MAMANIEVA: A World Vision Proof of Concept Pilot Project of the Grandmother Centered Approach to Improve Infant and Young Child Feeding in Bum ADP, Bonthe District, Sierra Leone

Formative Research Report

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Prepared for World Vision Germany, World Vision International Nutrition Centre of Expertise and The Grandmother Project

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Introduction

State of Child Nutrition in Sierra Leone

The available data shows that improvements in child nutrition in Sierra Leone have been limited (Table 1). According to recent surveys, more than 40% of children under the age of 5 years are stunted, while underweight and wasting persist at alarmingly high rates. Nearly 75% of young children are anemic and /or vitamin A deficient (WHO, 2009; WHO, 2008) and a substantial minority consume inadequate intakes of zinc and iodine (MI, 2009; UNICEF, 2009). Recent national surveys highlight that infant and young child feeding (IYCF) practices remain poor and likely contribute to the high rates of underweight, stunting, wasting and subsequent mortality (SSL 2007; SSL 2009; SSL 2011). Most recently, the 2010 Multiple Indicator Cluster Survey for Sierra Leone reported that only 45% of infants initiated breastfeeding within one hour, 20% of 4–5 month olds were exclusively breastfed, and only 20% of 6–24 month olds received the recommended minimum meal frequency for their age (SSL 2011).

Table 1: Prevalence of malnutrition among children under 5 years old in Sierra Leone according to national survey data.

	Survey and Year		
Malnutrition indicator	**MICS 2005 (SSL 2007)**	**DHS 2008 (SSL 2009)**	**MICS 2010 (SSL2011)**
Stunting %	40%	36%	44%
Wasting %	9.8%	10.2%	8%
Underweight %	30%	36%	22%

Extensive evidence supports optimal nutrition practices in the first two years of life to ensure long-term child health and development outcomes. Indeed, deficits in growth and development caused by poor nutrition during this period have long-term detrimental effects on the children's schooling and later job and economic opportunities. This critical window for improving child nutrition begins well before the child is born however good nutrition before and during pregnancy is necessary to support adequate fetal growth and development. Inadequate weight gain during pregnancy and poor micronutrient status both before and during pregnancy increase the risk of a child being born low birth weight or preterm with long term implications for later growth and development. In Sierra Leone poor maternal nutrition is a key barrier to improving child nutrition as evidenced by a low birth prevalence of nearly 25% (UNICEF. 2009). More than half of all pregnant women are anemic and nearly 20% suffer from clinical vitamin A deficiency.

Improving infant and young child nutrition

Multiple factors including poverty, food insecurity and access to health services to name a few, contribute to the poor nutrition of children largely through their contributions to repeated infections and inadequate dietary intakes. Perhaps the most important determinants of a child's nutrition, however, are found in the private domain of the family where care giving and feeding activities are concentrated. Throughout Africa, Asia and Latin America, research indicates that families act collectively to support the care of children. Mothers make decisions about the care of the child in collaboration with or under the direction of other family members, most notably elder women (grandmothers, mothers-in-law); rarely do mothers act autonomously or independently from the family unit (Aubel, 2012). Indeed, research in numerous communities identifies elder women (hereafter referred to as grandmothers) as the primary household advisors for issues related to pregnancy, childbirth, and care and feeding of the young child as well they are often key caregivers for both mothers and children. This family-based decision-making has profound

implications for nutrition interventions given that the majority of traditional nutrition education and counseling interventions target solely the mother with messages, skills and support often to the exclusion of others in the family, most notably grandmothers. Indeed, previous community-based research in Senegal and Malawi identified the critical role played by elder women in maternal and infant nutrition. In Senegal, when programs engaged grandmothers in dialogue on optimal diet and nutrition for women and infants, dramatic improvements in attitudes and practices of mothers and grandmothers with regards to early initiation of breastfeeding and duration of exclusive breastfeeding were observed (Aubel, 2004). Thus, the exclusion of grandmothers from the development and implementation of community-based programs likely represents a missed opportunity for effecting sustainable improvements in child nutrition.

Government and nongovernmental groups in Sierra Leone currently support initiatives to improve infant and young child feeding practices namely community wide sensitizations, nutrition counseling of pregnant and breastfeeding mothers by community health workers, and establishing mother-to-mother support groups. However, to enhance effectiveness, strategies should recognize and be inclusive of the key influencers and authorities within the household and community with respect to maternal and child health. In Sierra Leone, particularly in rural communities, grandmothers provide support to their daughters/daughters-in-law during pregnancy, labour, delivery and the postpartum period. These supports range from sharing of knowledge and experiences to caring directly for mothers or children. During this time, grandmothers have the potential to exert significant influence on maternal nutrition and infant and young child feeding practices. The Mamanieva Proof of Concept Project will utilize a mixed methods participatory approach to explore the role of grandmothers as advisors and caregivers for child nutrition and pilot a grandmother-inclusive strategy that engages grandmothers through participatory community based activities to raise their awareness and ownership of optimal child nutrition practices.

The main objectives of this proof of concept pilot project are to
1) Identify the roles of grandmothers as they relate to infant and young child feeding in southern Sierra Leone using qualitative and quantitative research
2) Develop culturally appropriate, participatory activities that engage grandmothers' existing knowledge and expertise and promote dialogue on optimal child feeding practices
3) Qualitatively assess changes in infant and young child feeding practices, namely timely initiation of breastfeeding, duration of exclusive breastfeeding and optimal complementary feeding practices and the pathways through which these changes occurred.
4) Document feasibility, acceptability and capacity requirements of the grandmother-inclusive approach to inform future programming through a modified process evaluation.

The objectives of the mixed methods formative research are to document
1) Current knowledge and practices as they relate to maternal, infant and young child nutrition
2) The role of the grandmothers in influencing nutrition in pregnant women and feeding practices of infants and young children
3) The attitudes and perceptions as they relate to maternal, infant, and young child nutrition
4) The family and societal contexts within which the pilot project will be implemented.

This report provides the findings from the quantitative and qualitative components of the formative research essential to inform the development of the grandmother engaged strategy and achievement of objectives 2 and 3 of the Mamanieva Proof of Concept Project.

Bum ADP, Bonthe District
The Bum Chiefdom, located in Bonthe District, in the southern region of Sierra Leone is one of the priority areas in which World Vision is involved in integrated community development programs. It has a population of approximately 23,000 and the main economic activities are fishing, agriculture, and petty trading. The Chiefdom is predominately members of the Mende tribe and the majority speaks the Mende language. The land area is divided into two main habitats, the mainland and the riverine areas, with the majority of the population residing on the mainland. The research will occur specifically in consenting villages located in two sections in Bum—Torma and Fikie—with all villages in Torma serving as the intervention villages and all villages in Fikie section serving as control villages. Torma and Fikie were originally selected by WV Sierra Leone office for this pilot work due to year-round accessibility, though recent flooding and heavy rains are raising concerns about their accessibility.

In the Bum Chiefdom and across the country, World Vision (WV) has implemented health and nutrition strategies targeting *women of reproductive age*, since a priority goal is to improve the health and nutrition of community members, especially women and children. However, for the past few years, the World Vision Nutrition Centre of Expertise, in Canada has been encouraging WV country programs to look beyond women of reproductive age, to consider the role and influence of other household actors who have a significant influence on the attitudes and practices of younger women, particularly grandmothers.

In 2012 WV initiated a community nutrition project for communities in the Bum Chiefdom to contribute to improved nutritional practices and nutritional status of infants and young children. During project development, team members opted to use the *grandmother-inclusive approach* developed by Grandmother Project (GMP): Change through Culture, an American and Senegalese NGO that builds capacity of other organizations to implement grandmother-inclusive programs.

In mid-2012, GMP facilitated a three-day introductory workshop for WV staff in Freetown on its grandmother-inclusive approach to community nutrition/health programs. The workshop participants formulated two overarching conclusions. First, participants concluded that in all Sierra Leonean families, senior women, or *grandmothers* play a central role and have great influence on nutrition and health practices related to children and women. Second, they concluded that it would be beneficial to actively involve grandmothers in future WV community programs and that their involvement will most probably increase the results of those programs by helping to ensure that both younger and older women have the same nutrition/health information and practices. During the workshop it was also decided by WV staff to call it *Mamanieva (w*hich means *for our grandmothers) i*n order to have a culturally meaningful name for the new project.

Methods

Quantitative Survey

Survey participants and sampling: The target populations for the baseline survey included pregnant women, women with children <24 months and grandmothers (elder female

relatives) residing in eligible households. Inclusion criteria for eligible households and participants at baseline included:
1) Household has at least one pregnant woman or a mother with a child 0–24 months of age
2) Pregnant woman or mother with child <24 months of age is at least 17 years of age

Due to the small number of potentially eligible households in Torma and Fikie sections, exhaustive survey sampling procedures (i.e., census sampling) were employed. Briefly a census-based survey requires all households in participating areas to be screened for eligibility and all eligible households requested to participate.

Sample size calculations: Table 2 presents a priori estimated sample sizes based on populations in these villages in 2010 and assuming that 3% of the population in Bum are pregnant women and 9% have a child of <24 months. Based on 2010 population estimates and assuming 20% refusal or ineligible rates, we expected 156 pregnant women and 470 women with children <24 months to participate. Table 3 presents the final sample sizes interviewed for each category of respondent in the two study sites.

Table 2: Estimated sample sizes available for cross-sectional baseline and endline surveys, pregnant women and women with young children (<24 months) based on 2010 population estimates for the two villages.

Section	Total population (2010 estimates)	Pregnant women		Women with children <24 months	
		Assuming 3% of population is pregnant women	Population available assuming 20% refusal /ineligible rate	Assuming 9% of population is children 0-24 mos	Population available assuming 20% refusal / ineligible rate
Torma	3781	113	90	340	238
Fikie	2747	82	66	247	173
Estimated Sample Available			**156**		**411**

Table 3: Final samples sizes for the Mamanieva baseline survey interview by respondent type and section[1].

	Mothers with children < 24 mos	Pregnant women	Grandmothers
Torma	217	78	97
Fikie	126	53	50
Totals	343	131	147

In addition to the pregnant women and women with children < 2, grandmothers residing in eligible households were surveyed. The proportion of the population comprised of grandmothers living with pregnant women or women with children <24 months was unknown prior to the survey. Therefore, in eligible households, women >45 years (and who was not the pregnant woman or mother with young child respondent) were invited to participate in the survey. In the event that more than 1 woman in the household was older than 45 years then the most senior woman as determined by the household was as the grandmother respondent.

[1] A total of 486 mothers were interviewed. Six pregnant women and six women with children less than 2 years were excluded from analyses because they were < 17 years at the time of the survey and did not meet eligibility criteria

Baseline survey tool: The baseline survey queried the knowledge, beliefs and attitudes of mothers (pregnant women and women with young children) and grandmothers as they relate to maternal and infant nutrition and feeding practices. Key maternal nutrition beliefs assessed included consumption of extra food during pregnancy, rest and consumption of iron and folic acid tablets; infant feeding beliefs assessed included initiation of breastfeeding within one hour; prelacteal feeds in the first few days of life; exclusive breastfeeding to 6 months postpartum, timely and appropriate complementary feeding and continued breastfeeding[2]. Additionally, the baseline survey assessed sources of advice and information on infant feeding for mothers and the content of nutrition and infant feeding advice given to mothers by commonly sought out advisors as well as the maternal nutrition and infant feeding beliefs and advice of grandmothers.

A total of 486 mothers were interviewed of which 137 were pregnant mothers and 349 were mothers with children under 2 years. Six pregnant women and six women with children less than 2 years were excluded from analyses and are not included in this report because they were <17 years at the time of the survey and thus did not meet eligibility criteria.

Implementation of baseline survey

Consultants from Njala University were hired by WVSL/WVGermany to implement the baseline survey in collaboration with the World Vision Sierra Leone principal investigator. The Njala consultants and WVSL office were responsible for developing and coordinating a standard protocol for data collection; training and supervision of the field team, quality control measures in the field and data entry. The baseline survey was implemented from March 22-April 2, 2013. Two main challenges were encountered during implementation as reported by the Njala consultant, namely 1) Some of the villages did not have the required number of respondents especially pregnant women including only one housing unit and no eligible household at Mofassie in Torma Section. Hence, enumerators were not able to obtain data from this village. Additionally, there was only one eligible mother in Senehun, Fikie section. 2) Five villages namely: Koyama, Kpangba, Barley, Mojigba and Senehun were across the river. Strategies used to manage the challenges included 1) To avoid bias in sampling, Malema, which was the nearest village to Torma Bum, was selected to complete the remaining number of respondents for Torma section. Moto bikes and canoes were hired to gain access to the five villages across the river. See appendix III for the consultant's implementation report.

The Emory consultant finalized data entry and cleaning in early December. Data analysis involved generating general descriptive statistics of continuous and categorical variables with continuous data initially presented as medians (min, max) due to data skewness, but later revised to mean and standard deviations at the request of World Vision. Categorical data are presented as proportions. Because an exhaustive census approach was used for sampling, analyses were not adjusted for clustering. Differences in responses between Fikie and Torma were assessed using nonparametric tests of the median for continuous variables and chi-square for proportions with significance set at $p< 0.05$. All analyses were conducted using SAS v7.1. Due to small sample sizes, especially for pregnant women and grandmothers, specific measures of association will be conducted by request due to the

[2] The survey, as originally designed, also included an assessment of current IYCF practices but this module was excluded from the survey during field implementation.

likely instability of the effect measures and the potential for spurious associations at P<0.05 due to multiple testing/type II error.

Qualitative Research

Survey participants and sampling: A total of 259 persons were interviewed consisting of: 78 women with children <24 months; 111 grandmothers/mothers-in-law with grandchildren; and 70 men with young children. (See Table 4. below).

