



# The Mamanieva Project: A Grandmother-inclusive Approach to Improve Maternal Nutrition & Infant and Young Child Feeding in Sierra Leone

## Preliminary Report on Findings

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## **LIST OF ACRONYMS**

ANC	Antenatal Care
GM	Grandmother
GML	Grandmother Leader
IYCF	Infant and Young Child Feeding
MU2	Mother with children under-2
PW	Pregnant Women
WHO	World Health Organization
WRA	Women of Reproductive Age
WV	World Vision

## I. EXECUTIVE SUMMARY

### OVERVIEW

In Sierra Leone, maternal and child malnutrition persists at high levels with long-term impacts on the nation's social and economic development. For example, in 2013, approximately 38% of children under 5 years were stunted and 45% of women of reproductive age were anaemic. Poor maternal nutrition and suboptimal infant and young child feeding (IYCF) practices contribute substantially to the lack of progress on malnutrition.

In rural communities across the globe, grandmothers and elder women play a vital role in maternal and child nutrition with the support they provide during pregnancy, labour, delivery and the postpartum period. Participatory community-based research in Senegal and Malawi that targeted grandmothers as change agents reported significant improvements in knowledge, attitudes and practices of mothers and grandmothers for IYCF. In response to the slow progress on nutrition, World Vision Sierra Leone and the Sierra Leone Ministry of Health in collaboration with World Vision Germany, Emory University, the Grandmother Project and the World Vision Nutrition Centre of Expertise developed and piloted a socially innovative grandmother-inclusive strategy to accelerate progress on maternal and child nutrition in Sierra Leone.

Known as *Mamanieva*, which means “for grandmothers” in Mende, the pilot project implemented a grandmother-inclusive approach to social and behaviour change for nutrition. The program ran from 2013 to 2016 in Bum ADP, Bonthe. The specific programme activities were grounded in extensive formative research in the programme areas including both a knowledge and attitudes survey as well as rapid ethnographic / qualitative research. The formative work identified significant gaps in maternal and grandmothers' knowledge and attitudes towards optimal maternal nutrition and optimal IYCF practices. The research also identified grandmothers as critical sources of influence and nutrition and health advice for young mothers from pregnancy through two years of life.

The approach used in the Mamanieva pilot project builds on the culturally-designated role of grandmothers as advisors and caregivers to women and children and aims to strengthen grandmothers' knowledge and self-efficacy to promote positive maternal and child health practices in the community. Using a quasi-experimental design, the team allocated one section—Torma and its 15 villages—to receive the Mamanieva program activities. In the intervention communities, World Vision Sierra Leone used community-based facilitators to lead participatory dialogue sessions with grandmothers on maternal and child nutrition and health topics, facilitated community praise sessions for grandmothers and sponsored intergenerational forums to achieve project aims. The project also identified and capacitated grandmother leaders to liaise between World Vision staff and communities and to promote acceptability and sustainability. Fikie section and its eight villages was allocated to the comparison group and received the Sierra Leone Ministry of Health standard of care for maternal and child nutrition education delivered through the health facilities.

This report outlines the findings of the Mamanieva Project. Cross-sectional surveys at baseline and endline captured relevant data on maternal and IYCF knowledge and attitudes and the endline survey additionally captured information on maternal and child nutrition practices, birth weight and, in the intervention communities, program participation and perceived impacts of the intervention on communities. Qualitative operations research conducted at midline and endline provided information on gaps and strategies for improvement, as well as challenges and facilitators of program scale up and sustainability.

## FINDINGS

Results suggest that the grandmother-inclusive strategy was highly acceptable among grandmothers and women and served to improve the knowledge and self-efficacy of grandmothers. Among grandmothers, mean nutrition knowledge scores were significantly higher at endline compared to controls and positive beliefs about specific IYCF practices increased more from baseline to endline among intervention communities compared to control communities. For example, at baseline, 64% of grandmothers in both intervention and control communities believed women should take more food during pregnancy. This proportion remained unchanged among control grandmothers at endline but increased to 96% among grandmothers in the intervention communities. At baseline, 86% of control grandmothers and 78% of intervention grandmothers believed infants should be breastfed within an hour of birth. At endline, the proportion of control grandmothers believing in early initiation decreased to 73% but increased among intervention grandmothers to 100%. At baseline, just under half of grandmothers in both control and intervention communities believed infants should be given water before 6 months. By endline, less than 2% of intervention grandmothers believed infants should be given water, compared to 25% of control grandmothers. We observed similar findings for pregnant women's and mothers' knowledge and beliefs.

Beyond knowledge and attitudes, results also showed differences in nutrition and health seeking practices. Greater proportions of mothers and pregnant women in the intervention communities achieved minimum dietary diversity in the previous 24 hours (95%) compared to women in the control communities (65%,  $p < 0.001$ ). Intervention women also consumed more meals in the previous 24 hours ( $2.6 \pm 1.4$ ) compared to control women ( $1.6 \pm 1.3$ ,  $p < 0.001$ ). Among pregnant women specifically, those in the intervention group intended to consume more food (88.9% vs 48.9%,  $P < 0.0001$ ) and work less (94.4% and 88.1%,  $P = 0.002$ ) during their current pregnancy. Among women with infants, those in the intervention group reported increased meal frequency (94.6% vs 63.6%,  $P < 0.001$ ) and decreased work (91.3% vs 75.7%,  $P < 0.001$ ) during their most recent pregnancy. As well, more mothers in the intervention communities reported attending antenatal care (ANC) at least four times (97.1% vs 80.8%,  $P < 0.001$ ) and delivering in a health facility (96.7% vs 90.7%,  $P = 0.03$ ). Birthweight, a useful proxy for maternal nutrition and health during pregnancy was significantly higher in the intervention group ( $3.3\text{kg} \pm 0.5$ ) compared to the control group ( $3.1\text{kg} \pm 0.4$ ) at endline. While baseline data on birthweight were not available, it is useful to note that the DHS data for Bonthe in 2013 reported a prevalence of low birth weight (6.1%) more in line with that seen in the control group at endline (7.7%) than the intervention group (2.7%,  $p = 0.06$ ).

Regarding IYCF practices, the proportion of infants 0–23 months old exclusively breastfed during the first week of life was higher in the intervention group (90.2% vs 79.4%,  $P = 0.01$ ). Among infants 6–23 months, the proportion achieving minimum dietary diversity (77.2% vs 51.8%,  $P < 0.001$ ) and minimum acceptable diet (53.8% vs 22.6%,  $P < 0.001$ ) was significantly higher in the intervention group than the comparison group.

Some gaps were noted, most notably with respect to attitudes towards and knowledge of providing thicker foods beginning at six to seven months of age and meal frequency as children age. Additionally, few differences were found in breastfeeding practices, though this is likely due to the high prevalence of optimal breastfeeding practices present in both control and intervention sites. An exception was that among infants 0–23 months old, as a significantly greater proportion of intervention infants were exclusively breastfed during the first week of life.

## RECOMMENDATIONS

Based on the findings of high overall acceptability and effectiveness, the grandmother-inclusive approach should be scaled to other World Vision nutrition programs in Sierra Leone. While additional research is needed to document and attribute impacts on longer-term child well-being indicators, such as stunting, the significant and substantial changes seen in maternal nutrition practices, birth weight and IYCF practices illustrate the potential of this approach. Below are additional specific recommendations for scale-up and sustainability considerations.

- The grandmother-inclusive approach empowered grandmothers (self-efficacy) and improved their knowledge of optimal nutrition practices. These changes permit a more enabling household environment for women to put recommendations into practice. As such, grandmothers in World Vision target communities should be intentionally and appropriately included in nutrition programming.
- Communities perceived that the grandmother-inclusive approach improved relationships between grandmothers and community members, especially daughters / daughters-in-law. Improved communication likely facilitated more effective transfer of grandmothers' knowledge to daughters and support for optimal nutrition practices. Future nutrition and child well-being programs must consider familial and community relationships and how strengthening these through intergenerational dialogue and community praise forums may improve program effectiveness.
- The grandmother-inclusive approach improved maternal nutrition practices including increased food intakes during pregnancy, greater women's dietary diversity and increased consumption of iron and folic acid (IFA) supplements. These changes likely explain the significant differences in birth weights observed between the intervention and control communities. Given stunted growth of children begins in utero, nutrition programs in Sierra Leone must include maternal nutrition as a key priority if accelerated progress on child stunting is to be achieved. In this context, a grandmother-inclusive approach may be the most effective strategy to improve maternal nutrition and prevent growth faltering in utero.
- The grandmother-inclusive approach was highly acceptable in communities in part due to the participatory manner in which it engaged community members. Scale up of the grandmother inclusive approach will require field-based personnel with skills and experience in participatory rural development, community engagement and dialogue-focused approaches to community engagement.
- Community acceptability, while high, may have benefited from more active engagement with fathers and elder men in the community. Qualitative research with mothers, grandmothers and fathers indicated a desire for greater father engagement in areas that would be most relevant to fathers, for example preparation for safe labour and delivery, food prioritization of maternal and child health, and how and why to encourage women to consume IFA and take diverse diets. Alive and Thrive programs have developed successful father-engagement strategies that may be examined for relevance to the Sierra Leone context and adapted.
- Mamanieva was a pilot-scale operations research, which identified the significant promise of a grandmother-inclusive approach for nutrition social and behaviour change. More rigorous testing of the approach with larger samples, preferably using a cluster-randomized controlled design, and over a longer period of time, is needed to more robustly evaluate the approach's impact on child growth and development outcomes and the pathways through which these changes occur.

- A grandmother-inclusive approach is not exclusive to nutrition. Research in other contexts have highlighted the potential effectiveness of the approach to address other child well-being domains, including for example early child marriage and genital cutting. In Sierra Leone, program officers should evaluate their programs to identify ways in which they might benefit from a more grandmother-inclusive approach.
- To support sustainability and the transfer of the approach to the government, future iterations of the grandmother-inclusive approach by World Vision Sierra Leone should actively engage the Ministry of Health to identify potential community-based facilitators to work alongside World Vision staff for capacity strengthening and partnership.

## 2. INTRODUCTION AND OBJECTIVES

Adequate nutrition during pregnancy and the first two years of life—a period often referred to as the first 1000 days—is critical to ensure survival, optimal growth and development of children (Bhutta et al., 2013). The long-term social and economic advantages of adequate nutrition during this period for both individuals and countries is well established. Indeed, interventions to improve the nutrition of young children are one of the top investment priorities a country can make given nutrition’s associations with

Table 1: Prevalence of malnutrition among children under 5 years old and women of reproductive age in Sierra Leone according to national survey data in surveys conducted prior to implementation of Mamanieva.

Malnutrition indicator	Survey and Year <sup>†</sup>			
	MICS 2005	DHS 2008	MICS 2010	DHS 2013
Children 6-59 months				
Stunting, %	40%	36%	44%	38%
Wasting, %	9.8%	10.2%	8%	10%
Underweight, %	30%	36%	22%	21%
Anemia, %	NA	77%	NA	80%
Women of Reproductive age				
Anemia, %	NA	45%	NA	45%
Infant < 2500 g at birth	26%	11%		7.1%
Perceived infant to be very small / smaller than average at birth	NA	5% / 13%	NA	7% / 12%

improved child survival, reduced morbidity, enhanced child schooling and later adult productivity (Adair et al., 2013; Hodinott et al., 2013).

In Sierra Leone, child malnutrition persists at high levels with long term impacts on the nation’s social and economic development. National surveys since

2005 highlight the limited progress on underweight, stunting, and wasting in Sierra Leone (Table 1). Anaemia rates have similarly remained stubbornly high for both women and young children<sup>1</sup>. Data on maternal diet practices during pregnancy are not currently captured in national surveys; however, birthweight and perceived size at birth are commonly used proxies for maternal nutrition. In the 2013 SLDHS, 7% of infants were born low birth weight (< 2500g); while this appears to be an improvement since 2005 it is important to note that the proportion of birthweights measured and recorded was only 35% in 2005 and increased to 62% in 2013. A more reliable indicators to assess trends is perception of infant size. As can be seen in table 1, limited change has occurred for this indicator over time. In 2008, 13% of women perceived their infants to be smaller than average at birth and 5% said their infants were very small compared to 12% and 7%, respectively in 2013.

The WHO recommends that infants initiate breastfeeding within the first hour of birth and breastfeed exclusively thereafter until six months. At six months of age, families are recommended to introduce safe (hygienic) and nutritious complementary

Table 2: WHO designated food groups used to assess dietary diversity of children < 24 months

- Cereals, white tubers and roots, cooking banana / plantain
- Vitamin A rich fruits and vegetables, including dark green leafy vegetables and orange / yellow fruits and vegetables and red palm oil
- Other fruits and vegetables
- Legumes (beans / peas), nuts and seeds
- Eggs
- Dairy products
- Meat, fish, poultry, insects and any organ meats

<sup>1</sup>Recent research attributes the high prevalence of anemia to the elevated burdens of infectious disease related to poor sanitation and malaria rather than iron deficiency (Spring 2015)

foods in addition to breastfeeding. Infants need a minimum of two to three meals of semi-solid foods a day beginning at six months and a variety of foods—from at least four of seven food groups (Table 2). As infants age, the recommended number of meals increases from two to three meals per day to three per day for 9 to 12 month olds and increases again to four meals per day for infants 12 to 24 months. Infants nine months and older should also be offered snacks between meals. Maternal undernutrition culminating in low birth weight and suboptimal IYCF practices contribute to the persistence of child malnutrition globally (Marriott et al., 2012). Suboptimal maternal nutrition and poor IYCF practices likely explain much of the persistence of child malnutrition in Sierra Leone. With the exception of early and exclusive breastfeeding (EBF), the country has made limited improvement in maternal nutrition and IYCF practices since 2005 (Table 3).

Infant Feeding Indicator, %	Survey and Year			
	MICS 2005	DHS 2008	MICS 2010	DHS 2013
Initiated breastfeeding within first hour of birth	33%	51%	45%	53%
Infants 0–59 month olds who were exclusively breastfed in the previous 24 hours	7.9%	12%	32%	32%
Infants 6–23.9 months who were fed with adequate diet diversity in the previous 24 hours <sup>†</sup>	NA	50%	NA	14.5%
Infants 6–23.9 months who were fed the recommended number of meals in the previous 24 hours <sup>†</sup>	37.2%	36%	20%	39%
Infants 6–23.9 months who received an acceptable diet in the previous 24 hours <sup>†</sup>	NA	23%	NA	7%

<sup>†</sup> The sample for MICS2005 indicators included data only for infants 6–11 months of age. In the 2008, the DHS indicator for adequate diet diversity was 3+ food groups as opposed to 4+ food groups.

Government and nongovernmental organizations in Sierra Leone are increasingly supporting evidence-based initiatives to improve IYCF practices including community-wide sensitizations, counselling of pregnant and breastfeeding mothers, 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 rural communities across the globe, grandmothers and elder women play a vital role in maternal and child nutrition with the support they provide during pregnancy, labour, delivery and the postpartum period (Aubel, 2012). These elder women (hereafter referred to as “grandmothers”) include grandmothers, mothers-in-law, aunts, birth attendants, female religious elders and traditional healers and provide various forms of support from sharing knowledge to caring directly for the mother and child. Thus, grandmothers serve as a significant influence on maternal and child health and nutrition (MCHN) practices. Despite this influence, grandmothers and other elder women are often ignored as a positive resource for advancing the goals of MCHN programs. This lack of engagement of grandmothers is unfortunate as community-based research using participatory and grandmother-inclusive approaches in Senegal (Aubel) and Malawi (Bezzner-Kerr) have observed significant improvements in knowledge, attitudes and practices of mothers and grandmothers with regards to IYCF (Aubel, 2004; Malawi refs) and reductions in child stunting (Bezzner-Kerr). In response to this cultural asset, the Grandmother Project has recently formalized the grandmother-inclusive approach. This approach is grounded in formative ethnographic research and builds on the culturally-designated role of grandmothers as advisors and caregivers. It utilizes participatory dialogue and positive community psychology theory to strengthen grandmothers’ knowledge and self-efficacy and promote positive change for maternal and child health (Aubel and Ryncnarik, 2015).

In 2012, World Vision, the Grandmother Project, and Emory and Njala Universities conducted mixed methods formative research in Torma and Fikie sections of Bum, Sierra Leone and noted inadequate knowledge and poor attitudes to optimal maternal nutrition. Of the 343 pregnant and breastfeeding women included in the knowledge and attitudes survey, only 57% believed that women should eat more during pregnancy while 62% believed women needed to take extra rest while pregnant. Conversely, knowledge about early initiation and exclusive breastfeeding were high with more than 85% of women; indicating that initiation of breastfeeding should begin within one hour of delivery, that mothers should not give anything to the child before initiation, and that mothers should feed colostrum. Additionally, 85% reported that mothers should give only breastmilk to the infant in the first week of life. However, beliefs about exclusive breastfeeding to six months were not as supportive with 45% of respondents believing that waters, teas, animal milks are needed before six months and 25% believing porridge is needed before six months. The need for water was especially pervasive as both mothers and grandmothers alike did not believe breast milk contained water. Another prominent belief that undermined EBF, especially among grandmothers, was that infants needed to take rice water in the first few months of life to prepare the child for rice later and to prepare the stomach, in general, for paps. With regards to complementary feeding, most mothers (>65–70%) knew how many meals a day that infants should receive according to their age but were less certain about when protein-rich foods such as eggs, meat, fish and legumes should be introduced. Meat specifically, mothers and grandmothers believed, should not be introduced before 24 months for fears of intestinal worms and other stomach disturbances.

In addition to exploring knowledge and beliefs about maternal nutrition and IYCF practices, the formative work identified grandmothers as key cultural influencers of maternal and child nutrition. Grandmothers provided 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. Grandmothers were also a key source of advice and information for mothers about their own and their children's nutrition with more than 80% of mothers indicated they spoke at least monthly with their mother/ mother-in-law monthly about maternal or child nutrition and 53% reporting they spoke daily. Thus, during the first 1000 days of life, grandmothers have the potential to exert significant influence on maternal nutrition and IYCF practices and could serve as a critical asset for positive social and behavior change for maternal and child nutrition.

From 2012 to 2015, World Vision and its partners the Grandmother Project and Emory University developed, implemented and evaluated the Mamanieva proof of concept project in Torma and Fikie sections, Bum ADP, Sierra Leone. Informed by the formative research, the team designed the Mamanieva project as a nutrition social and behaviour change project that specifically capitalized on the role of grandmothers as advisors and caregivers for children and mothers in southern Sierra Leone. The project was based on the prior work and experiences of the Grandmother Project in Senegal (Aubel, et al., 2004), which found that grandmothers, when empowered with appropriate knowledge related to maternal and child nutrition, can positively influence knowledge, attitudes, and practices related to MCHN. The goal of the Mamanieva proof-of-concept study was to assess whether a grandmother-inclusive approach to nutrition social and behavior change could positively impact the knowledge and practices of pregnant women and women with children under 2 years of age.

## **PROJECT OBJECTIVES**

The overall aims of the Mamanieva operations research project were to:

- 1) Identify the knowledge, attitudes and practices of mothers and grandmothers with respect to recommended practices for maternal nutrition and IYCF and understand the roles of

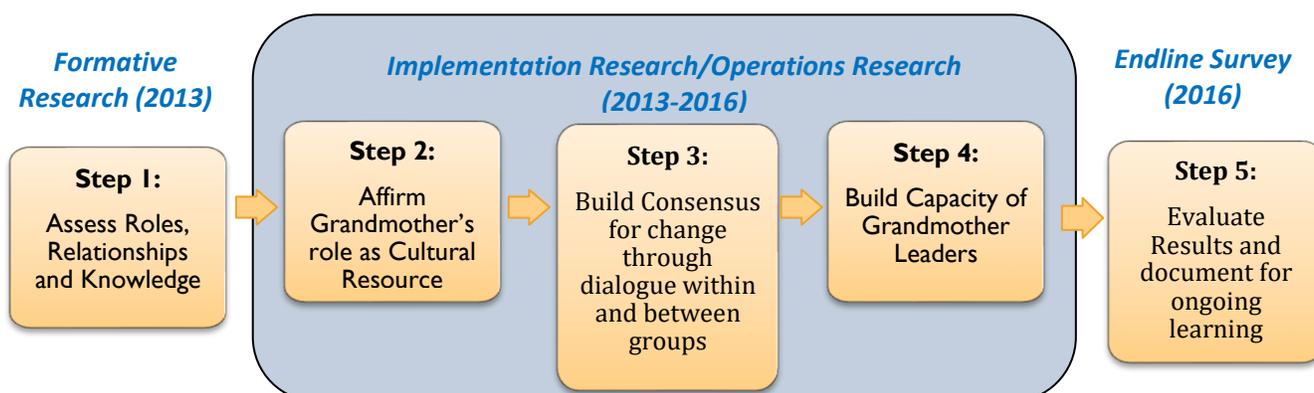
grandmothers as they relate to maternal, infant and young child feeding in southern Sierra Leone (see Formative Research Report, 2013)

- 2) Develop culturally appropriate, participatory activities that engage grandmothers' existing knowledge and expertise and promote dialogue on optimal maternal nutrition and child feeding practices, based on the qualitative findings (see Mamanieva Curriculum, 2014)
- 3) Document feasibility, acceptability and capacity requirements of the grandmother-inclusive approach to inform future programming through a modified process evaluation (see also Process Evaluation Report, 2015)
- 4) Assess effects of the project on maternal diet practices and health seeking during pregnancy, birthweight and IYCF knowledge and practices.

### 3. METHODOLOGY

#### PROJECT STUDY SITE

The Mamanieva Project was implemented in 15 villages in Torma section of World Vision's operational area (Area Development Program) in Bum Chiefdom, Bonthe District in the southern province of Sierra Leone. The eight villages in Fikie section of Bum Chiefdom served as the comparison communities. The Mende tribe predominates in Bum Chiefdom and their main economic activities are agriculture, fishing, and petty trading. The land is comprised of two main habitats, the mainland and the riverine areas, with most the population living on the mainland.



