition ..... 4 Advice on TB ..... 5 Advice on breastfeeding..... 6 Advice on complementary feeding ..... 7 Adding MNP ..... 8 Washing hands with water and soap before prep/ feeding child..... 9 Encouraging child to eat enough ..... 1 0 Feeding during illness/extra after illness ..... 1 1 Other (specify) ..... 7 7 Don't know ..... 9 9
H.32	Have you ever contacted the PK to help you address a child feeding problem?				Yes.....1 No.....2
H.33	How did you contact her? [multiple responses possible]				By phone.....1 By word of mouth.....2 On a regular household visit.....3 Others (specify).....77
H.34	Has the SS ever contacted the PK on your behalf for a child feeding problem?				Yes.....1 No.....2 Don't know.....99
H.35	<b>Observation:</b> Mother please show me the sticker in your home that has the PK's mobile number on it.				Yes the sticker is present....1 No the sticker is not present...2>>> H37
H.36	Have you ever called the number on the sticker when facing an IYCF problem?				Yes.....1 No.....2

Question #	Questions and Filters	SS/PS	SK	PK	Response options

**Please finish all of the columns above before asking the following questions.**

Question #	Questions and Filters	Response	Response options
H.37	In the last 3 months, have you bought any food for the index child that you didn't buy before that time?		Yes.....1 No.....2 >> Next module
H.38	If Yes, what were some reasons for buying these new foods for the index child?  (multiple responses possible)		SS/SK/PK advise.....1 Saw on TV.....2 Advised by family/friends/neighbors....3 Advised by a doctor.....4 No reason, just bought it.....5 Others (specify).....77
H.39	What are these new foods that you have bought for the index child?		Leafy green vegetable (spinach, shak) .....1 Vitamin A riched vegetables and fruits (pumpkin, carrots, sweet potatoes, riped mangoe, riped papaya, jackfruit).....2 Other fruits.....3 Other vegetables.....4 Small fish.....5 Big fish.....6 Meat or Poultry.....7 Eggs.....8 Cereals (Rice, wheat bread, puffed rice, pressed rice, noodles, corn).....9 Food made from beans, peas or lentils (daal).....10 Dairy products (Milk youghurt).....11 Oil or fats (oil, butter, ghee).....12 Biscuits, cookies, chips, chanachur, sweets.....13 Chocolates, candies, honey, mishit.....14



			Spices, condiments, beverages.....15
			Others (specify).....77

## MODULE I: MARKET ACCESS AND USE OF INFORMATION

Sl. No	Questions	Response	Code
I.1	Which types of markets does your family usually purchase foods from?		Neighborhood shop ..... 1 Retail market in village ..... 2 Wholesale market in village ..... 3 Market in other village ..... 4 Other (specify) ..... 5 Don't know ..... 88
I.2	Who purchases most of the foods consumed by the family?		Husband/partner ..... 1 Self ..... 2 Both ..... 3 Someone else ..... 4 Don't know ..... 88
I.3	How far is the nearest market/shop where you can buy some basic food items for your household?  How long does it take to get there?	KM  MINUTES  HOURS	
I.4	Are there any special foods that someone in your household buys for children?  Special foods for children are those foods that are bought only for children (<5 years). No other members of the HH consume that food.		YES ..... 1 NO ..... 2>> <b>Next Module</b>

Sl. No	Questions	Response	Code
I.5	Who buys these special foods for children?		Husband ..... 1 Self ..... 2 Both (husband and self) ..... 3 Father/Father in law ..... 4 Brother/Brother in law ..... 5 Mother/Mother in law ..... 6 Others (specify) ..... 77 Don't know ..... 99
I.6	In the last 7 days, how much was spent on special foods for children?		Taka DON'T KNOW ..... 99

## MODULE J: WOMAN'S DECISION MAKING POWER & CAPACITIES

Sl. No	Questions	Response	Code
J.1	Do you currently live with your Husband?	<input type="text"/>	Yes..... 1 No ..... 2
J.2	Now, I would like to have your opinion on some ideas regarding how people live within a household. Please tell me if you agree or not with each of the following declarations. There are people who say:		
J.2.1	In a household, the man should take the important decisions.	<input type="text"/>	
J.2.2	If the woman works outside home, her husband or partner should help her with the daily housework.	<input type="text"/>	
J.2.3	A husband should not let his wife work outside home, even if she would	<input type="text"/>	Yes, agree ..... 1 No don't agree ..... 2 Don't know ..... 99
J.2.4	A woman has the right to express her opinion if she does not agree with what the husband or partner says.	<input type="text"/>	
J.2.5	A woman must accept that her husband or partner beats her in order to keep the family together.	<input type="text"/>	
J.2.6	It is better to send a son to school than a daughter.	<input type="text"/>	
J.3	Can you decide on your own about the the following things?		
J.3.1	Buying small amounts of food like rice, vegetables, and beans?	<input type="text"/>	
J.3.2	Buying bigger amounts of food like a bag of rice?	<input type="text"/>	
J.3.3	Buying animal source foods (meat, fish, poultry, eggs)?	<input type="text"/>	Yes..... 1 No ..... 2 Don't buy..... 3
J.3.4	Buying cooking oil?	<input type="text"/>	
J.3.5	Buying clothes for yourself?	<input type="text"/>	
J.3.6	Buying medicine for yourself?	<input type="text"/>	
J.3.7	Buying toilet articles for yourself like soap, toothpaste?	<input type="text"/>	

Sl. No	Questions	Response	Code
J.3.8	Buying clothes for the children?	<input type="text"/>	
J.3.9	Buying medicine for the children?	<input type="text"/>	
J.3.10	Buying special foods for your children?	<input type="text"/>	
J.3.11	Buying MNPs (Pushtikona, MyMix, MoniMix)?		
J.3.12	What food is prepared every day?		
J.3.13	Visiting other family members, friends or relatives?		
J.3.14	Seeing a doctor or visiting a dispensary when you are pregnant?		
J.3.15	Use of family planning methods?		
J.3.16	Whether or not you breastfeed the child and when to wean the child?		
J.3.17	What and how to feed the infant in his/her first year of life?		
Enumerator: the following are separate to the statements above and are questions.			
J.4	Do you have your own money that you can use for what you want to use it?	<input type="text"/>	Yes..... 1 No..... 2
J.5	Do you contribute to the total household expenses?	<input type="text"/>	Yes..... 1 No..... 2
J.6	How often do you see or talk to somebody from your own family? (EXCEPT THE ONES YOU LIVE WITH)	<input type="text"/>	Several times per week ..... 1 About once per week ..... 2 Several times per month ..... 3 Less than once per month but more often than once a year ..... 4 About once per year or less ..... 5 Never ..... 6