Table 4: Number of Interviewees by category in the Torma and Fickie sections, May 2013

Site of Interviews		Grandmothers	Women with children < 24 months	Men with children < 24 months
Fikie Section	**Tangahun**	9	10	8
	Mandu	10	8	10
	BoiPieh	19	10	10
	Sogballeh	19	10	10
Torma Section	**Torma Town**	19	11	10
	Victoria	12	10	5
	Solon Town	13	9	10
	Dodo	10	10	7
Total Interviewees By Category		**111**	**78**	**70**
Total number of Interviewees.		**259**		

Data Collection Tools: Data collection was carried out using semi-structured focus group interviews [3]. In community health/development programs during the past fifteen years, this qualitative data collection technique has increasingly been used to investigate various health topics. It involves identifying a *purposive sample* of groups of between eight and ten individuals who are similar in terms of their gender, age and experience relative to the topic/s to be studied. The homogeneity of the group is important so that participants feel comfortable sharing their experiences and ideas. In this case, three types of homogeneous groups were interviewed: 1) women with children <24 months; 2) grandmothers/mothers-in-law with grandchildren; and 3) men with children <24 months.

Two types of data collection instruments were used namely, interview guides and a participatory rural appraisal (PRA) exercise. Three different interview guides were developed for each category of interviewees. The PRA exercise asked participants to discuss the roles of the different actors in several situations and was very effective for collecting information related to roles in maternal and child nutrition and health.

Data Collection

The team of researchers consisted of:

- A team coordinator, an experienced qualitative researcher from Grandmother Project
- A nutrition tutor from the University of Njala

[3] Aubel, J. (1992) Guidelines for studies using the group interview technique. ILO, Geneva.

- The World Vision Germany Nutrition-Health Technical Advisor
- 3 staff members of the World Vision Mamanieva community nutrition project
- 4 sociology students from Njala University

The World Vision Nutrition Coordinator provided logistical support to the team. All interviewers, except the team leader, who had a translator, spoke Mende fluently and all interviews were carried out in the local language.

Prior to the data collection period, study team members participated in a three-day training session on qualitative data collection methods, including basic knowledge and skills required for in-depth interviewing, note taking, and basic data analysis.

Interviews were conducted in 8 communities in the Bum Chiefdom, 4 in Fikie section and 4 in Torma section. The sites were picked based on accessibility and distance from the ADP office in Madina. At each site, the interviewees were selected using a *convenience sample.* Local contact persons were informed of the inclusion criteria for focus group members and they identified community members who were qualified, interested, and willing to participate. The local collaborators were also asked to identify a quiet and comfortable place for the groups to meet. The group interviews were often conducted in courtyards or under a large tree in the village.

Data collection occurred during a three-week period in June 2013 by three sub teams of interviewers. On a daily basis, each of the three teams carried out at least 1 interview, typed up field notes, color coded the responses according to the 12 research topics, and participated in a group debrief, summarizing and analyzing the data. Content analysis was used to categorize responses, while ongoing data analysis allowed team members to identify incomplete or unclear ideas, and to adjust the interview guide as necessary.

The final phase of data analysis was triangulating information from all the sites and interviewee categories.

Ethical Approvals

The research protocol, baseline survey questionnaire, informed consent documents were reviewed and approved by the internal review boards at Emory University and Sierra Leone. Respecting ethical guidelines for data collection, at the outset of all group interviews the objective of the study and use of study results was explained to interviewee groups. Verbal consent was obtained in all cases prior to initiating the interviews.

Findings

Part I: Roles and influence of different family actors related to the nutrition and health of young children, pregnant and breastfeeding women

In order to develop a strategy to effectively promote changes in family nutrition practices, it is important to first understand the roles played by key family members and the influence of different family actors on women's knowledge and practices with young children and with themselves.

The study identified the roles played by women of reproductive age (WRA), fathers with young children, grandfathers, elder daughters, and grandmothers. The study revealed the specificity of the roles played by each category of family actor and also the complementarities between them. Almost all respondents stated that they reside in multi-generational households in which senior men and senior women, or grandmothers, are present and play a critical role as advisors and supervisors of younger generations.

1. ***Role of women of reproductive age***

The focus groups revealed that the roles of WRA include, caring for other family members (husbands, children and mothers-in-law), carrying domestic tasks, giving birth, and generating financial resources for the family.

When a young woman marries, she moves to the village where her in-laws live and, in most cases, she and her husband take up residence with his parents. In all cases, the new wife is expected to learn from her mother-in-law and to practice what she is taught related to her assigned responsibilities.

The *domestic chores* that WRA are expected to master include cooking, laundry, sweeping, cleaning the bedrooms and courtyard areas, making the beds, fetching water, and washing dishes. She is expected to carry out all of these tasks by her husband and mother–in-law. Often this is done under the guidance and to the standards of her mother in law, or other senior woman in the household.

A major responsibility is to *take care of their husbands* defined by respecting them and caring for them. All women interviewees agreed that their most important expected activity for their husbands are their "*night duties*". During the day, while husbands are usually away from the home, potentially involved in income-generating activities, WRA undertake activities related to their well-being including laundry and cooking

Giving birth is a major responsibility that can elevate the status of WRA within the family and society. After giving birth, WRA are tasked with caring for children. Their childcare responsibilities include laundry, bathing, food preparation, feeding, attentive care when the child is ill, and teaching proper values. These childcare activities are carried out under the supervision of the senior women, or grandmothers.

Another important role of daughters-in law is *caring for their mother-in-law*. Husbands identified this as a very important role that WRA are expected to assume as a key element in their integration into the family. Caring for the mother-in-law involves showing love and respect, cleaning their bedrooms, laundry, cooking, checking on their health and caring for them when they are ill, and giving them small presents (i.e., snuffs). The mother-in-law's degree of satisfaction with her care is often reflected in the amount of support that she provides to the daughter-in-law vis-à-vis domestic and childcare tasks. A husband's satisfaction with his wife is partially determined by whether his wife is sufficiently attentive to the needs and advice of his mother.

Showing *hospitality toward visitors* is an additional role of WRA to ensure a comfortable experience during short or longer visits to the family.

All WRA interviewed engaged in *income generating activities*. In most cases these activities are related to farming (primarily cassava, rice, groundnuts and vegetables) and occasionally petty trading (selling Maggie, soap, cigarettes, etc.). According to women interviewees the revenues generated from these activities are generally used for school fees, to purchase food for the family, for health care expenses. and clothing.

2. ***Role of husbands/fathers of young children***

Men are usually referred to as the *head of the* household and they play a central role in ensuring the wellbeing of families. Based on cultural values and traditions, the roles of men are very different, but complementary, to those of women.

All female and male interviewees stated that the role of men is *to manage family members and resources,* at the *macro level* of family life. According to interviewees, men are generally not involved in *micro level* issues related either to day-to-day domestic tasks nor to the multi-faceted aspects of caring for children and women, except when serious problems arise. Several factors explain the fact that men are not involved in these female-managed tasks on a routine basis. First, men do not have experience managing domestic tasks, nor do they have the expertise required to address issues such as pregnancy, newborn care or complementary feeding. Second, during the day, men are usually away from home carrying out activities related to their role as *provider* for the family, i.e. activities to generate income and/or to produce food to feed the family. Men are expected to provide basic foodstuffs for the family, to pay for health care, and contribute to school fees, and to the purchasing of clothing.

Another role is to *promote understanding and solidarity* between family members and to ensure their safety, which contributes to the well being of the entire family. Interviewees stated that men are expected to "*care for their children and wives."* The definition of care is vague and not defined like that of a woman, but all categories of interviewees stated that it is men's role to *provide tangible support* and *moral encouragement* to wives and children. However, men and women interviewees agreed that men are not directly involved in day-to-day "care of women and children".

Both older and younger women stated that an important male role is to impregnate their wives, but they are rarely involved in providing ongoing care or advice to their wives during the antenatal or postpartum period. These domains are neither the responsibility of men nor their areas of expertise. The general attitude is that men should **not** be involved in caring for newborns and they do not really start caring for young children until they are at least five or six years of age.

In multi-generational families, men are expected to provide for basic needs of all members of the extended family, including his parents and the extended family of his wife/wives.

3. Role of grandfathers

In virtually all families there are grandfathers, or other older men, who play a supportive role to younger men and to the family at large. The interviewees often referred to the grandfathers as the *wise family advisors*. Based on their age, experience, and concern for the overall well-being of the family as a whole, they observe family members, and provide

advice on major family situations and decisions. Grandfathers will transmit advice to younger women through the mother-in-law or other senior woman in the family.

Many interviewees suggested that the grandfather is like the "hard drive" in the family and that he advises, passes on knowledge based on his own experiences and on the traditions of the family and culture. His advice is oriented toward males in the family, dealing with financial management, farming, other economic activities, the choice of marriage partners, food for the family, and social cohesion between family members.

Interviewees, men and women alike, clearly stated that grandfathers are not involved in directly advising younger women on their diet and work during pregnancy nor on nutrition and other childcare practices after delivery. They delegate this advisory role to the grandmothers based on their experience and status in the family. Grandfathers do, however, often advise younger women in the family to "listen to the grandmothers" on these issues.

Grandfathers view themselves as the *custodians of* tradition and they are concerned with the moral and cultural education of family members and play an important role in passing on cultural values and traditions, through story telling and discussions, primarily with male children.

Many grandfathers do play a role in the care of grandchildren, especially of boys from three years of age and to a lesser extent of girls from 5 years of age. They monitor them while they are playing in the courtyard and protect them from dangers, they often buy snacks for them (biscuits, for example) and they encourage children to go to school.

4. Role of grandmothers

The responses of men and women, older and younger clearly show that senior women, or *grandmothers,* play a pivotal role in families given their extensive experience with all aspects of family life. In relation to the health and well-being of women and young children, according to all categories of interviewees, everyone looks to grandmothers for advice and guidance. Grandmothers' roles in the family are numerous, but they deal primarily with *advising, coaching* and *coordinating* the activities of other family members and *managing* the resources available to the family.

Both men and younger women state that the main household advisors and supervisors of women during pregnancy are senior women, often the mothers-in-law. Mothers-in-law play a series of roles associated with their pregnant daughters-in-law or daughters including detecting pregnancy, advising women during pregnancy, advising on the type of work to avoid doing (e.g. splitting wood and carrying heavy loads), prohibiting women from eating certain foods, advising on food quantities, advising how they should lie down, and on the need for rest during the day. Grandmothers are also the ones who explain to first time mothers what the delivery process will entail, detect labor pains, and advise if/when it is necessary to take the woman to the hospital.

This quote summarizes the feelings of the majority of men, "Grandmothers are the ones who know the newborn." As with pregnancy, when interviewees were asked about the role of different family members related to the care of newborns, all interviewees said that within the family, it is the grandmothers who have more experience and who advise, demonstrate

and participate in the care of infants. After birth and during the first weeks of life, especially for the first 40 days, it is the grandmothers who are closest to the baby and the mother during the day and also at night. For the first two to three months, the grandmother sleeps with the mother and baby in order to allow the woman to rest from her "night duties" and to monitor both of them.

As grandmothers, it is their culturally-defined duty to pass on to new mothers the culturally appropriate way of caring for newborns (i.e., the do's and don'ts according to the cultural traditions of the society and family). First time mothers are "apprentices" given that "they know nothing about how to care for an infant". With subsequent children they become more experienced and more independent caring for their newborns, replicating what they learned from their senior advisors.

In the Bum area, only about half of the deliveries take place in official health facilities. A traditional birth attendant (TBA), who is usually an older and respected woman, or GM performs home deliveries. After delivery GMs in the family collaborate with the TBA to wash the baby and to provide initial care. Wherever the child is born, the GMs are there to give herbs to "clean out the stomach", to care for the umbilical cord with special herbs before it falls off, to give warm water to make the baby sleep, to massage the baby with herbs, and to monitor him/her to detect any health problems.

The GM plays a critical role in caring for the umbilical cord when it falls off. A deeply-rooted tradition dictates that the GM must plant a tree (e.g. banana, coconut or mango), called a *wongei,* in the yard around the family home, to ensure long life for the newborn child. For the rest of the child's life, he/she is expected to visit and pay respect to the *wongei* in order to not forget his/her cultural roots.

Male and female family members agree that infants should be breastfed. They state that nurses encourage this practice as well. When interviewees were asked whether the nurses or grandmothers have more experience with breastfeeding, a large majority stated that "the midwives have more knowledge, but the grandmothers have more experience." Midwives encourage early initiation of breastfeeding and exclusive breastfeed for six months. However, this advice is given at health centers and many women deliver at home. Additionally, after the delivery, women are placed under the care and supervision of the grandmothers.

The advice and assistance of grandmothers related to breastfeeding deals with positioning the baby, washing the nipples with herbs, recommending foods to increase breast milk, and encouragement through the difficulties and pain. The advice on breastfeeding given by grandmothers was passed down from one generation to the next and it is expected for the new mother to follow those traditions.

Grandmothers dictate complimentary feeding by choosing the timing and type of first paps (porridge) to be given to infant. The first paps are usually given before young children reach six months of age, which is what the WHO recommends. First time mothers may not know when to start giving semi-solid foods. Although they may have been told by health workers to wait until children reach six months of age, the grandmothers are making decisions in the home. Both husbands and GMs expect that first-time mothers will follow the advice of their mothers-in-law on issues related to complementary feeding.

Study results show that GMs play a leading role in deciding when breast milk is insufficient and that the child needs to begin to eat other foods, preparing complementary foods, and feeding the first paps to the child in question. Many of the WRA interviewed were first-time mothers who admitted not having any idea on when or what type of pap should be given to a young child. They said that it was not difficult to learn how to prepare the first paps with the help of the GMs. Both WRA and GM stated that with the first pap it is most often the GM who feeds them to the child because many young mothers don't know how to feed a young baby and that it is a challenging task that young women cannot always handle. GMs have acquired a series of strategies they use to get children to eat, including singing to them, promising to take them for a walk, promising to carry them on their back, etc.

