An Examination of Exclusive Breastfeeding Implementation in Ethiopia and Mali: Factors Influencing Change

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ACRONYMS

DFATD	Department of Foreign Affairs, Trade and Development
MIC-KMI	Muskoka Initiative Consortium – Knowledge Management Initiative
EBF	Exclusive Breastfeeding
INGO	International Non-Governmental Organization
IYCF	Infant and Young Child Feeding
LMIC	Low- and Middle-Income Country
WHO	World Health Organization
BCC	Behavior Change Communication
CHW	Community Health Worker
RCT	Randomized Controlled Trial
IMCI	Integrated Management of Childhood Illness
BFHI	Baby Friendly Hospital Initiative
CFIR	Consolidated Framework for Implementation Research
HCR	Health Care Recipient
IYCN	Infant and Young Child Nutrition
HV	Health Volunteer
FGD	Focus Group Discussion
GO	Government
HEW	Health Extension Worker
M2M	Mother-to-Mother
MNCH	Maternal Newborn and Child Health
WDA	Women's Development Army

EXECUTIVE SUMMARY

In 2012, a Consortium of international non-governmental organizations (CARE Canada, Plan International Canada Inc., Save the Children Canada, and World Vision Canada) partnered *with the* Hospital for Sick Children and the University of Toronto Munk School of Global Affairs with funding support from the Department of Foreign Affairs, Trade and Development (DFATD) through the Government of Canada's commitment to maternal newborn and child health, hereon referred to as the Muskoka Initiative.

Research Question

What contextual factors are associated with successful implementation of EBF programs in low- and middle-income countries (LMICs)?

Among the work supported by the Muskoka Initiative Consortium – Knowledge Management Initiative (MIC-KMI) were two field studies. The focus of the present research project was exclusive breastfeeding (EBF), an intervention implemented by all MIC-KMI projects. Specifically, the field study explored a range of contextual influences associated with the successful implementation of EBF in two countries, Ethiopia and Mali. The findings have implications for how global health and development actors may plan for future programmatic implementation, how they may understand outcomes from such efforts, and contribute more generally to our knowledge of factors that play a key role in successful implementation of evidence in similar contexts.

Interventions to promote optimal infant and young child feeding (IYCF) practices are a critical part of efforts to reduce infant mortality and morbidity in LMICs. One component of optimal feeding is exclusive breastfeeding (EBF), defined as the exclusive provision of breast milk for the first 6 months of life. The World Health Organization (WHO) guidelines for optimal breastfeeding practices have been disseminated widely, and the promotion of EBF has been recognized as an essential nutrition action (WHO, 2014). This is due to the strength of existing evidence supporting the effectiveness of EBF in reducing the burden of disease in populations. Breast milk provides the optimal balance of nutrients, and transfers antibodies from mother to child. In addition, EBF excludes potentially contaminated water or food from an infant's diet, which helps to prevent diarrheal disease and other infections.

Although there are a number of guiding models and frameworks for implementation, few comprehensively address the diverse array of factors associated with implementation success. *The* Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009) organizes these factors into five domains (intervention characteristics, inner setting, outer setting, characteristics of individuals (i.e., practitioner, or in this case, CHW), and the implementation process) of 31 measureable constructs. The CFIR allows for the comprehensive examination and categorization of a variety of contextual factors that are associated with successful implementation across a variety of disciplines (e.g., global health, education, mental health, etc.), as well as specific challenges, barriers, and facilitators identified during implementation and evaluation of programs that have the potential to modify the effect of an intervention. The application of CFIR to an intervention well supported by evidence, such as EBF promotion, allows for the examination of factors that may distinguish programs with high and low implementation effectiveness, and elucidates those factors associated with implementation success.

Methods

This is a case study of EBF interventions in two countries (Ethiopia, in collaboration with Care, and Mali, in collaboration with Save the Children) that is conceptually linked to the CFIR implementation framework (Damschroder et al., 2009), allowing for comparison of findings across contexts/countries/cases. Mixed methods combined semi-structured interviews and focus group discussions (FGDs) with key informants, with baseline and endline quantitative survey data from each country. In Ethiopia, interviews and FGDs were conducted in three kebeles in East and West Hararghe: Ifa Aman, Jiru Belina, Biftu Geda. In Mali qualitative data were collected in three villages of the Sikasso region in the south of Mali: Sieou, Kiko, Nangola. In order to gain a comprehensive understanding of the EBF implementation process, we examined the perspectives of both program recipients (i.e., mothers) and program implementers (i.e., International Non-Governmental Organizations (INGOs) staff in Ethiopia, Mali and Canada; government (GO) staff in Ethiopia and Mali; community health workers (CHWs); and health extension workers (HEWs)).

EBF program activities were similar yet tailored to address external country contexts. In Ethiopia, HEWs supported M2M (mother-to-mother) group leaders, who, based on government policy, were unpaid, whereas HEWs received a salary. In Mali, CHWs were paid by the government and INGO, and their work was supported by the community in which they worked. In both countries, EBF was a component of a larger health initiative that focused on diarrhea and malaria treatment, hygiene, sanitation and other health interventions. EBF was implemented through various activities, such as home visits, use of educational materials, training of influential community and family members, and radio messages.

Results

In both countries, we learned that EBF implementation is facilitated by engaging influential community members, such as religious leaders; repeated exposure to information on EBF practice and benefits; exposure to the testimonials of community members who adopted EBF; and recognition of the strong need for change in the community based on the observed poor health outcomes of infants and children who are not exclusively breastfed.

Barriers to EBF implementation included certain characteristics of mothers' personalities, such as an initial resistance to novel practice and existing knowledge. Other barriers included a commitment to strong traditional beliefs and practices regarding infant and child feeding, traditional gender roles, initial low regard for the work of CHWs, HEWs, and M2M leaders, transportation and financial difficulties, among others.

In both countries, most mothers, HEWs, M2M leaders, and CHWs initially reacted with disbelief and resistance to the idea that breast milk was sufficient for infants' optimal development and that water was not necessary for infants in the first six months of life; this posed an obstacle to EBF implementation. Gender roles also emerged as a significant barrier to EBF at the beginning of the projects, although participants reported shifts in gender roles as EBF implementation unfolded, particularly in Ethiopia. This is a very important aspect of the implementation process because mothers could not implement EBF, even if they understood the benefits and were persuaded by the information, if they did not receive help with household work and additional social supports.

The evidence emerging from this study suggests that certain modifications would improve the CFIR model, specifically the inclusion of new contextual factors pertaining to *supervision* of CHWs, HEWs, and M2M leaders, provision of *remuneration* to CHWs, attention to the *sustainability* of the intervention over time, and factors

associated with the *characteristics of intervention recipients* (e.g., education, socio-economic status, family composition, and traditional and religious beliefs and practices). With respect to existing CFIR constructs, our analysis of interviews and focus groups revealed several contextual factors that were strongly related to implementation effectiveness in both countries, including:

- the extent to which the intervention could be adapted to the local context (*adaptation*);
- the perceived *relative advantage* of EBF compared to traditional feeding practices;
- *complexity* of the intervention, that was addressed in many ways;
- awareness of the *needs* of the targeted population, *resources* available, and taking these into account in program development and implementation planning;
- a high level of networking with like-minded, external organizations working in the same regions (*cosmopolitanism*);
- implementing interventions that prioritize the intervention at a national level, through policies and regulations (*external policies & incentives*);
- working in areas where there is a high *tension for change* relative to the status quo;
- providing implementation agents (e.g., CHWs, HEWs, M2M leaders) with access to *information and knowledge* about the intervention;
- supporting the attitudes toward and value placed on the intervention on the part of implementation agents (e.g., CHWs, HEWs, M2M leaders) (*knowledge and beliefs*); and
- establishing strong *champions* for the intervention.