Sl. No	Questions	Response	Code
J.7	Do you have somebody who could help you when you need it or when you have the following problems:		
J.7.1	To accommodate you for several nights if you need it (SOMEBODY OTHER THAN HUSBAND)?	<input type="checkbox"/> Yes..... 1 <input type="checkbox"/> No ..... 2 <input type="checkbox"/> DK....99	<input type="checkbox"/> IF YES, WHO IS THIS PERSON (See Code List below) ..... 1 SON OR DAUGHTER .... 2 SON-IN-LAW or DAUGHTER-IN-LAW ... 3 BROTHER OR SISTER .. 4 BROTHER-IN-LAW or SISTER-IN-LAW ..... 5 MOTHER OR FATHER.. 6 FATHER-IN-LAW or MOTHER-IN-LAW ..... 7 GRANDSON or GRANDDAUGHTER..... 8 OTHER RELATIVE ..... 9 NON RELATIVE ..... 1 0 DON'T KNOW ..... 9 9
J.7.2	To help you out with money or lend you some money? (SOMEBODY OTHER THAN HUSBAND)	<input type="checkbox"/> Yes..... 1 <input type="checkbox"/> No ..... 2 <input type="checkbox"/> DK.....99	
J.7.3	To help when you don't have enough food at home? (SOMEBODY OTHER THAN HUSBAND)	<input type="checkbox"/> Yes..... 1 <input type="checkbox"/> No ..... 2 <input type="checkbox"/> DK....99	
J.7.4	To talk to when you have a problem?	<input type="checkbox"/> Yes..... 1 <input type="checkbox"/> No ..... 2 <input type="checkbox"/> DK.....99	
J.8	Do you usually meet with other women in your community to discuss any of the following?		
J.8.1	Problems of the community?	<input type="checkbox"/>	Yes.....1 No.....2
J.8.2	Education problems?	<input type="checkbox"/>	
J.8.3	Health problems	<input type="checkbox"/>	
J.8.4	Problems of women?	<input type="checkbox"/>	
J.8.5	To receive information on health and nutrition?	<input type="checkbox"/>	

Sl. No	Questions	Response	Code
NOW I WOULD LIKE TO ASK YOU SOME QUESTIONS ABOUT YOUR HEALTH			
J.9	How is your health? (Note: it is Ok to prompt answers here)	<input type="text"/>	Good.....1>>Q J12 Not so good/all right/average.....2 Not good.....3
J.10	You said your health is ____ because of your health status has the family's behaviour towards you changed?	<input type="text"/>	Yes.....1 No.....2>>Q J12
J.11	Do they treat you better or worse?		Better.....1 Worse.....2
J.12	You do many types of work every day. You told me that your health is _____. I will now talk about many types of household work that you do every day. Because of your health you may be able to do your household work or not able to do your household work., Now I will tell you the household activities:		
J.12.1	Heavy work/activities: Polishing the floor with mud and cow dung, cooking, cleaning the house and yard, washing clothes or pumping the tube well.	<input type="text"/>	Yes, can do.....1 Yes, but some less.....2 No, can't do.....3
J.12.2	Comparatively easy work: Taking care of the child, sweeping the floor, housekeeping, , cleaning the cow dung, other household work.	<input type="text"/>	
J.13	<b>STRESS (SRQ 20) (Last 1 month)</b>		

Sl. No	Questions	Response	Code
J.13.1	Do you often have headaches?	<input type="checkbox"/>	Yes ..... 1 No ..... 2
J.13.2	Is your appetite poor?	<input type="checkbox"/>	
J.13.3	Do you sleep badly?	<input type="checkbox"/>	
J.13.4	Do you easily get frightened?	<input type="checkbox"/>	
J.13.5	Do your hands shake/tremble?	<input type="checkbox"/>	
J.13.6	Do you feel nervous, tense or worried?	<input type="checkbox"/>	
J.13.7	Is your digestion poor?	<input type="checkbox"/>	
J.13.8	Do you have trouble thinking clearly?	<input type="checkbox"/>	
J.13.9	Do you feel unhappy?	<input type="checkbox"/>	
J.13.10	Do you cry more than usual?	<input type="checkbox"/>	
J.13.11	Do you find it difficult to enjoy your daily activities?	<input type="checkbox"/>	
J.13.12	Do you find it difficult to make decisions?	<input type="checkbox"/>	
J.13.13	Is your daily work suffering?	<input type="checkbox"/>	
J.13.14	Are you unable to play a useful part in life?	<input type="checkbox"/>	
J.13.15	Have you lost interest in things?	<input type="checkbox"/>	
J.13.16	Do you feel that you are a worthless person?	<input type="checkbox"/>	
J.13.17	Has the thought of ending your life been on your mind?	<input type="checkbox"/>	
J.13.18	Do you feel tired all the time?	<input type="checkbox"/>	
J.13.19	Do you have uncomfortable feelings in your stomach?	<input type="checkbox"/>	
J.13.20	Are you easily tired?	<input type="checkbox"/>	



Sl. No	Questions	Response	Code
<b>SELF-EFFICACY</b>			
J.14	Do you feel that you are able to feed your index child family cooked foods (rice, vegetable, fish) along with breastmilk after six months?		Yes.....1 No.....2 Don't know....99 If YES then ask: Always....3 Sometimes.....4
J.15	If someone tries to feed your child shop food (like chips, chanachur, loaf chocolate) or anything other than breastmilk before 6 months are you able to stop them?		Yes.....1 No.....2 Don't know....99 If YES then ask: Always....3 Sometimes.....4
J.16	Do you feel that you are able to make the decision about what you will feed [index child]?		Yes.....1 No.....2 Don't know....99 If YES then ask: Always....3 Sometimes.....4

Sl. No	Questions	Response	Code
J.17	Do you face problems with family members and relatives if you want to feed [index child] family foods (dal, vegetables, egg, meat, and fish) after 6 months of age?		Yes.....1 No.....2 Don't know....99 If YES then ask: Always....3 Sometimes.....4
J.18	Do you feel confident that you can raise [index child] to be a healthy child?		Yes.....1 No.....2 Don't know....99 If YES then ask: Always....3 Sometimes.....4
<b>MOTHER'S ROLES, PRIORITIES AND TIME</b>			
J.19	Is [index child name] with you when you are doing work inside the household?		Yes .....1>> Q J22 No.....2
J.20	If no, who cares for [index child name] while you do household work?		Adult (>15 year) family member within household. . . . .1 Adult (>15 year) family member outside household. . . . .2 Child (<15 year) family member within