**Figure 3.1: Phases of the Grandmother Inclusive Approach for the Mamanieva Operations Research Project, Bum ADP**

The endline evaluation included exhaustive census-based survey sampling of households in both the intervention and control sections, as well as focus group discussions with both men and grandmother leaders in three intervention communities. The evaluation data provide information on the project outcomes and, where baseline data are available, also allow for assessment of differential change over time in project intervention and control communities.

#### INTERVENTION DESCRIPTION

The Mamanieva Project was a three-year proof-of-concept study implemented by World Vision in Bum Chiefdom, Bonthe District, Sierra Leone from April 2013 to September 2016. A quasi-experimental study design was used to evaluate intervention impacts. Torma section and its 15 villages was allocated to receive the grandmother-inclusive strategy (intervention) while Fikie section and its eight villages was

allocated to the comparison group (control). The intervention utilized the grandmother-engaged approach developed by Dr. Judi Aubel of the Grandmother Project: Change Through Culture. The approach was grounded in formative ethnographic research and built on grandmothers' culturally traditional roles as caregivers and advisors. Following the formative research conducted in April 2013, World Vision, the Grandmother Project and Emory University collaboratively developed program activities and accompanying culturally appropriate curriculum. Key activities included 1) monthly participatory dialogue sessions with grandmothers that promoted key nutrition messages, 2) quarterly intergenerational community praise sessions that highlighted the positive roles of grandmothers in the community and specifically in regards to maternal and child health and 3) intergenerational forums in which grandmothers and young mothers came together for dialogue on maternal and child nutrition and health issues. The approach used adult education theory and methods (Mamanieva Curriulum, 2014) and engaged and empowered grandmothers through dialogue thus affirming GMs as change agents for maternal and child health. The field team tasked with implanting program activities included 2 to 3 World Vision staff with experience and training in participatory community engagement, rural development and/or adult education. Additionally, communities developed criteria and selected elder women meeting those community-defined criteria as grandmother leaders (GMLs). GMLs served as intermediaries between the World Vision project staff and the other grandmothers and mothers in the communities. Figure 1 depicts a simplified version of the project's theoretical framework (theory of change) whereby activities (in blue) contribute to specific intermediate behavioral antecedents (in green) and ultimately the project outcomes of interest (in orange). Villages in Fikie section, the control arm, received the standard of care for nutrition education delivered by the Ministry of Health through antenatal and postnatal care visits and capacity strengthening of community health workers. In both sections, the World Vision also implemented the standard nutrition programming of timed and targeted counseling and cascade training of community health workers.

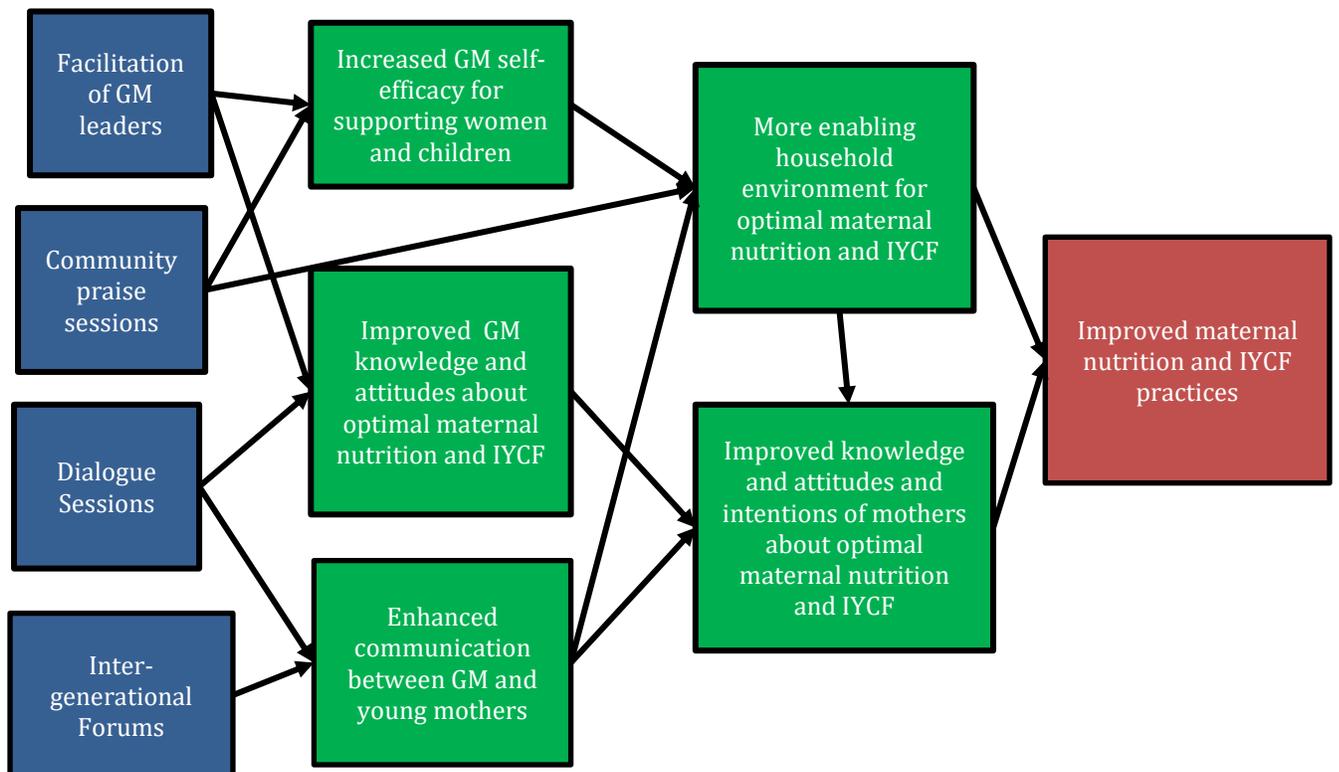


Figure 1: Simplified Mamanieva theory of change diagram

## EVALUATION STRATEGY

Project evaluation utilized quantitative and qualitative data collection methods. Quantitative data were collected through repeat cross-sectional surveys at baseline (January-March 2013) and endline (May-June 2016;) in intervention (Torma) and control (Fikie) sections. In both baseline and endline, exhaustive census sampling was conducted for all households with pregnant women or children less than 24 months. Elder women residing in eligible households were also included. It should be noted that the baseline survey assessed only knowledge, attitudes and beliefs. Maternal nutrition-related, health seeking and IYCF practices were not captured. Rather data from the DHS survey conducted in 2012–2013 are used to approximate baseline practices. In addition to rapid ethnographic research conducted after the baseline survey to inform program development, a qualitative process evaluation was conducted in June–July 2015 to identify program fidelity as well as identify potential gaps and areas in need of strengthening. Qualitative research was again conducted at endline to identify potential strategies and opportunities for scale up and sustainability. In the next section we provide a detailed description of the endline survey. Detailed information the methods and findings of the baseline / formative research and the midline operations research can be found in previous project publications (formative research report and operations research report, respectively) from World Vision.

### Quantitative Endline Survey

#### *Sampling and Participant Eligibility*

The target populations for the endline survey were pregnant women (PW), women with children <24 months old (MU2), and grandmothers (GMs) residing with eligible participants in Torma and Fikie sections. Respondents had to meet one of the criteria outlined below for inclusion. Screening questions for eligibility were asked at the beginning of the survey, prior to informed consent, to ensure the respondent was eligible for the survey.

- 1) pregnant woman over 17 years of age,
- 2) mother over 17 years of age with at least one child under 2 years of age,
- 3) grandmother (or elder female relative) over 45 years of age living in households with eligible women,
- 4) grandmother leader (only in the intervention section)

In Torma, the intervention section, grandmother leaders were surveyed even if they lived alone and did not live with any eligible women. In the event where there was more than one eligible elder woman in the household, the senior woman most involved in the case of women and children was selected. If there was more than one child under 2 years of age in the household, the enumerator selected the index child by coin flip.

Available sample sizes for PW and MU2 were approximated based on 2015 population estimates for the two villages and assumptions that 3% of the population in Bum Chiefdom are PW and 9% are MU2 (Table 3.1). After accounting for 10% refusal or ineligible rates, the total eligible population expected was 143 PW and 428 MU2.

**Table 3.1: Sample sizes available for cross-sectional endline surveys, pregnant women and women with young children (<24 months) based on 2015 population estimates for the two sections.**

Section	Total population (2015 estimates)	Pregnant women		Women with children <24 months	
		Assuming 3% of population is pregnant women	Population available assuming 10% refusal /ineligible rate	Assuming 9% of population is children 0-24 mos	Population available assuming 10% refusal / ineligible rate
<b>Torma (Intervention)</b>	2527	76	69	227	205
<b>Fikie (Control)</b>	2747	82	74	247	223
<b>Final Sample</b>			<b>143</b>		<b>428</b>

Due to the limited number of potentially eligible respondents in each section, exhaustive sampling measures were employed for the endline survey. Respondent screenings and household listing in each village were done one to two weeks prior to the administration of the survey to identify eligible respondents. Of those identified as eligible during screening (119 PW; 319 WU2; 260 GM), approximately 10–15% of women and 25% of grandmothers were unable to be tracked at the time of the survey in spite of multiple (maximum two) attempts to return to the household for survey administration. Final sample sizes for the survey are found in Table 3.2. Final sample sizes were less than anticipated based on the expected numbers estimated from the 2015 census data.

**Table 3.2: Actual sample size by eligible respondent type for cross-sectional endline surveys, pregnant women and women with young children (<24 months) for the two sections.**

	<b>PW</b>	<b>MU2</b>	<b>GM</b>
<b>Torma (intervention)</b>	54	184	157
<b>Fikie (control)</b>	47	107	62
<b>Total</b>	101	291	219

## ENDLINE SURVEY DATA COLLECTION

The endline survey was implemented from May 16 – May 22 following pilot testing and revision. The survey was carried out in the months of May and June, at the beginning of rainy season.

Fourteen enumerators and one translator competent in the local Mende language were hired by World Vision Sierra Leone to administer the endline survey. All enumerators underwent a 5-day didactic and field-based training that included research ethics, survey tools, translation and data entry in tablets using Open Data Kit (ODK). Field based sessions allowed for pilot testing and revision of instruments ahead of the survey implementation. During the survey, questions were translated in real time by trained enumerators from English to Mende as Mende is not a written language. Enumerators employed the use of mobile data collection using the platform ODK and used tablets to collect survey data. The team uploaded survey data to the ODK server at the end of each day. The survey took 1 to 1.5 hours to complete per respondent and were completed in the respondent’s home.

## DATA COLLECTION TOOLS

The endline survey tool (see Appendix 2) was designed by Emory University in collaboration with World Vision. The survey queried respondents (pregnant women, mothers with young children and grandmothers) on knowledge, attitudes, and practices related to maternal and child nutrition. Survey questions are described in more detail below:

Household sociodemographic and respondent characteristics were collected related to education of respondent and household head, respondent's age, occupation and marital status. Household food deprivation was assessed using the household hunger scale (Ballard, et al., 2011). Indicators of maternal diet and nutrition practices assessed included 1) number of meals consumption during pregnancy; 2) workload and 3) receipt and consumption of iron and folic acid tablets during pregnancy. Women's meal frequency and diet diversity were assessed using 24-hour open recall methods described by the FAO (2016). Indicators of infant and young child feeding practices were collected using methods described by the UNICEF/WHO (2010). In addition to the WHO described indicators for EBF collected using 24-hour recall, we also assessed maintenance of early EBF (i.e. in the first week of life) and duration of EBF using a since birth recall for the introduction of non-breastmilk liquids or foods. Among pregnant women, a series of 11 questions were asked to gauge intentions to practice recommended breastfeeding and complementary feeding practices.

Knowledge, beliefs and attitudes of pregnant women, mothers with young children and grandmothers about diet and nutrition in pregnancy and recommended IYCF practices were assessed through a series of 20 knowledge questions and 11 scenarios. Additionally, the endline survey queried the sources of maternal and child health and nutrition information and the kinds of advice given to women of reproductive age (WRA) by grandmothers and other community members on maternal nutrition and infant feeding. A 20-item generalized self-efficacy scale (Adapted from REF) was administered to grandmother respondents in all communities. Current pregnancy and/or obstetric history data including ANC uptake, delivery location, complications during delivery and birthweight were collected from child health cards or maternal recall if health card was not available.

Lastly the endline survey collected information from all respondents in intervention communities on participation in program activities and perceived impacts of the program on households and communities.

#### *Birth weight data collection*

Birth weight data from the maternity ward in intervention and comparison groups were collected from facility records to compare the birth weights in each section over the course of the project period. The historical review covered the period including one year prior to project implementation through to the date of the endline survey. Unfortunately, Emory consultants found large gaps in data, especially in the intervention health facility, including missing birthweights, no records for 9 months, and inability to trace the village of the mother. Therefore, the birth weight data collected from the historical records of the facilities was instead used as a quality control check to validate the birth weights obtained during the endline survey.

#### *Qualitative Focus Group Discussion*

Focus group discussions (FGDs) were conducted to gather qualitative data on strategies for including men in future programming. Three intervention villages were purposively selected by project staff for heterogeneity in size. Two FGDs were conducted in each of the 3 villages: one FGD with 10 men and one with 10 women. Each FGD lasted about an hour. Participants were recruited by grandmother leaders in each intervention community and were provided transport remuneration and a snack. A local facilitator moderated the FGD in Mende using the discussion guide made by the research team. The discussion was audio-recorded and two research members took notes of the interactions between participants as well as responses that were translated to them by the project team member. Key themes repeated throughout the FGDs were pulled out for generation of recommendations to the World Vision for future programming.

## **INSTITUTIONAL REVIEW BOARD AND INFORMED CONSENT**

All study procedures and tools were approved by the local review boards in Sierra Leone and at Emory University. All participants provided written and verbal consent prior to beginning the survey or participating in FGDs. Participants were informed of the nature and purpose of the research, the expectation of the participants, and the potential risks/benefits of the study. Participants were also informed that their participation was completely voluntary and that they could withdraw at any time or refuse to answer questions without penalty. Copies of the consent document and research team contact information were provided to participants.

## **ANALYSIS**

Survey data were downloaded from the ODK server and statistical analyses were performed using Excel and SASv9.1. Indicators for adequacy of complementary feeding practices, including minimum meal frequency, minimum acceptable diet and minimum diet diversity were estimated per WHO recommendations (REF). Questions relating to pregnancy and IYCF knowledge were aggregated to create maternal and child nutrition (MCN) knowledge score; grandmother self-efficacy questions were aggregated to create a grandmother self-efficacy score. Women's dietary diversity score and adequacy of women's diet diversity were calculated using the method described by the FAO (ref). Normally distributed continuous variables were analyzed using T-tests and F-tests; non-normally distributed continuous variables were analyzed using Wilcoxon Rank Sum test. Categorical variables were analyzed with chi-square test. Differences between the intervention and control sections were considered significant at  $p < 0.05$ . Multivariable regressions models, adjusted for differences observed between intervention and control communities at endline, were developed for 2 high priority outcomes of interest that were significant in preliminary analyses, including maternal and child dietary diversity, infant minimum acceptable diet and birthweight. Logistic regression models were run for categorical outcomes and multiple linear regression models were run for continuous outcomes. Regression models were run using SASv.9.4.

## **LIMITATIONS**

The analyses presented in this report should be interpreted in light of study limitations. Firstly, the baseline and endline surveys used census-based sampling in the intervention and control communities. While this approach ensures representativeness to the study population, the sample sizes at endline were less than anticipated based on the sampling frame developed using the existing census data. This occurred for two reasons, firstly upon recruitment the team found fewer eligible respondents during the household listing exercise than expected based on the available census data and secondly 10–20% of the eligible sample (depending on the respondent type) identified during listing were not traceable two weeks later when the survey was implemented. Most households that were not traceable had travelled outside of the study area. Thus, we cannot rule out that some null findings would have obtained significance given larger samples and more power.

The second limitation of the research is the lack of baseline data on key practice indicators. The baseline survey only assessed knowledge and attitudes an extensive formative ethnographic research. Given the DHS survey, ongoing at the time of the formative research, captured detailed IYCF practice data but not important behavioural antecedents such as knowledge or attitudes we opted to limit our data collection to these antecedents for efficiency and cost-savings. We acknowledge the absence of these data limits the capacity for difference in difference analysis, assessment of change over time and ultimately attribution. However, we are able to approximate baseline values for these indicators in project communities using data available from the DHS 2013 in Bonthe.

With the exception of a core set of practice outcomes presented in this report, namely birthweight, maternal diet and nutrition practices, and IYCF practices, the results are unadjusted for potentially influential covariates such as household education and food insecurity status. Moving forward antecedent indicators including those related to knowledge and self-efficacy should be assessed using adjusted analyses.

A third limitation relates to the potential for reporting biases common in studies using self-report and recall data. For example, data on age and education of grandmothers likely suffered from recall bias as these were difficult for grandmothers to indicate with certainty. Social desirability bias is a second bias of self-report data that is a potential problem if women in the intervention communities are aware of and know the correct answers and state they are performing these optimal practices instead of claiming their true practices because they want the organization to approve of what they have been doing. Because it was not possible to blind participants or enumerators to intervention assignment, we cannot exclude the possibility that differences are the result of social desirability bias whereby the respondents may answer a certain way to appeal to the researchers (i.e. to “say the right/ expected thing”).

Errors in coding and data entry are also errors to consider in all research undertakings; however, these are issues that can be remedied with effective quality control monitoring and data cleaning. For example, dietary diversity was calculated from open recalls of foods consumed in the 24 hours prior to the survey. Essentially respondents recalled all foods / drinks consumed and enumerators wrote these on diet recall forms (hard copies). Enumerators used these recall forms to complete the food groups section in the diet recall section on the tablet. The FAO recommends this approach in areas where diet diversity is limited because it is less burdensome on respondents and reduces response bias. However, initial data quality checks comparing 10% of the diet recall forms against entered data, found that enumerators mis-categorized or marked incorrectly at least one food group question per form checked. As a result, the entire dataset was extensively cleaned using the hard copy recall forms.

## 4. FINDINGS

In this section we present the findings from the evaluation of the Mamanieva Project on a subset of key indicators, compare, where possible, endline with baseline data and triangulate findings with qualitative research conducted at midline and endline.

We present first the descriptive characteristics of the respondents. Because the theory of change (See Chapter 3: Methods, Figure 1) underlying the Mamanieva project focuses on strengthening, through engagement in project activities, the knowledge and self-efficacy of grandmothers to serve as change agents for maternal and child health and nutrition, we will first characterize project participation followed by effects of the program on grandmothers knowledge, attitudes, practices and self-efficacy. Following forthwith, we move through the stages of behavioral change for mothers: from knowledge, attitudes and intentions through to practices. In that vein, we present first those outcomes related to mothers’ nutrition and health knowledge about maternal and child nutrition including diet and workload in pregnancy, IYCF and health seeking followed by attitudes and intentions and then practices. We include, where available, comparison of change from baseline to endline between control and intervention noting significant differences between groups for knowledge and beliefs indicators. Practices are presented following the chronology of the 1000 days with nutrition and health practices in pregnancy presented first followed by impacts on birth weight and finally impacts on IYCF practices. For those outcome indicators of greatest interest to the team and most closely linked with child stunting we conduct adjusted regression analyses to control for the effects of potentially influential covariates including for example, maternal age, education, parity and household hunger. We close by

presenting mothers' and grandmothers' perspectives of the most significant impacts of the intervention on the community.

## I. DESCRIPTIVE STATISTICS OF RESPONDENTS AND PROGRAM PARTICIPATION

A total of 375 pregnant women and women with children less than 2 years participated in the endline survey. Of these 225 were from the intervention section of (Torma) and 150 from the comparison section (Fikie) (Table 4.1). A total of 101 women were pregnant at the time of the survey (N=54 (24%) in intervention communities; 47 (44%) in control,  $p < 0.01$ ). At the time of the endline survey, women were on average 26 years and more than 70% had more than 2 children. Three-quarters were married monogamous. Sixty per cent of women had no formal schooling with a significantly greater proportion of respondents in control communities never attending school (70% vs. 57%,  $p = 0.04$ ; Table 1); a similar finding was observed for schooling of the household head ( $p = 0.03$ ). The primary occupation of both women and household heads was agriculture (>80%) though a significantly greater proportion of household heads in control communities were engaged in agriculture compared to intervention (91.3% vs. 83.3%,  $p = 0.03$ ). Of concern, a significantly greater proportion of respondents in control communities reported household hunger compared to those in intervention communities.

Table 4.1. Descriptive statistics for women with children <24 months of age (MU2) and pregnant women (PW) included in the Mamanieva endline survey, Bum ADP; data presented as mean $\pm$ SD or n (%). P values estimated using chi square or tests of the mean.

	Overall (n=375)	Intervention (n=225)	Control (n=150)	P value
Average maternal age in years <sup>1</sup>	25.8 $\pm$ 6.0	25.6 $\pm$ 6.0	26.1 $\pm$ 6.1	0.58
Pregnant at time of endline survey	101 (26.9%)	54 (24.0%)	48 (31.3%)	0.12
Number of children respondent has given birth to				0.07
0	20 (5.3)	8 (3.6)	12 (8.0)	
1	66 (17.6)	47 (20.9)	19 (12.7)	
2-3	125 (33.3)	75 (33.3)	50 (33.3)	
>3	164 (43.7)	95 (42.2)	69 (46.0)	
Sex of Index Child (n=291) <sup>2</sup> , % male	139 (47.8)	85 (46.2)	54 (50.5)	0.48
Age of Index Child, months <sup>3</sup>	11.8 $\pm$ 6.9	11.9 $\pm$ 6.9*	11.6 $\pm$ 7.0	0.70
Child age category				
0-5.9 months	72 (24.7)	48 (26.1)	24 (22.4)	0.69
6-8.9 months	42 (14.4)	24 (13.0)	18 (16.8)	
9-11.9 months	36 (12.4)	22 (12.0)	14 (13.1)	
12-17.9 months	69 (23.7)	41 (22.3)	28 (26.2)	
18-23.9 months	72 (24.7)	49 (26.6)	23 (21.5)	
Schooling (n=374)				<b>0.004</b>
Never attended	223 (59.6)	118 (52.7)	105 (70.0)	
Some primary but did not complete	49 (13.1)	34 (15.2)	15 (10.0)	
Completed primary or more	102 (27.3)	72 (32.1)	30 (20.0)	
Employment				0.30
Does not work outside of home	25 (6.7)	16 (7.1)	9 (6.0)	
Agriculture	317 (84.5)	186 (82.7)	131 (87.3)	
Informal business/trader	20 (5.3)	12 (5.3)	8 (5.3)	
Other	13 (3.5)	11 (4.9)	2 (1.3)	
Marital Status				0.52
Married/Partnered, monogamous	280 (74.7)	171 (76.0)	109 (72.7)	
Married/Partnered, polygamous	67 (17.9)	40 (17.9)	27 (18.0)	
Widowed, Divorced, Separated, or Single	28 (7.5)	14 (6.2)	14 (9.3)	
Lives with own or husband's parents	255 (68.0)	149 (66.2)	106 (70.7)	0.36
Head of household				0.26

Table 4.1. Descriptive statistics for women with children <24 months of age (MU2) and pregnant women (PW) included in the Mamanieva endline survey, Bum ADP; data presented as mean±SD or n (%). P values estimated using chi square or tests of the mean.