Another frequent practice of GMs, which supplements the food that children receive at mealtime, is giving children snacks between meals. Interviewees stated that compared to mothers with young children, GMs are generally more attentive to whether children have eaten enough and often they prepare special snacks for them to be sure that they are not hungry.

The role of GMs with young children is not limited to their role related to children's nutritional and health needs. GMs also assist in bathing, dressing, carrying them on their backs, washing their clothes, telling children to go to school, helping them get ready, and caring for them when they are sick.

Grandmothers coordinate daily household activities. Most of the domestic chores are carried out by the WRA, assisted by the elder daughters. However, the GMs may also participate in the domestic chores depending on the volume of work to be carried out and the number of hands available to do it.

A large proportion of GMs are involved in *income generating* activities. There was a minority of GM interviewees who are very old and who have difficulty seeing or walking who are unable to carry out such activities. The vast majority of GMs are actively and regularly involved in income generating activities that include growing and selling cassava, selling fish, making palm oil, making snuff, making soap, raising chickens, and weaving cloth. According to the GMs they use the revenues from these activities mainly to pay school fees, to buy food for the family, and for health care for women and children.

Many interviewees discussed the role of the GMs as a sort of *"bank*" given the fact that they always have some monetary resources in their pocket that can be used in the case of emergencies. GMs accumulate such resources from income generating activities, from gifts that they receive from their children, and during ceremonies. According to all interviewees, unlike other family members who are more likely to spend money that they receive, the GMs are both frugal and strategic in the way they use their resources. GMs are especially careful to always have resources "in the bank" when there are special needs related to their children or grandchildren.

Many interviewees identified *passing on traditional knowledge and* values as an important role of grandmothers. In the hierarchical structure of the society and of families it is expected that the younger generations will learn and emulate the values and traditions valued by the elder generations. The GMs' responsibility to "teach" and younger people's responsibility to "learn" applies to all facets of life including nutrition, health and caring practices with children and women. All family members recognize GM's expertise in these

domains and expect GMs to pass on their knowledge and experience to younger family members.

GMs ensure that family members communicate with and are supportive of each other and that conflict and misunderstanding between them are minimized. Promoting understanding and cohesion between family members is one of the major roles of GMs identified by interviewees. GMs can be viewed as family psychologists insofar as they study the personalities of individual family members, they observe the interactions between them (between husband and wife, between co-wives, etc.) and they strive to promote understanding and entente between them.

Several interviewees used the saying "the GM is the padlock and the shade" for the family. Many interviewees referred to GMs as the "protector of the family" in both a figurative and literal sense. It was frequently said, "When there is a GM in the house you feel safe. If there is no GM you are anxious for her to return." In a literal sense, it is more often *the* GM who is at home to protect the house when other family members are out carrying out their daily activities. Community members believe that some GMs have mystical powers that they can use for either beneficial or harmful practices. Given these powers it is in the interest of all family members that they are on good terms with these seniors.

5. Role of elder daughters

In virtually all households, there is an elder daughter, either from the family or from another family, who serves as an assistant to the mother and grandmother for domestic and childcare tasks. The interviews showed that depending on whether the elder daughter goes to school, she is more or less involved in assisting with daily tasks at the family level.

Many interviewees referred to the elder daughters as *apprentices*, who are instructed and coached by older women on the tasks they are expected to master once they become wives. Responsibilities and amount of autonomy of elder daughters are age dependent. Younger girls have limited autonomy and are closely monitored whereas older, more experienced girls have more responsibilities and independence in carrying out the work assigned to them. In all cases, interviewees stated that elder daughters are under the authority of the mothers or grandmothers.

The domestic tasks that elder daughters typically undertake include sweeping, cleaning the compound, fetching wood and water, washing dishes and doing laundry. The child-care tasks that are assigned to elder daughters, don't involve children less than 1 year of age. Experienced mothers insist that infants and very young children are fragile and it can be risky to leave them either with men or elder sisters.

The following sections report the sociodemographic characteristics and maternal and child nutrition knowledge, beliefs and attitudes of each of the respondent types.

Part II: Norms, attitudes, advice and practices of different family actors related to the nutrition/health of young children, pregnant and breastfeeding women

Characteristics of Mothers with Children Less than 24 Months:

In general, mothers with children less than 24 months who participated in the quantative survey had little formal schooling (median, 0 years; mean, 2.7yrs) and were engaged in agriculture (78.4%) as their primary occupation (**Table 5**). The majority were in formal or informal monogamous partnerships (65.1%). The median age was 25 (mean, 25.7 yrs) and the median number of children was 4. Approximately 40% had experienced at least one child death. The median household size was 7; 12.3% had more than 1 child less than 24 months and 75.5% had at least one 'grandmother' in residence. Mothers from Torma had significantly greater schooling, larger household size and a greater proportion with a grandmother in residence.

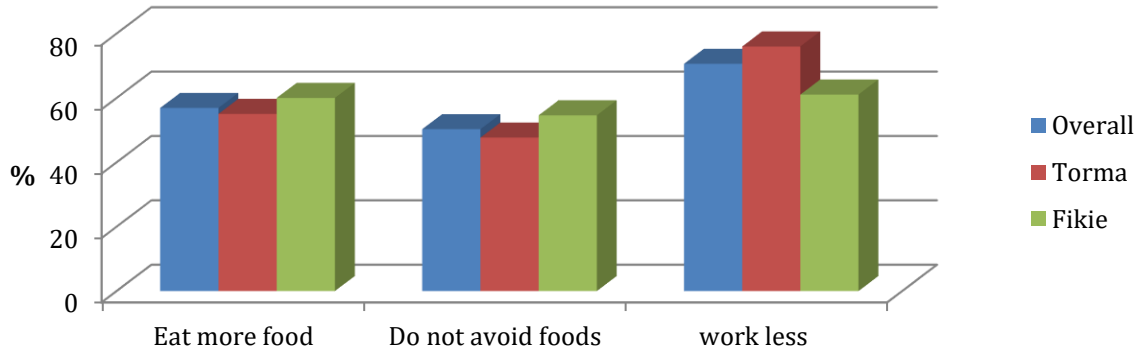
Table 5. Descriptive statistics for 343 mothers with children < 24 months included in the Mamanieva baseline survey, Bum ADP; data presented as mean±SD or % (n). P values estimated using chi square or tests of the median

Variable	Overall (n=343)	Torma (n=217)	Fikie (n=126)	P value
Sex of Index Child				
Male	48% (160)	51.22% (105)	43.20% (54)	0.17
Female	52% (170)	48.78% (100)	56.00% (70)	
Age of Index Child, months	10.6±6.2	10.6±6.1	10.7±6.4	0.29
Child age category				
0-5.9 months	24.0% (82)	24.5% (53)	23.0% (29)	0.08
6-8.9 months	16.4% (56)	13.9% (30)	20.6% (26)	
9-11.9 months	12.0% (41)	13.9% (30)	8.73% (11)	
12-17.9 months	29.5% (101)	32.4% (70)	24.6% (31)	
18-23.9 months	18.13% (62)	15.3% (33)	23.0% (29)	
Maternal age, years	25.7±6.4	25.7±6.6	25.8±6.0	0.81
Categories of maternal age				
17-25	48.4%	48.9%	47.6%	
25-35	40.8%	39.6%	42.1%	
>35	11.1%	11.5%	10.32%	
Maternal schooling, years	2.7±3.8	3.0±3.9	2.0±3.4	0.01
Maternal work				
Does not work	11.83% (40)	13.21% (28)	9.52% (12)	0.20
Agriculture	78.40% (265)	74.53% (158)	84.92% (107)	
Informal Business	6.21% (21)	7.55% (16)	3.97% (5)	
Other	3.55% (8)	4.72% (10)	1.59% (2)	
Marital Status				
Partnered, monogamous	65.01% (223)	66.82% (145)	61.90% (78)	0.58
Partnered, polygamous	17.49% (60)	17.05% (37)	18.25% (23)	
Single	15.45% (53)	13.36% (29)	19.05% (24)	
Other	1.75% (6)	2.76% (6)	0.79% (1)	
Number of live births	5.34±3.84	5.02±3.74	5.58±3.97	0.24
Number of child deaths	0 (0, 7)	0 (0, 7)	0 (0, 7)	0.08
% of women with at least 1 child death[1]	39.8% (127)	36.04% (71)	45.90% (56)	0.08
Head of Household Schooling, years	3.4±4.9	3.8±4.9	2.9±4.9	0.01

Head of Household Occupation				
Does not work	2.06% (7)	2.33% (5)	1.60% (2)	0.26
Agriculture	76.47% (260)	73.49% (158)	81.60% (102)	
Salaried Employment	9.12% (31)	10.70% (23)	6.40% (8)	
Informal Business	4.41% (15)	5.58% (12)	2.40% (6)	
Other	7.94% (27)	7.90% (17)	8.00% (10)	
Home ownership				
Mother respondent	1.94% (6)	2.08% (4)	1.69% (2)	0.41
Spouse / Partner	52.58 (163)	53.13% (102)	51.69% (61)	
Jointly owned	15.16% (47)	15.10% (29)	15.25% (18)	
Other	30.33% (94)	29.69% (57)	8.47% (10)	
Household size	7.34 ± 2.12	7.67 ± 2.07	6.78 ±2.08	<0.01
Number of children < 2 y in household				
1	87.43% (299)	84.26% (182)	92.86% (117)	0.07
>1	12.3% (42)	15.74% (33)	7.14% (9)	
Number of children 2-16y	2.1±1.7	2.2±1.7	1.9±1.7	0.07
Number of adults 16-45 y	2.8±1.2	2.8±1.2	2.7±1.2	0.56
Number of adults > 45 y	1.26±0.9	**1.41**±0.82	1.0±0.9	0.02
A grandmother is present in household	75.5% (259)	82.95% (180)	62.70% (79)	<0.001
[1] Value not known / missing for 24 respondents				

In response to questions about diet and workload in pregnancy, just over half of mothers reported that women should eat more during pregnancy (56.9%) compared to when not pregnant; 37% believed that women should reduce the amount of food they eat (**Figure1**). The remainder indicated that women should not change the amount of food they consume

Figure 1: Proportion of mothers reporting beliefs about diet and workload during pregnancy that align with recommendations

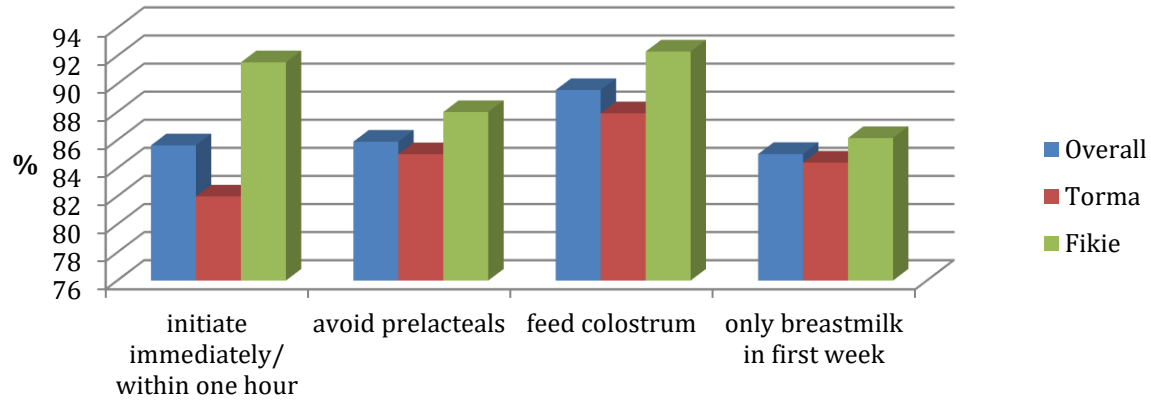


during pregnancy. More than 60% indicated that mothers should reduce their workload. Approximately 1/3 reported avoiding specific foods in pregnancy. The three most commonly cited foods to avoid during pregnancy were cassava, rice and foo foo. Other commonly avoided foods cited by mothers with young children and the reasons for their avoidance are listed in **Table 6.**

Table 6: Commonly avoided foods during pregnancy as reported by mothers with children less than 24 months in Bum ADP		
Food	**Number of respondents citing**	**Reasons for Avoiding**
Cassava	47	Smell; Causes heartburn; causes mother to choke; does not give blood
Rice	43	Smell; causes vomiting
Foo Foo	11	Causes mother to choke; weakens baby; causes vomiting
Snake	9	Causes skin disorders of mother / baby; causes difficult delivery; weakens baby
Oil / Palm oil	8	Smell; causes vomiting
Onion	6	Smell; causes vomiting

Knowledge regarding optimal initiation of breastfeeding was high, with more than 85% of mothers indicating that initiation of breastfeeding should begin within one hour of delivery, 85.9% reporting that mothers should not give anything to the child before initiation, 89.6% reporting that mothers should feed colostrum and 85.0% reported that only breastmilk should be given to the infant in the first week of life (**Figure 2**). Beliefs about initiation within one hour of birth differed significantly between mothers in Fikie compared to Torma; 91% of Fikie mothers believed one should initiate breastfeeding immediately after delivery compared to 82% in Torma ($p<0.05$). Though a greater proportion of mothers specified more appropriate beliefs about colostrum, prelacteals and exclusivity of breastfeeding in the first week, these were not significantly different from Torma at $p<0.05$.

Figure 2: Proportion of mothers reporting beliefs about breastfeeding initiation that align with recommended practices



In response to the open-ended question "What makes a child grow well", the majority of mothers noted breastfeeding (88% in Torma; 98% in Fikie, $p<0.01$, Figure 3); some mothers additionally reported consumption of sufficient (29%) or diverse (41%) food (**Figure 3**).