Discussion

A recent study looking at the reporting of context and implementation information in studies of global health interventions found it to be very limited and highly variable (Luoto, Shekelle, Maglione, Johnsen, & Perry, 2014). The present study helps to fill a research gap when it comes to examining the range of factors that play a role in the implementation of a health intervention in a global health context (low and middle income countries) informed by the Consolidated Framework for Implementation Research (CFIR). Findings highlight factors that emerge as most related to implementation effectiveness from among a wide range of factors, having implications for how global health and development actors plan and account for change. In addition, results contribute to the refinement of the CFIR, enhancing its utility for further research and planning.

Themes emerging from our respondent focus groups and interviews largely support findings from previous research and they are similar for both Mali and Ethiopia (i.e., although the details of how they manifested in the two contexts differed, the general themes were the same). In particular, the predominance of traditional beliefs, knowledge and practices regarding infant feeding as well as gender roles and their impact on mothers' decision-making and workload distribution emerged in both countries as significant considerations relative to EBF implementation and behaviour change. Although these barriers were known to the INGOs who considered them in planning the activities employed in their programming, they were nonetheless difficult to shift, largely because of the limited timeframe of the projects (i.e., 2-3 years, which is insufficient to produce long-term, significant behaviour changes).

Implementation research has also identified the importance of considering implementation outcomes, in addition to health outcomes (i.e., implementing an intervention with fidelity). Attending to implementation outcomes within the context of maternal, newborn and child health program evaluation is critical because it provides

important information for interpreting health outcomes. Future MNCH programming in LMICs would benefit from planning that incorporates evidence on key implementation factors, including measurement of implementation outcomes such as fidelity and sustainability.

Implications for global health and development programming

- This research highlights behaviour change strategies, like the use of testimonials from mothers who had adopted EBF and harnessing the support of influential community members as EBF *champions*, which were perceived by mothers to be most compelling for behaviour change. This was evident in both Mali and Ethiopia. As such, future health programming should incorporate these strategies for optimal impact.
- Our research identified key obstacles to EBF implementation in both countries, including the impact of *gender roles*, influence of *traditional beliefs* and the *influence of other household members* (mothers in law, husbands). Although the INGOs were aware of these influences based on their situational analyses, more could be done to address them (i.e., tracking knowledge shifts in CHWs pre/post training; tracking CHW contacts (frequency and quality) with households; tracking CHW fidelity to delivering the specific components of the intervention/activity being measured.
- Our CFIR analyses revealed several contextual factors that had a strong positive association with implementation effectiveness in both countries. Among these factors, the most strongly associated were: the *adaptability*, *complexity*, and *relative advantage* of the intervention (Characteristics of the Intervention); consideration of the *needs* of program recipients in the planning and delivery of the intervention, *collaborations* (*cosmopolitanism*) with organizations having a similar mandate and working in the same regions, and supportive *external policies and incentives* (Outer Setting); *tension for change* in the country or regional context and *access to knowledge and information* about the intervention (Inner Setting); consideration of *sustainability* of the intervention over the long term, use of *champions* (Process); and finally, aspects of *family composition* and *traditional beliefs* that can impact behaviour change (Characteristics of the Mother). Recognition of the role these factors play in successful implementation could inform future INGO programming focus, planning and measurement in LMICs.

BACKGROUND

Context

In 2012, a Consortium of international non-governmental organizations (CARE Canada, Plan International Canada Inc., Save the Children Canada, and World Vision Canada) partnered *with the* The Hospital for Sick Children and the University of Toronto Munk School of Global Affairs with funding support from the Department of Foreign Affairs, Trade and Development (DFATD) through the Government of Canada's commitment to maternal newborn and child health, hereon referred to as the Muskoka Initiative.

Among the work supported by the Muskoka Initiative Consortium – Knowledge Management Initiative (MIC-KMI) were two field studies. This final report comprises one of these studies, and is supported by additional materials, namely an infographic – a graphic visual representation of the knowledge emerging from the research - and a Research Snapshot that briefly summarizes the main messages from the research.

The focus of the present research project was exclusive breastfeeding (EBF), an intervention implemented by MIC-KMI projects. Specifically, the field study explored a range of contextual influences associated with the successful implementation of EBF in two countries, Ethiopia and Mali. The findings have implications for how global health and development actors may plan for future programmatic implementation, how they may understand outcomes from such efforts, and contribute more generally to our knowledge of factors that play a key role in successful implementation of evidence in similar contexts.

Research Question

What contextual factors are associated with successful implementation of EBF programs in low- and middle-income countries (LMICs)?

Background and Rationale for Exploring EBF Promotion

Interventions to promote optimal infant and young child feeding (IYCF) practices are a critical part of efforts to reduce infant mortality and morbidity in LMICs. One component of optimal feeding is exclusive breastfeeding (EBF), defined as the exclusive provision of breast milk for the first 6 months of life. The only exceptions are vitamin capsules, oral rehydration therapy, or other medications (WHO, http://www.who.int/nutrition/topics/exclusive_breastfeeding/en/ accessed 7 October 2013). Infant and young child feeding indicators are typically estimated based on respondents' recall of feeding within the 24-hour period preceding the interview, and, more rarely, based on birth recall; this variability in measurement can explain some of the differences in EBF rates noted in different studies (WHO, 2011). For instance, a cross-sectional study of the prevalence of EBF practices in Bahir Dar City, Ethiopia that used since birth recall noted that this non-standard measure might help explain (along with cultural differences) variations in reported EBF rates between studies. The authors also recognized the increased risk of recall bias with this measure of EBF, as opposed to a 24-hour recall (Seid, Yesuf, & Koye, 2013). Another cross-sectional study done in Accra, Ghana collected data on EBF prevalence using both the since birth recall and 24-hour recall definitions (Aidam, Perez-Escamilla, Lartey, & Aidam, 2005). Although multivariate logistic regression modeling found a very high correlation between the two measures ($r=0.66$, $P<0.01$ $n=376$), the 24-hour recall did overestimate EBF prevalence (70.2%) compared with the since birth recall (51.6%). Since determining EBF is based on excluding consumption of all other food and liquid,

the accuracy of this indicator is influenced by the range of food groups included in the survey, as well as the accuracy of respondents' recall (WHO, 2011). In this line of reasoning, a systematic review of breastfeeding promotion interventions found extensive heterogeneity in outcome definitions for EBF (e.g. EBF encompassing "fully" and "predominant" breastfeeding), as well as intervention to follow-up intervals. The time for mother's recall of feeding practices also varied, with some studies using since birth recall, and some using a 24-hour recall (Haroon, Das, Salam, Imdad, & Bhutta, 2013).

The World Health Organization (WHO) guidelines for optimal breastfeeding practices have been disseminated widely, and the promotion of EBF has been recognized as an essential nutrition action (WHO, 2014). This is due to the strength of existing evidence supporting the effectiveness of EBF in reducing the burden of disease in populations. Breast milk provides the optimal balance of nutrients, and transfers antibodies from mother to child. In addition, EBF excludes potentially contaminated water or food from an infant's diet, which helps to prevent diarrheal disease and other infections.