	Overall (n=375)	Intervention (n=225)	Control (n=150)	P value
Husband	169 (45.1)	96 (42.7)	73 (48.7)	
Respondent	5 (1.3)	4 (1.8)	1 (0.7)	
Mother-in-law	34 (9.1)	25 (11.1)	9 (6.0)	
Father-in-law	40 (10.7)	23 (10.2)	17 (11.3)	
Respondent's father	54 (14.4)	32 (14.2)	22 (14.7)	
Respondent's mother	25 (6.7)	19 (8.4)	6 (4.0)	
Other	48 (12.8)	26 (11.6)	22 (14.7)	
Head of Household Schooling (n=362) <sup>4</sup>				<b>0.00</b>
Never attended	282 (77.9)	152 (71.0)	130 (87.8)	
Some primary but did not complete	14 (3.9)	8 (3.7)	6 (4.1)	
Completed primary or more	66 (18.2)	54 (25.2)	12 (8.1)	
Head of Household Occupation (n=370) <sup>5</sup>				<b>0.03</b>
Agriculture	320 (86.5)	184 (83.3)	136 (91.3)	
Other	50 (13.5)	37 (16.7)	13 (8.7)	
Household Hunger Category				<b>&lt;0.001</b>
Little to no hunger	283 (75.9)	209 (92.9)	74 (50.0)	
Moderate to severe hunger	90 (24.1)	16 (7.1)	74 (50.0)	

<sup>1</sup> 216 women could recall age: Intervention, n=132, Control, n=84  
<sup>2</sup> 291 children under 2-years included in survey: Intervention, n=184, Control, n=107  
<sup>3</sup> age unknown for n=3  
<sup>4</sup> 5 women respondents are heads of their household; 3 women did not know if head of household attended school  
<sup>5</sup> 5 women respondents are heads of their household

A total of 219 grandmothers participated in the endline survey (Table 4.2); of those grandmothers responding from intervention communities, 63 (40%) had been designated and capacitated as grandmother leaders by the project.

The mean age of grandmothers was 57 years though this is likely an underestimate as only 57 respondents could remember their age. Grandmother respondents had lived in the household for a mean of 31.8 years and had approximately 5 children and 7 grandchildren, though grandmothers in the control communities reported significantly higher mean number of grandchildren ( $9.1 \pm 7.7$  vs  $6.3 \pm 4.6$ ,  $p < 0.001$ ). The majority were engaged in agriculture though a significantly higher proportion of grandmothers in the intervention communities reported currently working in agriculture (91.1% vs 75.8%,  $p < 0.001$ ). Grandmothers in intervention communities had higher education and more likely to be married (either monogamous or polygamous) while a higher proportion of grandmothers in the control communities reported being widowed ( $p = 0.02$ ).

Table 4.2. Descriptive statistics for grandmothers included in the Mamanieva endline survey, Bum ADP; data presented as mean±SD or n (%). P values estimated using chi square or tests of the mean.

	Overall (n=219)	Intervention (n=157)	Control (n=62)	P value
<b>Grandmothers</b>				
Mean number of years in household (n=121) <sup>1</sup>	31.8 ± 20.3	29.7 ± 19.2	38.3 ± 22.6	0.05
Number of children (n=211) <sup>2</sup>	5.5 ± 2.4	5.5 ± 2.2	5.6 ± 2.7	0.71
Mean number of grandchildren (n=211) <sup>2</sup>	7.2 ± 5.8	6.3 ± 4.6	9.1 ± 7.7	<b>&lt;0.00</b>
Mean age in years (n=57) <sup>3</sup>	56.6 ± 10.5	55.8 ± 9.5	62.1 ± 14.7	0.11
Employment				<b>0.001</b>
Does not work	11 (5.0)	7 (4.5)	4 (6.5)	

Table 4.2. Descriptive statistics for grandmothers included in the Mamanieva endline survey, Bum ADP; data presented as mean±SD or n (%). P values estimated using chi square or tests of the mean.

	Overall (n=219)	Intervention (n=157)	Control (n=62)	P value
Agriculture	190 (86.8)	143 (91.1)	47 (75.8)	
Retired	8 (3.7)	1 (0.6)	7 (11.3)	
Other	10 (4.6)	6 (3.8)	4 (6.5)	
Schooling				<b>0.03</b>
Never Attended	186 (84.9)	127 (80.9)	59 (95.2)	
At least some Primary	6 (2.7)	5 (3.2)	1 (1.6)	
More than Primary	27 (12.3)	25 (15.9)	2 (3.2)	
Marital Status				<b>0.02</b>
Married monogamous	89 (40.6)	60 (38.2)	29 (46.8)	
Married polygamous	49 (22.4)	43 (27.4)	6 (9.7)	
Widowed	73 (33.3)	47 (29.9)	26 (41.9)	
Other: Single, Divorced, or Separated	8 (3.7)	7 (4.5)	1 (1.6)	

<sup>1</sup> 121 GMs knew number of years she lived in household (Intervention n=29)  
<sup>2</sup> 211 grandmothers have children and grandchildren (Intervention n=150, Control n=61)  
<sup>2</sup> 57 grandmothers knew age (Intervention n=49, Control n=8)

Awareness of and participation in Mamanieva program activities were high. Among pregnant, mother and grandmother respondents in the intervention group (n=382), 98% had heard of Mamanieva (Table 4.3), 93% had participated in at least one WV-facilitated dialogue session, 94% had participated in at least one grandmother-leader led session, and 91% had participated in a quarterly community praise session. One third of respondents reported participating in WV-led dialogue sessions several times a year and nearly half reported participating about once a month or more often. Most (88.2%) had participated in a WV-led dialogue session within the past two to three months. There were no differences in participation in WV-led sessions between pregnant women and mothers and grandmothers. Similar findings were observed for grandmother-leader led sessions.

Table 4.3. Participation of women and grandmothers from intervention communities in Mamanieva activities; data presented as n (%).

	Overall (n=382)	Women (n=225)	Grandmother (n=157)
Heard of Mamanieva Project	373 (97.6)	221 (98.2)	152 (96.8)
Participated at least once in WV-facilitated Mamanieva sessions (n=373)	348 (93.3)	205 (92.8)	143 (94.1)
Frequency of participation in WV-facilitated sessions (n=347)			
Only a few times	52 (15.0)	37 (18.1)	15 (10.5)
Several times a year but less than once a month	127 (36.6)	74 (36.3)	53 (37.1)
About once a month	26 (7.5)	18 (8.8)	8 (5.6)
More than once a month	142 (40.9)	75 (36.8)	67 (46.9)
Most recent WV-facilitated session attended (n=347)			
Within the past 2-3 months	306 (88.2)	181 (88.3)	125 (88.0)
More than 3 months ago but within the past 6 months	36 (10.4)	22 (10.7)	14 (9.9)
More than 6 months ago	5 (1.4)	2 (1.0)	3 (1.4)
Participated at least once in GML-led Mamanieva sessions (n=373)	350 (93.8)	205 (92.8)	145 (95.4)
Most recent session GML-led session attended (n=349)			
Within the past 2-3 months	307(88.0)	182 (88.8)	125 (86.8)

Table 4.3. Participation of women and grandmothers from intervention communities in Mamanieva activities; data presented as n (%).

	Overall (n=382)	Women (n=225)	Grandmother (n=157)
More than 3 months ago but within the past 6 months	35 (10.0)	19 (9.3)	16 (11.1)
More than 6 months ago but within the last year	7 (2.0)	4 (2.0)	3 (2.1)
Participated at least once in a community praise session (n=373)	341 (91.4)	198 (89.6)	143 (94.1)
Number of times attended a community praise sessions (n=367)			
Never	32 (8.7)	23 (10.6)	9 (6.0)
1-2 times	145 (43.3)	96 (49.2)	49 (35.0)
3-4 times	78 (23.3)	50 (25.6)	28 (20.0)
More than 4 times	112 (33.4)	49 (25.1)	63 (48.8)
Last praise session attended			
Within the past 2-3 months	288 (84.5)	168 (84.9)	120 (83.9)
More than 3 months ago but within the past 6 months	40 (11.7)	23 (11.6)	17 (11.9)
More than 6 months ago	13 (3.8)	7 (3.5)	6 (4.2)

## II. IMPACTS ON GRANDMOTHERS KNOWLEDGE, ATTITUDES AND SELF EFFICACY

At endline, grandmothers in intervention communities had significantly higher mean knowledge ( $p < 0.001$ ) and self-efficacy scores ( $p < 0.001$ ) compared to grandmothers in control communities (Table 4.4). Detailed responses to individual nutrition and self-efficacy score items can be found in Appendix 1,

Table 4.4. Nutrition knowledge and self-efficacy scores of GMs participating in the Mamanieva endline survey, Bum ADP; data presented as mean  $\pm$  SD. P values estimated using t tests for mean.

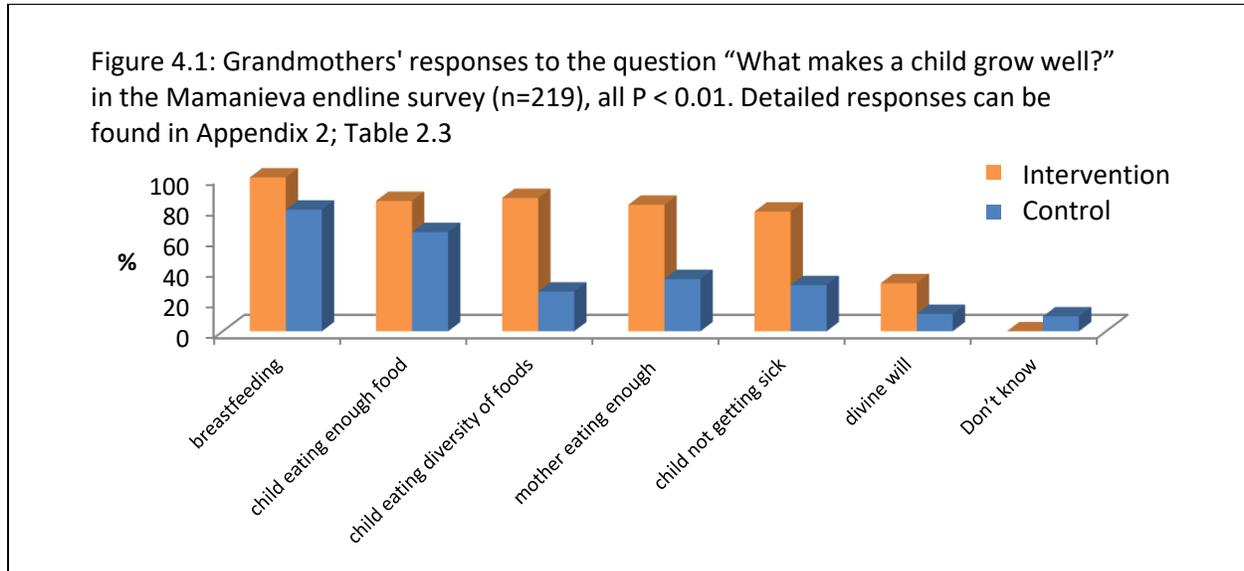
	Overall (n=219)	Intervention (n=157)	Control (n=62) <sup>3</sup>	P value
Nutrition knowledge score <sup>1</sup> , max=16 points	11.4 $\pm$ 2.4	12.0 $\pm$ 1.7	9.8 $\pm$ 3.1	<0.001
Self-efficacy scores <sup>2</sup> , max=20	18.2 $\pm$ 4.28	19.6 $\pm$ 1.9	14.8 $\pm$ 6.4	<0.001

<sup>1</sup> The total number of correct responses to nutrition knowledge questions were summed. <sup>2</sup> Self-efficacy scores calculated based on responses to self-efficacy questions where “Not at all true” and “Don’t know” were marked as 0 and “Somewhat true” and “Exactly true” were marked as 1 for each question. A more detailed breakdown of responses to self-efficacy questions is provided in Appendix 1. <sup>3</sup> For the self-efficacy scores, N=61 for control group

Tables 2.1 and 2.2, respectively. As an illustrative point, grandmothers in the intervention communities could more frequently name multiple factors that support child growth including for example breastfeeding and feeding the child enough food, child diet diversity and maternal nutrition (Figure 1) whilst most grandmothers in the control communities could name only one or two factors, the most common being breastfeeding and feeding child enough food. When examining individual responses to nutrition

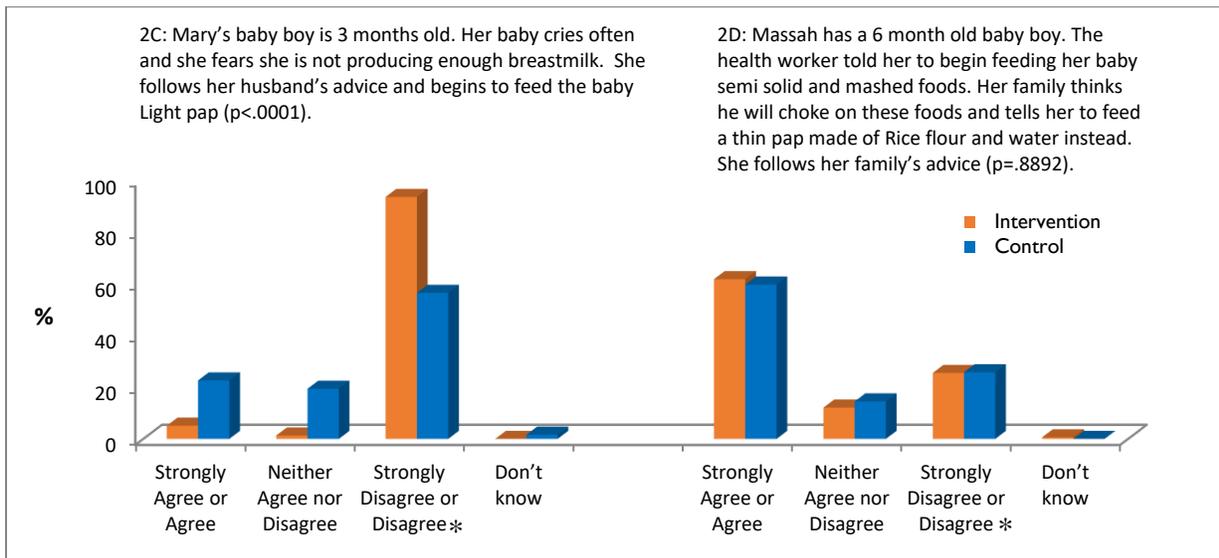
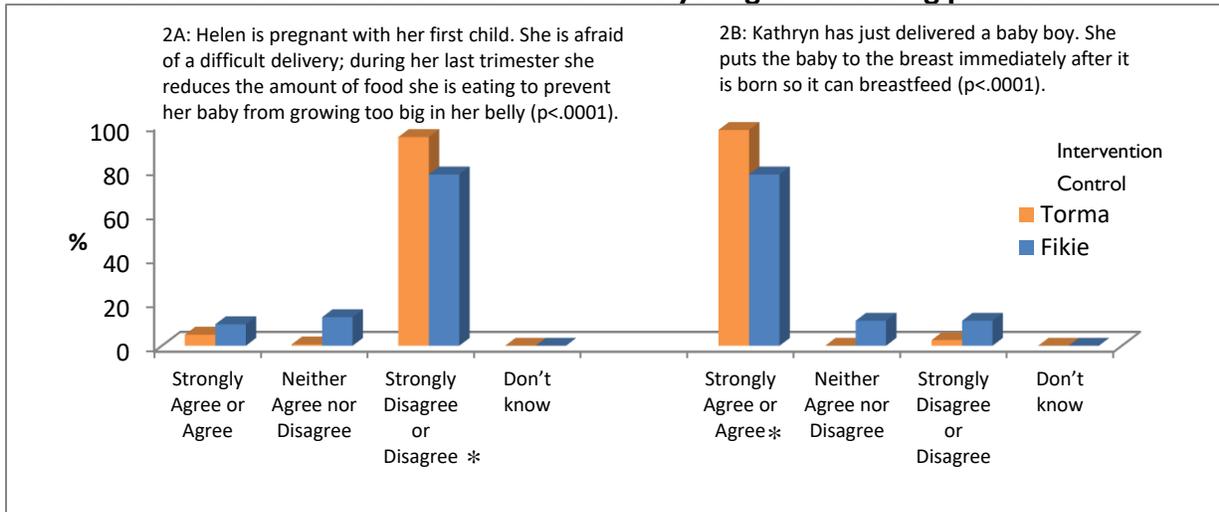
knowledge questions (Appendix 1, Table 1.2) a high and significantly greater proportion of grandmothers in the intervention community responded correctly to questions related to pregnancy nutrition, early initiation of breastfeeding, EBF to 6 months; more than 90% of grandmothers in intervention areas responding correctly to these questions. Nearly 100% of grandmothers in both communities could identify the recommended number of meals for babies 6-8 months of age. Knowledge about other recommended complementary feeding practices, while lower overall, was also greater among intervention compared to control communities. A significantly greater proportion of grandmothers in the intervention community indicated that infants could begin consuming eggs (47.1%

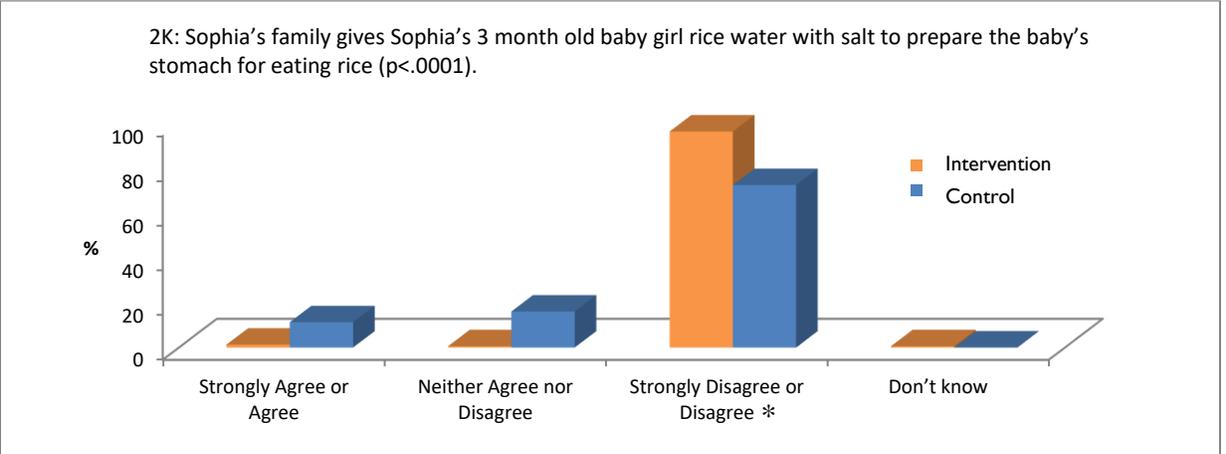
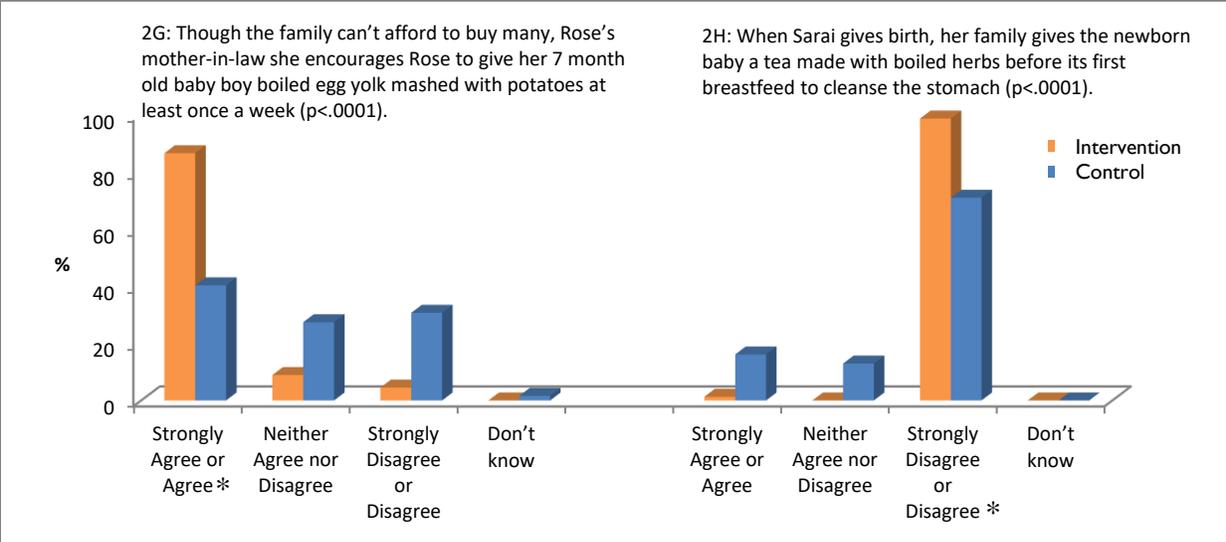
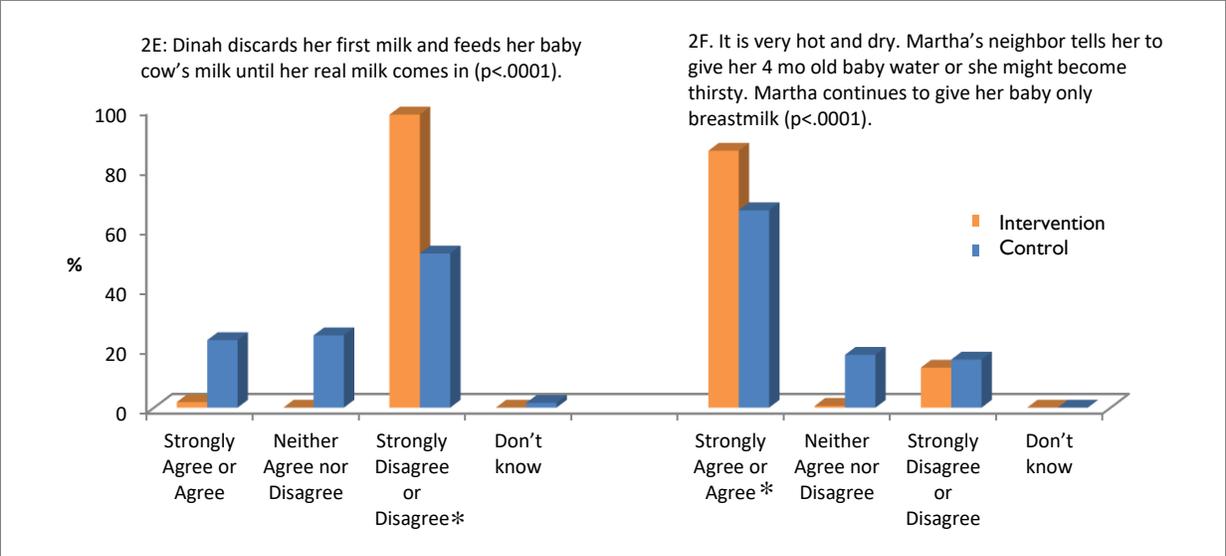
vs. 24.2%,  $p=0.002$ ), fish (39.5% vs. 22.6%,  $p=0.02$ ) and legumes (69.4% vs. 32.3%,  $p<0.001$ ) at 6-7 months of age. However, an exception to this trend in greater knowledge was seen for provision of thicker porridge beginning at 6 months: a significantly lower proportion of intervention grandmothers responded correctly compared to control grandmothers (5.7%, vs 41.9%;  $p<0.001$ ).