Qualitative findings show that the majority of men, WRA and GMs do not have a clear understanding of the links between food, growth, and health. When asked why certain children do not grow as much as others, most interviewees did not mention children's diet as a major contributing factor. A majority of the respondents, men and women, explained the fact that some children do not grow as quickly as others in their age group because it's the will of God, witchcraft, children playing too much, and when food is not served on time. A minority of respondents were able to explain the link between these three factors.

Figure 3: Mothers' responses to the question "what makes a child grow well"? (n=346)

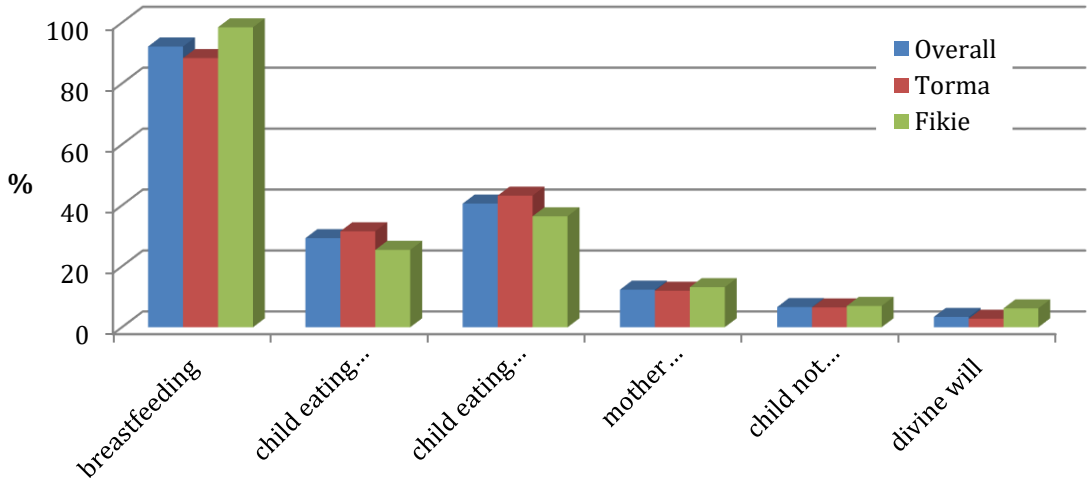


Table 7 presents mothers' beliefs about when non-breastmilk substances should be introduced to infants and frequency of complementary feeds. **Table 8** provides findings on the commonly avoided foods and the recommended age of introduction. From these data it can be inferred that mothers' currently held beliefs are not conducive to optimal exclusive breastfeeding or complementary feeding practices. A large minority of mothers indicated that waters, teas, animal milks should be introduced before 6 months. Interestingly while a significantly greater proportion of mothers in Fikie indicated that infants should not be given water in the first 6 months (74% in Fikie vs. 65% in Torma), far fewer believed that animal milks and other liquids should be withheld until 6 months (38% in Fikie vs. 52% in Torma). While thin porridge, it was widely believed, should not be introduced until the child is 6 months, most mothers believed that the introduction of thick porridge should occur between 6-9 months of age. Only 5-15% believed that meat, fish, eggs, legumes or fruits and vegetables should be introduced at 6-9 months of age; Most either felt these should be delayed to beyond 1 year or did not know when to introduce these foods.

Table 7: Mothers' beliefs about when infants should be introduced to nonbreastmilk substances. P values estimated by chi-square for differences in proportions between Torma and Fikie

	Overall % (N)	Torma, % (N)	Fikie, % (N)	**P value**
Water / Teas				
doesn't know	8.9 (30)	6.57 (14)	12.9 (16)	**0.004**
in the first week	10.39 (35)	12.21 (26)	7.26 (9)	
before child is 6 months	12.17 (41)	15.96 (34)	5.65 (7)	

Table 7: Mothers' beliefs about when infants should be introduced to nonbreastmilk substances. P values estimated by chi-square for differences in proportions between Torma and Fikie				
	Overall % (N)	Torma, % (N)	Fikie, % (N)	**P value**
not before child reaches 6 months	68.55(231)	65.26 (139)	74.19 (92)	
Animal milks, broths, juice, formula or other liquids				
doesn't know	30.03 (94)	29.53 (57)	30.83 (37)	**0.022**
in the first week	6.39 (20)	9.33 (18)	1.67 (2)	
before child is 6 months	7.35 (23)	8.81 (17)	5 (6)	
not before child reaches 6 months	56.23 (176)	52.33 (101)	38.34 (75)	
Thin porridge				
doesn't know	12.02 (41)	11.21 (24)	13.39 (17)	0.279
in the first week	5.28 (18)	7.01 (15)	2.36 (2)	
before child is 6 months	6.16 (6.16)	6.54 (14)	5.51 (7)	
not before child reaches 6 months	76.54 (261)	75.23 (161)	78.74 (100)	
Thick porridge or other semi-solid foods				
doesn't know	11.64 (39)	10.9 (23)	12.9 (16)	0.374
in the first week	4.78 (16)	6.16 (13)	2.42 (3)	
before child is 6 months	2.69(9)	3.32 (7)	1.61 (2)	
between 6 and 9 months	48.06 (161)	45.02 (95)	53.23 (66)	
between 9-12 months	27.46 (92)	28.44 (60)	25.81 (32)	
after 12 months	5.37 (18)	6.16 (13)	4.03 (5)	
Eggs				
doesn't know	46 (138)	46.74 (86)	44.83 (52)	0.11
in the first week	2 (6)	3.26 (6)	0	
before child is 6 months	1 (3)	1.63 (3)	0	
between 6 and 9 months	15.67 (47)	16.3 (30)	14.66 (17)	
between 9-12 months	21.67 (65)	17.93 (33)	27.59 (32)	
after 12 months	13.67 (41)	14.13 (26)	12.93 (15)	
Meat or Fish				
doesn't know	33.44 (106)	30.3 (60)	38.66 (46)	0.278
in the first week	2.84 (9)	3.54 (7)	1.68 (2)	
before child is 6 months	1.58 (5)	1.52 (3)	1.68 (2)	
between 6 and 9 months	8.83 (28)	8.08 (16)	10.08 (12)	
between 9-12 months	15.46 (49)	14.14 (28)	17.65 (21)	
after 12 months	37.85 (120)	42.42 (84)	30.25 (36)	
Legumes				
doesn't know	33.44 (106)	26.42 (51)	33.33 (38)	**0.037**
in the first week	2.84 (9)	3.63 (7)	1.75 (2)	
before child is 6 months	1.58 (5)	2.07 (4)	5.26 (6)	
between 6 and 9 months	8.83 (28)	16.58 (32)	25.44 (29)	
between 9-12 months	15.46 (49)	17.1 (33)	12.28 (14)	
after 12 months	37.85 (120)	34.2 (66)	21.93 (25)	
Fruits and /or Vegetables				

Table 7: Mothers' beliefs about when infants should be introduced to nonbreastmilk substances. P values estimated by chi-square for differences in proportions between Torma and Fikie				
	Overall % (N)	Torma, % (N)	Fikie, % (N)	**P value**
doesn't know	31.89 (103)	28.36 (57)	37.7 (46)	0.593
in the first week	2.48 (8)	2.99 (6)	1.64 (2)	
before child is 6 months	1.86 (6)	1.99 (4)	1.64 (2)	
between 6 and 9 months	7.43 (24)	7.96 (16)	6.56 (8)	
between 9-12 months	15.48 (50)	16.92 (34)	13.11 (16)	
after 12 months	40.87 (132)	41.79 (84)	39.34 (48)	
Number of times a child 6-9 months should be fed semi solid foods				
<2	2.03% (7)	0.93% (2)	3.88% (5)	0.567
2-3	96.8% (170)	94.88% (204)	94.57% (122)	
>3	0.5% (2)	0.47% (1)	0.78 (1)	
Doesn't know	0.5% (2)	0.47% (1)	0.78 (1)	
Number of times a child 9-12 months should be fed semi solid foods				
<3	32.46% (112)	31.94% (69)	33.33% (43)	0.957
3-4	64.93% (224)	65.28% (141)	64.34% (83)	
>4	1.74% (6)	1.85% (4)	1.55% (2)	
Doesn't know	0.87% (3)	0.93% (2)	0.78% (1)	
Number of times a child >12 months should be fed semi solid foods				
<3	17.30% (59)	17.92% (38)	16.28% (21)	0.552
3-4	75.95% (259)	75% (159)	77.52% (100)	
>4	4.11% (14)	3.30% (7)	5.43% (7)	
Doesn't know	2.64% (9)	3.77% (8)	0.78 (1)	

Table 8: Foods commonly avoided for young children (< 24 months) as reported by mothers in Bum ADP.			
Food	**Number of respondents citing**	**Reasons for Avoiding**	**Recommended age to introduce**
Cassava	49	Causes frequent stooling [diarrhea]; malnutrition/ kwashiorkor; causes lack of blood; causes malaria	Most recommended > 12 months; some >24 months
Rice	33	Causes lack of blood; will dry the stomach; stunt child's growth	Most recommended > 12 months; some >24 months
Garie	10	Causes constipation / bloat / gripe in the stomach;	>24 months
Meat (general)/ Fish	6	[both] causes worms; not good; disturb the stomach;	12-36 months
Snake	3	Child becomes weak; child will creep like a snake; will make sex organ increase	> 12 months
Foo foo	4	Cause child malnutrition; heavy stomach	> 10 months
Mango	2	Frequent stooling; stomach disorder	6-16 months

Value of Breastfeeding

The qualitative research revealed that mothers, GMs and men all recognize the value of breast milk for infants, however, there are several traditional attitudes and practices that support giving infants other fluids and foods, along with breast milk, long before six months when it is recommended to introduce other foods and fluids. The pre-lacteals that are frequently given to newborns include herbs, water, and *paps*.

The pre-lacteals commonly given in the very first days of life include herbs that have different medicinal purposes (i.e. "to clean out the stomach"), holy water containing verses of the Koran (in Muslim communities), and water. The majority of interviewees explained that water must be given to infants to quench their thirst within weeks of birth. "Babies, like all human beings need to drink water". At the outset of the discussion, group members often gave the "politically correct" answer, i.e. "We were advised by the nurses and now we are doing exclusive breastfeeding". However, in all of the focus groups, as the interview proceeded, group members explained the various reasons why they need to give water to infants in addition to breast milk from the first weeks of life.

It was discovered that many community members, particularly women interviewees believe that breast milk does not contain water. In all of the interviews, group members insisted that "breastmilk contains vitamins and food but it does not contain any water." One GM adamantly expressed this opinion when she said, "Anyone who thinks that there is water in breastmilk is a liar". This apparently widely held belief provides strong support for the traditional practice of giving water to newborns from the first days or weeks of life.

We discovered that virtually all children are given *ngwoh bayei (*which literally means *rice water + salt*, but which is often referred to as "the food of the Gods") at 2 to 3 months of age. The rice water is given based on the instructions of the GM whose role is to pass on this practice and other cultural traditions*.* It is prepared by lifting spoonfuls of water off the top of the rice when it is being cooked and adding a bit of salt to give it more flavor. GMs are the ones who think it is important for children to consume *ngwoh bayei* and according to them there are several reasons for giving it. First and foremost, there is the cultural significance of giving children a rice-based product in order to "introduce them to the taste of rice". Second, the *ngwoh bayei* is given in order to "prepare the child's stomach for the first semi-solid pap" that will be given a bit later. Lastly, while the practice of giving *ngwoh bayei* is an age-old cultural tradition, according to the WRA it is also beneficial in a practical sense stating that, "If I give *ngwoh bayei* to my baby it makes him stop crying and puts him to sleep. And that's a big help to me because then I can get on with my chores". Interviewees stated that *ngwoh bayei* is not a pap which may explain why it appears that past studies that investigated the place of *paps* in initiating *complementary feeding* did not identify this practice. It is in fact a very significant element insofar as it is a cultural tradition that will need to be addressed if EBF is to be widely adopted.

Nutrition of Breastfeeding Women and Breast Milk Quality

Men and women agree on the importance of breastfeeding for newborns and having enough breast milk is a concern. The GMs were reported to have knowledge of foods that can increase the production of breast milk. The main foods that they encourage new mothers to eat in order to have plenty of breast milk are cassava leaves with *benni* paste, broad beans with leafy vegetables and groundnuts (raw or cooked in stew over rice). GMs also believe

that fish and meat will contribute to increased breast milk, however, they recognize that most women do not have frequent access to these foods.
Very few GMs or women believe that drinking lots of water, or other fluids, can contribute to increased breast milk production. The fact that women do not associate drinking lots of water with greater production of breast milk appears to be associated with the fact that very few of them think that there is water in breast milk. Only a few GMs or WRA know that "frequent breastfeeding contributes to increased production of breast milk".

Most women and GMs believe that quality of breast milk varies among women. GMs have the experience to determine the quality of a woman's breast milk. The situations or factors associated with "poor quality breast milk" are when the color of the breast milk is a bit dark, when it is too thin, when a child vomits or cries a lot after breast feeding, when a child is not growing as fast as expected, swollen breasts, when a breast fed child has frequent stools, or when a breast feeding woman has sex. According to GM interviewees, the quality of breast milk of most women is good. In the few cases where it is believed that a woman's milk is not good quality the usual procedure is to stop breast-feeding her child.

Exclusive Breastfeeding

Interviews revealed that the majority of GMs and WRA have heard about EBF, however very few of them have ever practiced it. Four categories of factors were identified that tell us why EBF isn't widely practiced. First, a major constraint to EBF identified particularly by women and GMs is the "lack of food" at the household level.