Given the widely documented benefits of EBF, specific interventions have been developed that can help to increase EBF rates in populations. Evidence cited in multiple systematic reviews support the effectiveness of EBF promotion programs in increasing EBF rates among at-risk populations in low-income countries (Gilmore & McAuliffe, 2013; Hall, 2011; Haroon, Das, Salam, Imdad, & Bhutta, 2013; Imdad, Yakoob, & Bhutta, 2011; Sudfeld, Fawzi, & Lahariya, 2012). Examples of specific interventions include nutrition counseling and peer support, mother-to-mother groups, behavior change communication (BCC), and other community-based interventions delivered by Community Health Workers (CHWs).

Reviews highlight the importance of promoting EBF by demonstrating that they can contribute to significant increases in EBF rates. These studies typically examine a very narrow range of implementation factors (e.g. the *number of CHWs trained*; *mothers education level*), and link them with a primary *health outcome* (change in EBF rates). More generally, a recent study looking at the reporting of context and implementation information in studies of global health interventions found it to be very limited and highly variable (Luoto, Shekelle, Maglione, Johnsen, & Perry, 2014). Thus, at present, there is a notable lack of evidence pertaining to the contribution of different contextual factors influencing implementation of EBF interventions, as well as implementation outcomes other than changes in health indicators (i.e. intervention fidelity and sustainability). This is due in part to the structure of randomized controlled trials (RCTs) being optimized for assessing program efficacy through controlling of confounding factors, rather than evaluating the reasons for implementation effectiveness. This study addresses this knowledge gap.

In the following sections we briefly describe the types of interventions that have been utilized to increase EBF rates in LMICs. We then outline contextual factors that act as facilitators or barriers to successful implementation of EBF promotion programs, and discuss implementation outcomes and their consideration in the literature with respect to EBF promotion interventions.

EBF Promotion Interventions

A variety of interventions to increase rates of EBF have been detailed in the literature. The WHO provides a comprehensive list of breastfeeding promotion interventions, separated into four general categories: *national-level*

and advocacy, training and capacity building, behaviour change communication, and *community-based activities* (WHO, 2008). Table 1 provides brief descriptions of such interventions with examples.

Table 1: EBF promotion interventions and illustrative examples

Category	Brief Description	Examples
National-level advocacy	Policies and guidelines at the national level that create an environment supportive of EBF and other optimal feeding practices.	Development of the Code of Marketing of Breast-milk substitutes Development of IYCF strategy Create HIV and infant feeding guidelines Development of Maternity legislation PROFILES[1] or other nutrition advocacy process Use of the Convention on the Rights of the Child
Training and capacity building	Training on optimal feeding practices provided to front-line community-based providers of health care and maternal counselling, including: Health care professionals Peer and lay counselors Multi-purpose community health workers Community development and extension workers Traditional health practitioners (TBAs, traditional healers, herbalists, etc.) Local breastfeeding advocates (Grandmothers, supportive men, local media, members of village health committees)	Training and capacity building have covered a variety of topics including: Breastfeeding Lactation management Complementary feeding IYCF counseling course Counseling and communication skills HIV and infant feeding Baby-Friendly Hospital Initiative Facility-based care showed 87% increase (RR: 1.87, 95% CI: 1.26-2.78) in EBF at 1-5 months
Behaviour Change Communication	Disseminating messages promoting the adoption of EBF practices through a variety of	Formative research and behavioural assessments Workshops for message and material development Radio and television campaigns

[1] It is a process designed to demonstrate the contribution that improved nutrition can make to human and economic development and to influence the way policy makers think about public health nutrition issues and the priority they give to investing in nutrition programs. At the heart of this approach is a set of computer models that translate nutrition data and scientific analyses into terms and arguments that make sense to non-experts (http://www.globalhealthcommunication.org/tools/18)

Category	Brief Description	Examples
(BCC)	media.	Print materials
Community-based activities	Direct, face-to-face engagement and communication with mothers in different environments.	Individual counseling 90% increase (RR: 1.90, 95% CI: 1.54-2.34) in EBF rates at 1-5 months Group education sessions 80% increase (RR: 1.80, 95% CI: 1.18-2.74) in EBF rates at 1-5 months Combined individual and group counseling 101% increase (RR: 2.01, 95% CI: 1.43-2.82) in EBF rates at 1-5 months Community links with health facilities Combined facility- and community-based care showed 47% increase (RR: 1.47, 95% CI: 1.08-1.99) in EBF rates at 1-5 months Sensitization meetings with local leaders and community dialogue Community mobilization Mother-to-mother support groups for breastfeeding Other types of women's groups Workplace initiatives

Adapted from WHO 2008. Examples of pooled effect size estimates adapted from a meta-analysis by Haroon et al. (2013)

Although at present there is little evidence regarding the mechanism by which each intervention leads to changes in maternal behaviour, the existing research suggests that there is nevertheless a beneficial effect on EBF rates. Intervention strategies that have been recognized as particularly successful in increasing rates of EBF include the use of peer or lay counselors, home visitation of trained personnel, mother-to-mother support groups, as well as health facility-based counselling packages of intervention such as Integrated Management of Childhood Illness (IMCI) programs, the Baby Friendly Hospital Initiative (BFHI), and other large-scale awareness programs communicating the importance of optimal feeding practices (Haroon et al., 2013). Meta-analysis of pooled results from a systematic review of a variety of EBF promotion interventions (34 RCTs, 19 quasi-experimental trials) estimated a 90% increase [RR 1.90, 95% CI 1.54, 2.34] in EBF rates for infants 1-5 months, and a 188% increase [RR 2.88, 95% CI 2.11, 3.93] in EBF rates for infants 1-5 months in a subgroup of trials including only developing countries (Haroon et al., 2013). The larger effect size found for EBF promotion interventions in LMICs suggests greater potential for high impact interventions in those areas where the burden of infectious disease and malnutrition is highest, or where the *relative priority* of the intervention is most salient.

Although significant increases in EBF rates have resulted from a variety of promotion interventions there is variation in their relative effectiveness and there are synergies from combinations of interventions that are difficult to quantify. A systematic review exploring the effectiveness of CHWs in delivering preventative interventions in LMICs found that substantial heterogeneity between studies made it impossible to conduct a meta-analysis of effect sizes (Gilmore & McAuliffe, 2013). However, evidence suggests that CHWs are particularly effective in promoting EBF and other maternal behaviours. Meta-analysis of results from 62 trials of peer counseling from both LMICs and high-income countries found that the likelihood of EBF is 2.46 times higher (95% CI: 1.99 to 3.04, $p<0.001$) among mothers who received counseling than among those who did not

(Fanzo et al., 2014). Furthermore, only 31% of the variation in effect size between countries could be accounted for by the country-level contextual factors measured, such as adult literacy rate, adolescent birth rate, and female labour participation. This suggests there may be wide variations in experimental design, local context, and implementation quality between programs, which further highlights the need to more closely examine these factors and address those that can impact intervention effectiveness. Understanding the impact of CHWs could also be improved by exploring the extent to which they deliver the core features of the intervention as intended (fidelity), and how often they interact with the target mothers in the population (dose).

There are concerns regarding the design quality of these efficacy trials. For instance, a systematic review exploring the effectiveness of health education interventions in increasing the duration of EBF in low-income countries assessed trial quality, and concluded that methodological limitations did not allow for a meaningful statement of effectiveness to be made (Okyere, Woodall, & Appiah-Brempong, 2014). These studies concluded that more rigorous and in-depth research is required to measure the effectiveness of different EBF promotion interventions in various contexts.