Sl. No	Questions	Response	Code
J.21	Are you able to give [index child name] breast milk along with your household work?		YES.....1 NO.....2 If YES then ask: Always.....3 Sometimes...4
J.22	Are you able to give [index child name] family food along with your household work?		YES.....1 NO.....2 If YES then ask: Always.....3 Sometimes...4

Sl. No	Questions	Response	Code
J.23	Do you get any free time during the day?		YES.....1 NO.....2>> Q J26
J.24	What do you do during this free time?  [multiple responses possible]		Feed my child more.....1 Spend time with child....2 Play with child.....3 Take prayer.....5 Help children in their studies.....6 Take rest.....7 Gossip with others.....8 Do additional household work (cooking, cleaning, etc).....9 Watch TV.....10 Listen to radio.....11 Others (specify).....77
J.25	You said you get free time during day. .Please think if you were able to finish your work earlier than usual and you got more free time, what would you do with the extra free time?  Go to Question Q28		Feed my child more.....1 Spend time with child....2 Play with child.....3 Take prayer.....5 Help children in their studies.....6 Take rest.....7 Gossip with others.....8 Do additional household work (cooking, cleaning, etc).....9 Watch TV.....10 Listen to radio.....11 Others (specify).....77

Sl. No	Questions	Response	Code
J.26	You said you don't get free time during day. You have to do a lot of work in a whole day. Please think if you were able to finish your work earlier than usual and you got some free time, what would you do with the spare time?		Feed my child more.....1 Spend time with child....2 Play with child.....3 Take prayer.....5 Help children in their studies.....6 Take rest.....7 Gossip with others.....8 Do additional household work (cooking, cleaning, etc).....9 Watch TV.....10 Listen to radio.....11 Others (specify).....77
J.27	What do you do for fun activities?		Play with child.....1 Give advice to other people.....2 Gossip and chat with other people....3 Nothing.....4 Watch TV.....5 Listen to Radio.....6 Others (specify).....77
J.28	Do you take rest during the day?		YES....1 NO.....2
J.29	Do you feel that you have enough time to take good care of the child along with the household work?		YES.....1 NO.....2 If YES then ask: Always .....3 Sometimes...4

Sl. No	Questions	Response	Code
J.30	Do you feel that you do not have enough time to finish your daily household work ?		YES.....1 NO.....2 If YES then ask: Always.....3 Sometimes...4
J.31	Do you feel that you have a very heavy workload?		YES.....1 NO.....2 If YES then ask: Always .....3 Sometimes...4
J.32	Some mother's tell us that they have a lot of work to do in one day and so they cannot find a moment for themselves. Now tell me do you have work pressure like this?		YES.....1 NO.....2 If YES then ask: Always.....3 Sometimes...4

Sl. No	Questions	Response	Code
J.33	Do you feel tensed about finishing all of the work that you must do in 1 day?		YES.....1 NO.....2 If YES then ask: Always .....3 Sometimes...4

## SOCIAL NETWORKS

J.34		Do you know anyone who uses MNPs?					Yes.....1 No.....2 >>Next Module
	Name of person	Male 1 Female 2	Did [NAME] purchase the MNP?  Yes....1 No.....2 Don't know.....99	What para and village does [NAME] live in?  CODE FOR OWN	What is your relationship with this person? (Please see code list below)	Is [NAME] an NGO worker?  Yes 1 No 2>>>Next Module DK 99	Which NGO is that person affiliated with?  Don't Know...99
J.35	J.36	J.37	J.38	J.39	J.40	J.41	J.42
1							
2							
3							
4							
5							
6							
7							
8							

Codes for J.40

Own village....1

Other village but within same union...2

Other union....3

Others.....77



**Relationship codes for J.41**

Relative.....1

Friend/Neighbour.....2

Non relative.....3

Codes for J. 43

BRAC.....1

Other NGO....2

Don't know....99

**MODULE K: HOUSEHOLD FOOD SECURITY & DIETARY DIVERSITY****SECTION 1: HOUSEHOLD FOOD SECURITY**

**For each of the following questions, consider what has happened *in the past 30 days*. For the questions “how often”, according to the FANTA manual, the answer “Rarely” means 1-2 times, “Sometimes” means 3-10 times and “Often” more than 10 times**

Sl. No	Questions	Response	Code
K.1	In the past 30 days did you worry that your household would not have enough food?	<input type="text"/>	Yes ..... 1 No ..... 2>> <b>Q K2</b>
K.1.1	If "Yes", how often did this happen?	<input type="text"/>	Rarely(1-2 times) ..... 1 Sometimes (3-10 times) ..... 2 Often (>10 times) ..... 3
K.2	In the past 30 days were you or any household members not able to eat the kinds of foods you preferred because of a lack of resources?	<input type="text"/>	Yes ..... 1 No ..... 2>> <b>Q K3</b>
K.2.1	If "Yes", how often did this happen?	<input type="text"/>	Rarely(1-2 times) ..... 1 Sometimes (3-10 times) ..... 2 Often (>10 times) ..... 3
K.3	In the past 30 days did you or any household member eat just a few kinds of food day after day because of a lack of resources?	<input type="text"/>	Yes ..... 1 No ..... 2>> <b>Q K4</b>
K.3.1	If "Yes", how often did this happen?	<input type="text"/>	Rarely(1-2 times) ..... 1 Sometimes ..... 2 Often (>10 times) ..... 3