To assess grandmothers' attitudes towards recommended maternal nutrition and IYCF practices, a series of scenarios were posed to grandmothers. Enumerators then asked grandmothers to what degree they agreed with the actions in the scenario. Similar scenarios were used at baseline and endline with the exception of two scenarios added to the endline. The two additional scenarios were based on findings from the formative and midline operations research and focused on the provision of rice water before 6 months and care for the sick child. Detailed responses to scenarios can be found in Appendix I, Table I.4. As illustrated in Figure 4.2A-K (asterisked responses indicate correct response), grandmothers in intervention communities responded to different maternal and child nutrition scenarios with attitudes that were significantly more in line with recommended practices (all  $p<0.001$ ), including scenarios related to nutrition in pregnancy (Figures 4.2A, I), early initiation of breastfeeding (Figures 4.2B, E, H), exclusive breastfeeding (Figures 4.2C, F, K) and feeding eggs to children at 6 months (Figure 4.2G). Exceptions to this trend however were related to attitudes towards providing thicker foods to infants 6-9 months of age (Figure 4.2D); only a small majority (~60%) of grandmothers in both intervention and control agreed with this practice ( $p=0.07$ ).

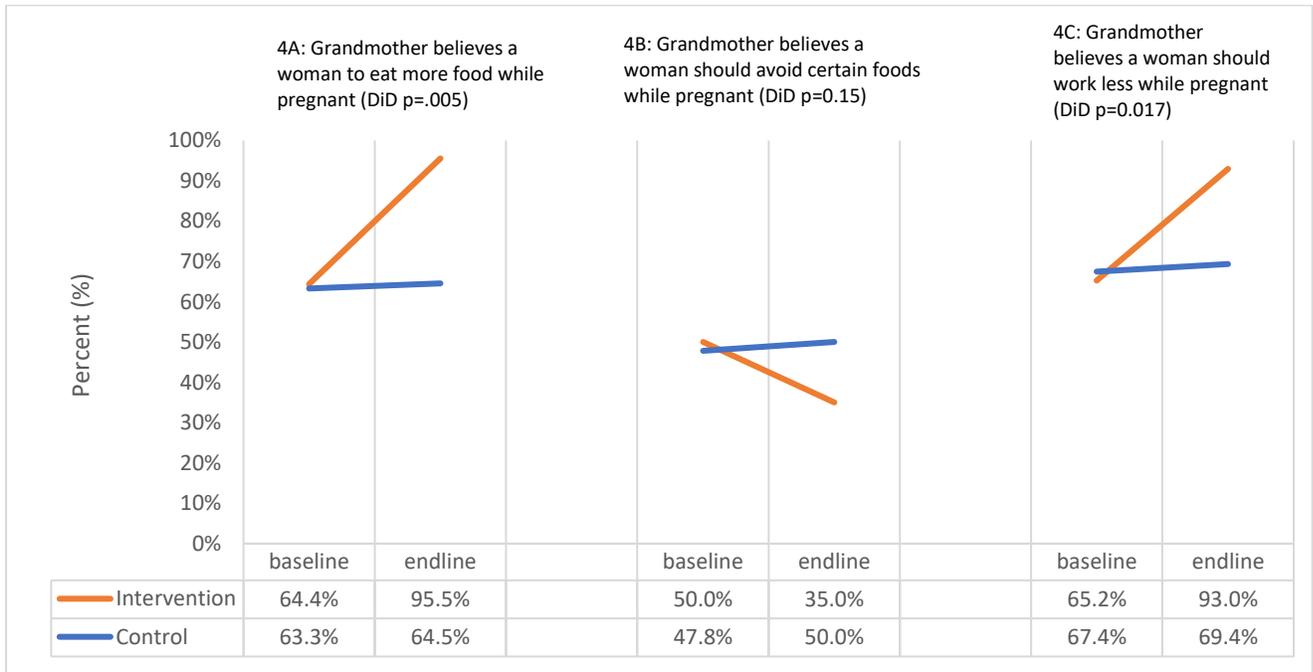
**Figure 4.2A-K: Grandmothers' responses to scenarios assessing attitudes towards recommended maternal nutrition and infant and young child feeding practices.**



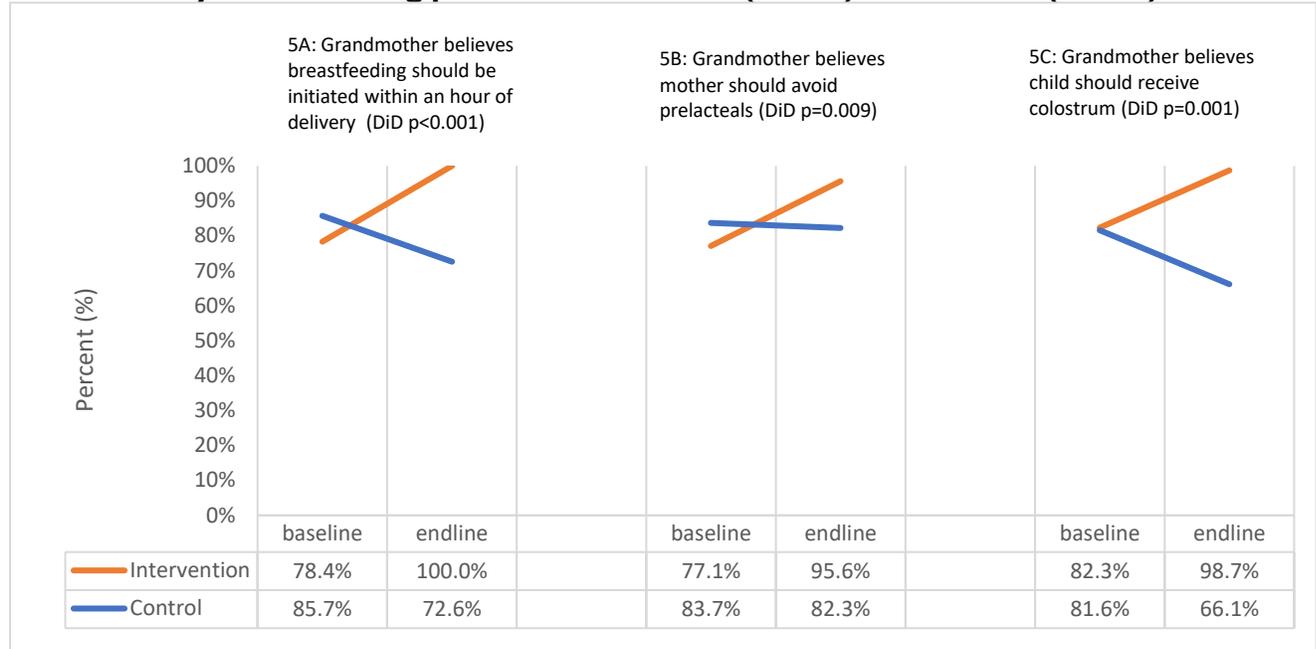


Preliminary difference in difference analyses were conducted on selected indicators of grandmother knowledge and beliefs for which both baseline and endline data were available. Significant improvements were observed among intervention grandmothers relative to controls for maternal diet practices in pregnancy (Figure 4.4A-C), early breastfeeding (Figures 4.5A-C) and complementary feeding (Figure 4.6A-C). For example, at baseline, 64% of GM in both intervention and control communities believed women should take more food during pregnancy. This proportion remained unchanged among control GM at endline but increased to 96% among GM in the intervention communities. At baseline, 86% of control GMs and 78% of intervention GMs believed infants should be breastfed within an hour of birth. At endline, the proportion of control GMs believing in early initiation decreased to 73% but increased among intervention GM to 100%. At baseline, just under half of GMs in both control and intervention communities believed infants should be given water before 6 months. By endline, less than 2% of intervention GM believed infants should be given water, compared to 25% of control GMs

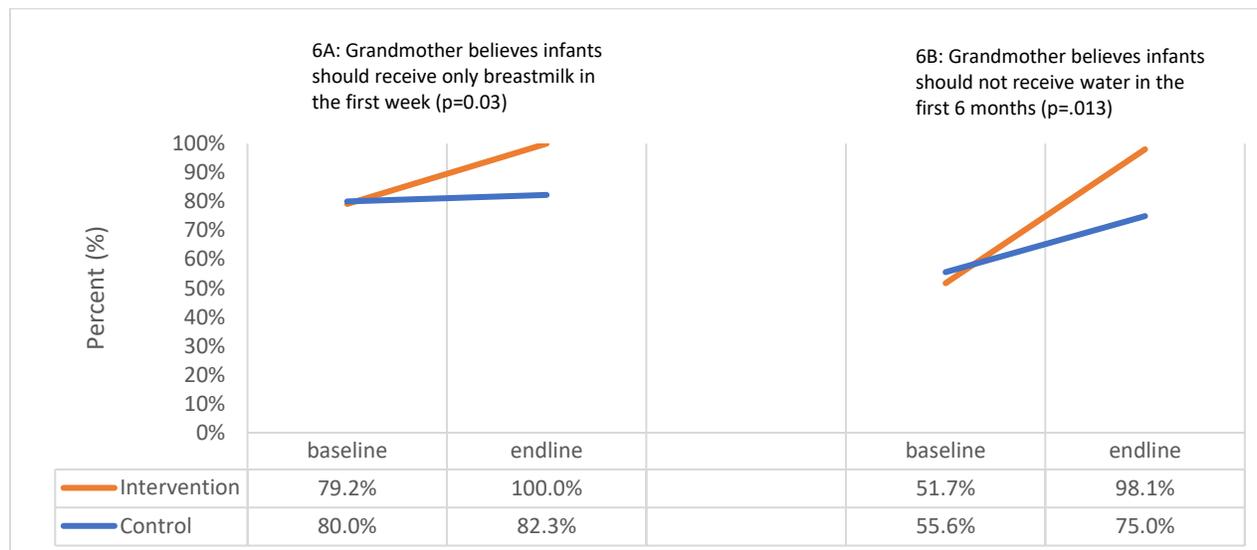
**Figure 4.4A-C: Difference in difference (DiD) analyses of attitudes of grandmothers towards diet practices in pregnancy at baseline (n= 100) and endline (n=219).**



**Figure 4.5A-C: Difference in difference (DiD) analyses of attitudes of grandmothers towards early breastfeeding practices at baseline (n=100) and endline (n=219).**



**Figure 4.6A-B: Difference in difference (DiD) analyses of attitudes of grandmothers about exclusive breastfeeding at baseline (n=100) and endline (n=219).**

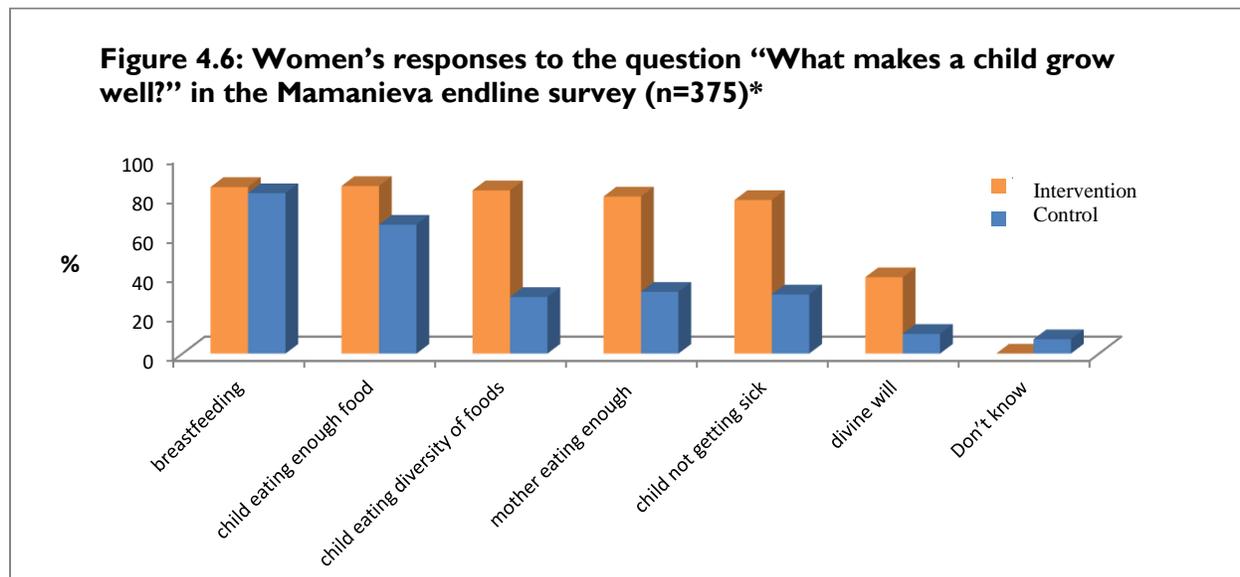


### III. IMPACTS ON WOMEN'S KNOWLEDGE, BELIEFS AND ATTITUDES

Following on the theory of change for the Mamanieva project, given grandmothers culturally designated roles in the domain of maternal and child health, we would expect that the greater knowledge and improved attitudes towards recommended practices observed in grandmothers in the intervention community, coupled with their greater self-efficacy will translate into improved maternal knowledge and attitudes. Here we explore this second link in the theory of change. As was seen for grandmothers, pregnant women's and mother's knowledge scores were significantly higher than control women's

(Table 4.5) at endline. As was seen with grandmothers, women in intervention communities could more frequently name multiple factors that support child growth, while women in control communities named fewer (Figure 4.6 and Appendix I, Table I.6)

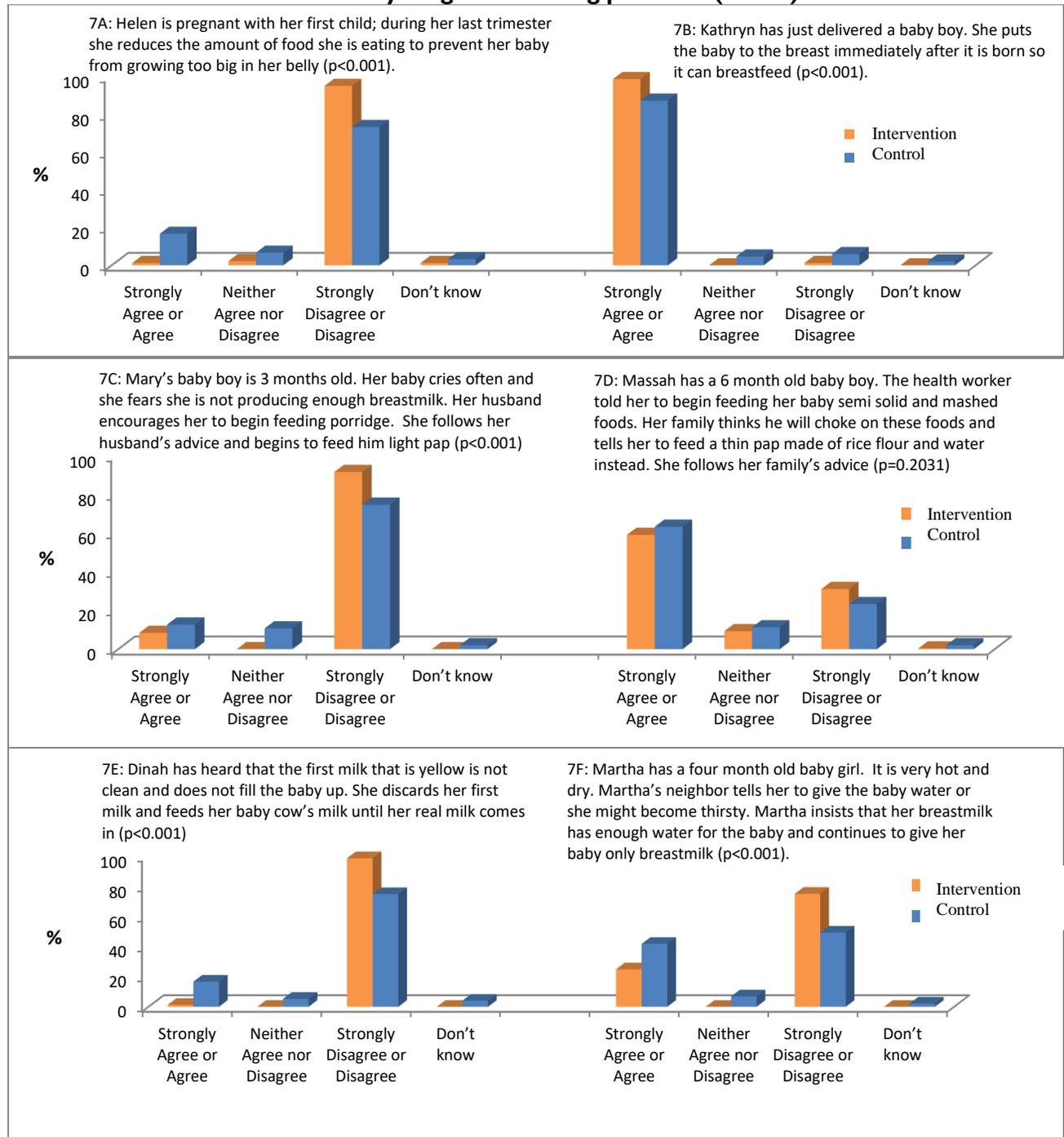
Table 4.5. Maternal and child nutrition knowledge scores of pregnant women and mothers with children < 2 years included in the Mamanieva endline survey (n=375), Bum ADP; data presented as mean ± standard deviation.				
	Overall (n=375)	Intervention (n=225)	Control (n=150)	P value
Average maternal child nutrition knowledge score, max=16 points	11.1 ± 2.4	11.6 ± 1.9	10.2 ± 2.8	<0.001

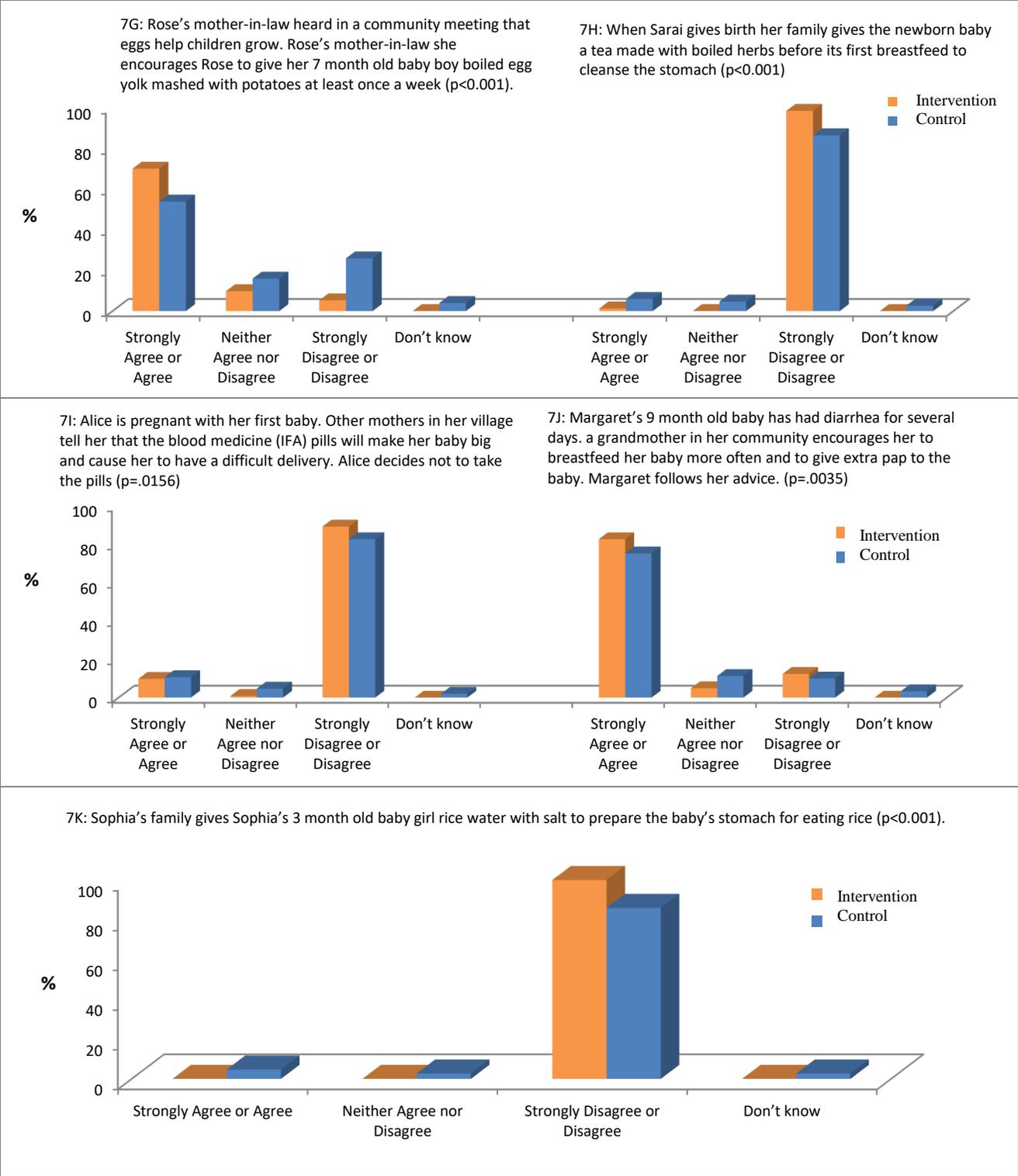


\* p-values all <0.0001 with the exception of breastfeeding (0.43)

When examining individual responses to knowledge questions (Appendix I; Table I.7) a similar trend was observed to that seen with grandmothers. A significantly greater proportion of pregnant women and mothers with young children in intervention communities answered correctly those questions related to early initiation of breastfeeding, exclusive breastfeeding, and feeding eggs, fish and legumes to infants beginning at 6–7 months. However, and similar to what was observed for grandmothers, a significantly lower proportion of women in the intervention communities compared to controls correctly noted the provision of thicker porridge to infants beginning at 6–7 months (34.2% vs. 62.7%, p<0.001). Knowledge was reflected in attitudes. In response to the same scenarios provided to grandmothers, pregnant women and mothers with young children had responses that suggested their attitudes were significantly more aligned with recommended practices than respondents in the control communities (Figures 4.7A-K; Detailed responses to scenarios in Appendix I, Table I.8).