Implementation Barriers and Facilitators

Many factors can facilitate or hinder the effectiveness of EBF interventions during the course of implementation. A systematic review by Pérez-Escamilla et al. (2012) regarding the "dissemination, diffusion, scale up, and sustainability of EBF programs in LMICs" identified a comprehensive list of barriers and enablers for effectively and sustainably implementing and scaling up different EBF programs across 28 LMICs in Africa, Latin America and the Caribbean, and Asia. The 17 studies included (peer-reviewed and grey literature) were diverse in their methodology, and encompassed case studies, literature reviews, pre/post interventions, and one RCT, among other designs. Between 3 and 10 of the 17 sources included in the systematic review cited enabling factors, and between 1 and 7 sources cited barriers. This list identifies a disproportionate number of factors related to the *Outer Setting*, presumably because of the importance of a supportive external environment for the sustainability of EBF promotion interventions. Specific types of EBF promotion programs recognized as supporting sustainability and scale-up of EBF coverage are found in Table 2.

Table 2: Enablers and barriers to effective EBF promotion program implementation and scale up identified

Enablers	Barriers
• Contextual • International advocacy groups: International Baby Food Action Network, World Alliance for Breastfeeding Action • Evidence-based recommendations: timely initiation of breastfeeding; exclusive breastfeeding for 6 months (WHO) • International consensus meetings/declarations: Bellagio and beyond • Political Support • Cost/savings analyses • Local advocacy and coalition building, including public opinion leaders • Civil society mobilization and engagement	• Unethical marketing of infant formula • Maternal employment • Unsustainable workforce development system • Overburdened staff in medical facilities and in community health settings • Community health worker investment just to promote breastfeeding difficult to justify • Strong dependency on international aid (affects sustainability) • Weak monitoring and evaluation systems • Prolonged lag time before impacts can be detected • Lack of community-level breastfeeding

Enablers	Barriers
• Political sensitization • Political will • Long-term commitment to scaling up • Process and sustainability facilitators • Research and evaluation • Baseline facility and community needs assessment • Operational (formative) research/pilot studies • Program delivery • Facility-based delivery system, e.g., Baby-Friendly Hospital Initiative • Community-based exclusive breastfeeding promotion and support: baby-friendly primary health care units, peer counselors, community health workers, mother-to-mother support groups • Communications/mass media campaigns targeting opinion leaders, policymakers, mothers; simple and doable messages; celebrities • Visible community events: world breastfeeding week, other • Program delivery through other existing programs: immunizations, diarrheal control, family planning, and other programs • Workforce development • Training: administrators, health professionals, and paraprofessionals • Endorsement from medical societies • Medical/nursing school curricula • Legislation: maternity leave, workplace, WHO Code • Program Coordination and quality control • Inter-sectoral coordination: government, civil society (nongovernmental organizations, philanthropists), medical societies, academic researchers, mass media • Monitoring and evaluation, low cost, rapid response	promotion and support • High turnover of unpaid "volunteers" • Cultural beliefs: "insufficient" milk, other • Lack of multilevel incentives • Program "fatigue" • Lack of referral system for lactation management problems • Poor interpersonal communication skills among peer counselors/community health workers

(Pérez-Escamilla et al., 2012)

Several studies have examined predictors and contextual factors associated with EBF practices in several developing countries. Looking specifically at Ethiopia and Mali, existing research is quite limited, particularly in Mali. DHS 2012-2013 data show EBF rates of 35% in Mali (http://data.unicef.org/countries/MLI) and 2011 DHS data show EBF rates of 52% in Ethiopia (http://data.unicef.org/countries/ETH). The EBF rate was been shown to vary across communities in Ethiopia, but has consistently decreased sharply once the infant is 4-5 months old,

which is prior to the recommended duration of 6 months (Alemayehu, Haidar, & Habte, 2009; Seid, Yesuf, & Koye, 2013; Seifu, Assefa, & Egata, 2014; Setegn et al., 2012).

In addition, research studies conducted in Ethiopia looked at several variables associated with EBF rates. For instance, in a study examining non-EBF in rural areas of eastern Ethiopia, Egata and colleagues found that mothers with no marital relationships, poor access to health facilities, and inadequate knowledge about infant and young child feeding practices were less likely to exclusively breastfeed their infants (Egata, Berhane, & Worku, 2013). In other studies, maternal occupation, place and mode of delivery, and absence of counseling on feeding practices have been cited as predictors of non-EBF (Seid, Yesuf, & Koye, 2013), as has the perception of insufficient milk (Setegn et al., 2012). In addition, attendance at an antenatal care visit was found to be independently associated with EBF in Jimma Town (Seifu, Assefa, & Egata, 2014) and Debre Markos (Mekuria & Edris, 2015), but not in a study examining Ethiopia as a whole (Alemayehu, Haidar, & Habte, 2009). The most common reasons cited for non-EBF found in the Debre Markos study included the practice being incompatible with maternal work, the belief that breastfeeding alone is insufficient, the perception of producing less milk, and the belief that an infant is thirsty (Mekuria & Edris, 2015). In Mali, a cross-sectional study of mothers in the city of Bamako found an association between the practice EBF and early initiation (<30 min) of breastfeeding, having had ≥4 antenatal care visits, as well as a higher level of maternal education (Traoré et al., 2014). In addition, a situational analysis of child nutrition policy in Mali found that although monitoring and evaluation was done for some breastfeeding interventions, determining *fidelity* was difficult as there was no mechanism in place by which one could capture whether components of the program were being implemented as originally intended (Wuehler & Coulibaly, 2011).

Looking at EBF research conducted in other parts of Africa, a study of mothers living in informal settlements in Kenya cited perceptions of insufficient breast milk and lower levels of maternal education as determinants of the introduction of complementary food before six months of age (E. Kimani-Murage et al., 2011). A qualitative study in Zambia supported these findings and also showed that the influence of family members was a significant barrier to both EBF and the translation of knowledge provided by health workers (Fjeld, Siziya, Katepa-Bwalya, & Kankasa, 2008).

An RCT of a counseling intervention in Brazil, South Amercia explored the effect of a single contextual factor - new mothers living both with and without their own mothers (i.e. baby's grandmother)- but found this had no significant effect on the duration of EBF (de Oliveira, Giugliani, do Espirito Santo, & Nunes, 2014). Other facilitators of EBF adoption following behavior change communications include awareness of breast milk's benefits, family support with child care, and the recognition of breastfeeding as a priority over household work (Avula et al., 2013). In summary, cultural, family, and personal beliefs of breast milk insufficiency coupled with mothers' lack of knowledge of the benefits of EBF are common themes in the literature with regards to mothers' characteristics.

Although these types of contextual factors are important considerations for program planning and evaluation, they often only take into account mother-household characteristics. The potential influence of these constructs on EBF practices is made clear, but their effect on the actual process of implementing EBF promotion programs and the implications for their effectiveness in increasing EBF rates is not well understood or prioritized for investigation. There is evidence that new studies on the effectiveness of EBF promotion are beginning to embed qualitative analysis of a variety of barriers and facilitators into their design. For instance, a published protocol for an RCT of

home-based nutritional counseling in Nairobi informal settlements describes one of the main objectives as an explicit assessment of these influences, including satisfaction, personal experiences, and various facilitating and limiting factors (Kimani-Murage et al., 2013). Some important implementation challenges have looked beyond maternal socioeconomic and demographic characteristics in an evaluation of the PROMISE-EBF study, a randomized behaviour change intervention trial using peer counselors to promote EBF, rolled out in Burkina Faso, Uganda, and South Africa for 2579 mother-infant pairs (Engebretsen et al., 2014). In this study, researchers described mothers' acceptance of, and satisfaction with, peer counselors were significant barriers, but only in South Africa. This was attributed in part to local cultural issues, the peer counsellors' need for constant supervision, and a lack of community acceptance of the peer counselors due to the recruitment methods used. In order to be useful to implementers of EBF promotion programs, future research exploring the determinants of EBF implementation success in specific communities – on which clinical success is contingent - should adopt a broader perspective, and include contextual factors relevant not only to the mother and baby, but also those factors that could affect program effectiveness.