Second, there are a number of traditional attitudes and practices that are in conflict with EBF particularly the deeply ingrained practice of giving water to babies from the first days of life, the practice of giving warm water to babies so that they will sleep, the practice of giving water to stop babies from crying, the belief that some breast milk is not be of good quality, the belief that breast milk alone is not sufficiently nutritious to ensure proper growth of a child, the belief that if a breastfeeding woman has intercourse her breast milk becomes contaminated and, therefore, she should discontinue breastfeeding, the widespread tradition of giving *ngwoh bayei*, and the belief that when a woman is sick she should not breast feed as her breast milk is contaminated.

Third, factors associated with the nature of family and cultural systems in the study area. These include the prevalence of multi-generational and hierarchically-organized households in which age and experience are to be respected, GMs being the leading household advisors on breastfeeding, GMs' attitude that children cannot be healthy if they are not given water in the first weeks of life, young mothers are expected to follow the advice of their culturally-designated advisors and coaches (i.e. the GMs), and the fact that GMs have never been included in nutrition/health education sessions dealing with EBF.

Fourth, factors related to the accessibility of the study communities to health services and health providers. These include having very limited contact with health workers after delivery, infrequent community outreach about nutrition and health, and nutrition /health education activities on EBF and other topics target WRA and do not explicitly include GMs.

Preparation and feeding of paps to young children (complementary feeding)

A majority of women and of GMs reported that they begin giving semi-solid foods, in the form of paps, before children are 6 months old, typically when the baby is between 3 and 5 months old. The GMs are at the center of the decision-making process regarding when complementary foods should be given to a young child. According to the senior women, the moment at which a child should start being given the first paps is partially determined by cultural norms, but also by the specificities of each child. GMs' observe young children and depending on growth rate, they decide when breast milk is no longer sufficient and it is time to start providing thin paps, which is easily digested.

The majority of interviewees said that paps were first given between 3 and 6 months. A minority of families wait until 7 or 8 months to start giving these semi-solid foods. When men were asked when the first paps should be given, the answers varied from 3 to 7 months but they stated that "We are not involved in making these decisions. That is women's work."

Ingredients of paps given to young children

The content of paps varies considerably, however most contain rice flour. Other ingredients depend on the economic resources of the family, the seasonal availability, and the types of food that the family produces. According to interviewees, namely GMs and women, the standard and widely used recipe for the first pap is rice flour, palm oil and salt (or Maggi). Other pap recipes included corn flour + beans + vegetables, rice flour + milk, and various types of *benni mix*. There is a long tradition in Sierra Leone of using a mixture composed of benni and other ingredients combined to make a highly nutritious pap. Benni mix is produced and sold in the market in addition to home production.

GMs and mothers explained that the first semi-solid food should be a *thin pap "*so that it is easy for the young child to swallow and easy for the stomach to digest as the babies stomach is still not fully developed". It is believed that a *thick pap* will give the child a stomachache. Interviewees explained that as the child grows they introduce other ingredients into the paps, based on availability. It seems that the composition of the paps is mainly based on traditional recipes passed down from earlier generations. However, some interviewees stated that they have been advised by the nurses to add other things to the paps (i.e. fish).

Preparation of paps

According to GMs and young mothers alike, most first time mothers have limited experience preparing paps for their children and they depend on the mother-in-laws to teach them. The interviewees explained that the tradition regarding how paps should be prepared is passed from one generation to the next. "Based on experience, tradition and the hierarchy in the family the GM prepares the first pap and feeds it to the child, she teaches the young mother who, after mastering the process teaches the elder daughter." With subsequent offspring, mothers become increasingly confident and make paps independently, although the mother-in-law will always be at her side to ensure that she is respecting the approach that she was taught.

Feeding methods with young children

We wanted to know whether food is given to a child *with a cup and spoon*, as recommended for hygienic reasons, or if it is given with the mother's or GM's hand. It was a bit difficult to collect this information, as all of the WRA and GMs know that the "politically correct" answer is that they use a *cup and spoon.* In some of the interviewee groups, the majority of the participants stated clearly that they use their hand to feed young children because "It is our tradition" and "It is easier than using a spoon". In other groups, most participants stated that they use a cup and spoon. While the message regarding the use of a cup and spoon for feeding young children has been widely disseminated, it does not appear that this practice has been adopted in most families.

Active feeding practices

We asked interviewees what strategies they use to encourage children to eat. The responses to this question from WRA and GMs were quite different, reflecting their respective levels of experience associated with childcare and with child feeding. While WRA tend to be harsher with such children, GMs tend to be more patient.

The WRA stated that when children don't want to eat they threaten the child, force food into the child's mouth by squeezing his/her nose, beating the child, or leaving him/her alone a room or in the compound. Women themselves recognize that these attitudes often are not very effective and explain their behavior by stating that they have so much work to do and not enough time do it and that they can easily become impatient with children who they view as "uncooperative".

On the other hand, GMs, who have considerable experience dealing with such situations tend to be more patient and to use more positive methods for getting children to eat. GMs state that their techniques for getting children to eat include being very patient with the child and not showing frustration, delaying the normal feeding time until the child says that he/she is hungry, identifying the foods that the child says he/she likes to eat, never forcing the child to eat, and promising the child a small reward for good eating, like going for a walk or carrying him/her on her back.

Feeding the Sick Child

Interviewees stated that it is impossible for a sick child to eat *more than usual*, which is contrary to recommendations. There does appear to be an understanding on the part of many community members, however, that during an illness a child should be actively encouraged to eat and that after the illness the child can be encouraged to eat more than usual.

Scenarios

As a way to verify mothers' beliefs and manage potential reporting bias, mothers were also presented with maternal nutrition and infant feeding scenarios during the quantitative survey. At the end of each scenario they were asked their level of agreement with the protaganists' decision in each scenario. Appendix 1, Figures A1-A8, present the findings from these 8 scenarios. In general, the proportion of mothers agreeing with optimal / recommended practices or disagreeing with harmful practices in the scenarios section was marginally lower than the proportion of mothers reporting beliefs in positive practices

when asked more direct questions related to knowledge and beliefs. This tendency may indicate potential reporting bias that can potentially be minimized with the use of scenarios to capture beliefs and potential intentions or practices.

Advice Seeking

In regards to who advises mothers on infant nutrition most mothers indicated that they talked to husbands, own mothers and mother in laws frequently (**Figure 4**), with more than 80% reporting that they spoke to these advisors at least several times a month and 53%, 53%, 49% indicating that they spoke with their husbands, own mothers, or mother in laws, respectively about how to feed their child on a daily basis; 29%, 40% and 18% indicated that they spoke to a health care worker daily, weekly or several times a month, respectively, about how to feed their child. When mothers were asked who's advice they were most likely to follow, approximately 40% indicated they would follow the advice of the health care worker (**Figure 5**); 34% indicated they would follow their husband's advice 21% indicated they would follow the advice of a female elder in the family, typically their own mother or mother-in-law. When analysis was restricted to only those mothers with a grandmother in residence this proportion shifted marginally as follows: 30% would follow a healthcare workers advice, 38% would follow their husband's advice and 25% would follow the elder female's advice. A significantly greater proportion of mothers in Torma compared to Fikie reported following their husband's advice while a significantly greater proportion of mothers in Fikie reported following a healthcare worker's advice ($p < 0.05$).

Figure 4: Person mothers report that they speak to about child nutrition several times a month or more

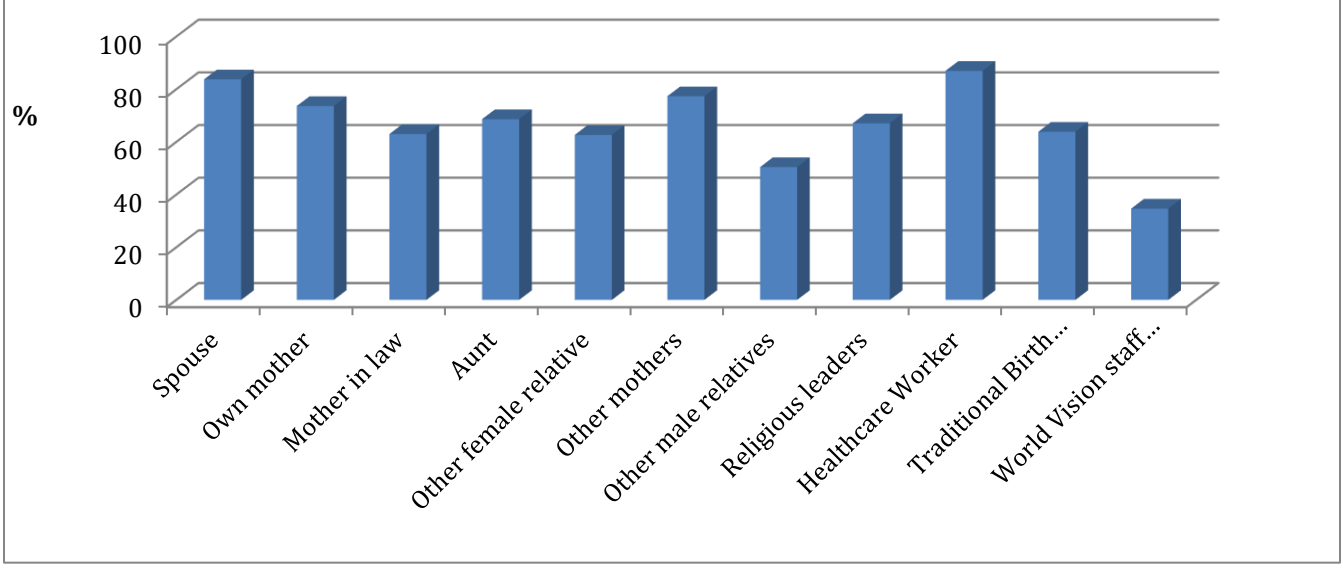
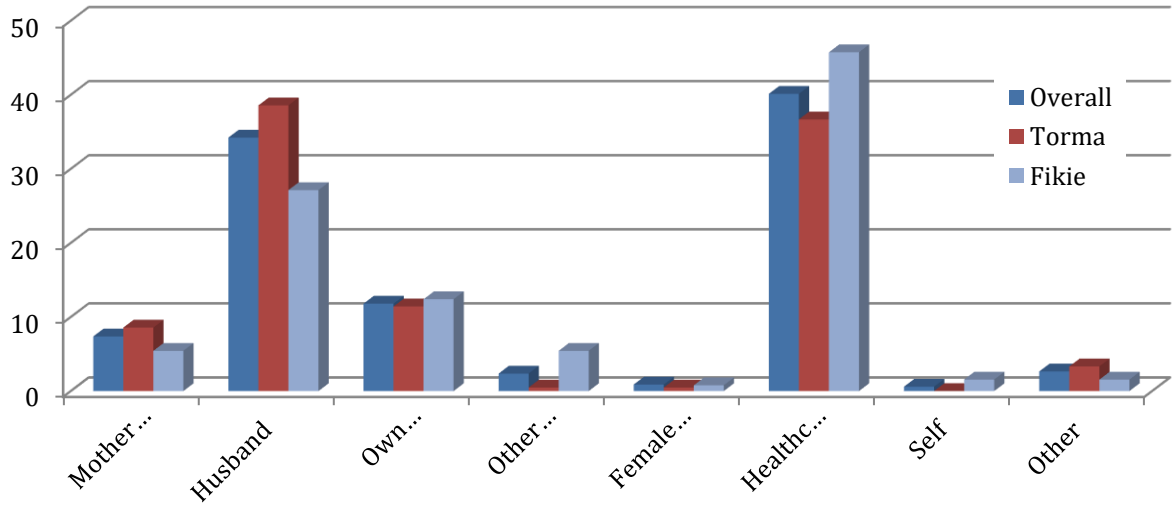
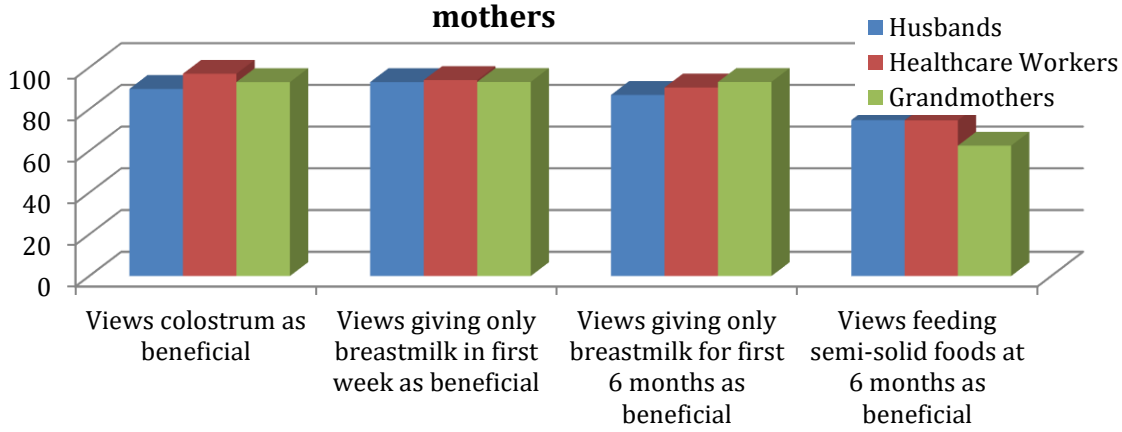


Figure 5: The person mothers cite who's advice on infant nutrition they are most likely to follow.



Of these three most commonly specified advisors to women on infant feeding – healthcare workers, grandmothers, husbands – we examined their beliefs about infant feeding based on mothers' report. Briefly, mothers were asked, for the person that they identified as who's advice they would follow, what that person's recommendation or belief was regarding various infant and young child feeding practices. In general, all three advisors appeared to overwhelmingly support the provision of colostrum and exclusive breastfeeding in the first week and first 6 months (**Figure 6**). However, mothers who indicated grandmothers as their primary advisors perceived them to be less supportive of introducing semi-solid foods at 6 months compared to those who designated husbands or health care workers.