K.4	In the past 30 days did you or any household member eat food that you did not want to eat because of a lack of resources to obtain other types of food?	<input type="checkbox"/>	Yes ..... 1 No ..... 2 >> <b>Q K5</b>
K.4.1	If "Yes", how often did this happen?	<input type="checkbox"/>	Rarely(1-2 times) ..... 1 Sometimes (3-10 times) ..... 2 Often ..... 3
K.5	In the past 30 days did you or any household member eat a smaller meal than you felt you needed because there was not enough food?	<input type="checkbox"/>	Yes ..... 1 No ..... 2 >> <b>Q K6</b>
K.5.1	If "Yes", how often did this happen?	<input type="checkbox"/>	Rarely(1-2 times) ..... 1 Sometimes ..... 2 Often (>10 times) ..... 3
K.6	In the past 30 days did you or any household member eat fewer meals in a day because there was not enough food?	<input type="checkbox"/>	Yes ..... 1 No ..... 2 >> <b>Q K7</b>
K.6.1	If "Yes", how often did this happen?	<input type="checkbox"/>	Rarely(1-2 times) ..... 1 Sometimes (3-10 times) ..... 2 Often ..... 3
K.7	In the past 30 days was there ever no food at all in your household because there were no resources to get more?	<input type="checkbox"/>	Yes ..... 1 No ..... 2 >> <b>Q K8</b>
K.7.1	If "Yes", how often did this happen?	<input type="checkbox"/>	Rarely(1-2 times) ..... 1 Sometimes (3-10 times) ..... 2 Often (>10 times) ..... 3
K.8	In the past 30 days did you or any household member go to sleep at night hungry because there was not enough food?	<input type="checkbox"/>	Yes ..... 1 No ..... 2 >> <b>Q K9</b>
K.8.1	If "Yes", how often did this happen?	<input type="checkbox"/>	Rarely(1-2 times) ..... 1 Sometimes ..... 2 Often ..... 3
K.9	In the past 30 days did you or any household member go a whole day without eating anything because there was not enough food?	<input type="checkbox"/>	Yes ..... 1 No ..... 2 >> <b>Module K</b>
K.9.1	If "Yes", how often did this happen?	<input type="checkbox"/>	<b>Section 2</b> Rarely(1-2 times) ..... 1 Sometimes (3-10 times) ..... 2 Often (>10 times) ..... 3

## SECTION 2: HH DIETARY DIVERSITY

First ask if yesterday was a special day, like a celebration or feast day or a fast day where anyone in the HH ate special foods or where they ate more or less than usual or did not eat because they were fasting?

K.10 Was **yesterday** a special day where special kinds of foods were eaten? ☐ Yes ..... 1 No..... 2

If yesterday was **not** a special day, then ask the respondent about the types of foods that they or anyone else in their household ate yesterday during the day and at night.

If yesterday **was** a special day, then ask the respondent to describe the foods (meals and snacks) consumed the **day before yesterday (or the last normal day)** during the day and night, whether at home or outside the home.

Sl. No	Questions	A. Respondent (Index Child's Mother) ate	B. Any OTHER Household Member ate	Code
K.10.1	CEREALS Rice, bread made of wheat, puffed rice, pressed rice, noodles, or any other foods rice, wheat, maize/corn, <i>or other locally available grains</i>	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.2	VITAMIN A RICH VEGETABLES AND TUBERS? pumpkin, carrots, sweet potatoes that are orange and yellow inside	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.3	WHITE TUBERS AND ROOTS OR OTHER STARCHY FOODS? Potatoes, white yams, white sweet potato (not orange inside), potato crisps or other foods made from roots (not orange or yellow roots)	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.4	DARK GREEN LEAFY VEGETABLES ? Dark green leafy vegetables, including spinach, red amaranth leaves, green amaranth, puishak, laushak, kumrashak, kolmishak, mustard leaves, yam leaves, koloishak (pea leaves), methishak (amaranth leaves), dhekishak, demishak etc	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.5	OTHER VEGETABLES ? Other vegetables (e.g., squash, eggplant, green papaya, cauliflower, cabbage, onion, radish, sheem/boboti (beans),	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.6	VITAMIN A RICH FRUITS? Ripe mangoes, ripe papaya/pawpaw, jack fruit	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.7	OTHER FRUITS Other fruits (e.g. banana, apples, guava, oranges, other citrus fruits, pine apple, shakalu, watermelon, olives, grapes, jambura (grapefruit) berries, kamranga, tamarind, plum	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.8	ANY BEEF, GOAT, LAMB, CHICKEN, DUCK, OR OTHER BIRDS, LIVER, KIDNEY, HEART, OR OTHER ORGAN MEATS?	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.9	EGGS? Eggs of different birds – chicken, duck, turkey etc.; with yolk, without yolk	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2

K.10.10	FISH? Big/small fresh or dried fish or shellfish (e.g prawn, crab etc.)	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.11	ANY FOODS MADE FROM BEANS, PEAS, OR LENTILS? beans, peas, lentils, other pulses, soybeans, peas	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.12	MILK AND MILK PRODUCTS? Milk, cheese, yogurt or other milk products	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.13	OILS AND FATS ? Oil, fats or butter added to food or used for cooking including ghee	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.14	SWEETS ? Sugar, molasses, honey, misti, cold drinks, chocolates, candies, biscuits	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.15	SPICES, CONDIMENTS, BEVERAGES? Spices (cumin, coriander, salt), condiments (pickles, chutney), coffee, tea, etc.	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2
K.10.16	Tea/Coffee	<input type="checkbox"/>	<input type="checkbox"/>	Yes..... 1 No..... 2

## MODULE L: HOUSEHOLD SOCIOECONOMIC STATUS

### HH construction

Sl. No	Questions	Response	Code
L.1	Main floor material [OBSERVATION]	<input type="text"/>	Concrete .....1 Brick/Cement .....2 Tin /CI sheet .....3 Wood .....4
L.2	Main exterior wall material [OBSERVATION]	<input type="text"/>	Smoothed mud .....5 Tile .....6 Jute Stick .....7
L.3	Main roof material [OBSERVATION]	<input type="text"/>	Bamboo/ Grass/straw .....8 Others (Specify) .....9

L.4 **HH assets:** I am now going to ask you about household items that are available in your household. For each item, please tell me if the item mentioned is available in your household? If yes, please tell me how many of each is available?