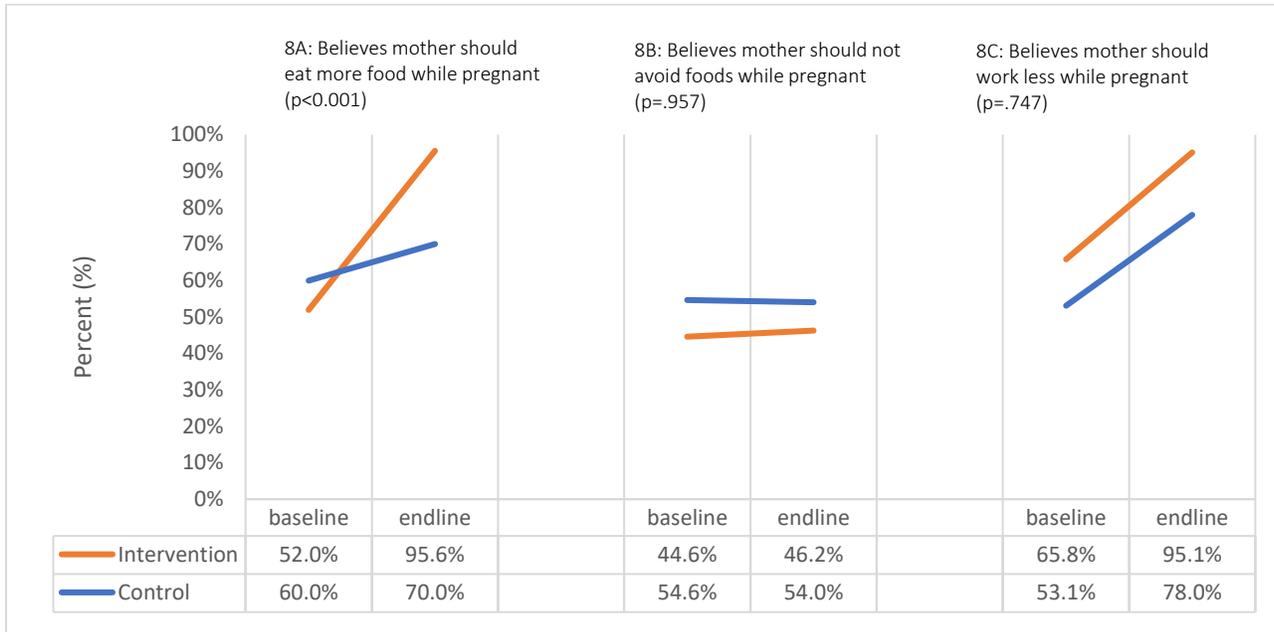
**Figure 4.7A-K: Women’s responses to scenarios assessing attitudes towards recommended maternal nutrition and infant and young child feeding practices (n=375).**



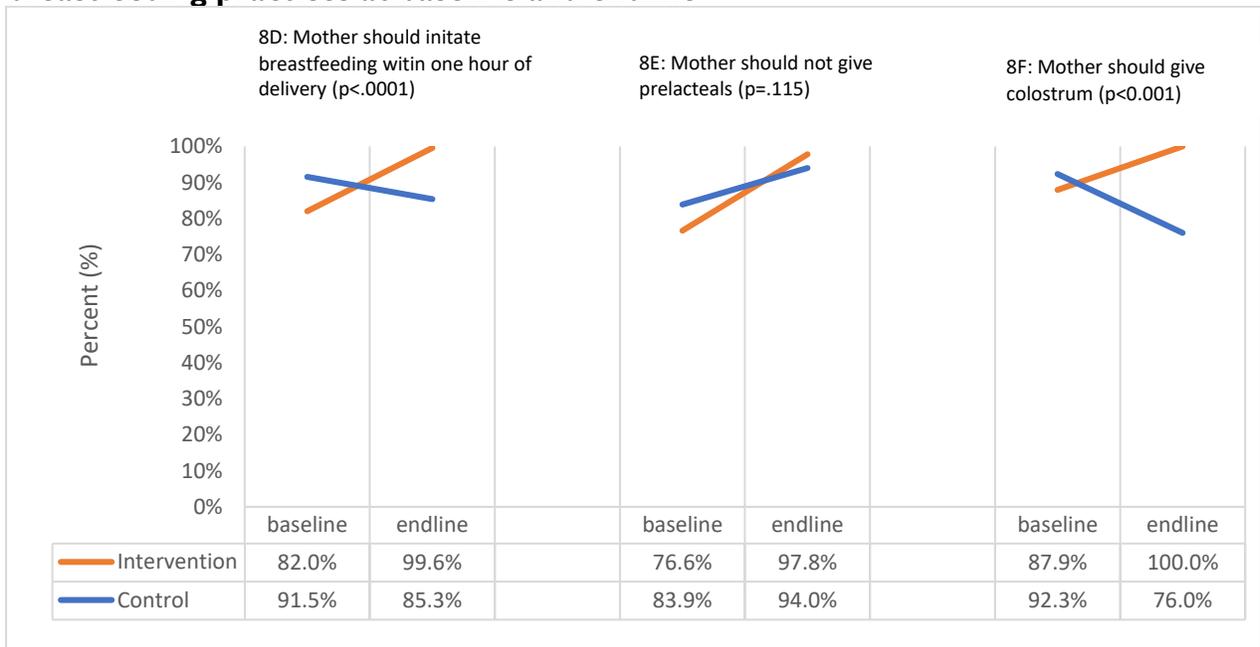


Difference in difference analyses were conducted on selected indicators of women's knowledge and beliefs for which both baseline and endline data were available. Significant improvements were observed among intervention women relative to controls for increased consumption of food during pregnancy (Figure 4.8A) early breastfeeding (Figures 4.8D, F) and exclusive feeding (Figure 4.8G, H).

**Figure 4.8A-C: Difference in difference (DiD) analyses between intervention and control of attitudes of mothers towards diet practices during pregnancy at baseline and endline.**

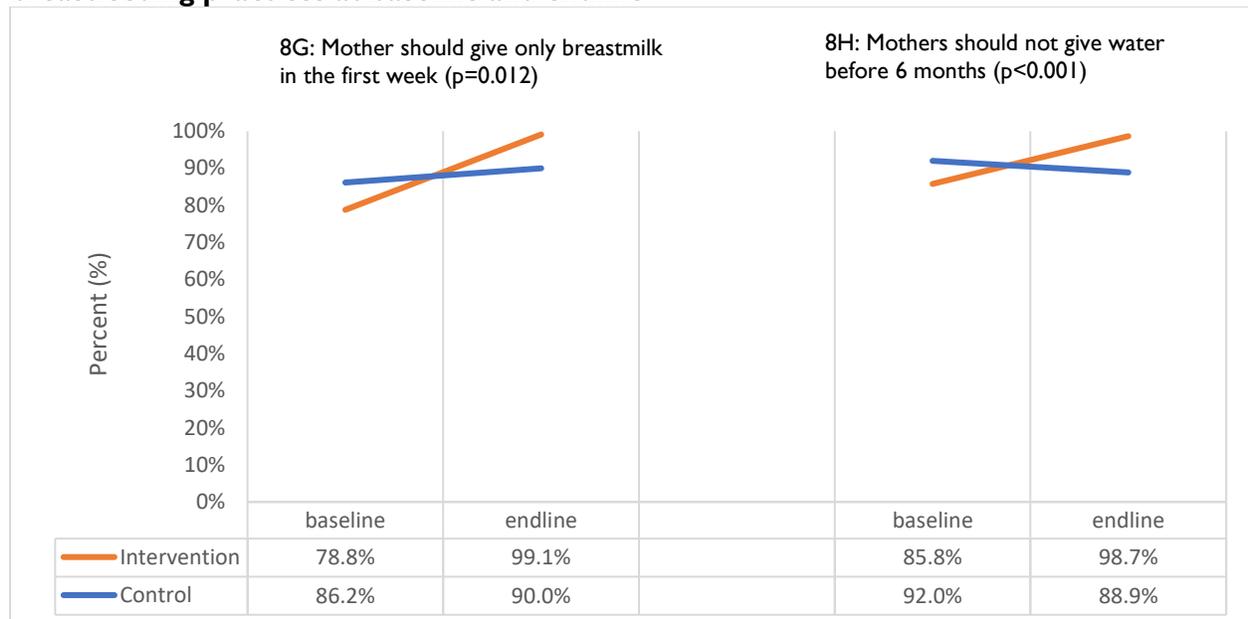


**Figure 8D-F: Difference in difference analyses of mothers' attitudes towards early breastfeeding practices at baseline and endline**



A bit more explanation on what we see in the DiD will be helpful please, making note of the direction, starting point (baseline) and ending, especially where control was better off at the beginning.

**Figure 8G-H: Difference in difference analyses of mothers' attitudes towards early breastfeeding practices at baseline and endline**



The alignment of women's knowledge and attitudes with those of grandmothers can be better understood when examining who pregnant women and mothers with young children cite as key sources of information and advice (Appendix I, Table I.7). In both intervention and control communities, health care workers, husbands / partners, own mothers and other older women are frequently cited sources for information and advice; however the proportion of women who named older women (own mother, mother in law, other relative and non-relative older women) as an important source of information and advice was significantly higher among intervention community respondents. Among those sources cited, the proportion who indicated that an elder woman was their top source of advice was also significantly higher among intervention respondents compared to control respondents (Appendix I, Table I.7). Whereas a higher proportion of respondents in the control community indicated husbands, health care workers, religious leaders and traditional healers as their top source among those listed.

#### IV: IMPACTS ON MATERNAL NUTRITION AND HEALTH SEEKING PRACTICES AND BIRTH OUTCOMES

In the next sections we follow the trajectory of greater maternal and child nutrition and health knowledge and improved attitudes towards recommended practices observed in the last section through to the actual practices themselves. Following the chronology of the first 1000 days we begin with maternal practices related to diet and health seeking through to birth outcomes followed by women's intended and actual infant and young child feeding practices from birth through two years of life.

##### Intentions of Pregnant Women for Nutrition and Health Seeking Practices

Among pregnant women, we assessed health seeking, diet and nutrition related intentions during the current pregnancy. Overall a greater proportion of women in intervention communities intended to eat more and work less during pregnancy (Table 4.9). While the proportion who had received iron-folic acid tablets (IFA) was similar (80.3%). However, among those who received IFA a greater proportion of intervention women reported that they were currently taking them daily compared to control women.

	Overall (n=101)	Intervention (n=54)	Control (n=47)	P-value
Confirmed pregnancy at clinic/health facility	93 (92.1)	52 (96.3)	41 (87.2)	0.09
Received ANC at the clinic/health facility	90 (96.8)	51 (98.1)	39 (95.1)	0.43
Intend to deliver at clinic/health facility	97 (96.0)	54 (100)	43 (91.5)	0.03
Intend to increase amount of food consumed during pregnancy	71 (70.3)	48 (88.9)	23 (48.9)	<0.001
Intend to increase the frequency of meals during pregnancy	71 (70.3)	49 (90.7)	22 (46.8)	< 0.001
Intend to decrease workload during pregnancy	83 (82.2)	51 (94.4)	32 (68.1)	0.002
Received/purchased IFA tablets	88 (87.1)	51 (94.4)	37 (78.7)	0.02
Of those who have received tablets, currently taking iron tablets daily	74 (84.1)	48 (94.1)	26 (20.3)	0.003

##### Maternal Nutrition and Health Seeking Practices

We used an open recall method to assess meals consumed and diet diversity in the previous 24 hours and the FAO recommendation for an adequacy cut-off of  $\geq 5$  food groups. We observed that, at endline, a significantly greater proportion of pregnant women (96.3% vs. 61.7%,  $p < 0.001$ , Table 7), and women with children under 2 years in intervention group (94.6% vs. 67.3%,  $p < 0.001$ ) achieved adequate dietary diversity than the control. Women in the intervention community also consumed a greater number of meals in the previous 24 hours compared to women in control communities (Table 4.7).

	Overall	Intervention	Control	P value
Diet Diversity Adequacy, all women respondents (n=375)	311 (82.9)	213 / 225 (94.7)	98/150 (65.3)	<0.001
Mothers with children < 2 years (n=274)	246 (84.5)	174/ 184 (94.6)	72 / 107 (67.3)	<0.001
Pregnant women (n=101)	81 (80.2)	52 / 54 (96.3)	29 / 47 (61.7)	<0.001

Meal Frequency, all women (n=375)	2.2 ± 1.4	2.6 ± 1.4	1.6 ± 1.3	<0.001
Mothers with children < 2 years (n=274)	2.3 ± 1.5	2.7 ± 1.4	1.7 ± 1.3	<0.001
Pregnant women (n=101)	2.2 ± 1.4	2.8 ± 1.3	1.5 ± 1.3	<0.001

In addition to significantly greater diet diversity adequacy, among mothers with children < 2 years, a significantly greater proportion in intervention communities reported that during their pregnancy with the index child, they attended four or more antenatal care (ANC) visits (97.1% vs. 80.8%,  $p<0.001$ ), and delivered at a health facility (96.7% vs. 90.7%,  $p<0.001$ ; Table 4.8). Mothers in intervention communities also reported significantly earlier first attendance at ANC ( $9.13 \pm 5.65$  wks vs.  $12.21 \pm 7.43$  wks;  $p<0.001$ ). A significantly greater proportion also reported consuming more food (94.6% vs. 63.6%,  $p<0.001$ ), increased meal frequency (95.7% vs. 58.9%,  $p<0.001$ ), consumption of iron tablets daily (92.4% vs. 74.3%  $p<0.001$ ) and reduced workload (95.7% vs. 75.7%,  $p<0.001$ ) during their pregnancy.

	Overall (n=291)	Intervention (n=184)	Control (n=107)	P value
Attended ANC at clinic/health Facility (at least once)	284 (97.6)	178 (96.7)	106 (99.1)	0.21
Attended ANC at least 4 times at clinic/ health facility (n= 238)	215 (90.3)	135 (97.1)	80 (80.8)	< 0.001
Average length of pregnancy at first ANC visit (in weeks) (n=282)	10.28±6.54	9.13 ± 5.65	12.21 ± 7.43	<0.001
Delivered at Health Facility	275 (94.5)	178 (96.7)	97 (90.7)	0.03
Increased amount of food during pregnancy	242 (83.2)	174 (94.6)	68 (63.6)	<0.001
Increased frequency of meals during pregnancy	239 (82.1)	176 (95.7)	63 (58.9)	<0.001
Decreased workload during pregnancy	249 (85.6)	168 (91.3)	81 (75.7)	<0.001
Received/purchased iron tablets	284 (97.6)	183 (99.5)	101 (94.4)	0.01
Of those who received iron tablets, took iron tablets daily	244 (85.9)	169 (92.4)	75 (74.3)	<0.001

### **Birth Outcomes and Birthweight**

When mothers with young children were asked to name any complications they experienced during pregnancy we noted that a significantly greater proportion of women in intervention communities reported no complications compared to control communities (90.2% vs. 79.4%,  $p=0.01$ ). The most commonly named complications (>20%) by those experiencing them included severe headaches, a difficult or longer than normal labor and excessive bleeding during labour (Table 4.9a).

	Overall (n=40)	Intervention (n=18)	Control (n=22)	P-value
Bleeding during pregnancy (n=3)	3 (7.5)	2 (11.1)	1 (4.6)	0.43
High blood pressure (n=1)	1 (2.5)	1 (5.6)	0 (0)	0.26
Seizures (n=1)	1 (2.5)	1 (5.6)	0 (0)	0.26
Swelling of hands/feet (n=7)	7 (17.5)	2 (11.1)	5 (22.7)	0.34
Severe headaches (n=11)	11 (27.5)	2 (11.1)	9 (40.9)	0.04
Excessive bleeding during labor (n=15)	15 (37.5)	8 (44.4)	7 (31.8)	0.41
Difficult/longer than normal labor (n=9)	9 (22.5)	2 (11.1)	7 (31.8)	0.12
Baby born too early (n=2)	2 (5.0)	2 (11.1)	0 (0)	0.12
Required Cesarean section (n=2)	2 (5.0)	1 (5.6)	1 (4.6)	0.88

Infant birthweight was assessed by review of infant health card or when not available (n=26) by maternal recall. For those infants for whom birthweight data are available (n=254), mean birthweights were significantly higher for intervention compared to control infants (3.34±.47 kg vs. 3.08±.43 kg, p<0.01; Table 4.10). The proportion of infants born weighing less than 2.5kg was 2.7% among the intervention community and 7.8% in the control community (p=0.05).