Figure 6: Beliefs of common infant feeding advisors as reported by mothers



Somewhat different perspectives emerged from the qualitative research. Advice that pregnant women receive on their diet and work comes from other women in the household

who are older and more experienced. Men play an important role in providing food to the family, but they are rarely involved in giving specific advice to pregnant women regarding their diet or work. Women receive some advice from health workers during pregnancy, but pre-natal consultations are not consistent. Even if women attend prenatal clinics and receive advice regarding their diet that is contradictory to what the GMs advise, it is extremely difficult for them to go against the advice of their "resident advisors" who are there to monitor and supervise their meals on a daily basis. Furthermore, refusing to comply with advice given by the mother-in-law or by other senior women in a women's entourage is seen as a sign of disrespect for them and for the community's values in general.

From the qualitative research, the community-identified experts on breastfeeding are the senior women, or GMs. Given the gender-specificity of experience and knowledge, men are considered not be experienced and do not advise on the specifics of breastfeeding or associated problems. All of the men interviewed stated that "the GMs are the experts on breastfeeding and given their extensive experience, we are confident that they will advise our wives on the do's and don'ts." Many young mothers who attended prenatal visits report that the nurses told them about EBF during those consultations. Also, of those who gave birth in health centers (approximately half) many were informed about EBF soon after the birth of the baby.

However, after birth, new mothers have very limited contact with nurses while they have constant contact with their culturally designated advisors on such topics, the GMs. Husbands and other household members all recognize the GMs as the authorities on breastfeeding and on all other aspects of the care of infants.

Care of Pregnant Mothers

Compared to mothers with children less than 24 months, the 131 pregnant mothers who participated in the quantitative survey were somewhat younger (median age 24), resided in smaller households (median of 6 members) and fewer had a grandmother in residence (54.7%; **Table 9**). Pregnant mothers from Fikie had significantly smaller households and a significantly greater proportion with a grandmother in residence compared to Torma. There were no differences in age or number with a child less than 2 years. 82% of pregnant mothers had confirmed their pregnancy with a health care worker. Torma had a significantly greater proportion of mothers in their second trimester (64.5% vs. 44.4%) whereas Fikie had significantly more presenting in their third trimester (46.7% vs. 27.4%).

Table 9. Age and household composition for 131 pregnant women included in the Mamanieva baseline survey, Bum ADP; data are presented as mean±SD, median (min, max) or % (n). P values estimated using chi square or tests of the median

Variable	Overall (n=131)	Torma (n=78)	Fikie (n=53)	P value
Maternal age[1], y	24.71±5.64	25.12±5.88	24.11±5.26	0.34
Pregnancy Confirmed by Health worker	82.31% (107)	76.92% (60)	90.38% (47)	0.116
Trimester[2]				
First	15.1% (19)	14.9% (11)	15.4% (8)	0.023
Second	73.8% (93)	77.0% (57)	69.2% (36)	
Third	11.1% (14)	8.1% (6)	15.4% (8)	
Household size				0.01
Number of children < 2 years in household				

Table 9. Age and household composition for 131 pregnant women included in the Mamanieva baseline survey, Bum ADP; data are presented as mean±SD, median (min, max) or % (n). P values estimated using chi square or tests of the median

Variable	Overall (n=131)	Torma (n=78)	Fikie (n=53)	P value
0	86.15% (112)	83.12% (64)	90.57% (48)	0.54
1	10.77% (14)	11.69% (9)	9.43% (5)	
>1	3.08% (4)	5.19% (4)	0.00% (0)	
Number of children 2-16y	2.32±1.64	2.33±1.64	2.28±1.56	0.95
Number of adults 16-45 y	2.86±1.25	2.86±1.25	2.99±1.13	0.002
Number of adults > 45 y	1 (0, 4)	1 (0, 4)	0 (0, 3)	<0.001
A grandmother is present in household	54.69% (70)	37.33% (28)	79.25% (42)	0.001

[1] 3 respondents excluded because age 17y
[2]based on reported estimated date of delivery; dating missing or not known for 32 women

The survey collected information on pregnant mothers' current dietary practices, workload and infant feeding intentions (**Table 10**). Most mothers reported working less (73.8%) but consuming the same amount of food (41%) or more (46%) as they did when not pregnant. A large majority of women reported receiving or taking fewer than 29 iron tabs during their current pregnancy, despite most being in their second or third trimester. Data on antenatal care attendance was not collected so it is not clear if this is a result of low uptake of antenatal care or problems with iron supply and distribution.

Findings from the qualitative research contradict to some extent the quantitative findings. To understand community members' attitudes toward weight gain by pregnant women, they were asked whether they prefer seeing a pregnant woman with "a big belly or a small belly". The vast majority of respondents, men and women alike, stated that they prefer that a pregnant woman have a "small belly". Many stated that "with a small belly it is easier for the woman to move and to walk" but the main rationale for preferring a "small belly" is that "this means that the baby is smaller and that the delivery will be easier." There is a minority of respondents, in each of the three categories of interviewees, who believe that it is preferable for a woman to have a "big belly", as this denotes that the baby is larger and that the woman will have more strength to successfully deliver a healthy baby.

Consistent with the idea that "it is preferable to have a small belly", the majority of interviewees stated that during the last trimester the woman should eat less so that she does not gain too much weight at the end of the pregnancy as this would make the baby larger and the delivery more difficult. A GM expressed the widely held idea that "during the last trimester the pregnant woman should not go hungry, but she should eat less, by eating smaller portions of food."

The majority of interviewees, men and women, expressed the idea that "pregnant women should work less and rest more than usual, especially during the last trimester". Tasks that pregnant women are most often advised to avoid include carrying heavy loads on their head, pounding, fetching water, bending over (i.e. harvesting cassava), and splitting wood. The reasons given for discouraging women from carrying out these tasks include increased possibility of complications for the woman or baby and excessive work can lead to weight loss in women and low birth weight babies. Most interviewees stated that they advise pregnant women to rest for a while in the afternoon. Only a minority of respondents said that they should not rest, that they should work hard throughout their pregnancy because

"pregnancy is not an illness" and that they can rest after delivery. Similarly, a significant minority of respondents stated that "women should work as usual throughout the pregnancy and until delivery day".

Breastfeeding Intentions of Pregnant Women

There were some contradictions apparent in early breastfeeding intentions among pregnant women. Nearly 90% of pregnant mothers indicated that it was very likely that they would initiate breastfeeding within the first hour and 71% indicated it was very likely that they would give only breastmilk to their infant in the first week; despite this substantial minorities indicated that it was very likely they would express and discard colostrum (40%) or give other foods/ drinks prior to initiating breastfeeding (18%). Conversely, mothers' intentions regarding giving only breastmilk in the first week of life (71% very likely; 7.7% somewhat likely) and intentions on giving teas, waters or other liquids in the first week (13.9% very likely and 10% somewhat likely) were relatively consistent. It is possible that mothers did not understand the questions or that field teams did not sufficiently probe inconsistencies to seek clarification. It is also possible that mothers do not perceive prelacteals prior to initiation as a contradiction to exclusive breastfeeding once breastfeeding has been initiated. Similarly, inconsistencies were observed with respect to intending to give only breastmilk for the first 6 months (77% very likely; 8.7% somewhat likely) compared to intending to give thin soups, water or teas in the first 3 months (21.4% very likely; 8.7% somewhat likely). However, it should be noted that more than 40% of pregnant mothers indicated they would be very unlikely to give thin soups, water teas for the first 3 months and half indicated they would be very unlikely to give porridge, animal milks or other foods before 6 months. As was seen with mothers with children < 24 months, while the majority would introduce thick porridge at 6 months, pregnant mothers were not likely to introduce other semi-solid nutrient dense foods such as meat, eggs, fruits vegetables and legumes by 6-9 months of age. Just over half indicated they would continue breastfeeding for at least 2 years (37.7% very likely; 13.9% somewhat likely).

Table 10: Current nutrition practices and infant feeding intentions of 131 pregnant women in Bum ADP, Bonthe District

	Overall	Torma % (N)	Fikie % (N)	P value
Variable	%	%	%	
Food intake during this pregnancy compared to nonpregnancy (n=131)				
Missing	3.05% (4)	2.56 % (2)	3.77% (2)	0.27
More	46.56% (61)	52.56% (41)	37.74% (20)	
The same	41.22 % (54)	38.46% (30)	45.28% (24)	
Less	8.4% (11)	36.36% (4)	13.21% (7)	
Doesn't know	0.76%	1.28% (1)	0	
Mother is avoiding specific foods during this pregnancy (128)				
No	60.94% (78)	66.23% (51)	52.94% (27)	0.21
Yes	32.81% (42)	29.87% (23)	37.25% (19)	
Doesn't Know	6.25% (8)	3.9% (3)	9.8% (5)	
Reported work load during this pregnancy (n=126)				

More	15.08% (19)	14.86% (11)	15.38% (8)	0.43
Less	73.81% (93)	77.03% (57)	69.23% (36)	
The Same	11.11% (14)	8.11% (6)	15.38% (8)	
Number of Iron Tabs Received / Purchased During This Pregnancy (n=129)				
0	13.18% (17)	16.88% (13)	23.53% (4)	0.38
1-29	52.71% (68)	48.05% (37)	59.62% (31)	
30-59	24.81% (32)	23.38% (18)	26.92% (14)	
60-90	4.65% (6)	6.49% (5)	1.92% (1)	
>90	4.65% (6)	5.19% (4)	3.85% (2)	
Number of Iron Tabs Consumed This Pregnancy (n=114)				
0	13.16% (15)	16.42% (11)	8.51% (4)	0.66
1-29	46.49% (53)	41.79% (28)	53.19% (25)	
30-59	22.81% (26)	22.39% (15)	23.4% (11)	
60-90	10.53% (12)	10.45% (7)	10.64% (5)	
>90	6.14% (7)	7.46% (5)	4.26% (2)	
Doesn't know	0.88% (1)	0.88% (1)	0	
Mother will initiate breastfeeding within one hour of birth (n=131)				
Very likely	89.31	85.9	94.34	0.21
Somewhat likely	2.29% (3)	1.28% (1)	3.77% (2)	
Not Sure	4.58% (6)	6.41% (5)	1.89% (1)	
Somewhat unlikely	2.29% (3)	3.85% (3)	0	
Very unlikely	1.53% (2)	2.56% (2)	0	
Mother will express and throw away first milk (n=130)				
Very likely	40.0% (52)	44.87% (35)	32.69% (17)	0.13
Somewhat likely	6.15% (8)	6.41% (5)	5.77% (3)	
Not Sure	19.23% (25)	12.82% (10)	28.85% (15)	
Somewhat unlikely	0.77% (1)	0	1.92% (1)	
Very unlikely	33.85% (44)	35.9% (28)	30.77% (16)	
Mother will give food or drink before initiating breastfeeding (N=136)				
Very likely	18.25% (23)	21.05% (16)	14% (7)	0.67
Somewhat likely	8.73% (11)	9.21% (7)	8% (4)	
Not Sure	23.81% (30)	21.05% (16)	28% (14)	
Somewhat unlikely	3.97% (5)	2.63% (2)	6% (3)	
Very unlikely	45.24% (57)	46.05% (35)	44% (22)	
Mother will give baby only breastmilk in the first week of life (n=130)				
Very likely	70.77 % (92)	73.08% (57)	67.31% (35)	0.76
Somewhat likely	7.69% (10)	8.97% (7)	5.77% (3)	
Not Sure	11.54% (15)	10.26% (8)	13.46% (7)	
Somewhat unlikely	1.54% (2)	1.28% (1)	1.92% (1)	
Very unlikely	8.46% (11)	6.41% (5)	11.54% (6)	
Mother will give teas, water or other liquids in first week (130)				
Very likely	13.85% (18)	17.95% (14)	7.69% (4)	**0.004**
Somewhat likely	10% (13)	15.38% (12)	1.92% (1)	