	Asset	Asset code	How many (Number)
	1	2	3
L.4.1	Metal cooking pots/pans	1	
L.4.2	Bucket	2	
L.4.3	Stove/Gas burner	3	
L.4.4	Plates/Pans	4	
L.4.5	Cup/mug	5	
L.4.6	Bed/Khat/Chowki	6	
L.4.7	Mattress/blanket	7	
L.4.8	Table/ Chair	8	
L.4.9	Almirah	9	

	Asset	Asset code	How many (Number)
	1	2	3
L.4.10	Trunk / Suitcase	10	
L.4.11	Electric fan (Ceiling/Table)	11	
L.4.12	Table lamp	12	
L.4.13	Electric iron	13	
L.4.14	Radio	14	
L.4.15	Audio cassette/CD player	15	
L.4.16	TV (color/black-white)	16	
L.4.17	Refrigerator	17	
L.4.18	Microwave oven	18	
L.4.19	Sewing machine	19	
L.4.20	Wall clock/wrist watch	20	
L.4.21	Camera	21	
L.4.22	Bicycle	22	
L.4.23	Motorcycle	23	
L.4.24	Car/truck	24	
L.4.25	Rickshaw/Van	25	
L.4.26	Bullock cart/Push cart	26	
L.4.27	Boat	27	
L.4.28	Engine boat	28	
L.4.29	Phone/mobile phone	29	
L.4.30	Cow/buffalo	30	

	Asset	Asset code	How many (Number)
	1	2	3
L.4.31	Goat/sheep	31	
L.4.32	Chicken/duck	32	
L.4.33	Other 1 (specify).....	33	
L.4.34	Other 2 (specify).....	34	
L.4.35			
L.4.36			

## MODULE M: MEDIA EXPOSURE

MODULE M: SECTION 1 RADIO ADVERTISEMENTS				
M.1	Do you usually listen to Radio? This can be anywhere, in your house, or anywhere outside of your house.	Yes (usually).....1 Rarely.....2	No (not at all).....2 >> <b>Section 2</b>	
MODULE M: SECTION 2 TV ADVERTISEMENTS				
M.2	Do you usually watch television? This can be anywhere, in your house, or anywhere outside of your house.	Yes (usually).....1 Rarely.....2	No (not at all).....3 >> <b>Next module</b>	
M.3	Which television channels do you watch the most?  (Write the 3 most important ones)	BTV.....1 BTV world.....2 Masranga.....3 NTV.....4 Ekushey TV.....5 RTV.....6 BanglaVision.....7 DeshTV.....8 DigantaTV.....9 ATNBangla.....10 ATN News.....11 Baishakhi.....12 Channel i.....12 Banglavisio.....13 Islamic TV.....14 Peace TV Bangla.....15 Channel 9.....16		



		Don't watch local channel/watch foreign channels.....17 Others (specify).....77		
M.4	Which day of the week do you watch TV the most?  (If they say "every day" then probe to select one particular day)		Sunday.....1 Monday.....2 Tuesday.....3 Wednesday.....4 Thursday.....5 Friday.....6 Saturday.....7	
M.5	What time of the day do you watch TV the most?		0:00 – 5:59 hrs .....1 6:00 – 11:59 hrs..... 2 12:00 – 17:59 hrs 3 18:00 – 23:59 hrs.....4	
M.6	What type of program do you watch the most on TV?		News 1 Music 2 Children's program 3 Religious program 4 Sports 5 Weekly movie...6 Weekly drama...7 TV drama serial...8 TV talk show...9 Recreational program....10 Health/disease programs...11 Others (specify)_____77	
<b>Instruction for Interviewer:</b> Show PHOTO on each TVC one by one, and collect responses for each TVC. Now, I will show you photos of a TV advertisement to remind you about the content of that TV advertisement.				
<b>MODULE M SECTION 3A TVC 1: Mother of new born baby</b> Now I'll show you some photographs on new born baby				

M.7	Have you seen this advertisement in TV?	Yes.....1 No.....2 >> <b>Section 3B</b>	
M.8	Please tell us the story about this TV advertisement.  <i>(Multiple response possible)</i>	A baby girl is born.....1 Please give her to me.....2 It's going to be late.....3 She has to be given my breast milk.....4 Babies should be fed breast milk within an hour of birth.....5 So, the baby keeps healthy and milk production in the mother's breast is fast...6 The baby needs to be fed breast milk immediately to protect from sicknesses.....7 She cannot be fed anything other than breast milk.....8 Do not feed honey or sugar water.....9 Husband pleased to have such an intelligent wife .....10 Others.....77 Don't Know.....99	
M.9	What is the TV spot asking the viewer to do? <i>(Multiple response possible)</i>	Initiate feeding breast milk immediately (in the first hour) after birth .....1 Not to feed the baby anything other than breast milk.....2 Other.....77 Don't Know.....99	
M.10	Do you use any of the messages you heard or saw in the advertisements regarding child feeding that we just discussed?	Yes.....1 No.....2 >> <b>Section 3B</b>	
<b>MODULE M, SECTION 3B TVC 2: Father brings tinned milk for baby</b> Now I'll show you some photographs on breastfeeding			
M.11	Have you seen this advertisement in TV?	Yes.....1 No.....2 >> <b>Section 3C</b>	
M.12	Please tell us the story about this TV advertisement  <i>(Multiple response possible).</i>	Bhabi, brother has come .....1 What have you brought for me brother?.....2 Father proudly takes out a canned formula from his bag for the baby.....3 What a father you are!.....4 You don't know the dangers of feeding any foods other than breast milk in first six months .....5 The baby urinates minimum 6 times a day .....6 The baby plays and sleeps well and is growing.....7	

		For the first 6 months, only breast milk is sufficient for the baby .....8 Even mothers suffering from undernutrition can feed sufficient breast milk for six months.....9 The baby needs to be fed breast milk immediately to protect from sicknesses.....10 She cannot be fed anything other than breast milk.....11 Others.....77 Don't Know.....99	
M.13	What is the TV spot asking the viewer to do? (Multiple response possible)	Not to feed the baby anything other than breast milk for the first 6 months....1 Malnourished mothers can also sufficiently breastfeed their child for 6 months.....2 Other .....77 Don't Know.....99	
M.14	Do you use any of the messages you heard or saw in the advertisements regarding child feeding that we just discussed?	Yes.....1 No.....2 >> <b>Section 3C</b>	
<b>MODULE M, SECTION 3C TVC 3: The house is on fire</b> Now I'll show you some photographs on a burning house			
M.15	Have you seen this advertisement in TV?	Yes.....1 No.....2 >> <b>Section 3D</b>	
M.16	Please tell us the story about this TV advertisement. (Multiple response possible)	Father, come out after covering yourself with a wet blanket .....1 It is very important to take good care of the baby at early stage of life .....2 In the first 2 years, a child's brain develops fast .....3 I bought nutritious foods for Tomal .....4 I used to help in household chores.....5 I used to help take care of Tomal .....6 Mother gets enough time and is able to feed the baby family foods .....7 You see who is the father of this child. ....8 Others.....77 Don't Know.....99	