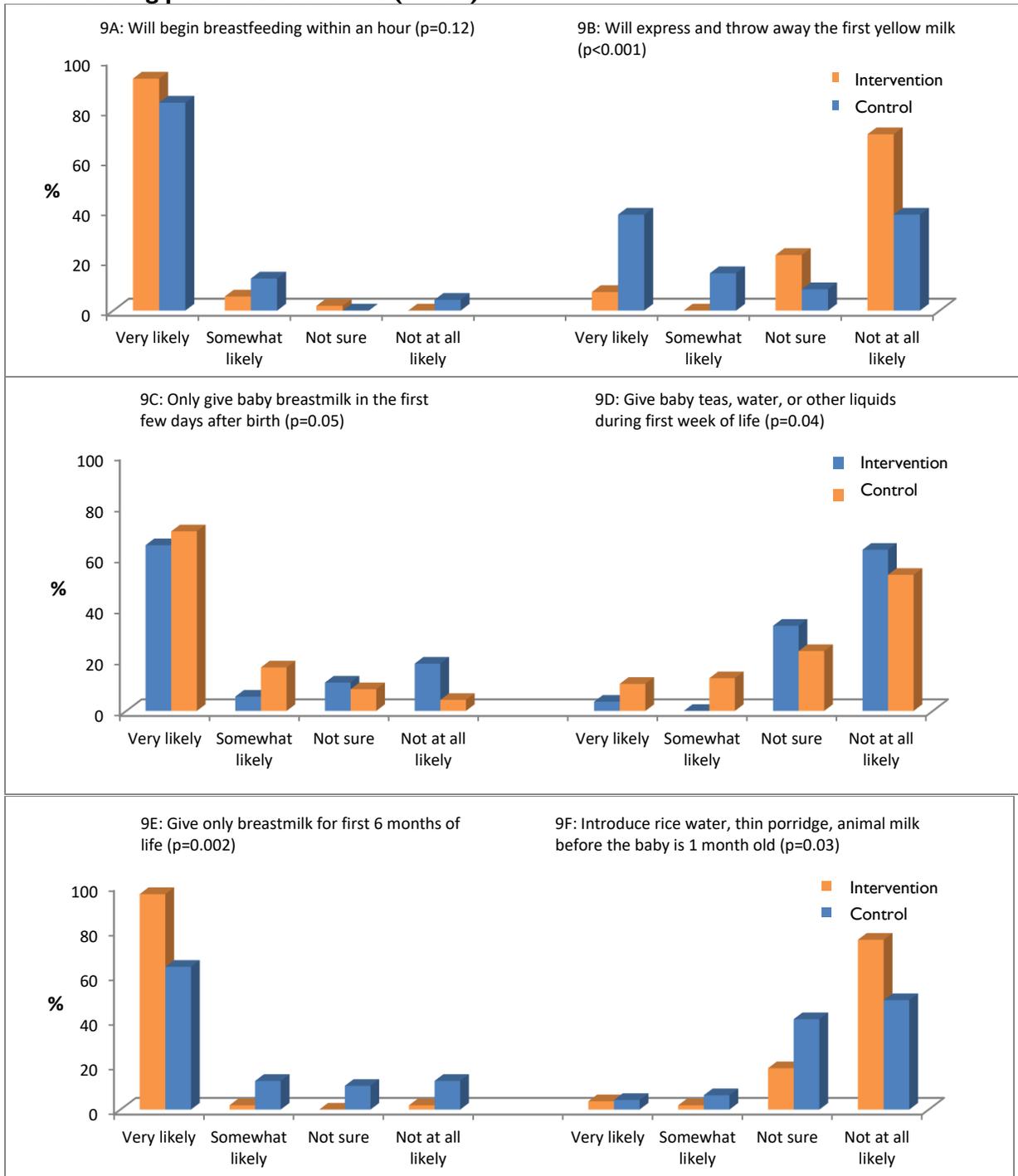
	Overall (n=254)	Intervention (n=184)	Control (n=107)	P value
Birthweight, kg	3.23±.47	3.34±.47	3.08±.43	<0.001
Low Birthweight (< 2.5kg)	12 (4.7)	4 (2.7)	8 (7.8)	0.05

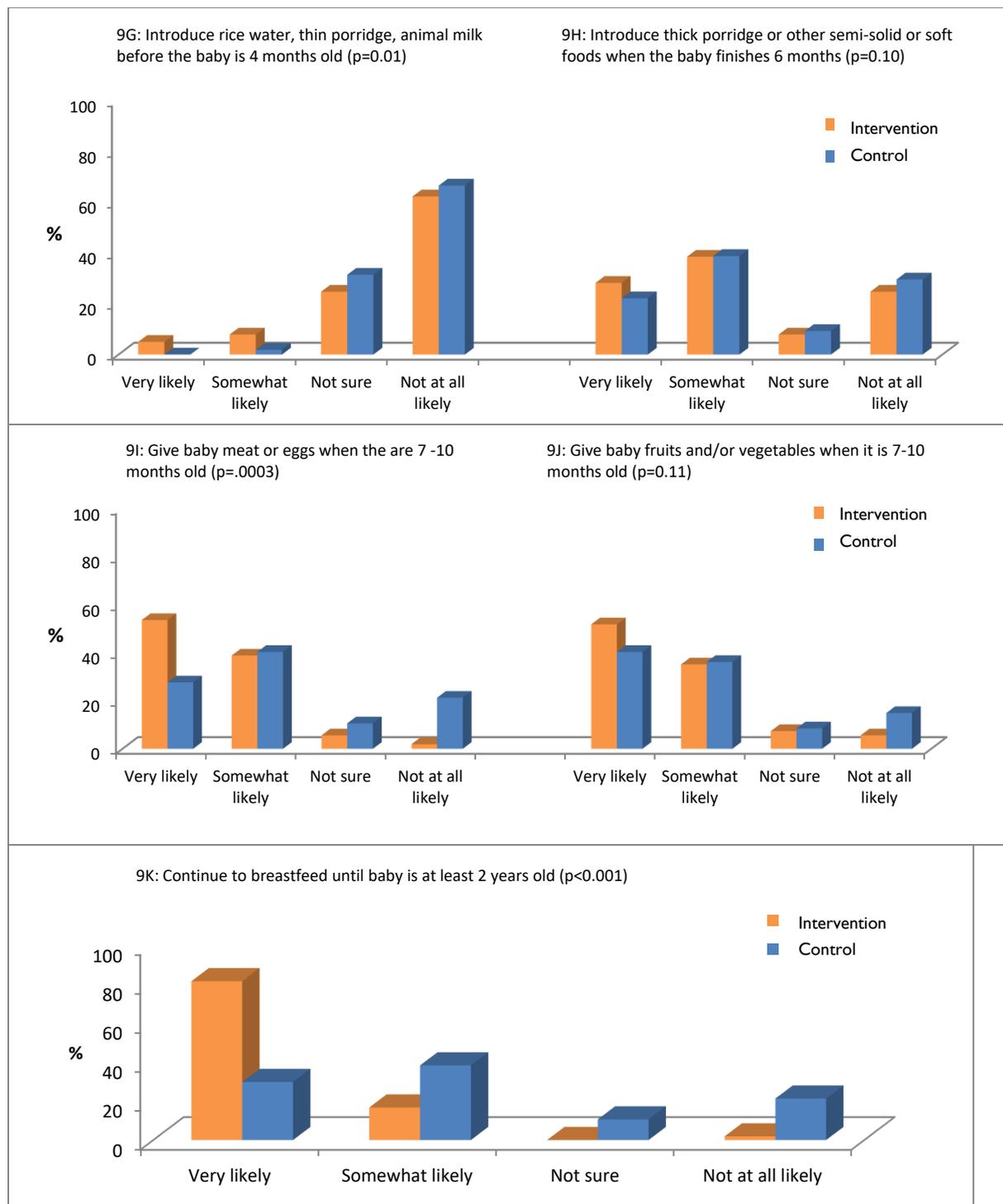
## V. IMPACTS ON INFANT AND YOUNG CHILD FEEDING PRACTICES

### *Infant and Young Child Feeding Intentions among Pregnant Women*

Women's infant feeding intentions during pregnancy are a strong indicator of the practices that women will engage in after birth. As seen in Figures 4.9A-K, among pregnant women interviewed for the Mamanieva endline survey (n=101), women universally intended to initiate breastfeeding within the first hour following delivery and while most intended to avoid giving liquids or other non-breastmilk substances in the first week of life (Figures 4.9C, D) a minority were unsure of whether they would give other items in the first week. For other intentions we observed that, compared to control participants, a significantly greater proportion of those in intervention communities intended to put into action recommended practices for colostrum (Figure 4.9B), foregoing porridge at 1 or 4 months postpartum (Figures 4.9F, G), feeding meat / eggs beginning at 6-7 months (Figure 4.9I), and continuing to breastfeed to two years (Figure 4.9K). Detailed responses to intentions questions are found in Appendix I, Table I.9.

**Figure 4.9A-K: Comparison of intervention and control pregnant women’s intentions for infant feeding practices at endline (n=101)**





### Infant and Young Child Feeding Practices

Significantly more children in intervention communities were exclusively breastfed during the first week of life, achieved minimum dietary diversity and minimum acceptable diet at 6–23 months of age, compared to control communities (Table 4.11). The proportion achieving the recommended meal

frequency was also higher among intervention sites. Though this difference did not achieve significance either overall or by age groups (Table 4.11a), likely due to sample size.

	Overall (n=291)	Intervention (n=184)	Control (n=107)	P value
Children 0-24 mos old put to breast within one hour of delivery	198 (68.0)	119 (64.7)	79 (73.8)	0.12
Children 0-24 mos old exclusively breastfed during the first week of life	251 (86.3)	166 (90.2)	85 (79.4)	<b>0.01</b>
	Overall (n=72)	Intervention (n=48)	Control (n=24)	P value
Children 0-6 mos old exclusively breastfed in the previous 24 hours	65 (90.3)	43 (89.6)	22 (91.7)	0.78
	Overall (n=219)	Intervention (n=136)	Control (n=83)	P value
Children 6-23 mos old who are continuing to breastfeed in addition to complementary foods	161 (73.5)	101 (74.3)	60 (72.3)	0.75
Children 6-23 mos old achieving minimum dietary diversity ( $\geq 4$ food groups yesterday)	148 (67.6)	105 (77.2)	43 (51.8)	<b>&lt;0.001</b>
Children 6-23 mos achieving the recommended minimum meal frequency for their age	125 (57.1)	83 (61.0)	42 (50.6)	0.13
Children 6-23 mos achieving minimum acceptable diet (n=168)	71 (42.3)	57 (53.8)	14 (22.6)	<b>0.001</b>

	Overall (n=207) <sup>1</sup>	Intervention (n=129)	Control (n=80)	P-value
Child 6-23 months	2.9 $\pm$ 1.6	3.0 $\pm$ 1.1	2.7 $\pm$ 1.3	0.10
6-8.9 months (n=36)	2.8 $\pm$ 1.1	2.6 $\pm$ 0.8	3.0 $\pm$ 1.4	0.24
9-11.9 months (n=35)	2.6 $\pm$ 0.9	2.8 $\pm$ 0.7	2.2 $\pm$ 1.1	0.06
12-17.9 months (n=68)	2.9 $\pm$ 1.1	3.0 $\pm$ 1.1	2.6 $\pm$ 1.1	0.14
18-23.9 months (n=68)	3.2 $\pm$ 1.3	3.3 $\pm$ 1.3	3.0 $\pm$ 1.3	0.42

<sup>1</sup> Out of 217 children whose age categories are known, 209 mothers knew how many times children ate yesterday; 10 did not know (n=7 in Torma, n=3 in Fikie)

Continued breastfeeding (4.11b) similarly was higher among intervention but the difference did not approach statistical significance with the exception of infants 12-17.9 (p=0.09). No significant differences between interventions and control communities were observed for other early breastfeeding indicators (ie., put to the breast with 1 hour of delivery, EBF in past 24 hours, Table 4.11). However, it is important to note that optimal behaviors had high coverage in both communities likely reducing our ability to detect significant differences.

Table 4.11b. Continued breastfeeding among children 6-23 mos by age group in the Mamanieva endline survey, Bum ADP. Data are n (%)

	Overall (n=219)	Intervention (n=136)	Control (n=83)	P-value
Child 6-23 months	161 <sup>1</sup> (73.5)	101 (74.3)	60 (72.3)	0.75
6-8.9 months (n=42)	36 (85.7)	19/24 (79.2)	17/18 (94.4)	0.16
9-11.9 months (n=36)	30 (83.3)	19/22 (86.4)	11/14 (78.6)	0.54
12-17.9 months (n=69)	58 (84.1)	37/41 (90.2)	21/28 (75.0)	0.09
18-23.9 months (n=70)	36 (51.4)	25/47 (53.2)	11/23 (47.8)	0.67

<sup>1</sup> 161 total 6-23 months who are continuing to breastfeed. One child's age category is unknown; therefore sum of children in age categories is 160.

## VI. Preliminary Adjusted Analyses of Key Outcomes

A selected set of priority outcomes that were significant in unadjusted analyses were further examined with multivariable regression model. This approach allowed for us to control for the potential influence of those potentially influential variables that differed at endline, notably maternal education, pregnancy status, parity, household food insecurity and education and occupation of the household head.

Outcomes for these analyses included maternal diet diversity, maternal meal frequency, birthweight, child diet diversity and child minimum acceptable diet. As can be seen in Table 4.12, effects remained significant after adjusting for the aforementioned influential variables. Women in the intervention community consumed half a meal more than those in the control community and consumed an adequately diverse diet 9 times more often than control women. Infants in intervention communities were also 0.2 kg heavier at birth compared to controls. Infants in the intervention group consumed a diet of adequate diversity and achieved a minimum acceptable diet 3.5 times more often than children in control communities (Table 4.12). Following adjustment for differences at endline, the differences between the intervention and control communities remained significant for birthweight as well (adjusted mean difference = 0.22 kg (0.07, 0.36); p=0.003).

Table 4.12: Adjusted point estimates and 95% confidence intervals for selected outcomes from the Mamanieva endline survey

	Intervention	Control	Adjusted estimate and 95% CI, p-value
Maternal diet diversity adequacy <sup>1</sup> , n=359	213 (94.7)	98 (65.3)	9.0 (4.0, 20.0), p<0.001
Number of meals consumed in previous 24 hours by women <sup>1</sup> , n=359	2.6 ± 1.4	1.6 ± 1.3	0.52 (0.32, 0.72), p<0.001
Birthweight <sup>2</sup> , n=244	3.34±0.47	3.08±0.43	0.22 (0.07, 0.36), p=0.003
Infant diet diversity adequacy <sup>3</sup> , n=208	105 (77.2)	43 (51.8)	3.5 (1.5, 8.3), p=0.005
Infant minimum acceptable diet <sup>3</sup> , n=208	57 (53.8)	14 (22.6)	3.5 (1.5, 8.1), p=0.003

<sup>1</sup> Model adjusted for maternal schooling, parity, and pregnancy status; schooling and occupation of household head; and household hunger category. Fifteen women excluded from analyses due to missing outcome and/or covariate data.

<sup>2</sup> Model adjusted for maternal schooling and parity, household head schooling and occupation, household hunger category and child sex. Ten infants excluded due to missing outcome or covariate data.

<sup>3</sup> Model adjusted for child age and sex, maternal schooling and parity; schooling and occupation of household head; and household hunger category. Analyses restricted to 219 infants 6–23 month olds; 11 infants excluded due to missing outcome or covariate data.

## VII. Community Perceived Impacts

Among grandmothers and women in intervention communities, enumerators queried what respondents perceived to be the most significant and important changes in the community as a result of the Mamanieva project. The question was intended to be open ended with the enumerators ticking through a set of a-priori identified response codes in the event the respondent mentioned the benefit. However, analyses suggest that instead of an open-ended approach, enumerators instead asked whether the mother felt the response code was a benefit (Table 4.13). In general, grandmothers and mothers were very much in agreement that relationships between grandmothers, mothers and other community members had improved, including greater respect for grandmothers. Respondents also believed that families felt they were better able to care for and support their children and mothers and that maternal and child health had improved. However, the way in which the question was asked by enumerators meant we were unable to capture a ranking of the most important perceived impacts and potentially introduced response bias.

	Women with children < 23 months (n=181)	Pregnant women (n=53)	Grandmothers (n=152)
Relations between grandmothers and communities have improved	174 (96.1)	48 (90.6)	149 (98.0)
Children are sick less often	164 (92.1)	47 (97.2)	141 (95.6)
Children are growing better/have better nutrition	174 (97.8)	48 (100)	147 (98.7)
Family members are more supportive of mothers	135 (75.8)	36 (75.0)	110 (73.8)
Family members have more respect for grandmothers	157 (88.2)	43 (89.6)	128 (85.9)
Community has more respect for grandmothers	155 (87.1)	40 (83.3)	137 (92.0)
Grandmothers feel they are better able to care for family/mother/child	132 (74.2)	34 (70.8)	114 (76.5)
Grandmothers and mothers have improved relationships	137 (77.0)	38 (79.2)	124 (83.22)
Mothers attend facility more often for ANC/delivery/PNC	140 (78.7)	38 (79.2)	128 (85.9)

## VIII. Qualitative Findings with Communities

World Vision sought to answer two key questions from the endline focus group discussions with men and grandmother leaders: 1) What are men's perceptions of the Mamanieva Project? and 2) If appropriate, how can men be included in future programming of the Mamanieva Project? Overall, the quotes from the FGDs with fathers, indicated below, suggest that men perceived the project positively.

*"There is no one who says they don't like MP [mamanieva project], even myself."*

*"The knowledge grandmothers and women are receiving deviates from old practices to new practices, for example going to ANC."*

*"Women are adhering to advice so the children's weights have improved."*

According to both men and grandmother FGD participants, men credited the project for decreasing maternal death and improving child health since grandmothers were now encouraging better diets

*“Before there were a lot of maternal deaths during delivery but no longer happening. Women go to ANC and there are no complications.” GM FGD*

*“Before pregnant women were dying, but [death] has reduced. Delivery has improved.*

*Complications during delivery has reduced. They are delivering healthy babies.” Fathers FGD*

Participants in FGDs also reported that pregnant women had increased positive health seeking behaviors, such as going to ANC visits and delivering at the clinic per the GM’s advice.

*“Before (younger women) were not going for ANC. Now they are encouraged to go to ANC and eating improved food.”*

*“GMs are advising that women deliver in the clinic.” Fathers FGD*

Participants also said women were listening to the advice of GMs and were eating more nutritious foods during pregnancy as well as no longer throwing away the colostrum as they now understood its value.

*“As soon as the woman delivers, they will give first breastmilk immediately, making the elder women feel good (because following her advice).” Fathers FGD*

*“Before we threw away first breastmilk. Now we are giving first breastmilk and is making children healthy.” GM FGD*

*“Before pregnant women don’t know anything; pregnant women were just eating cassava. Now we are teaching that they should eat good food.” GM FGD*

With regards to including men in future project programming, both men and grandmothers expressed that men should be integrated into the project.

*“MP is only working with women and men want to join the women.”*

*“If involve[d] men can support (women).”*

*“Men should be in meetings together with women so they can support them.”*

Key reasons for including men, repeated throughout the FGDs, were the necessity of common knowledge in the household to better capacitate husbands and grandfathers to support women in using the advice given to them. From these FGDs we learned that, in some instances, women may go home and not heed the advice given by GMs because their husbands did not believe them to be true.

*“(Men should be involved in the project because) men will direct their wives; if women want to deviate, will guide them properly.” Fathers FGD*

*“Not involving men will hinder the program if women go home and deviate from practices and men are not aware.” Fathers FGD*

A case in point for men’s support was reducing workloads during pregnancy.

*“(Men’s involvement could improve the program because men) won’t allow women to do heavy work.” Fathers FGD*

Both men and grandmother participants expressed that if men were engaged in the program activities they could have shared common knowledge on MCN knowledge and practices. Such shared knowledge would allow men to better support the women in achieving better maternal and child health outcomes, thus enhancing to an even greater extent, the enabling environment created by the grandmother-inclusive approach for improved maternal and child health and nutrition.

## **5. DISCUSSION**

The Mamanieva pilot, implemented by World Vision in Bum ADP, Bonthe, Sierra Leone used a community-based participatory approach to engage grandmothers as change agents for maternal and child nutrition. The evaluation of the pilot project found that the approach improved maternal nutrition and health seeking behaviors, birthweight and complementary feeding practices. The approach holds significant promise for accelerating progress on child stunting, a persistent public health problem in Sierra Leone.

Sustained behavior change within an enabling environment is foundational to improved nutrition practices and stunting reductions. Nutrition education and counseling, either on its own or in combination with other nutrition interventions is the most commonly applied strategy to achieve this social and behavior change. However, recent systematic reviews of education programs designed to improve nutrition in pregnancy, exclusive breastfeeding and complementary feeding practices found that while practices, and subsequently nutritional status, can be improved, the degree of improvement is often small and even more so in food insecure contexts (Girard, et al, 2012; Dewey et al., 2008; Haroon et al, 2013; Aboud, et al., 2012). The limited effectiveness of traditional nutrition education strategies, especially in low income contexts, undergirds the need to develop and test new and innovative approaches to social and behavior change that are grounded in behavioral theory and ethnographic research that provides context and understanding about the target audience (Aboud et al., 2012; Pelto et al., 2016). Building on the traditions of empowerment theory it is likely that the most effective strategies will ultimately be those that identify, strengthen and utilize the often ignored strengths and assets of communities, including for example, grandmothers. Indeed, the findings from the Mamanieva project suggest that, in southern Sierra Leone, a grandmother-inclusive strategy, informed by ethnographic research and designed to capitalize on the culturally designated social roles of elder women as the guardians of maternal and infant well-being, has significant potential to transform nutrition social and behavior change approaches and move the needle on diet and care practices and ultimately nutrition, even in poor contexts where food insecurity is pervasive.

The findings from this small scale operations research noted significant and substantial improvements in maternal nutrition-related practices and health seeking, including 1) improved diet diversity and increased meal consumption 2) greater intentions towards consuming more food during pregnancy 3) greater adherence to antenatal daily iron and folic acid supplementation and 4) greater uptake of health services during pregnancy. While data on nutritional outcomes such as anthropometry were beyond the scope of this evaluation, we noted significantly higher birthweights in intervention communities at endline even after adjusting for potentially confounding differences at baseline and other influential covariates. A 2012 systematic review of nutrition education and counseling strategies (NEC) delivered during pregnancy found that, in low/middle income countries, even when provided for a brief period of time, can improve diet practices and supplement use (Girard and Olude 2012). However, in LMIC, improvements in maternal and child health outcomes such as maternal anemia and birth weight were only observed when NEC were delivered in combination with food or micronutrient supplements. Further, these trials typically used trained health workers and facility-based delivery platforms. The Mamanieva project is unique from these previous efforts in that it worked with largely low literate and untrained elder community members as change agents. Improvements in maternal nutrition practices and birthweight in the absence of other nutrition supports such as direct food or micronutrient supplementation to beneficiaries suggest the potential power of grandmothers to mobilize the necessary food and other supports needed by women during pregnancy.

While we did not see differences in early initiation of breastfeeding, likely due to the near universality of this practice, we noted a significantly greater proportion of intervention infants 0-23 months of age exclusively breastfed during their first week of life. Research supports the importance of successful establishment of exclusive breastfeeding in the first week of life both as a determinant of continued exclusivity through 6 months (Semenic et al., 2008; Holmes 2013; Ahmed et al., 1996) and to reduce neonatal mortality (Edmond et al., 2007). Exclusive breastfeeding of infants 0-6 months in the previous 24 hours prior to the survey did not differ significantly between intervention and control; however, overall, this practice had very high prevalence and so there may have been insufficient variation to detect a difference. It should be noted that when we examined EBF as EBF since birth, similarly high rates of EBF were reported for 0-6 month olds. While this finding may appear at odds with the data for EBF in the first week it is important to note that EBF in the first week was assessed for all infants 0-23 months and may differ because younger infants in the intervention group are now being fed more appropriately. While it is encouraging to observe high rates of early initiation and EBF among 0-6 month olds we cannot rule out the potential influence of social desirability bias—when respondents are aware of the recommended practice and indicate they are performing that practice even when they are not. DHS data from 2013 noted, for example, that in Bonthe, 53% of

infants initiated within one hour of birth. District level data are not available for exclusive breastfeeding but it at the national level only 32% of infants 0–6 months of age were exclusively breastfed in 2013. This prevalence is substantially lower than that reported in our 2016 endline survey in both control and intervention groups. It is plausible that Ministry of Health and World Vision efforts in general improved these indicators in both sites, especially in light of enhanced health outreach during the Ebola epidemic. However, additional research should assess these trends on a larger scale to confirm or refute these potential improvements in breastfeeding practices.