Contextual Factors Associated with Implementation Success

Although there are a number of guiding models and frameworks for implementation, few come close to comprehensively outlining the diverse array of factors implicated in implementation success. The Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009) outlines five domains (intervention characteristics, inner setting, outer setting, characteristics of individuals (i.e., practitioner, or in this case, CHW), and the implementation process) and 31 measureable constructs that allow for the comprehensive examination and categorization of a variety of contextual factors that are associated with successful implementation across a variety of disciplines (e.g. global health, education, mental health, etc.), as well as specific challenges, barriers, and facilitators identified during implementation and evaluation of programs that have the potential to modify the effect of an intervention.

The application of CFIR to an intervention well supported by evidence, such as EBF promotion, allows for the examination of factors that distinguish program settings demonstrating high and low implementation effectiveness. Table 3 outlines the domains of the modified 'CFIR+' utilized in this study, as well as the constructs contained within each category. The '+' symbolizes the added domain associated with the characteristics of the mother and baby, as well as additional constructs (e.g., remuneration; supervision model, etc.) which represent critical considerations for implementation of EBF promotion programs.

Table 3: The CFIR+ domains and embedded constructs, adapted from (Damschroder et al., 2009)

Domains/Constructs	Description
Process	
Planning	The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance and the quality of those schemes or methods.
Engaging	Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities.
Opinion Leaders	Individuals in an organization who have formal or informal influence on the attitudes and beliefs of their colleagues with respect to implementing the intervention
Formally appointed internal implementation leaders	Individuals from within the organization who have been formally appointed with responsibility for implementing an intervention as coordinator, project manager, team leader, or other similar role.
Champions	Individuals who dedicate themselves to supporting, marketing, and 'driving through' an [implementation; overcoming indifference or resistance that the intervention may provoke in an organization.
External Change Agents	Individuals who are affiliated with an outside entity who formally influence or facilitate intervention decisions in a desirable direction.
Executing	Carrying out or accomplishing the implementation according to plan.
Reflecting and Evaluating **a. Supervision ***	Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience. Part of the evidence comes from our previous research on implementation in CYMH, but it would be important to see if anyone else has published on the link between supervision model and implementation. http://www.kidsmentalhealth.ca/documents/tp3_the_role_of_supervision_in_the_implementation_of_eip.pdf Supervision is vital for effective implementation. • Training in evidence-based practice is necessary but not sufficient to improve client outcomes (Dorsey et al, 2013) • Developing clinical competencies in EIPs (as an ongoing process) requires supervision (Falender & Shafranske, 2012) • Supervisors have significant influence on service providers and have lower rates of turnover (Dorsey et al, 2013) A model and guide for evaluating supervision outcomes in cognitive–behavioral therapy-focused training programs. Lewis, Cara C.; Scott, Kelli E.; Hendricks, Karin E. Training and Education in Professional Psychology, Vol 8(3), Aug 2014, 165-173. http://dx.doi.org/10.1037/tep0000029
Characteristics of the Intervention (program; EBF)	
Intervention source	Perception of key stakeholders about whether the intervention is externally or internally driven.
Evidence strength and quality for EBF	Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes.
Relative advantage	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution.

Domains/Constructs	Description
Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs.
Trialability	The ability to test the intervention on a small scale in the organization [8], and to be able to reverse course (undo implementation) if warranted.
Complexity	Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement
Design Quality and Packaging	Perceived excellence in how the intervention is bundled, presented, and assembled
Cost	Costs of the intervention and costs associated with implementing that intervention including investment, supply, and opportunity costs.
Outer Setting	
Patient Needs and Resources	The extent to which patient needs, as well as barriers and facilitators to meet those needs are accurately known and prioritized by the organization.
Cosmopolitanism	The degree to which an organization is networked with other external organizations.
Peer pressure	Mimetic or competitive pressure to implement an intervention; typically because most or other key peer or competing organizations have already implemented or in a bid for a competitive edge.
External Policies and Incentives	A broad construct that includes external strategies to spread interventions including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting.
Remuneration	the construct pertains to whether the individual implementing the intervention is paid or considered volunteer. Payment can also be in cash or resources. Remuneration is related to sustainability considerations, and one must also consider who pays the salary/remuneration (INGO, government, village, other).
Inner Setting	
Structural characteristics	The social architecture, age, maturity, and size of an organization.
Networks and communication	The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization.
Culture	Norms, values, and basic assumptions of a given organization.
Implementation climate	4. The absorptive capacity for change, shared receptivity of involved individuals to an intervention and the extent to which use of that intervention will be rewarded, supported, and expected within their organization.
Tension for change	The degree to which stakeholders perceive the current situation as intolerable or needing change.
Compatibility	The degree of tangible fit between meaning and values attached to the intervention by involved individuals, how those align with individuals' own norms, values, and perceived risks and needs, and how the intervention fits with existing workflows and systems.
Relative priority	Individuals' shared perception of the importance of the implementation within the organization.
Organizational Incentives & Rewards	Extrinsic incentives such as goal-sharing awards, performance reviews,

Domains/Constructs	Description
	promotions, and raises in salary and less tangible incentives such as increased stature or respect.
Goals and Feedback	The degree to which goals are clearly communicated, acted upon, and fed back to staff and alignment of that feedback with goals.
Learning Climate	A climate in which: a) leaders express their own fallibility and need for team members' assistance and input; b) team members feel that they are essential, valued, and knowledgeable partners in the change process; c) individuals feel psychologically safe to try new methods; and d) there is sufficient time and space for reflective thinking and evaluation.
5. Readiness for Implementation	Tangible and immediate indicators of organizational commitment to its decision to implement an intervention.
Leadership Engagement	Commitment, involvement, and accountability of leaders and managers with the implementation.
Available Resources	The level of resources dedicated for implementation and on-going operations including money, training, education, physical space, and time.
Access to knowledge and information	Ease of access to digestible information and knowledge about the intervention and how to incorporate it into work tasks.
Characteristics of the Individual (practitioner; community health worker)	
Knowledge and Beliefs about the interventions	Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to the intervention.
Self-efficacy	Individual belief in their own capabilities to execute courses of action to achieve implementation goals.
Individual stage of change	Characterization of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention.
Individual identification with organization	A broad construct related to how individuals perceive the organization and their relationship and degree of commitment with that organization.
Other Personal Attributes	A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style.
Mother and Household Characteristics*	
Education and literacy	Refers to the maternal level of education. Coded as negative if maternal education has a negative influence on uptake of the intervention. Coded as positive if mothers education has a positive influence on uptake of the intervention.
Family composition, #children, presence of mother-in-law	Any aspect of the family composition that has a negative or positive influence on the mother's ability/inclination to practice EBF (the intervention)
Religious and cultural beliefs	Any religious or cultural beliefs that influence maternal and familial practice, as well as EBF education interventions delivered by the CHWs.
Socioeconomic status	Considerations of SES, including working outside the home, land ownership, animals.