M.17	What is the TV spot asking the viewer to do? (Multiple response possible)	To take good care of the baby at early stage of life.....1 Buy nutritious foods for the baby.....2 Mother should allocate enough time to feeding the child.....3 Other.....77 Don't Know.....99	
M.18	Do you use any of the messages you heard or saw in the advertisements regarding child feeding that we just discussed?	Yes.....1 No.....2 >> <b>Section 3D</b>	
<b>MODULE M, SECTION 3D TVC 4: Mother is cooking fish</b> Now I'll show you some photographs on cooking fish			
M.19	Have you seen this advertisement in TV?	Yes.....1 No.....2 >> <b>Section 3E</b>	
M.20	Please tell us the story about this TV advertisement. (Multiple response possible)	Mother is preparing food for her child with joy.....1 Today Babu will eat fish.....2 Mother is mashing the food for the baby.....3 Babu likes to eat egg, fish and chicken liver .....4 Everyday I feed him/her at least one of these items .....5 Actually, I didn't know, doctor told me to feed my baby fish, egg and chicken liver with other food, there are important for the growth and development of children .....6 The baby is eating fish at 8 months?.....7 Other.....77 Don't Know.....99	
M.21	What is the TV spot asking the viewer to do? (Multiple response possible)	Feed the child egg, fish, chicken liver along with other food for the growth and development of the child.....1 Other.....77 Don't Know.....99	
M.22	Do you use any of the messages you heard or saw in the advertisements regarding child feeding that we just discussed?	Yes.....1 No.....2 >> <b>Section 3E</b>	
<b>MODULE M SECTION 3E TVC 5: Tumpa wins the prizes</b> Now I'll show you some photographs on sports			

M.23	Have you seen this advertisement in TV?	Yes.....1 No.....2 >> <b>Section 3F</b>	
M.24	Please tell us the story about this TV advertisement. (Multiple response possible)	Tumpa stood first.....1 Apa, what you fed to Tumpa, she is very good in study and games .....2 Mother took care of what she fed her child and in what quantity.....3 From 7 months onwards, a baby should have ½ bowl of food twice a day.....4 From 9 month onwards, a baby should have ½ bowl of food thrice a day.....5 From 12 month onwards, a baby should have 1 bowl of food thrice a day.....6 Family food should be given along with nutritious snacks.....7 You are the best mother.....8 Other.....77 Don't Know.....99	
M.25	What is the TV spot asking the viewer to do? (Multiple response possible)	To take care of what the child is being feed and the quantity of the meal.....1 From 7 months onwards, feed the baby ½ bowl of food twice a day.....2 From 9 month onwards, feed the baby ½ bowl of food thrice a day.....3 From 12 month onwards, feed the baby 1 bowl of food thrice a day.....4 Family food should be given to the baby along with nutritious snacks.....5 Other.....77 Don't Know.....99	
M.26	Do you use any of the messages you heard or saw in the advertisements regarding child feeding that we just discussed?	Yes.....1 No.....2 >> <b>Section 3F</b>	
<b>MODULE M, SECTION 3F TVC 6: Child goes to sleep without eating</b> Now I'll show you some photographs on child feeding			
M.27	Have you seen this advertisement in TV?	Yes.....1 No.....2 >> <b>Next Module</b>	
M.28	Please tell us the story about this TV advertisement. (Multiple response possible)	Infant refusing to eat.....1 Baby please eat, please eat.....2 My baby darling, eat a little .....3 Do not feed the child forcefully.....4 Feed your child with patience.....5 Chips, juice, biscuits will not fill her small stomach.....6 Doctor holds a chart showing different types of good and bad food.....7	

		If the child is hungry she will eat normally.....8 The baby went to sleep without eating.....9 Other.....77 Don't Know.....99	
M.29	What is the TV spot asking the viewer to do? (Multiple response possible)	Feed the child with patience.....1 Not to fill the child's stomach with chips, juice, biscuits.....2 Feed the child different types of food to increase the child's appetite.....3 Other.....77 Don't Know.....99	
M.30	Do you use any of the messages you heard or saw in the advertisements regarding child feeding that we just discussed?	Yes.....1 No.....2 >> <b>Next Module</b>	

## Module N: ANTHROPOMETRY

VERIFY HOUSEHOLD COMPOSITION TABLE : NOTE LINE NUMBER, NAME AND AGE OF RESPONDENT MOTHER and INDEX CHILD 6-23.9 MONTHS

MOTHER of Index Child				WEIGHT, HEIGHT OF RESPONDENT MOTHER			
Member ID (B01)	N.1 Name	N.2 DATE OF BIRTH (DD MM YYYY)	N.3 AGE (IN YEARS)	N.4 WEIGHT (KG)	N.5 HEIGHT (CM)	N.6 CURRENT PREG-NANCY  STATUS Yes.....1 No.....2 DK.....88	N.7 RESULT Measured... 1 Absent ..... 2 Refused..... 3 Other ..... 4
		<div style="display: flex; border: 1px solid black;"> <div style="border: 1px solid black; width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>		<div style="display: flex; border: 1px solid black;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>	<div style="display: flex; border: 1px solid black;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>	<div style="display: flex; border: 1px solid black;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>	<div style="display: flex; border: 1px solid black;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>
INDEX CHILD				WEIGHT, HEIGHT of INDEX CHILD			

Member ID(B01)	N.8 Name	N.9 DATE OF BIRTH	N.10 AGE	N.11 WEIGHT (KG)	N.12 HEIGHT (CM)	N.13 MEASURED LYING DOWN	N.14 RESULT
		(DD MM YYYY)	(Month)				
		<div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	<div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	<div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	<div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	<div> <div></div> </div>	<div> <div></div> </div>

NOTE: MAKE SURE ALL CHILDREN ARE MEASURED LYING DOWN.

## **CHAPTER 5**

### **CONCLUSIONS**

Despite improvements in child undernutrition in recent decades, current estimates indicate that 22% of children under 5 years of age are stunted and 15% are underweight [1]. Optimal infant and young child feeding (IYCF) practices can have major implications for child growth and development and can potentially prevent up to 19% of deaths of children under 5 years of age in developing countries [2, 3]. High coverage of interventions aimed at improving breastfeeding could reduce death before 2 years of age by 10% and high coverage of complementary feeding behavioral interventions could lead to a 1% reduction in deaths before 24 months and a 20% reduction in the prevalence of stunting at 1 year. However, interventions vary in their ability to improve IYCF behaviors and child health [4]. For example, interventions aimed at improving complementary feeding practices have achieved improvements in linear growth ranging from 0.04 to 0.64 z-scores [5].