In regards to complementary feeding the proportion of infants achieving adequate diet diversity was 26 percentage points higher among intervention infants. This difference exceeds that observed in the Alive and Thrive Programs in Vietnam and Ethiopia both of which utilized social media and father engagement to improve infant feeding practices. Similarly, the proportion achieving minimum acceptable diet was nearly 30 percentage points higher among intervention communities compared to controls. While the lack of baseline data precludes us from confidently attributing impacts to the intervention it is important to note that practices reported in Bonthe as part of the 2013 DHS survey were very low for both practices, less than 6%. While the proportion reporting adequate meal frequency was approximately ten percentage points higher among intervention infants, this difference was not statistically significant. It is possible that feeding frequency, given that it changes as children age, requires additional supports to simplify the message or visual or other cues to assist families to remember the recommended number of meals and snacks as the child ages. Research in Kenya, India and Malawi noted that the use of marked bowls which cued age appropriate meal volume and frequency improved families' self-efficacy for and attitudes towards feeding more frequently (Kram et al., 2015; Collison et al., 2015). Of note, when examining the change relative to the proportion of infants in Bonthe, who in 2013 consumed the recommended minimum number of meals (47%; DHS 2013), the difference is statistically significant among intervention infants (60% vs. 47% ,  $p=0.03$ ) but not for control communities (51% vs. 47%,  $p=0.59$ ). However, these comparisons, while illustrative, are limited by the differences in sampling strategies and sites used for the DHS survey compared to the Mamanieva pilot.

Of concern, we noted that knowledge and attitudes related to providing thicker porridge to infants beginning at 6–7 months were poorer in the intervention communities compared to controls. Provision of thick porridge was noted as a challenge in the formative research due in large part to families fears that thick porridge will cause stomach problems (i.e. constipation, pain), or choking. Researchers in other contexts have noted similar challenges (Kram et al, 2015; Collison et al., 2015; Alive and Thrive, 2010). These findings speak to the need for additional research to understand the continued resistance to these practices in communities and, based on those findings, revise the project's approach to behavior change on providing thick porridge. Additional cooking and feeding demonstrations and/or identification of positive deviants who can champion thicker foods may be additional supports needed to assist families in overcoming fears of choking or stomach upset.

An important limitation in our operations research is the lack of baseline data on key practices. The baseline survey focused on antecedent determinants of practices, knowledge and attitudes and we observed very few differences in knowledge and attitudes communities at baseline; those that did exist—for example attitudes towards early initiation and exclusive breastfeeding to 6 months—tended to favor control communities (Formative report). While we are able to approximate baseline conditions using the DHS 2013 data for Bonthe, it is important to note that households in DHS surveys are selected using a two-stage cluster randomized sampling strategy of eligible household across all sections in Bonthe. For the Mamanieva endline survey, the team included all eligible households in only two sections of Bonthe. However, in assessing the various steps in the pathway through which program activities could improve maternal and child nutrition, we provide stronger evidence for the plausibility of the impacts being attributed to the intervention. The significantly more positive intentions and attitudes towards and enhanced knowledge of both grandmothers and women were reflected in the observed differences in practices. Similarly, in those domains where knowledge and / or attitudes were poorer, for example, thicker porridge and feeding older infants more frequently, we noted lower prevalence of improved practices. While we performed only a limited number of unadjusted difference in difference analyses of knowledge indicators in this report, it is important to note that many of the effect sizes were large and significant further strengthening our

claims of attribution. However, future work to evaluate this approach should collect the information practice indicators so appropriate difference in difference analyses can be conducted and attribution more confidently assessed.

## 6. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the findings from the Mamanieva proof of concept project justify implementation of this approach at a larger scale and coupled with more robust evaluation. Future iterations of the work in Sierra Leone should strive to engage men to create a more enabling environment for change. Depending on where the approach is being implemented, such engagement may require additional formative research to identify the most effective activities to implement for engaging men, for example as part of intergenerational forum or through separate men's group meetings or other avenues.

To date, the grandmother-inclusive approach has been qualitatively evaluated in Senegal for infant and young child feeding, early marriage and female cutting with positive findings (Aubel, et al., 2004; Aubel, 2010). In Malawi, grandmother engagement coupled with food security interventions improved child feeding knowledge and practices and reduced stunting in a community based non-controlled study (Bezzner-Kerr, 2011; Satzinger et al, 2009). While the findings of the Mamanieva pilot for maternal and child nutrition practices are promising, additional and more large-scale evaluation of this approach is needed to inform its development as a World Vision project model, including in other contexts and for additional outcomes. Ideally, more robust evaluation would be accomplished through cluster-randomized or step-wedge designs; step wedge designs may be more appropriate ethically and programmatically as they involve sequential roll-out of an intervention to participants (individuals or clusters) over a number of time periods. For maternal and infant nutrition outcomes, quantitative dietary recalls to assess energy, protein and micronutrient intakes would be useful; but more importantly, given the capacity of this approach to address other determinants of maternal and child nutrition including health seeking, would be the inclusion of anthropometry and hemoglobin, as these data would provide stronger evidence of the impact of the approach. We would also encourage the collection of data on behavioral domains including self-efficacy, knowledge and attitudes. These data are critical to understand the approaches paths to impact as well as confirm plausibility, understand null findings, identify program areas of weakness and highlight domains of maternal nutrition and IYCF in need of additional strengthening.

Below are additional specific recommendations for scale-up and sustainability considerations.

- The grandmother-inclusive approach empowered grandmothers (self-efficacy) and improved their knowledge of optimal nutrition practices. These changes permit a more enabling household environment for women to put recommendations into practice. As such, grandmothers in World Vision target communities should be intentionally and appropriately included in nutrition programming.
- Communities perceived that the grandmother-inclusive approach improved relationships between grandmothers and community members, especially daughters / daughters-in-law. Improved communication likely facilitated more effective transfer of GM knowledge to daughters and support for optimal nutrition practices. Future nutrition and child well-being programs must consider familial and community relationships and how strengthening these through intergenerational dialogue and community praise forums may improve program effectiveness.
- The grandmother-inclusive approach improved maternal nutrition practices including increased food intakes during pregnancy, greater women's dietary diversity and increased consumption of iron and folic acid supplements. These changes likely explain the significant differences in birth weights observed between the intervention and control communities. Given stunted growth of children begins in utero, nutrition programs in Sierra Leone must include maternal nutrition as a key priority if accelerated progress on child stunting is to be achieved. In this context, a

grandmother-inclusive approach may be the most effective strategy to improve maternal nutrition and prevent growth faltering in utero.

- The grandmother-inclusive approach was highly acceptable in communities in part due to the participatory manner in which it engaged community members. Scale up of the grandmother inclusive approach will require field-based personnel with skills and experience in participatory rural development, community engagement and dialogue-focused approaches to community engagement.
- Community acceptability, while high, may have benefited from more active engagement with fathers and elder men in the community. Qualitative research with mothers, grandmothers and fathers indicated a desire for greater father engagement in areas that would be most relevant to fathers, for example preparation for safe labour and delivery, food prioritization of maternal and child health and how and why to encourage women to consume IFA and take diverse diets. Alive and Thrive programs have developed successful father-engagement strategies that may be examined for relevance to the Sierra Leone context and adapted.
- Mamanieva was a pilot-scale operations research, which identified the significant promise of a grandmother inclusive approach for nutrition social and behaviour change. More rigorous testing of the approach with larger samples, preferably using a cluster-randomized controlled design, and over a longer period of time, is needed to more robustly evaluate the approach's impact on child growth and development outcomes and the pathways through which these changes occur.
- A grandmother-inclusive approach is not exclusive to nutrition. Research in other contexts have highlighted the potential effectiveness of the approach to address other child well-being domains, including for example early child marriage and genital cutting. In Sierra Leone, program officers should evaluate their programs to identify ways in which they might benefit from a more grandmother-inclusive approach.
- To support sustainability and the transfer of the approach to the government, future iterations of the grandmother-inclusive approach by World Vision Sierra Leone should actively engage the Ministry of Health to identify potential community-based facilitators to work alongside World Vision staff for capacity strengthening and partnership.

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## **8. APPENDICES**

Appendix 1: Additional Tables / Supplemental Analyses and Detailed Results

Appendix 2: Endline Survey Tools (to be added)

## APPENDIX I: Supplemental analyses and detailed results

Table I.1. Self-efficacy of GMs as reported by GMs included in the Mamanieva endline survey, Bum ADP; data presented as n (%). P values estimated using chi square.				
	Overall (n = 219)	Intervention (n =157)	Control (n =62)	p-value
I am comfortable sharing my opinion with other elder women in the community.				<.0001
Not at All True	5.9% (13)	1.3% (2)	17.7% (11)	
Somewhat True	21.0% (46)	17.2% (27)	20.7% (19)	
Exactly True	71.7% (157)	81.5% (128)	46.7% (29)	
Don't Know	1.4% (3)	0% (0)	4.8% (3)	
I can always manage to solve difficult problems if I try hard enough.				<.0001
Not at All True	10% (22)	2.6% (4)	29.0% (18)	
Somewhat True	23.3% (51)	19.8% (31)	32.3% (20)	
Exactly True	65.3% (143)	77.7% (122)	33.9% (21)	
Don't Know	1.4% (3)	0% (0)	4.9% (3)	
I feel that most members of my community respect my experiences and opinions.				<.0001
Not at All True	5% (11)	0.6% (1)	16.1% (10)	
Somewhat True	22.4% (49)	17.8% (28)	33.9% (21)	
Exactly True	71.2% (156)	80.9% (127)	46.8% (29)	
Don't Know	1.4% (3)	0.6% (1)	3.2% (2)	
Young mothers in this community talk to me about how to stay healthy while pregnant.				<.0001
Not at All True	7.8% (17)	2.6% (4)	21.0% (13)	
Somewhat True	17.8% (39)	13.4% (21)	29.0% (18)	
Exactly True	72.6% (159)	84.1% (132)	43.6% (27)	
Don't Know	1.8% (4)	0% (0)	6.5% (4)	
If someone opposes me, I can find the means and ways to get what I want.				<.0001
Not at All True	7.3% (16)	1.3% (2)	22.6% (14)	
Somewhat True	33.8% (74)	31.9% (50)	38.7% (24)	
Exactly True	55.3% (121)	66.2% (104)	27.4% (17)	
Don't Know	3.7% (8)	0.6% (1)	11.3% (7)	
I am comfortable sharing my opinion at community meetings where there are many different people from the community, including male elders.				<.0001
Not at All True	6.9% (15)	1.3% (2)	21.0% (13)	
Somewhat True	21.0% (46)	15.9% (25)	33.9% (21)	
Exactly True	70.3% (154)	82.2% (129)	40.3% (25)	
Don't Know	1.8% (4)	0.6% (1)	4.8% (3)	
Mothers in this community talk to me about how to feed and care for their babies.				<.0001
Not at All True	6.4% (14)	2.6% (4)	16.1% (10)	
Somewhat True	14.2% (31)	10.8% (17)	22.6% (14)	
Exactly True	78.1% (171)	86.6% (136)	56.5% (35)	
Don't Know	1.4% (3)	0% (0)	4.8% (3)	
It is easy for me to stick to my aims and accomplish my goals.				<.0001
Not at All True	6.9% (15)	2.6% (4)	17.7% (11)	
Somewhat True	36.5% (80)	33.1% (52)	45.2% (28)	
Exactly True	53.9% (118)	63.7% (100)	29.0% (18)	
Don't Know	2.7% (6)	0.6% (1)	8.1% (5)	
Members of my family respect my experiences and opinions.				.0008
Not at All True	1.4% (3)	0.6% (1)	3.2% (2)	
Somewhat True	20.6% (45)	16.6% (26)	30.7% (19)	
Exactly True	76.7% (168)	82.8% (130)	61.3% (38)	
Don't Know	1.4% (3)	0% (0)	4.8% (3)	
I am confident that I could deal efficiently with unexpected events.				<.0001
Not at All True	6.9% (15)	1.9% (3)	19.4% (12)	
Somewhat True	37.4% (82)	35.0% (55)	43.6% (27)	
Exactly True	53.9% (118)	63.0% (99)	30.7% (19)	
Don't Know	1.8% (4)	0% (0)	6.5% (4)	

Table I.1. Self-efficacy of GMs as reported by GMs included in the Mamanieva endline survey, Bum ADP; data presented as n (%). P values estimated using chi square.

	Overall (n = 219)	Intervention (n = 157)	Control (n = 62)	p-value
Members of the community seek me out when they have problems and ask my advice.				<.0001
Not at All True	6.0% (13)	3.2% (5)	12.9% (8)	
Somewhat True	22.8% (50)	18.5% (29)	33.9% (21)	
Exactly True	69% (151)	78.3% (123)	45.2% (28)	
Don't Know	2.3 (5)	0% (0)	8.1% (5)	
Thanks to my resourcefulness, I know how to handle unforeseen / unexpected situations.				<.0001
Not at All True	9.6% (21)	1.9% (3)	29.0% (18)	
Somewhat True	37.0% (81)	36.3% (57)	38.7% (24)	
Exactly True	50.7% (111)	61.2% (96)	24.2% (15)	
Don't Know	2.7% (6)	0.6% (1)	8.1% (5)	
I can solve most problems if I invest the necessary effort.				<.0001
Not at All True	6.9% (15)	1.9% (3)	19.4% (12)	
Somewhat True	30.1% (66)	24.8% (39)	43.6% (27)	
Exactly True	59.9% (131)	73.3% (115)	25.8% (16)	
Don't Know	3.2% (7)	0% (0)	11.3% (7)	
I feel I am a valuable member of my community.				<.0001
Not at All True	2.7% (6)	0% (0)	9.7% (6)	
Somewhat True	17.8% (39)	12.1% (19)	32.3% (20)	
Exactly True	77.6% (170)	87.9% (138)	51.6% (32)	
Don't Know	1.8% (4)	0% (0)	6.5% (4)	
I can remain calm when facing difficulties because I can rely on my coping abilities.				<.0001
Not at All True	6.4% (4)	1.9% (3)	17.7% (11)	
Somewhat True	38.8% (85)	40.1% (63)	35.5% (22)	
Exactly True	50.7% (111)	58.0% (91)	32.3% (20)	
Don't Know	4.1% (9)	0% (0)	14.5% (9)	
When I am confronted with a problem, I can usually find several solutions.				<.0001
Not at All True	6.9% (15)	1.3% (2)	21.0% (13)	
Somewhat True	24.2% (53)	19.8% (31)	35.5% (22)	
Exactly True	67.1% (147)	79% (124)	37.1% (23)	
Don't Know	1.8% (4)	0% (0)	6.5% (4)	
If I am in trouble, I can usually think of a solution.				<.0001
Not at All True	5.0% (11)	1.3% (2)	14.5% (9)	
Somewhat True	25.1% (55)	18.5% (29)	41.9% (26)	
Exactly True	67.6% (148)	80.3% (126)	35.5% (22)	
Don't Know	2.3% (5)	0% (0)	8.1% (5)	
I am a leader in my community or in community groups.				<.0001
Not at All True	19.6% (43)	10.8% (17)	41.9% (26)	
Somewhat True	19.6% (43)	21.7% (34)	14.5% (9)	
Exactly True	58.9% (129)	67.5% (106)	37.1% (23)	
Don't Know	1.8% (4)	0% (0)	6.5% (4)	
I feel I am a valuable member of my family.				<.0001
Not at All True	2.3% (5)	0% (0)	8.1% (5)	
Somewhat True	12.3% (27)	9.6% (15)	19.4% (12)	
Exactly True	83.1% (182)	90.5% (142)	64.5% (40)	
Don't Know	2.3% (5)	0% (0)	8.1% (5)	
I can usually handle whatever comes my way.				<.0001
Not at All True	6.4% (14)	1.3% (2)	19.7% (12)	
Somewhat True	28.0% (61)	22.9% (36)	41.0% (25)	
Exactly True	64.0% (140)	75.8% (119)	34.4% (21)	
Don't Know	1.4% (3)	0% (0)	4.9% (3)	

Table 1.2. Grandmothers responses to nutrition and health related knowledge questions on the Mamanieva endline survey, Bum ADP. Data are presented as N (%).

	Overall (n=219)	Intervention (n=157)	Control (n=62)	P value
Pregnant women should eat more	190 (86.8)	150 (95.5)	40 (64.5)	<.0001
Pregnant women should work less	189 (86.3)	146 (93.0)	43 (69.4)	<.0001
Infants should breastfeed immediately after delivery	202 (92.2)	157 (100)	45 (72.6)	<.0001
Mothers should feed baby first yellow milk	196 (89.5)	155 (98.7)	41 (66.1)	<.0001
Mothers should not give baby anything before it is put to breast for first time	203 (92.7)	152 (96.8)	51 (82.3)	.0002
Mothers should not give baby anything other than breastmilk in first week of life	208 (95.0)	157 (100)	51 (82.3)	<.0001
Baby should be at least 6 months before receiving water for first time	199 (90.9)	154 (98.1)	45 (72.6)	<.0001
Baby should be 6–7 months old before it receives light porridge for the first time	179 (81.7)	134 (85.4)	45 (72.6)	.0276
Baby can receive thick porridge beginning at 6–7 months old	35 (16.0)	9 (5.7)	26 (41.9)	<.0001
Baby can receive eggs for the first time at 6–7 months	89 (40.6)	74 (47.1)	15 (24.2)	.0018
Baby can receive meat or fish for the first time at 6–7 months	76 (34.7)	62 (39.5)	14 (22.6)	.0179
Baby can receive vegetables or fruits for the first time at 6–7 months	37 (16.9)	24 (15.3)	13 (21.0)	.3121
Baby can receive mashed beans, peas, lentils, or nuts for the first time at 6–7 months	129 (58.9)	109 (69.4)	20 (32.3)	<.0001
6–9 month olds should be fed foods other than breast milk at least 2–3 times a day	218 (99.5)	157 (100)	61 (98.4)	.1107
9–12 month olds should be fed foods other than breast milk at least 3 times a day	212 (96.8)	157 (100)	55 (88.7)	<.0001
12–24 month olds should be fed foods other than breast milk at least 4 times a day	132 (60.3)	90 (57.3)	42 (67.7)	.1558

Table 1.3 Grandmothers' responses to the question "what makes a child grow well" in the Mamanieva endline survey, Bum ADP; data presented as n (%). P values estimated using tests for chi square and tests of mean.

Grandmother said,	Overall (n=219)	Intervention (n=157)	Control (n=62)	P value
Breastfeeding	206 (94.1)	157 (100)	49 (79.0)	<.0001
Child eating enough food	173 (79.0)	133 (84.7)	40 (64.5)	.0009
Child eating a diversity of foods	152 (69.4)	136 (86.6)	16 (25.8)	<.0001
Mother eating enough in pregnancy and/or when breastfeeding	150 (68.5)	129 (82.2)	21 (33.9)	<.0001
Child not getting sick	220 (58.7)	175 (77.8)	45 (30.0)	<.0001
Spiritual protection or divine will	56 (25.6)	49 (31.2)	7 (11.3)	.0023
Doesn't know	6 (2.7)	0 (0)	6 (9.7)	<.0001

Table 1.4 Responses of Grandmothers to Maternal and Child Health and Nutrition Scenarios in the Mamanieva Endline Surve				
	Overall (n=219)	Intervention (n=157)	Control (n=62)	P value
Helen is pregnant with her first child. She is afraid of a difficult delivery and so during her last trimester, she decides to reduce the amount of food she is eating to prevent her baby from growing too big in her belly.				<.0001
Strongly Agree	4.1% (9)	5.1% (8)	1.61% (1)	
Agree	2.3% (5)	0% (0)	8.1% (5)	
Neither Agree nor Disagree	4.1% (9)	.6% (1)	12.9% (8)	
Disagree	30.6% (67)	26.8% (4)	40.3% (25)	
Strongly Disagree	58.9% (129)	67.5% (106)	37.1% (23)	
Don't Know	0% (0)	0% (0)	0% (0)	
Kathryn has just delivered a baby boy. She puts the baby to the breast immediately after it is born so he can breastfeed.				<.0001
Strongly Agree	72.6% (159)	84.1% (132)	43.6% (27)	
Agree	19.2% (42)	12.4% (21)	33.9% (21)	
Neither Agree nor Disagree	3.2% (7)	0% (0)	11.3% (7)	
Disagree	2.3% (5)	.6% (1)	6.5% (4)	
Strongly Disagree	2.7% (6)	1.9% (3)	4.8% (3)	
Don't Know	0% (0)	0% (0)	0% (0)	
Mary's baby boy is 3 months old. Mary does not have much food to eat in her household because the harvests have not been good this season. Her baby cries often and she fears she is not producing enough breastmilk. Her sister encourages her to continue only giving breastmilk, but her husband encourages her to begin feeding porridge. She follows her husband's advice and begins to feed him light pap.				<.0001
Strongly Agree	5.9% (13)	3.8% (6)	11.3% (7)	
Agree	4.1% (9)	1.3% (2)	11.3% (7)	
Neither Agree nor Disagree	6.4% (14)	1.3% (2)	19.4% (12)	
Disagree	29.2% (64)	26.1% (41)	37.1% (23)	
Strongly Disagree	53.9% (118)	67.5% (106)	19.4% (12)	
Don't Know	.5% (1)	0% (0)	1.6% (1)	
Massah has a 6-month-old baby boy. The health worker told her to begin feeding her baby semi solid and mashed foods. Her family thinks he will choke on these foods and tells her to feed a thin pap made of Rice flour and water instead. She follows her family's advice.				.0730
Strongly Agree	24.2% (53)	24.8% (39)	22.6% (14)	
Agree	37% (81)	36.9% (58)	37.1% (23)	
Neither Agree nor Disagree	12.8% (28)	12.1% (19)	14.5% (9)	
Disagree	9.6% (21)	6.4% (10)	17.7% (11)	
Strongly Disagree	16% (35)	19.1% (30)	8.1% (5)	
Don't Know	.5% (1)	.6% (1)	0% (0)	
Dinah has heard that the first milk that is yellow is not clean and does not fill the baby up. She discards her first milk and feeds her baby cow's milk until her real milk comes in.				<.0001
Strongly Agree	1.8% (4)	.6% (1)	4.8% (3)	
Agree	5.9% (13)	1.3% (2)	17.7% (11)	
Neither Agree nor Disagree	6.9% (15)	0% (0)	24.2% (15)	
Disagree	14.2% (31)	12.7% (20)	17.7% (11)	
Strongly Disagree	70.8% (155)	85.4% (134)	33.9% (21)	
Don't Know	.5% (1)	0% (0)	1.6% (1)	
Martha has a four-month-old baby Girl. It is very hot and dry. Martha's neighbor tells her to give the baby water or she might become thirsty. Martha insists that her breastmilk has enough water for the baby even in hot and dry weather and continues to give her baby only breastmilk.				<.0001
Strongly Agree	62.6% (137)	72.3% (115)	35.5% (22)	
Agree	17.8% (39)	12.7% (20)	30.7% (19)	