Not Sure	23.08% (30)	14.1% (11)	36.54% (19)	
Somewhat unlikely	3.08% (4)	3.85% (3)	1.92% (1)	
Very unlikely	50% (65)	48.72% (38)	51.92% (27)	
Mother will give only breast milk for the first 6 months (n=127)				
Very likely	77.17% (98)	76.62% (59)	78.0% (39)	0.5
Somewhat likely	8.66% (11)	6.49% (5)	12.0% (6)	
Not Sure	5.51% (7)	5.19% (4)	6.0% (3)	
Somewhat unlikely	0.79% (1)	1.3% (1)	0	
Very unlikely	7.87% (10)	10.39% (8)	4.0% (2)	
Mother will give thin soups, water, teas in first 3 months (n=127)				
Very likely	21.43% (27)	29.33% (22)	9.8% (5)	0.08
Somewhat likely	8.73% (11)	8% (6)	9.8% (5)	
Not Sure	24.6% (31)	20% (15)	31.37% (16)	
Somewhat unlikely	0.79% (1)	1.33% (1)	0	
Very unlikely	44.44% (56)	41.33% (31)	49.02% (25)	
Mother will give baby thin porridge, animal milks, formula or other foods before 6 months (n=128)				
Very likely	10.94% (14)	14.29% (11)	5.88% (3)	0.25
Somewhat likely	7.81% (10)	10.39% (8)	3.92% (2)	
Not Sure	26.56% (34)	22.08% (17)	33.33% (17)	
Somewhat unlikely	4.69% (6)	3.9% (3)	5.88% (3)	
Very unlikely	50% (64)	49.35% (38)	50.98% (26)	
Mother will give baby thick porridge or semi-solid foods at 6 months(n=127)				
Very likely	51.18% (65)	51.28% (40)	51.02% (25)	0.94
Somewhat likely	12.6% (16)	14.1% (11)	10.2% (5)	
Not Sure	15.75% (20)	14.1% (11)	18.37% (9)	
Somewhat unlikely	4.72% (6)	5.13% (4)	4.08% (2)	
Very unlikely	15.75% (20)	15.38% (12)	16.33% (8)	
Mother will give baby meat at 6-9 months (n=129)				
Very likely	26.36% (34)	24.36% (19)	29.41% (15)	0.31
Somewhat likely	8.53% (11)	5.13% (4)	13.73% (7)	
Not Sure	22.48% (29)	26.92% (21)	15.69% (8)	
Somewhat unlikely	4.65% (6)	5.13% (4)	3.92% (2)	
Very unlikely	37.98% (49)	38.46% (30)	37.25% (19)	
Mother will give baby eggs at 6-9 months (n=129)				
Very likely	27.91% (36)	25.64% (20)	31.37% (16)	0.65
Somewhat likely	8.53% (11)	6.41% (5)	11.76% (6)	
Not Sure	23.26% (30)	24.36% (19)	21.57% (11)	
Somewhat unlikely	3.1% (4)	2.56% (2)	3.92% (2)	
Very unlikely	37.21% (48)	41.03% (32)	31.37% (16)	
Mother will give baby fruits / vegetables at 6-9 months (n=130)				
Very likely	30% (19)	32.05% (25)	26.92% (14)	0.93
Somewhat likely	13.85% 918)	11.54% (9)	17.31% (9)	
Not Sure	16.92% (22)	15.38% (12)	19.23% (10)	

Somewhat unlikely	3.85% (5)	3.85% (3)	3.85% (2)	
Very unlikely	35.38% (46)	37.18% (29)	32.69% (17)	
Mother will continue to breastfeed for at least 2 years (n=130)				
Very likely	37.69% (49)	41.03% (32)	32.69% (17)	0.45
Somewhat likely	13.85% (18)	11.54% (9)	17.31% (9)	
Not Sure	13.85% (18)	10.26% (8)	19.23% (10)	
Somewhat unlikely	5.38% (7)	6.41% (5)	3.85% (2)	
Very unlikely	29.23% (38)	30.77% (24)	26.92% (114)	

Table 11: Commonly avoided foods during pregnancy as reported by 131 pregnant mothers in Bum ADP

Food	Number of respondents citing	Reasons for Avoiding
Cassava	14	Smell; Causes heartburn; no appetite for it
Rice	6	Smell; causes vomiting; irritates heart
Garie	4	Causes constipation; will make the child cry; will dry the baby's / mother's stomach
Snake	3	It will disturb the baby
Foo foo	2	Smell; heart palpitations; weakens the baby

Findings for Grandmothers

The 147 grandmother respondents were on average 57 years old (median of 55 years) and very few had any formal schooling (**Table 12**). The median numbers of both children and grandchildren were 6 each. The majority of grandmothers were engaged in agriculture as a primary occupation (72.5%) though some also worked in childcare (11.5%). Approximately 1/3 were in formal or informal monogamous arrangements and more than 1/3 were widowed. Grandmothers were predominantly the respondent's mother or mother in law.

Table 12. Descriptive statistics for 147 grandmothers included in the Mamanieva baseline survey, Bum ADP data presented as mean (SD) or % (n). P values estimated using chi square or tests of the median as appropriate.

Variable	Overall (n=)	Torma (n=)	Fikie (n=)	P value
Duration of residence, years	24.66±24.24	23.98±23.94	26.04±25.31	0.714
Age, years	57.19±11.21	58.18±12.04	55.28±9.23	0.109
Schooling, years	0.32±1.62	0.43±1.92	0.10±0.71	0.361
Occupation				
Does not work / retired	10.20% (15)	10.31% (10)	10.00%(5)	0.247
Agriculture	72.11% (106)	72.16% (70)	72.00% (36)	
Informal Business	2.72% (4)	4.12%(4)	0%	
Child Care	11.56% (17)	11.34% (11)	12.00% (6)	
Other	3.40% (6)	2.06% (2)	6.00% (3)	
Marital Status				
Partnered, monogamous	30.07 (43)	29.79% (28)	30.61% (15)	0.186
Partnered, polygamous	17.48% (25)	18.09% (17)	16.33% (6)	
Widowed	37.06 (53)	37.23% (35)	36.73% (18)	
Other	15.39% (22)	14.89% (14)	16.33% (8)	
Number of children	6 (0, 20)	5 (0, 12)	6 (1, 20)	0.187

Number of grandchildren	6 (0, 33)	5 (0, 20)	7 (1, 33)	0.161
Relation to mother / pregnant woman				
Mother in law	31.91 % (45)	27.37% (26)	41.30% (19)	0.348
Mother	39.01% (55)	37.89% (36)	41.30% (19)	
Other female relative	27.67% (39)	32.36% (31)	17.38% (8)	
Not related	1.42% (2)	2.11% (2)	0%	
Household size	7.46±2.21	7.69±2.24	7.02±2.08	0.021
Number of children < 2 years in household				
0	6.80% (10)	10.31% (10)	0	0.063
1	77.55% (114)	71.13% (69)	90.00% (45)	
>1	2.04% (3)	18.55% (17)	10% (5)	

Grandmothers supported increased food intakes (64.0%) and reduced workloads (65.9%) during pregnancy, though it should be noted that nearly 30% of grandmothers indicated that mothers should eat less during pregnancy compared to when not pregnant (Figure). Nearly 40% felt that certain foods should be avoided during pregnancy, the most common being cassava, rice and snake (**Table 13**). The grandmothers engaged in the qualitative research stated that their dietary recommendations to pregnant women "depend on the woman's taste", however, there are certain foods that women are generally either encouraged or discouraged from eating. The GMs often encourage pregnant women to eat cassava leaves, potato leaves with broad beans, eggplant and rice (*pemahui)*, sauce with palm oil, beans, raw cassava, *benni* (sesame) soup, and *benni* with rice and eggplant (*lafidi).* GMs often forbid women from eating foods, which they believe to have a negative effect on the woman and/or the baby, including *foo foo* (wet fermented cassava cake believed to increase both women's weight gain and the size of the fetus, which makes delivery more difficult), crawling animals (for fear that the baby will start walking very late), plantains (that will increase the size of boy baby's penis), and limes. As with other advice that GMs give to women of reproductive age, pregnant women are expected to follow it.

Figure 7: Grandmothers beliefs regarding diet and work in pregnancy

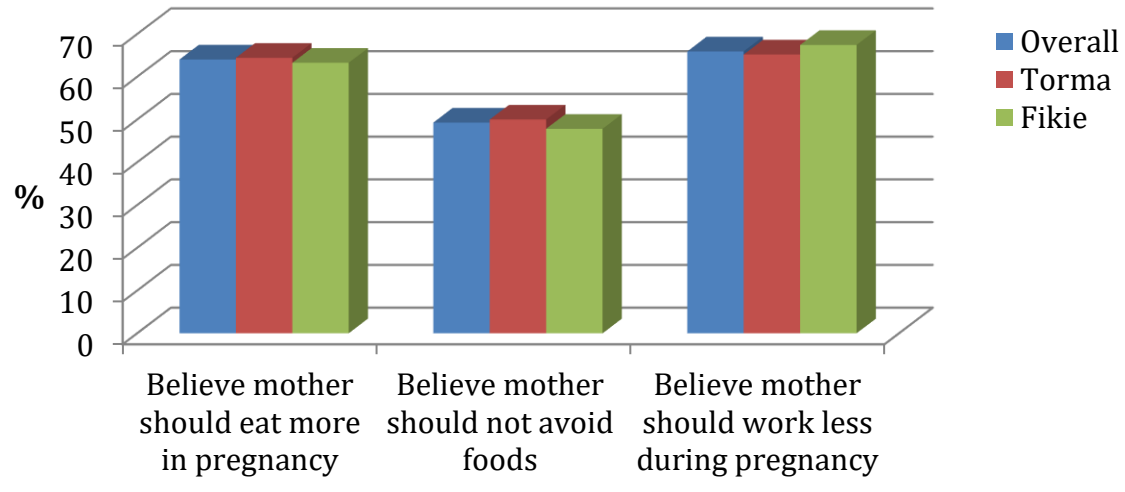


Table 13: Commonly avoided foods during pregnancy as reported by grandmothers in Bum ADP		
Food	**Number of respondents citing**	**Reasons for Avoiding**
Cassava	14	Smell; Causes heartburn; causes mother to choke
Rice	14	Smell; causes choking of mother; causes vomiting
Garie	6	Causes dry stomach;
Snake	8	Causes skin disorders of mother / baby; causes difficult delivery; weakens baby

Similar to mothers with children less than 24 months, 88% of grandmothers responded that breastmilk supported a child to grow well. A similar minority of grandmothers indicated that feeding the child sufficient (35%) or diverse (39%) foods supported growth. Overall 14% indicated that consumption of sufficient food by women during pregnancy and breastfeeding was important for child growth while less than 10% indicated a role for divine will. A significantly greater proportion of grandmothers from Torma indicated consumption of sufficient foods (42.5% vs 22%, p=0.01) were important; no other differences between the two sections were noted. Grandmothers overwhelmingly stated that they believed initiation of breastfeeding should occur within one hour of birth (80%), that the infant should be given colostrum (82%), that nothing should be given to the infant before putting him/her to the breast for the first time (79%) and that nothing but breast milk should be given in the first week of life (80%). No significant differences were observed between Torma and Fikie (**Figure 8**).

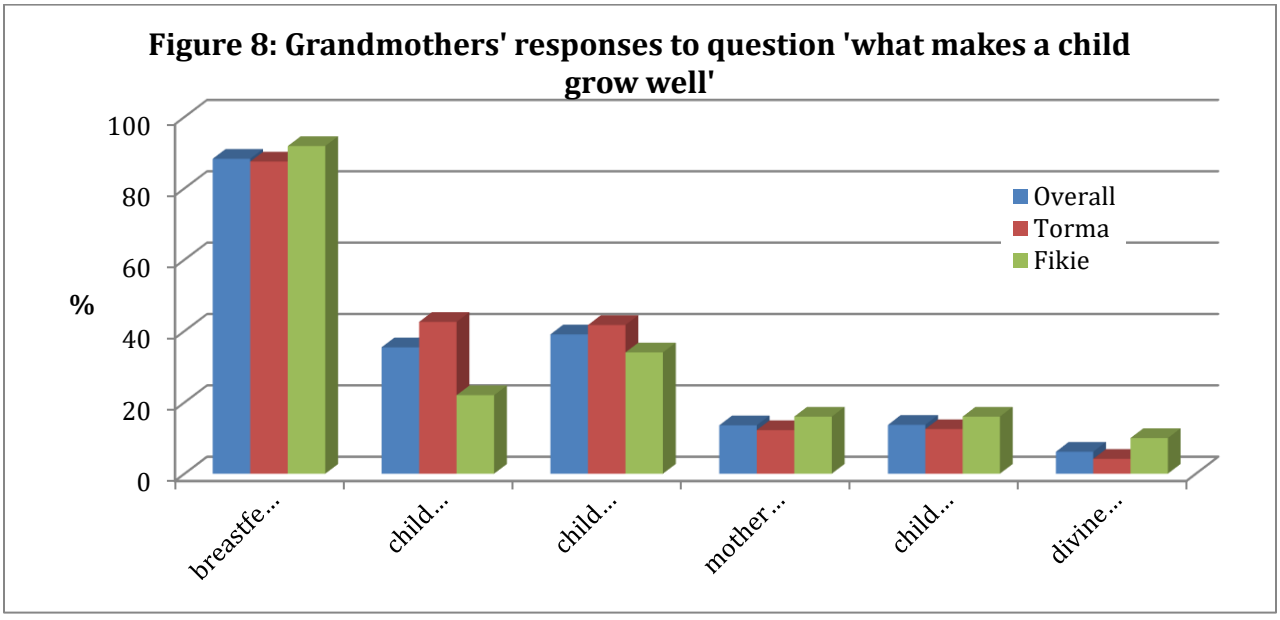
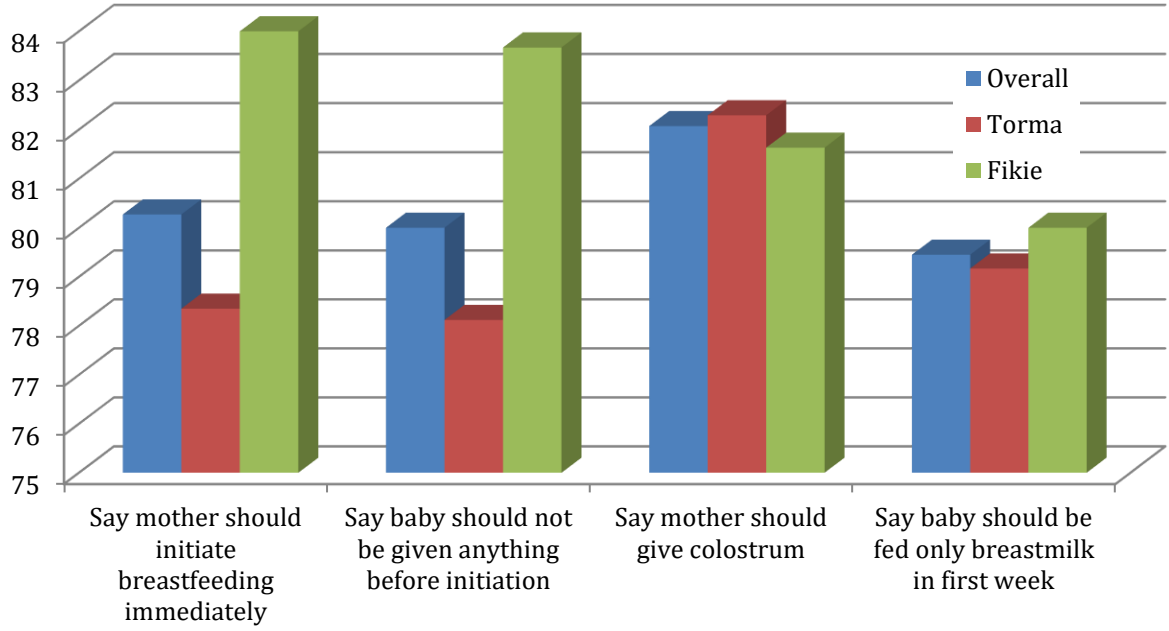


Figure 9: Grandmothers' beliefs about initiation of breastfeeding



In regards to infant feeding practices beyond the first week, grandmothers more often reported not knowing when to introduce foods than mothers with young children (**Table 14**). Almost 40% indicated that children should receive water / teas before 6 months of age and nearly 20% reported that children should receive animal milks, juice or broth or thin porridge before 6 months. Nearly half (45%) of grandmothers believed that thick porridges should be introduced between 6-9 months and a substantial minority believed that other nutrient dense semi solid foods such as meats, fish, eggs, fruits and vegetables should not be introduced until after 9 months of age. The large majority of grandmothers (64%) believed that infants 6-9 months old should be fed 2-3 times a day, however ~ 67% felt that children 9-12 months and > 12 months of age should receive 3-4 meals; only 8% believed that children older than 12 months should be fed more than 4 times in a day.