One factor that could account for the variability in intervention outcomes is the lack of consideration of determinants at the level of the child, caregiver or household or the combination of these in the design and evaluation stages of the intervention. Additionally, the common approach to intervention design and evaluation does not consider the entire program impact pathway (PIP) from intervention inputs to outcomes [6]. When the PIP between the program inputs and behavioral or health outcomes are not adequately examined, researchers may miss important factors that acted as bottlenecks or barriers to desired intervention effects. A recent review by Fabrizio et al. [7] found that effective complementary feeding interventions used both



a PIP approach and formative research that identified barriers and facilitators to recommended feeding practices.

Studies of IYCF behaviors are often cross-sectional, examining one IYCF behavior or a set of behaviors (e.g. breastfeeding) at a single time. This approach may allow for the necessary depth to examine individual IYCF behaviors or a set of behaviors but it may not reveal important insights into barriers that occur during feeding transitions or across a full spectrum of IYCF that would be readily visible in a longitudinal analysis. This may inhibit our ability to identify, target and, thus, improve barriers to the uptake of behavior change interventions.

The objectives of this dissertation were to: 1) scope the extent to which caregiver capabilities are considered in research on complementary feeding behavior change interventions in low- and middle-income countries, 2) describe IYCF trajectories from 0 to 11 months of age and explore decisions made by caregivers at critical IYCF junctures, and 3) examine the role of caregiver self-efficacy for complementary feeding as part of a program impact pathway to complementary feeding behaviors. Overall, the guiding hypothesis for this dissertation was that with a greater understanding of underlying determinants of behavior including caregiver capabilities in multiple contexts, interventions can be more effectively shaped and ultimately have a greater impact on child health.

We first investigated the current landscape for caregiver capabilities in the literature on behavior change interventions for complementary feeding using a scoping study. Second, we employed the PIP method in the examination of one caregiver capabilities construct, self-efficacy. Third, a trajectories approach was used to

examine a full spectrum of IYCF behaviors to describe and explain variability in IYCF trajectories and illuminate the underlying processes that determined these trajectory patterns. In the study presented in Chapter 2 we used the existing complementary feeding behavior change intervention literature as data and in Chapters 3 and 4 we drew heavily on data from Bangladesh that were collected as part of the process evaluation of a large-scale IYCF behavior change intervention, Alive & Thrive.

### **Contributions to the literature on infant and young child feeding in Bangladesh and caregiver capabilities**

We found that caregiver capabilities are rarely explicit points of intervention, measured, or discussed as part of complementary feeding behavior change interventions. In our scoping study of the complementary feeding behavior change literature accessible in PubMed, we found that 17 of the 37 interventions identified mentioned at least one caregiver capabilities construct. Few interventions targeted caregiver capabilities as a point of intervention (n=5) and even fewer measured these constructs (n=5). The measurement of these constructs favored qualitative methods. Only 8 interventions made inferences about how these constructs contributed to the results of their intervention (Chapter 2).

The results of this scoping study (Chapter 2) also reflected the dominant lens through which interventions are planned and the way that caretakers, nearly always women, are viewed in interventions aimed to improve IYCF. Bringing a gender-sensitive lens [8] to interventions would require the inclusion of caregiver capabilities as points of intervention, and identification as potential facilitators and barriers to the success of the intervention. This would require the measurement of caregiver

capabilities constructs.

Using data from a large-scale cluster randomized intervention in Bangladesh, we investigated one caregiver capability, self-efficacy. We found that self-efficacy simultaneously moderated and mediated the association between the Alive & Thrive intervention and the child's consumption of green leafy vegetables in the last 24 hours. This means that self-efficacy had an overall indirect effect in the Alive & Thrive intensive group (mediation) and simultaneously at higher levels of self-efficacy in the Alive & Thrive intensive group, self-efficacy was associated with a greater likelihood of giving green leafy vegetables in the last 24 hours. These findings were, however, juxtaposed with the results that indicated that self-efficacy did not mediate or moderate the relationship between the intervention and the on-time introduction of egg, another Alive & Thrive recommended practice.

This provided evidence to suggest that self-efficacy is important to IYCF behaviors and behavior-change interventions but differed in its relationship with two different IYCF behaviors. It also demonstrated that measuring self-efficacy at the level of the domain achieves a level of specificity that is general enough to avoid the creation of measures that are simply tautological, i.e. asking about the action of a particular behavior when the intention was to ask about the self-efficacy surrounding that behavior. We avoided this problem with our approach. Additionally, domain-specific self-efficacy is refined enough to avoid what Bandura cautions against, the treatment of self-efficacy as a generalized attribute that can be applied to a person as a whole [9]. It is not a generalizable construct that can be applied to all behaviors, even if these behaviors all fall under the same biomedical “umbrella” such as

“complementary feeding.”

Self-efficacy needs to be examined for complementary feeding behavior in multiple contexts so we can understand if it is relevant in all places, which contextual factors are important for self-efficacy, and how to adapt measurement tools to make them setting-specific. Answering these remaining research questions will allow us to understand how to measure and evaluate behavior-specific self-efficacy, informing hypotheses on how best to intervene on IYCF. This would inform whether and for which behaviors we should include attempts to improve caregiver self-efficacy in interventions.

The young child diets in Bangladesh often lack diversity [10], an essential feature of healthy diets [11]. Micronutrient status, dietary adequacy and growth of a child can be improved by increasing the diversity of child diets [12-14]. Thus, understanding the role of self-efficacy is essential for the larger goal of improving child diets. Our study indicates that specifically targeting self-efficacy in an intervention could lead to greater adherence to some program-recommended behaviors and thus increase the impact of the program on child health. However, changing some child feeding behaviors, such as introducing egg on-time, may require other interventions in addition to improving self-efficacy, if self-efficacy is the proximal variable to feeding egg on-time (Chapter 4).

Extending this moderator and mediator analysis for other caregiver capabilities that are hypothesized to be along a PIP for a given behavior change intervention may lead to information about barriers and enablers of effective behavioral change [7]. Currently, few complementary feeding behavior change interventions conduct this

type of analysis with caregiver capabilities constructs (Chapter 2).