Neither Agree nor Disagree	5.5% (12)	.6% (1)	17.7% (11)	
Disagree	5.9% (13)	4.5% (7)	9.7% (6)	
Strongly Disagree	8.2% (18)	8.9% (14)	6.5% (4)	
Don't Know	0% (0)	0% (0)	0% (0)	
Rose's mother-in-law heard in a community meeting that eggs help children grow. Though the family can't afford to buy many, Rose's mother-in-law she encourages rose to give her 7-month-old baby boy boiled egg yolk mashed with potatoes at least once a week.				<.0001
Strongly Agree	40.6% (89)	51.6% (81)	12.9% (8)	
Agree	32.9% (72)	35% (55)	27.4% (17)	
Neither Agree nor Disagree	14.2% (31)	8.9% (14)	27.4% (17)	
Disagree	8.2% (18)	2.6% (4)	22.6% (14)	
Strongly Disagree	3.7% (8)	1.9% (3)	8.1% (5)	
Don't Know	.5% (1)	0% (0)	1.6% (1)	
When Sarai gives birth, her family gives the newborn baby a tea made with boiled herbs before its first breastfeed to cleanse the stomach				<.0001
Strongly Agree	2.3% (5)	1.3% (2)	4.84% (3)	
Agree	3.2% (7)	0% (0)	11.3% (7)	
Neither Agree nor Disagree	3.7% (8)	0% (0)	12.9% (8)	
Disagree	35.5% (22)	14% (22)	35.5% (22)	
Strongly Disagree	35.5% (22)	84.7% (133)	35.5% (22)	
Don't Know	0% (0)	0% (0)	0% (0)	
Alice is pregnant with her first baby. At her first ANC visit the nurse gave her pills to take every day and said the pills will make her blood strong. Other mothers in her village tell her that the pills will make her baby big and cause her to have a difficult delivery. Alice decides not to take the pills.				<.0001
Strongly Agree	10.1% (22)	12.7% (20)	3.2% (2)	
Agree	5% (11)	.6% (1)	16.1% (10)	
Neither Agree nor Disagree	7.8% (17)	1.3% (2)	24.2% (15)	
Disagree	21% (46)	17.8% (28)	29% (18)	
Strongly Disagree	56.2% (123)	67.5% (106)	27% (17)	
Don't Know	0% (0)	0% (0)	0% (0)	
Margaret's 9-month-old baby has had diarrhea for several days. an elder woman in her community encourages her to breastfeed her baby more often and to give extra pap to the baby. Margaret listens to the grandmother and follows her advice.				<.0001
Strongly Agree	41.1% (90)	52.2% (82)	12.9% (8)	
Agree	37.4% (82)	31.9% (50)	51.6% (32)	
Neither Agree nor Disagree	12.3% (37)	7% (11)	25.8 (16)	
Disagree	4.6% (1)	4.5% (7)	4.8% (3)	
Strongly Disagree	4.6% (10)	4.5% (7)	4.8% (3)	
Don't Know	0% (0)	0% (0)	0% (0)	
Sophia's family gives Sophia's 3-month-old baby girl rice water with salt to prepare the baby's stomach for eating rice.				<.0001
Strongly Agree	.4% (1)	.6% (1)	0% (0)	
Agree	3.7% (8)	.6% (1)	11.3% (7)	
Neither Agree nor Disagree	5% (11)	.6% (1)	16.1% (10)	
Disagree	19.63% (43)	14% (2)	33.9% (21)	
Strongly Disagree	70.8% (155)	83.4% (131)	38.7% (24)	
Don't Know	.5% (1)	.6 (1)	0% (0)	

Table 1.5. Important sources of maternal and child health and nutrition advice as named by pregnant women and mothers with children < 2 years in the Mamanieva endline survey, Bum ADP; data presented as n (%).				
	Overall (n=375)	Intervention (n=225)	Control (n=150)	P value
Husband / Partner	257 (68.5)	160 (71.1)	97 (64.7)	0.18
Other wives	101 (26.9)	92 (40.9)	9 (6.0)	<0.001
Own Mother	249 (66.4)	165 (73.3)	84 (56.0)	0.005
Mother-in-Law	173 (46.1)	122 (54.2)	51 (34.0)	0.001
Aunt or other older female relative	144 (38.4)	111 (49.3)	33 (22.0)	<0.001
Older non-relative female	122 (32.5)	93 (41.3)	29 (19.3)	<0.001
Other mothers with young children	166 (44.3)	134 (59.6)	32 (21.3)	<0.001
Older male relatives	84 (22.4)	63 (28.0)	21 (14.0)	0.001
Religious leaders / Elders	59 (15.7)	54 (24.0)	5 (3.3)	<0.001
Health Care workers	354 (94.4)	214 (95.1)	140 (93.3)	0.46
Traditional healers/medicine providers	19 (5.1)	13 (5.8)	6 (4.0)	0.44
World Vision community facilitators	209 (55.7)	204 (90.7)	5 (3.3)	<0.001
2.5A. Among those naming source, % naming person as top source	Overall (n=375)	Intervention (n=225)	Control (n=150)	P value
Husband / Partner (n= 275)	138 (53.7)	83 (51.9)	55 (56.7)	0.002
Other wives (n=101)	16 (15.8)	15 (16.3)	1 (11.1)	0.43
Own Mother (n=249)	55 (22.1)	43 (26.1)	12 (14.3)	<0.001
Mother-in-Law (n=173)	34 (19.7)	25 (20.5)	9 (17.7)	<0.001
Aunt or other older female relative (n=144)	29 (20.1)	26 (23.4)	3 (9.1)	<0.001
Older non-relative female (n=122)	24 (19.7)	22 (23.7)	2 (6.9)	0.008
Other mothers with young children (n=166)	29 (17.5)	24 (17.9)	5 (15.6)	0.001
Older male relatives (n=84)	10 (11.9)	9 (14.3)	1 (4.8)	0.001
Religious leaders/Elders (n=59)	4 (6.8)	3 (5.6)	1 (20.0)	0.006
Health Care workers (n=354)	141 (39.8)	66 (30.8)	75 (53.6)	<0.001
Traditional healers/ medicine providers (n=19)	1 (5.3)	0 (0)	1 (16.7)	0.05
World Vision community facilitators (n=209)	69 (33.0)	68 (33.3)	1 (20.0)	0.72

Table 1.6. Women's responses to the question "what makes a child grow well" in the Mamanieva endline survey, Bum ADP; data presented as n(%). P-values estimated using tests for chi square.

Mother indicated:	Overall (n=375)	Intervention (n=225)	Control (n=150)	P value
Breastfeeding	312 (83.2)	190 (84.4)	122 (81.3)	.4299
Child eating enough food	289 (77.1)	191 (84.9)	98 (65.3)	<.0001
Child eating a diversity of foods	229 (61.1)	186 (82.7)	43 (28.7)	<.0001
Mother eating enough in pregnancy and/or when breastfeeding	226 (60.3)	179 (79.6)	47 (31.3)	<.0001
Child not getting sick	220 (58.7)	175 (77.8)	45 (30.0)	<.0001
Spiritual protection or divine will	102 (27.2)	87 (38.7)	15 (10.0)	<.0001
Doesn't know	11 (2.9)	0 (0.0)	11 (7.3)	<.0001

Table 1.7 Proportion of women correctly responding to maternal and infant diet and nutrition knowledge questions in the Mamanieva endline survey, Bum ADP (n=375). Data are n (%).

	Overall (n=375)	Intervention (n=225)	Control (n=150)	P value
<b>Pregnancy knowledge</b>				
PW should eat more	320 (85.3)	215 (95.6)	105 (70.0)	<.0001
PW should work less	331 (88.3)	214 (95.1)	117 (78.0)	<.0001
<b>IYCF knowledge</b>				
Should breastfeed immediately after delivery	352 (93.9)	224 (99.6)	128 (85.3)	<.0001
Should feed baby first yellow milk	339 (90.4)	225 (100)	114 (76.0)	<.0001
Should not give baby anything before it is put to breast for first time	361 (96.3)	220 (97.8)	141 (94.0)	.0587
Should not give baby anything other than breastmilk in first week of life	358 (95.5)	223 (99.1)	135 (90.0)	<.0001
Baby should be at least 6 months before receiving water for first time	344 (91.7)	219 (97.3)	125 (83.3)	<.0001
Baby should be 6–7 months old before it receives light porridge for the first time	325 (86.7)	202 (89.8)	123 (82.0)	.0300
Baby can receive thick porridge beginning at 6–7 months old	171 (45.6)	77 (34.2)	94 (62.7)	<.0001
Baby can receive eggs for the first time at 6–7 months	178 (47.5)	126 (56.0)	52 (34.7)	<.0001
Baby can receive meat or fish for the first time at 6–7 months	161 (42.9)	106 (47.1)	55 (36.7)	.0453
Baby can receive vegetables or fruits for the first time at 6–7 months	92 (24.5)	55 (24.4)	37 (24.7)	.9609
Baby can receive mashed beans, peas, lentils, or nuts for the first time at 6–7 months	235 (62.7)	163 (72.4)	72 (48.0)	<.0001
6–8.9 month olds should be fed foods other than breastmilk at least 2-3 times a day	329 (87.7)	194 (86.2)	135 (90.0)	.2746
9–11.9 month olds should be fed foods other than breastmilk at least 3 times a day	192 (51.2)	115 (51.1)	77 (51.3)	.9664
12–23.9 month olds should be fed foods other than breastmilk at least 4 times a day	68 (18.1)	42 (18.7)	26 (17.3)	.7427

Table 1.8. Responses of pregnant women and women with young children to Maternal and Child Health and Nutrition Scenarios in the Mamanieva Endline Survey; data presented as n (%). P values estimated using chi square.				
	Overall	Intervention	Control	Pvalue
Helen is pregnant with her first child. She is afraid of a difficult delivery and so during her last trimester, she decides to reduce the amount of food she is eating to prevent her baby from growing too big in her belly.				<.0001
Strongly Agree	4.47% (13)	1.09% (2)	10.28% (11)	
Agree	2.41% (7)	0% (0)	6.54% (7)	
Neither Agree nor Disagree	4.12% (12)	2.17% (4)	7.48% (8)	
Disagree	27.49% (80)	25.54% (47)	30.84% (33)	
Strongly Disagree	59.11% (172)	69.57% (128)	41.12% (44)	
Don't Know	2.41% (7)	1.63% (3)	3.74% (4)	
Kathryn has just delivered a baby boy. She puts the baby to the breast immediately after it is born so he can breastfeed.				<.0001
Strongly Agree	72.85% (212)	82.61% (152)	56.07% (60)	
Agree	23.02% (67)	16.3% (30)	34.58% (37)	
Neither Agree nor Disagree	1.37% (4)	0% (0)	3.74% (4)	
Disagree	.69% (2)	0% (0)	1.87% (2)	
Strongly Disagree	1.37% (4)	1.09% (2)	1.87% (2)	
Don't Know	.69% (2)	0% (0)	1.87% (2)	
Mary's baby boy is 3 months old. Mary does not have much food to eat in her household because the harvests have not been good this season. Her baby cries often and she fears she is not producing enough breastmilk. Her sister encourages her to continue only giving breastmilk, but her husband encourages her to begin feeding porridge. She follows her husband's advice and begins to feed him light pap.				<.0001
Strongly Agree	5.2% (15)	6.5% (12)	2.8% (3)	
Agree	5.2% (15)	2.7% (5)	9.4% (10)	
Neither Agree nor Disagree	3.4% (10)	0% (0)	9.4% (10)	
Disagree	31.6% (92)	23.9% (44)	44.9% (48)	
Strongly Disagree	54% (157)	66.9% (123)	31.8% (34)	
Don't Know	.7% (2)	0% (0)	1.9% (2)	
Massah has a 6-month-old baby boy. The health worker told her to begin feeding her baby semi-solid and mashed foods. Her family thinks he will choke on these foods and tells her to feed a thin pap made of rice flour and water instead. She follows her family's advice.				.1632
Strongly Agree	26.5% (77)	23.4% (43)	31.8% (34)	
Agree	34.4% (100)	36.4% (67)	30.9% (33)	
Neither Agree nor Disagree	10.3% (30)	9.2% (17)	12.2% (13)	
Disagree	11.7% (34)	10.3% (19)	14% (15)	
Strongly Disagree	16.5% (48)	20.1% (37)	10.3% (11)	
Don't Know	.7% (2)	.5% (1)	.9% (1)	
Dinah has heard that the first milk that is yellow is not clean and does not fill the baby up. She discards her first milk and feeds her baby cow's milk until her real milk comes in.				<.0001
Strongly Agree	2.8% (8)	1.63% (3)	4.7% (5)	
Agree	3.1% (9)	0% (0)	8.4% (9)	
Neither Agree nor Disagree	1.4% (4)	0% (0)	3.7% (4)	
Disagree	23% (67)	16.9% (31)	33.6% (36)	
Strongly Disagree	68.4% (199)	81.5% (150)	45.8% (49)	
Don't Know	1.4% (4)	0% (0)	3.7% (4)	
Martha has a four-month-old baby girl. It is very hot and dry. Martha's neighbor tells her to give the baby water or she might become thirsty. Martha insists that her breastmilk has enough water for the baby even in hot and dry weather and continues to give her baby only breastmilk.				<.0001
Strongly Agree	62.9% (183)	75% (138)	42.1% (45)	
Agree	21.7% (63)	16.3% (30)	30.9% (33)	
Neither Agree nor Disagree	1.7% (5)	0% (0)	4.7% (5)	

Table 1.8. Responses of pregnant women and women with young children to Maternal and Child Health and Nutrition Scenarios in the Mamanieva Endline Survey; data presented as n (%). P values estimated using chi square.				
	Overall	Intervention	Control	Pvalue
Disagree				
Disagree	7.6% (22)	3.3% (6)	15% (16)	
Strongly Disagree	5.5% (16)	5.4% (10)	5.6% (6)	
Don't Know	.7% (2)	0% (0)	1.9% (2)	
Rose's mother-in-law heard in a community meeting that eggs help children grow. Though the family can't afford to buy many, Rose's mother-in-law she encourages rose to give her 7-month-old baby boy boiled egg yolk mashed with potatoes at least once a week.				<.0001
Strongly Agree	37.1% (108)	50% (92)	15% (16)	
Agree	39.2% (114)	37.5% (69)	42.1% (45)	
Neither Agree nor Disagree	10.3% (30)	7.6% (14)	15% (16)	
Disagree	7.22% (21)	3.3% (6)	14% (15)	
Strongly Disagree	4.8% (14)	1.6% (3)	10.3% (11)	
Don't Know	1.4% (4)	0% (0)	3.7% (4)	
When Sarai gives birth, her family gives the newborn baby a tea made with boiled herbs before its first breastfeed to cleanse the stomach				<.0001
Strongly Agree	1.3% (4)	1.63% (3)	.9% (1)	
Agree	1.3% (4)	0% (0)	3.7% (4)	
Neither Agree nor Disagree	1.8% (5)	0% (0)	4.7% (5)	
Disagree	27.8% (81)	16.9% (31)	46.7% (50)	
Strongly Disagree	66.7% (194)	81.5% (150)	41.1% (44)	
Don't Know	1% (3)	0% (0)	2.8% (3)	
Alice is pregnant with her first baby. At her first ANC visit the nurse gave her pills to take every day and said the pills will make her blood strong. other mothers in her village tell her that the pills will make her baby big and cause her to have a difficult delivery. Alice decides not to take the pills.				<.0001
Strongly Agree	7.6% (22)	8.7% (16)	5.6% (6)	
Agree	2.4% (7)	1.1% (2)	4.7% (5)	
Neither Agree nor Disagree	2.1% (6)	.5% (1)	4.7% (5)	
Disagree	29.2% (85)	22.8% (42)	40.2% (43)	
Strongly Disagree	58.1% (169)	66.9% (123)	43% (46)	
Don't Know	.7% (2)	0% (0)	1.9% (2)	
Margaret's 9-month-old baby has had diarrhea for several days. an elder woman in her community encourages her to breastfeed her baby more often and to give extra pap to the baby. Margaret listens to the grandmother and follows her advice.				.0008
Strongly Agree	44.3% (129)	50% (92)	34.6% (37)	
Agree	35.4% (103)	33.2% (61)	39.2% (42)	
Neither Agree nor Disagree	6.9% (20)	4.4% (8)	11.2% (12)	
Disagree	5.8% (17)	4.4% (8)	8.4% (9)	
Strongly Disagree	6.2% (18)	8.2% (15)	2.8% (3)	
Don't Know	1.4% (4)	0% (0)	3.7% (4)	
Sophia's family gives Sophia's 3-month-old baby girl rice water with salt to prepare the baby's stomach for eating rice.				<.0001
Strongly Agree	.3% (1)	0% (0)	.9% (1)	
Agree	.7% (2)	0% (0)	1.9% (2)	
Neither Agree nor Disagree	1.7% (5)	0% (0)	4.7% (5)	
Disagree	25.1% (73)	14.7% (27)	43% (46)	
Strongly Disagree	71.1% (207)	85.3% (157)	46.7% (50)	
Don't Know	1% (3)	0% (0)	2.8% (3)	

Table 1.9 Intended infant feeding practices of 101 pregnant women included in the Mamanieva endline survey, Bum ADP; data presented as n (%). P-values estimated using tests for chi square.

	Overall (n=101)	Intervention (n=54)	Control (n=47)	P value
Begin breastfeeding within an hour				.1241
Very likely	89 (88.1)	50 (92.6)	39 (83.0)	
Somewhat likely	9 (8.9)	3 (5.6)	6 (12.8)	
Not sure	1 (1.0)	1 (1.9)	0 (0)	
Not at all likely	2 (2.0)	0 (0)	2 (4.3)	
Express and throw away the first yellow milk				<.0001
Very likely	22 (21.8)	4 (7.4)	18 (38.3)	
Somewhat likely	7 (6.9)	0 (0)	7 (14.9)	
Not sure	16 (15.8)	12 (22.2)	4 (8.5)	
Not at all likely	56 (55.5)	38 (70.4)	18 (38.3)	
Only give baby breastmilk in the first few days after birth				.0546
Very likely	68 (67.3)	35 (64.8)	33 (70.2)	
Somewhat likely	11 (11.0)	3 (5.6)	8 (17.0)	
Not sure	10 (9.9)	6 (11.1)	4 (8.5)	
Not at all likely	12 (11.9)	10 (18.5)	2 (4.3)	
Give baby teas, water, or other liquids during first week of life				.0387
Very likely	7 (6.9)	2 (3.7)	5 (10.6)	
Somewhat likely	6 (5.9)	0 (0)	6 (12.8)	
Not sure	29 (28.7)	18 (33.3)	11 (23.4)	
Not at all likely	59 (58.4)	34 (63.0)	25 (53.2)	
Give only breastmilk for first 6 months of life				.0002
Very likely	82 (81.2)	52 (96.3)	30 (63.8)	
Somewhat likely	7 (7.0)	1 (1.9)	6 (12.8)	
Not sure	5 (5.0)	0 (0)	5 (10.6)	
Not at all likely	7 (6.9)	1 (1.9)	6 (12.8)	
Introduce rice water, thin porridge, animal milk before the baby is 1 month old				.0306
Very likely	4 (4.0)	2 (3.7)	2 (4.3)	
Somewhat likely	4 (4.0)	1 (1.9)	3 (6.4)	
Not sure	29 (28.7)	10 (18.5)	19 (40.4)	
Not at all likely	64 (63.4)	41 (75.9)	23 (48.9)	
Introduce rice water, thin porridge, animal milk before the baby is 4 months old				.0096
Very likely	5 (5.0)	0 (0)	5 (10.6)	
Somewhat likely	8 (7.9)	1 (1.9)	7 (15.0)	
Not sure	25 (24.8)	17 (31.5)	8 (17.0)	
Not at all likely	63 (62.4)	36 (66.7)	27 (57.5)	
Introduce thick porridge or other semi-solid or soft foods when the baby finishes 6 months				.0950
Very likely	29 (28.7)	12 (22.2)	17 (36.2)	
Somewhat likely	39 (38.6)	21 (38.9)	18 (38.3)	
Not sure	8 (7.9)	5 (9.3)	3 (6.4)	
Not at all likely	25 (24.8)	16 (29.6)	9 (19.2)	
Give baby meat or eggs when it is 7 -10 months old				.0003
Very likely	42 (41.6)	29 (53.7)	13 (27.7)	
Somewhat likely	40 (39.6)	21 (38.9)	19 (40.4)	
Not sure	8 (7.9)	3 (5.6)	5 (10.6)	
Not at all likely	11 (11.0)	1 (1.9)	10 (21.3)	

Table 1.9 Intended infant feeding practices of 101 pregnant women included in the Mamanieva endline survey, Bum ADP; data presented as n (%). P-values estimated using tests for chi square.

	Overall (n=101)	Intervention (n=54)	Control (n=47)	P value
Give baby fruits and/or vegetables when it is 7-10 months old				.1018
Very likely	47 (46.5)	28 (51.9)	19 (40.4)	
Somewhat likely	36 (35.6)	19 (35.2)	17 (36.2)	
Not sure	8 (7.9)	4 (7.4)	4 (8.5)	
Not at all likely	10 (9.9)	3 (5.6)	7 (14.9)	
Continue to breastfeed until baby is at least 2 years old				<.0001
Very likely	58 (57.4)	44 (81.5)	14 (29.8)	
Somewhat likely	27 (26.7)	9 (16.7)	18 (38.3)	
Not sure	5 (5.0)	0 (0)	5 (10.6)	
Not at all likely	11 (10.9)	1 (1.9)	10 (21.3)	