At present, there is very little evidence about which of the 31 constructs is more associated with implementation success in any given context, and it is possible that factors predictive of implementation effectiveness may differ across contexts - global health, education, mental health. Overall, planning would be greatly improved if we had

more detailed knowledge about the specific influence of these factors in different contexts. One small in-depth multi-case study of implementation of a weight management program in the US was the first to demonstrate how the CFIR can be used to identify constructs that more strongly influence implementation effectiveness in the context of adult health care (Damschroder & Lowery 2013). Of the 31 CFIR constructs assessed, ten constructs strongly distinguished between facilities with low versus high program implementation effectiveness. The majority (six) were related to the Inner Setting: Networks and Communications; Tension for Change; Relative Priority; Goals and Feedback; Learning Climate; and Leadership Engagement. One Intervention Characteristic (Relative Advantage), one construct from Outer Setting (Patient Needs and Resources), and two constructs related to Process (Executing and Reflecting and Evaluating) also distinguished facilities with high versus low implementation effectiveness.

A second study conducted by the primary authors identified CFIR factors associated with implementation efforts in four child and youth mental health provider organizations in Ontario, Canada (Barwick, Barac, Kimber, Akrong & Johnson, in preparation). This study explored CFIR constructs through deductive coding of focus groups and interviews with key informants who had implemented an evidence-based practice in their organization. Here we counted the frequency with which each construct was evident. Eight constructs had weak support for their influence on implementation success (defined as a frequency score between the 50th and 75th percentile. Weakly associated constructs were related to the Characteristics of the Intervention (Adaptability, Relative Advantage); Inner Setting (Compatibility, Goals and Feedback, Available Resources), and Process (External Change Agents, Reflecting and Evaluating). Seven constructs were more strongly associated with implementation (frequency score above the 75 percentile). Strongly associated constructs were related to the Inner Setting (Structural Characteristics, Networks and Communications, Relative Priority, Leadership Engagement) and Characteristics of Individuals (Knowledge and Beliefs about the Intervention, Individual Stage of Change, Other Personal Attributes). Constructs associated with implementation in both Damschroder and Barwick studies are underlined above.

Contextual Factors Influencing EBF Promotion Interventions

Implementation science is the process of systematically investigating the methods used for increasing the uptake and use of evidence-based practices into routine clinical practice across a range of contexts. Often used interchangeably with terms "knowledge translation" and "dissemination", implementation science is a sub-speciality of knowledge translation with a focus on *evaluating the processes and methods* by which evidence-based practices are *integrated within, applied or used* in practice settings.

Although effective implementation of evidence-based practices is essential for improving health and well-being, the Institute of Medicine noted a substantial gap between care that could be delivered if it were informed by scientific knowledge, and the care that is delivered. Some estimate it takes approximately 17 years for only 14% of research to make its way down the 'leaky pipeline' into clinical practice. Given rising needs and costs, determining how to maximize societal benefit from the research knowledge we generate is imperative.

To date, understanding the 'how' of implementation has yielded a burgeoning knowledge base that has emerged and been applied most commonly in practice contexts within high income countries (Canada, USA, Australia, UK, and The Netherlands); it is still not well understood. In the context of LMICs, authors have noted that a major obstacle to the progress of the 2010 Millennium Development Goals has been the inability of health

systems in many LMICs to implement and scale up evidence-informed interventions or programs effectively and with sustainability. It is well recognized that evidence of the effectiveness of health interventions is *necessary but not sufficient* to produce better health outcomes. Interventions with proven effectiveness must also be *effectively implemented* to demonstrate impact, and together, they must inform policy and practice. At present, there are *effective* interventions for the major causes of child death (i.e., diarrhoea, pneumonia, measles, malaria, HIV/AIDS, the underlying cause of under-nutrition, and a small group of causes leading to neonatal deaths), but the global coverage for most interventions is below 50% (Jones et al., 2003). The cost of not delivering these interventions is high – over 7 million children under 5 dying every year from preventable causes (Liu et al., 2012). Thus, the gains from successful implementation of effective interventions are significant: it is estimated that if effective interventions were universally available, 63% of child deaths could be prevented (Jones et al., 2003).

In LMIC contexts, the CFIR has also demonstrated broad agreement with implementation factors identified as important determinants of implementation success for inpatient care based on best-practice guidelines in rural areas of Kenya (English, Nzinga, Mbindyo, Ayieko, Irimu, & Mbaabu, 2011). Elements of the implementation of the intervention in Kenya could be mapped onto all but one CFIR construct, leading the investigators to suggest that CFIR "may be very valuable in guiding future mixed-methods research on implementation in other low-income settings" (pp. 10).

Research has highlighted the role of several factors in the implementation of EBF interventions (i.e., CHWs' characteristics, contextual factors, communication; Gilmore & McAuliffe, 2013; Pérez-Escamilla, Curry, Minhas, Taylor, & Bradley, 2012), but in a more specific way, focusing on one or few factors at a time. For instance, several studies examined the characteristics of CHWs and their impact on implementation outcomes. Overall, there is significant variability in the use of pre-trained workers, education requirements, monetary compensation, training length and frequency, amount and quality of supervision, and workload (Gilmore & McAuliffe, 2013). In a recent systematic review of CHWs delivering preventive interventions for maternal and child health in LMICs, including EBF promotion, Gilmore and McAuliffe (2013) found insufficient evidence to draw firm conclusions about the effectiveness of CHWs. Other studies focused on the characteristics of the promoted intervention in relation to health outcomes using a cluster-randomized trial (e.g., Kramer et al., 2001) and found the duration and exclusivity of EBF were increased in the intervention sites relative to the controlled sites in Belarus. Kramer and colleagues (2001) noted the possible implications of other factors involved in implementation success or influencing EBF rates in a Baby Friendly Hospital intervention, such as deteriorating economic conditions, high price of infant-formula feeding, centralized nature of the hospitals in Belarus. As none of these factors were measured in the Belarus study, we do not fully understand the contextual conditions underlying the EBF program implementation and their impact on outcomes. In the present study the aim is to examine *a range of factors* and their concurrent influence on implementation outcomes by using CFIR as a conceptual framework.

The CFIR does not include factors related to the *health care recipient (HCR)*, in this case, the mother and baby. The HCR-level encompasses mother/baby characteristics such as health-relevant beliefs, motivation, and personality traits, family socioeconomic status, maternal education and employment status, cultural or religious practices/beliefs, and family composition that can impact implementation outcomes. In efficacy trials that compare health innovations to a standard of care or control condition, patient-level variables are of primary importance both as outcome measures of efficacy (*e.g.*, improved patient health outcomes) and as predictors (*e.g.*, patient health literacy, beliefs about innovation success) of these efficacy outcomes. In the area of EBF, perhaps

not surprisingly, several studies highlighted the importance of mother-related factors to the initiation and continuation of EBF. For instance, in Pakistan, mother's early return to work and breastfeeding support at work contributed to the continuation of EBF (Hirani & Premji, 2009). In a study looking at EBF rates in Canada, higher education, giving birth at an older age, living with a partner, and previous pregnancies were predictors of 6-month EBF (Al-Sahab et al., 2010). In Saudi Arabia increased maternal age, multiparity (two or more children), and vaginal delivery were significant predictors for *early breastfeeding* initiation, whereas rural, less-educated, low-income multiparous mothers were more likely to *exclusively breastfeed* their infants (Amin et al., 2011). Together, these studies demonstrate that maternal characteristics are important contributors to initiation and continuation of EBF. However, in implementation trials testing whether and to what degree an intervention had been integrated into a new context, the outcomes of interest were different from those in efficacy trials, which typically focused on provider- or organizational-level variables.