Table 14: Grandmothers' beliefs about infant and young child feeding practices, specifically introduction of nonbreastmilk substances and frequency of complementary feeding

	Overall % (N)	Torma % (N)	Fikie % (N)	P value
Water, tea				
doesn't know	8.7 % (12)	8.7% (8)	8.7% (4)	0.748
in the first week	18.12% (25)	20.65% (19)	13.04% (6)	
before child is 6 months	22.46% (31)	21.74% (20)	23.91% (11)	
not before child reaches 6 months	50.72% (70)	48.91% (45)	54.35% (25)	
Animal milks, juice, broths				
doesn't know	38.64% (51)	39.77% (35)	36.36% (16)	0.982
in the first week	8.33% (11)	7.95% (7)	9.09% (4)	
before child is 6 months	11.36% (15)	11.36% (10)	11.36% (5)	

Table 14: Grandmothers' beliefs about infant and young child feeding practices, specifically introduction of nonbreastmilk substances and frequency of complementary feeding				
	Overall % (N)	Torma % (N)	Fikie % (N)	P value
not before child reaches 6 months	41.67% (55)	40.91% (36)	43.18% (19)	
Thin porridge				
doesn't know	21.01% (29)	18.48% (17)	26.09% (12)	0.417
in the first week	5.8% (8)	5.43% (5)	6.52% (3)	
before child is 6 months	15.22% (21)	18.48% (17)	8.7% (4)	
not before child reaches 6 months	57.97% (80)	57.61% (53)	58.7% (27)	
Thick porridge / semi solid foods				
doesn't know	15.28% (22)	14.74% (14)	16.33% (8)	**0.034**
in the first week	6.25% (9)	4.21% (4)	10.2% (5)	
before child is 6 months	8.33% (12)	12.63% (12)	0%	
between 6 and 9 months	45.83% (66)	44.21% (42)	48.98% (24)	
between 9-12 months	20.14% (29)	17.89% (17)	24.94% (12)	
after 12 months	4.17% (6)	6.32% (6)	0	
Eggs				
doesn't know	59.56% (81)	56.32% (49)	65.31% (32)	0.776
in the first week	2.21% (3)	2.3% (2)	2.04% (1)	
before child is 6 months	5.15% (7)	6.9% (6)	2.04% (1)	
between 6 and 9 months	8.09% (11)	8.05%(7)	8.16% (4)	
between 9-12 months	16.18% (22)	16.09% (14)	16.33% (8)	
after 12 months	8.82% (12)	10.34% (9)	6.12% (3)	
Meat / Fish				
doesn't know	44.14% (64)	41.67% (40)	48.98% (24)	0.865
in the first week	4.83% (7)	4.17% (4)	6.12% (3)	
before child is 6 months	1.38% (2)	1.04% (1)	2.04% (1)	
between 6 and 9 months	8.28% (12)	9.38% (9)	6.12% (3)	
between 9-12 months	16.55% (24)	16.67% (16)	16.33% (8)	
after 12 months	24.83% (36)	27.08% (27)	20.41% (10)	
Fruits / Vegetables				
doesn't know	37.5% (54)	35.11% (35)	42% (21)	0.646
in the first week	4.86% (7)	4.26% (4)	6% (3)	
before child is 6 months	3.47% (5)	2.13% (2)	6% (3)	
between 6 and 9 months	11.81% (17)	11.7% (11)	12% (6)	
between 9-12 months	13.89% (20)	14.89% (14)	12% (6)	
after 12 months	28.47% (41)	31.91% (30)	22% (11)	
Legumes / Pulses				
doesn't know	30.71% (43)	26.6% (25)	39.13%	**0.026**

Table 14: Grandmothers' beliefs about infant and young child feeding practices, specifically introduction of nonbreastmilk substances and frequency of complementary feeding				
	Overall % (N)	Torma % (N)	Fikie % (N)	P value
			(18)	
in the first week	5.71% (8)	5.32% (5)	6.52% (2)	
before child is 6 months	2.86% (4)	2.13% (2)	4.35% (1)	
between 6 and 9 months	18.57% (26)	13.83% (13)	28.26% (13)	
between 9-12 months	12.14% (17)	15.96% (15)	4.35% (2)	
after 12 months	30% (42)	36.17% (34)	17.39% (8)	
Number of times an infant 6-9months should be fed				
<2	2.72%	1.03% (1)	6.0% (3)	0.079
2-3	93.88%	93.81% (91)	94.0% (47)	
>3	1.36%	2.06% (2)	0	
Doesn't know	2.04%	3.09% (3)	0	
Number of times an infant 9-12 months should be fed				
<3	27.89%	24.74% (24)	34.0% (17)	0.203
3-4	67.34%	68.05% (66)	66.0% (43)	
>4	1.36%	2.06% (2)	0	
Doesn't know	3.4%	5.15% (5)	0	
Number of times an infant >12 months should be fed				
< 3	18.88%	20.18% (19)	16.33% (8)	**0.039**
3-4	67.13%	60.63% (57)	79.59% (39)	
>4	7.69%	9.57% (9)	4.08% (2)	
Doesn't know	6.29%	9.57% (9)	0	

The same maternal nutrition and infant feeding scenarios presented to mothers with young children were presented to grandmothers and are presented in Appendix 1-2. Responses were similar between the two groups with a slightly greater proportion of mothers (~2-7%) reporting agreement with recommended or disagreement with harmful practices compared to grandmothers. Grandmothers' responses to the scenarios did not differ significantly between Torma and Fikie.

The qualitative research with GMs revealed that almost all of the grandmothers have never been explicitly invited to participate in community programs dealing with the health and wellbeing of women and children. The men and WRA interviewed concurred that none of the past programs, either government sponsored services or NGOs working in the area, have ever involved GMs as a group, though in many cases individual GMs have been involved in such activities along with the WRA.

When the GMs were asked why they think that past programs have not involved them they identified several negative attitudes towards them on the part of development organizations. They also presented their own critiques of each of these attitudes. First, there

is the idea that "GMs no longer give birth and so there is no need to involve them in discussions on pregnancy, delivery, newborn care or the nutrition/health of young children". GMs argue that while they no longer give birth, they are the principal advisors of younger women who do. Second, GMs sense that development workers often think that their lives are almost over and that they can no longer contribute to society as reflected in ideas such as "GMs have weak brains", that "GMs are almost dead" and that "GMs are unable to do hard work anymore". GMs maintain that until the day they die they will be on their feet working and doing everything possible to ensure the well-being of their children and grandchildren. Lastly, GMs sense that community development workers often question their ability to learn and to change. GMs maintain however, that they are interested in learning new things and seeing how they can be combined with what they know already in order to improve their practices. In many of the GM groups interviewed, they stated, "If we are not involved, we can't learn new things."

All categories of community interviewees insisted that in the future GMs should definitely be involved in community programs dealing with their domains of expertise, including maternal and child nutrition/health. Arguments presented by the GMs to support their inclusion in future programs are they have more time and greater patience than younger women to learn new ideas regarding the nutrition and well-being of children and women, learning new ideas will improve the advice they give to younger women and their families, they are intelligent, and they are not too old to learn. One of the GM interviewees confidently stated, "You have seen from the discussion today that we have intelligent things to say.

Discussion

From the two studies, the qualitative formative research and the quantitative baseline survey, it is apparent that belief systems of mothers and grandmothers do not currently support optimal maternal and child nutrition. This is contrary to the fact that many mothers reported knowledge of the recommended practices, especially in regards to exclusive breastfeeding, during the qualitative survey.

Community, family and individual belief systems underpin to child health and nutrition practices. They form part of the collection of social, psychological and environmental contributors to health practices and play a critical role in determining how a family or a caretaker will negotiate a given situation to provide care for a child, including nutrition and feeding practices. Child health belief systems, whether family, community or individual, are built on two key interlocking pillars -- knowledge of and experiences with the care of children. Knowledge is transferred through multiple interactions with formal and informal networks. Generational storytelling, peer interactions in social groups, interactions with community leaders/elders, as well as interactions with formal systems such as schools or health extension/outreach activities, serve as mechanisms for transferring knowledge about child health and care. Direct or indirect experiences with childcare and child health generate, reinforce and create nuanced knowledge, which deepens the ties to a belief system. Experiences may also influence self-efficacy and can enlarge support networks, which may further reinforce or shift one's belief systems.

The formative qualitative research identified that while women appeared to have knowledge of the recommended practices, four categories of factors contributed to child nutrition belief systems and undermined the practice and support of EBF and timely introduction of adequate complementary foods: 1) food insecurity; 2) traditional / cultural

norms and beliefs; 3) roles and influence of family system; 4) limited accessibility to health systems. We can see how this could play out in a family situation. For example, pervasive food insecurity in a community will likely undermine a mother's (and her family's) belief in her ability to produce adequate milk, which in turn may contribute to perceptions of insufficient milk production and low self-efficacy. This may be reinforced by a fussy or crying child. When combined with beliefs related to the composition of breastmilk and its adequacy for infant nutrition, it can contribute to the early provision of water or paps. For a new mother, her own lack of experience, lack of access to health care services (and the potential knowledge provided at antenatal care sessions), and her culturally designated role in the family, will likely reinforce her belief that she should heed the advice of the more experienced women in the household, despite her knowledge of the recommended practice (ie. EBF to 6 months. Food insecurity reduces household access to a diverse diet especially micronutrient rich foods such as animal source foods, fruits and vegetables. Thus even when empowered with knowledge of correct complementary feeding methods, the availability and accessibility of recommended foods may prevent women from adhering to the recommended practices.

Taken together the findings from the quantitative and the qualitative research highlights the need for a strategy that works to shift belief systems of communities rather than increase the knowledge of mothers. A critical first step is clarifying the foundational concept that a child's diet, growth and health are linked. Without a clear understanding of this foundational concept among mothers and their key advisors (grandmothers and husbands), it is unlikely that interventions or programs can sustainably shift nutrition practices. It would be useful to characterize which maternal and child nutrition strategies in Sierra Leone are attempting to clarify this link, including the approaches they are using and their likely or measured effectiveness.

Unlike the quantitative research, the qualitative research identified little support for giving only breast milk in the first few days/week of life. This inconsistency, the low support for exclusive breastfeeding to 6 months seen in both the qualitative and quantitative research, the apparent belief in delaying nutrient dense complementary foods and the likely underreporting of harmful beliefs in the quantitative research, suggests that there is not a single target practice that needs to be addressed. It is critical that multiple components of the essential nutrition actions be addressed. Once the foundational concept of the linkages between a child's diet, growth and health is laid, practices that support optimal child diet, growth and health can then be built upon this foundation. Participatory, community-based nutrition education strategies that utilize empowerment based or adult education strategies are recommended by the FAO because they are believed to be more effective at shifting nutrition practices than standard nutrition education approaches (ie. health talks, face to face counseling, etc.).[4]

Given low access to formal health systems and that mothers frequently seek out the advice of multiple advisors (both in the family and community), it is important that a holistic, community based approach be utilized. It needs to build upon positive belief systems and engage communities to reconsider potentially harmful beliefs. Identifying and working

[4] For more information and resources on participatory nutrition education please see Cerqueira, M.T., 1992 (available at http://www.fao.org/docrep/u8050t/u8050t07.htm) and FAO, 1997 (http://www.fao.org/docrep/w0078e/w0078e10.htm)

with positive deviant families, especially grandmothers in these families, may be a very effective strategy. These grandmothers, likely respected and sought after for their culturally designated roles as advisors, not only have maternal and child health experience and knowledge but likely have belief systems and positive experiences with practices that are more in line with recommendations. Furthermore because the challenge to harmful beliefs is coming from someone within the community (i.e. the positive deviant grandmother or family) as opposed to an "outsider" (i.e. nurse, doctor, health care worker) they are likely to be more acceptable by the community.

Lastly, for programs that may be delivered via health systems platforms it is critical that they are designed to be inclusive of other family members, especially grandmothers and husbands. Inclusive does not just mean that they target these members with messages and educational campaigns but that programs are designed in such as a way as to appeal to these populations and engage them in meaningful, participatory discussions that respect and capitalize on their wealth of experiences and knowledge, as well as their roles in households and communities.

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