The intra-cultural diversity [15] that exists in IYCF in Bangladesh was highlighted in Chapter 3. The results of this study suggest that individually tailored interventions that do not deliver a schedule of IYCF messages, but instead train health workers to respond to current behaviors that a caregiver is practicing and thus the existing IYCF trajectory that a child is following, may be the most appropriate way to target improvements in IYCF. This finding, however, is labor intensive and thus costly. The current goals to “scale-up” nutrition interventions involves achieving higher coverage of households that are receiving an intervention and experiencing improved child health. This recommendation is at odds with “scaling-up.” Achieving scale while still maintaining quality in the delivery of interventions as well as improvements in IYCF behavior and child health on the individual household level is a current challenge [16].

### **Methodological contributions of these studies**

The lack of discussion of caregiver capabilities constructs in the complementary feeding behavior change intervention literature (Chapter 2) may also reflect the lack of measurement tools available for these constructs as well as a lack of agreement about how best to measure them. The few studies that used quantitative measures for these constructs may indicate that measures are not readily available or accepted. A unifying conceptual model for how caregiver capabilities relate to both interventions and each other would facilitate the development of measures and guide further development of these constructs. Its application would promote dialogue around caregiver capabilities and advance our understanding of how these constructs

operate in the context of interventions.

Currently, there are several barriers to the quantitative measurement of caregiver capabilities constructs. First, asking a direct question about some constructs is difficult. For example, articulating one's self-efficacy for a behavior may be challenging for someone who has never reflected on their confidence about their ability to perform a behavior and had simply decided that they "can" or "cannot" without introspection. Probing about behaviors of interest in a qualitative interview may reveal a person's self-efficacy about a particular behavior more easily than a survey question. Second, although it is useful to develop scales or indices for a construct from survey data to combine the results of questions that a researcher feels measures the same construct, it is also complicated and time consuming. Assigning values to responses, weighting particular responses or questions more than others, and grappling with what a 2-point difference on a given scale *actually* means for a given construct, requires multiple testing, time, and consensus building. Third, it is important to determine if all caregiver capabilities constructs are relevant across multiple cultures and contexts as they are conceptualized, requiring a great deal of anthropological insight.

It is a high-input process to develop questions and scales that measure these constructs. However, a focus on increasing an evidence base of potential measures, as well as the testing and publishing of the results of intervention studies that include these measures, both as targets of the intervention and as covariates for other health outcomes, is essential to advance this field.

As our contribution to addressing the present lack of measures of caregiver

capabilities, we developed quantitative measures for one caregiver capabilities construct, complementary feeding self-efficacy, based on experiences in the field and cognitive testing of self-efficacy questions (Chapter 3). We then tested a complementary feeding self-efficacy scale in the context of a large-scale IYCF intervention in Bangladesh. The results of this research indicate that attention to caregiver capabilities constructs, such as self-efficacy, can illuminate facilitators and barriers to recommended infant and young child feeding practices. However, research on complementary feeding behavioral interventions should aim to measure self-efficacy that is specific for complementary feeding. Future research needs to be designed to determine how specific this measure of self-efficacy needs to be. For example, is it necessary to examine complementary feeding as a whole in relation to self-efficacy, or is it possible to group foods together such as all vegetables or all types of animal source foods? Are there certain characteristics of foods that predict different levels of self-efficacy and thus should inform our grouping of foods when we examine self-efficacy?

In addition to attention to caregiver capabilities, the variability in the success of behavioral change interventions may also be attributed to the way we investigate child-feeding behaviors. We often investigate these behaviors through cross-sectional examination of intervention inputs and behavioral or health outcomes. Feeding transitions and consequential decision moments may be missed when conducting cross-sectional analysis. These may be important to consider if we wish to improve intervention impacts. We used focused ethnographic research methods to carry out a trajectories approach to measuring and analyzing data in this study of IYCF practices.

This allowed for the rich description of IYCF practices and individual children's IYCF trajectories in this sample. Through the use of a trajectories approach, we found that caregivers have many ways in which they navigate the continuum from breastfeeding to complementary feeding. We found substantial variability in practices across this sample, demonstrating that there is perhaps no norm for infant feeding in the dynamic landscape of changing knowledge and practices in this setting.

The examination of caregiver capabilities across individual IYCF trajectories is also a necessary next step for future research. Understanding how caregiver capabilities vary between behaviors and across time would provide insight for program planning and intervention research such as which caregiver capabilities to target and how caregiver capabilities may influence the intended behavioral change.

#### **Future research activities and summary of contributions**

High-priority activities for future research related to this work include the development of a unifying conceptual framework for caregiver capabilities that would aid in the examination of caregiver capabilities, the advances in the theory around caregiver capabilities, and the testing of these constructs in an intervention context. The development and testing of measurement tools for caregiver capabilities constructs is of high priority as well. The development of sets of questions for surveys with suggestions for adaptation in multiple contexts; scales and indices for these questions; interview guides for suggestions for qualitative inquiry into these constructs; focused ethnographic research tools and other "rapid assessment" tools for these constructs would all contribute to the body of measurement tools for caregiver capabilities.



Other studies that could contribute greatly to the existing evidence include: intervention studies that have targeted the improvement of caregiver capabilities directly; used caregiver capabilities as covariates in analysis of other health outcome variables; and measured caregiver capabilities along program impact pathways to inform intervention process evaluation and the results of the study.

The qualitative evaluation of IYCF trajectories in other contexts, the investigation of caregiver capabilities as they relate to IYCF trajectories and decision moments, and an intervention specifically designed to target the diversity of IYCF trajectories in Bangladesh are also high priorities. Additionally, the quantitative measurement of IYCF trajectories are needed to identify key intervention points and to further explore exactly what existing IYCF summary indicators are measuring. This research is necessary to further advance the literature on IYCF practices and IYCF trajectories in Bangladesh as well as the value of this method as a research tool.

The multiple methods used in this study have led us to important insights about patterns and determinants of IYCF behavior and the current landscape for the investigation of caregiver capabilities in complementary feeding behavior change interventions. A longitudinal, holistic approach helped us to discover the wide intra-cultural diversity [15] in Bangladeshi IYCF. A PIP perspective led us to the in-depth investigation of self-efficacy, giving us evidence for its importance for one complementary feeding practice in Bangladesh. We also now understand the existing environment for future research on caregiver capabilities in behavioral interventions for complementary feeding. Future research that prioritizes the investigation of underlying determinants of IYCF behavior, including caregiver capabilities will

further advance knowledge in this field, may lead to improvements in child health, and the behavior change interventions that caregivers receive.

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