Implementation Outcomes

It is important to distinguish between primary program (health) outcomes and implementation outcomes; only the latter assess *how* interventions are implemented in order to understand the reasons why they may succeed or fail. This involves the identification of not only contextual factors, but also potential gaps in in the process of implementation *per se*, in order to provide a more accurate interpretation of program impact (Avula et al., 2013).

Clearly defined implementation outcomes are not articulated in the CFIR. Distinguishing implementation outcomes from program or health outcomes is critical, since efforts to translate new programs from 'controlled' settings to community settings may fail, and if they do, we must be able to determine if the failure occurred because the intervention was ineffective in the new setting (intervention failure) or if a good intervention was implemented poorly (implementation failure), or both (Proctor et al., 2011). Table 4 outlines eight 'implementation outcomes' described by Proctor & colleagues (2011).

Table 4: Implementation outcomes, guiding questions, and descriptions. Outcomes and descriptions are adapted from Proctor et al., (2011).

Implementation Outcome	Guiding Questions	Description
Appropriateness	Is the intervention a good fit for the implementation context, and will it be seen as an attractive alternative to the status quo?	"The perceived fit, relevance, or compatibility of the innovation or evidence based practice for a given practice setting, provider, or consumer; and/or perceived fit of the innovation to address a particular issue or problem."
Feasibility	Can the intervention be implemented effectively and consistently?	"The extent to which a new treatment, or an innovation, can be successfully used or carried out within a given agency or setting."
Adoption	Will people change their behavior because of the intervention?	"The intention, initial decision, or action to try or employ an innovation or evidence-based practice. "
Acceptability	Will stakeholders and beneficiaries view the intervention positively?	"The perception among implementation stakeholders that a given treatment, service, practice, or innovation is

		agreeable, palatable, or satisfactory."
Implementation Cost	What are the marginal costs associated with the intervention?	"The cost impact of an implementation effort."
Fidelity	Will the intervention be delivered as intended, and with a high degree of quality?	"The degree to which an intervention was implemented as it was prescribed in the original protocol or as it was intended by the program developers."
Penetration	Will the intervention become popular throughout a system?	"The integration of a practice within a service setting and its subsystems."
Sustainability	Will the intervention have staying power after the intervention period has elapsed?	"The extent to which a newly implemented treatment is maintained or institutionalized within a service setting's ongoing, stable operations."

In this study, we relied on health outcomes operationalized as the difference between baseline and endline maternal report of exclusive breastfeeding (%) in household surveys and we were able to capture aspects of implementation outcome in our qualitative analysis (i.e., sustainability).

Ideally, for this type of study, we would want to assess fidelity and sustainability outcomes in addition to health outcomes. Fidelity refers to the quality of the program delivery, and the degree to which an intervention was implemented 'as intended' (adherence) and the competence with which it was delivered. During program monitoring and evaluation of evidence-based interventions, explicitly assessing fidelity can provide data on whether a program failed to perform as expected because of poor implementation quality, because it was ineffective as an intervention, or because of other contextual factors that reduced effectiveness. Sustainability refers to planning and maintenance of program components, and the degree to which it has become embedded in the functioning of an organization.

Implementation Outcomes in EBF Programming

Significant gaps in the explicit assessment of implementation outcomes exist in the literature related to EBF promotion programs (see Table 4). With interventions as complex as EBF promotion it is imperative to evaluate process in order to understand not only what works, but also why it works and under what conditions. This information can be invaluable for informing the design of effective EBF promotion programs, tailoring them to the local context, and guiding future implementation research.

There is a notable lack of published literature addressing the question of 'how' EBF behaviour change interventions are carried out (Fabrizio, van Liere, & Pelto, 2014). Typically, studies examining EBF interventions only explore changes in EBF rates or other morbidity, mortality, or nutritional status indicators as outcomes. This was also the case in our study, since implementation outcomes were not included in the performance measurement of our INGO partners. EBF rate changes represent only part of the picture, leaving out other kinds of outcomes that are important for understanding how these complex interventions work. Thus, a more detailed assessment of the 'how' in EBF promotion program implementation is needed.

A similar conclusion is drawn in new research on the effect of home-based counseling of newborn care practices in Tanzania a year following program implementation. Although it was found that some targeted behaviours were

retained, including EBF in the first three days, the authors recognized that "… the quality, acceptability and cost effectiveness of the counseling intervention need to be evaluated to understand the process of behaviour change and sustainability of the intervention" (Penfold et al., 2014). This recommendation highlights the dearth of published literature exploring process evaluation and assessment of implementation outcomes such as fidelity and sustainability after the implementation period has ended.

There is guidance in the literature regarding methods to assess implementation outcomes during monitoring and evaluation. Rawat and colleagues described methodological approaches used for evaluating the implementation of the multi-country (Bangladesh, Ethiopia, and Vietnam) Alive and Thrive program, a comprehensive nutrition intervention aimed at improving IYCF practices and reducing the prevalence of stunting that has program learning built into its design (Rawat et al., 2013). Preliminary findings from program evaluation stressed the need for complementary process evaluation and program monitoring. The information gathered was used to build a 'program impact pathway' detailing various processes involved in program implementation and how these impacted health and behaviour (Rawat et al., 2013). Outlining the program impact pathway to assess intermediate behavioural change outcomes in order to determine what works and why has been recognized elsewhere as a determinant of effective behaviour change interventions (Fabrizio et al., 2014). Several challenges in reconciling implementation and evaluation were described in the Alive and Thrive evaluation, including communication between implementers and evaluators, inflexibility in results reporting deadlines, and disconnects between expectations of results and evaluations (Rawat et al., 2013). Despite the costs associated with additional monitoring and evaluation tools, they are an essential part of effective implementation and are necessary to determine how programs work to improve EBF coverage.

Implementation Fidelity and Sustainability

Several reviews of EBF promotion programs in developing countries consolidate recommendations related to implementation fidelity. A review of large-scale community-based breastfeeding promotion program evaluations in eleven LMICs detailed some key learnings (WHO, 2008). Monitoring and evaluation was recognized as both a measure of progress towards program goals and as a tool that could guide adjustments in program components and implementation process. With regards to program fidelity, interpersonal counseling skills were recognized as crucial, meriting greater focus during training to improve the quality of message delivery (WHO, 2008). Training quality and fidelity provided to health workers is also a concern for the scale-up of evidence-based interventions in general, as the burden on trainers continues to grow as coverage increases (Bhandari, Kabir, & Salam, 2008). Although it is known that program design must be sensitive to the local cultural context, consistently evaluating the quality of health worker training and supervision must also be a priority to ensure a high degree of fidelity (USAID, 2012). Evaluation of an individual peer counseling intervention in Uganda highlighted some considerations for implementation and scale up in similar developing country settings. They found adequate training, supportive supervision, and the provision of peer counselors with an allowance and greater flexibility to be important for program fidelity (Nankunda, Tylleskär, Ndeezi, Semiyaga, & Tumwine, 2010). Despite recognition from researchers as well as large multilateral and bilateral health and development organizations that implementation outcomes are important, implementation organizations are only beginning to prioritize their examination in global health programming.

The concept of sustainability is more widely discussed than fidelity but is not often framed explicitly as an implementation outcome of EBF interventions. Rather, the term is typically used to illustrate the durability of

increases in EBF coverage in intervention communities. The term has also been used to describe the long-term retention of volunteers (Penfold et al., 2014). While the short-term effectiveness of using various types of peer counselors for EBF promotion has been established, long-term (i.e. 10-20 years) sustainability has not been adequately examined, especially considering the volunteer nature and inconsistent supervision associated with these roles (WHO, 2008). A review of the evidence by the Infant and Young Child Nutrition (IYCN) arm of USAID details some recommendations to maximize sustainability, including carrying out formative research to shape program components, engaging community leaders, and building upon existing and successful comprehensive IYCF programs (USAID, 2012).

Findings relevant to several key implementation outcomes were explicitly addressed by Rawat et al. (2013), including fidelity, adoption, penetration, and sustainability. The most important constraints to adopting the Alive and Thrive IYCF recommendations (which includes EBF to 6 months) were found at the household level. Firmly entrenched norms and practices were found to be the greatest barriers to adoption and sustainability of the IYCF teachings, suggesting they must be a greater focus during program design (Rawat et al., 2013). Improvements in optimal complementary feeding practices were greater where households received messaging both from Alive and Thrive trained health workers and BCC messaging from the mass media (Rawat et al., 2013), but the extent to which this may aid in the sustainability of the program as a whole is unclear. Monitoring data from the process evaluation elucidated the implementation stage and the degree of penetration, which informed timing of data collection. The household reach, or penetration, of Alive and Thrive-trained health workers was also found to be higher than in comparison communities (Rawat et al., 2013).

Building on the previously mentioned study, one of the only comprehensive peer-reviewed assessments of implementation outcomes for an intervention promoting optimal IYCF practices was based on Alive and Thrive, and used the same program impact pathway framework approach mentioned above (Avula et al., 2013). The study analyzed the critical steps in the implementation and community uptake of a behaviour change communication intervention in Bangladesh, and identified several implementation outcomes, such as fidelity, sustainability, and adoption. Implementation fidelity, operationally defined as the extent to which promoters effectively applying their training, was measured through qualitative data analysis. After training activities were completed, data collected from IYCF training manuals was compared to observations from CHW shadowing sessions and semi-structured interviews to determine fidelity. IYCF message delivery and interactions with families were also examined. Each step in the program impact pathway was assessed using different qualitative and quantitative methods. These steps included training of promoters, retention of knowledge, home visits and counseling, the mother's acquisition of knowledge, and finally the mothers' trial and adoption of new behaviours. Using this pathway framework allowed fidelity to be assessed at several different stages of implementation. The study found overall good program fidelity, but level of quality varied between the cadres of health worker, as both 'Health Volunteers' (HVs) and 'IYCF Promoters' were evaluated. The quality of basic services was also hindered by to workers' diverse responsibilities. Discrepancies in implementation fidelity were thought to be due to a lack of incentives for HVs, and this finding has important implications for the sustainability of the training provided during the program. Adoption of the breastfeeding intervention was found to be determined by a complex set of factors, including maternal knowledge, availability of time and resources, feeding perceptions, and family support (Avula et al., 2013). The use of a framework for evaluating implementation outcomes in this study illustrates the richness of implementation data on EBF promotion programs that not only shed light on the process of implementation of this program, but help inform the design and process evaluation of future interventions.

There is recent interest in the literature for conducting studies that address implementation constructs. A published protocol for a breastfeeding support intervention to be carried out in a developing country (Nabulsi et al., 2014) makes explicit in the study design the intention to collect data for a continuous process evaluation, specifically concerning implementation fidelity, and the transfer and uptake of knowledge. It is clear that in order to properly examine the *how* of EBF promotion and similar evidence-based interventions related to optimal IYCF, future effectiveness studies must embed implementation outcomes within their program design.

METHODS

The CFIR (Damschroder et al., 2009) provides a conceptual framework for carefully considering a range of factors associated with effective implementation within the context of International Non-Governmental Organizations (INGOs) implementing EBF programs across MIC-KMI projects in LMICs. In this study, CFIR did not inform programmatic implementation but rather was applied to understand the endline data collected on EBF by the INGOs.

Design

This is a case study of interventions in two countries (Ethiopia, in collaboration with Care, and Mali, in collaboration with Save the Children) that is conceptually linked to the CFIR implementation framework (Damschroder et al., 2009), allowing for comparison of findings across contexts/countries/cases. Mixed methods combined semi-structured interviews and focus group discussions (FGDs) with key informants, with baseline and endline quantitative survey data from each country.

Participants

In order to gain a comprehensive understanding of the EBF implementation process, we examined the perspectives of both program recipients (i.e., mothers) and program implementers (i.e., INGO staff in Ethiopia, Mali and Canada; government (GO) staff in Ethiopia and Mali; community health workers (CHWs); and health extension workers (HEWs)).

To examine EBF implementation in Ethiopia, we conducted 3 FGDs with mothers, 3 FGDs with leaders of the mother-to-mother (M2M) groups, 3 interviews with HEWs, 3 interviews with GO staff in Ethiopia, 3 interviews with Care staff in Ethiopia, and 3 interviews with Care staff in Canada. EBF implementation in Mali was assessed through 3 FGDs with mothers, 3 FGDs with CHWs, 3 interviews with GO staff in Mali, 3 interviews with Save the Children staff in Mali, and 2 interviews with Save the Children staff in Canada. Thus, in total, we conducted 18 FGDs and interviews in Ethiopia and 14 in Mali. Although we kept data collection and analyses similar across the two countries examined, the slight difference in the number of interviews and FGDs conducted is related to differences in the structure of the health systems between the two countries. In Ethiopia, in addition to the GO and INGO staff, there are two layers of workers involved in the implementation of EBF: HEWs, who are paid GO employees, and leaders of the M2M groups, who comprise the Women Development Army, who work voluntarily. Mali has but one type of health worker, CHWs, who are paid GO employees. Each of the FGDs included 8 to 11 mothers/CHWs.

Participant Characteristics in Ethiopia

All participating mothers (n = 27) were married, had between 1 (n = 10) and 9 children (n = 1) with 1 child being the most common, and their ages ranged from 20 to 40 years[2]. About half of the mothers had not attended any form of schooling and were illiterate, while approximately 40% of mothers completed between 2 and 5 grades and had some reading and writing skills. The remaining 10% of mothers completed 8 to 10 grades and were able to read and write. All women were involved in farming, agriculture and petty trading.

The leaders of the M2M groups (n = 25) were all females ranging in age from 20 to 40 years[3]. The majority had worked on the project for 2 years, with only a few having worked for about half a year. Each of them supported about 25 households through their voluntary work. Sixty percent of the leaders of the M2M groups had not attended school and were illiterate, whereas the remaining 40% had completed between 3 and 9 grades and had literacy skills. All women were involved in farming, agriculture and petty trading.

The 3 HEWs interviewed were all females between 22 and 30 years of age. The HEWs had worked as government employees for 6 to 8 years, and on the Muskoka project for the last 2 to 3 years. They had all completed 11 grades of schooling and could read and write. Through their paid, full-time work, each of the HEWs supported about 500 households and travelled by foot to reach these households.

The other 3 GO employees interviewed were all males between 38 and 51 years of age. They were not directly involved in the implementation of the Muskoka project at either the community and individual levels but rather were in charge of planning, training, capacity building, and nutrition programming in collaboration with Care staff. They have worked for the government for 13 to 23 years and for the Muskoka project for the last 2 to 3 years. The highest level of education completed was Nursing College (n = 2) and Master of Public Health (n = 1).

Care Ethiopia staff interviewed included 2 females and 1 male with ages between 27 and 38 years. Their overall work experience ranged from 6 to 14 years and they have been involved in the Muskoka project for the last 2-3 years. The Care Ethiopia staff had been in charge of the overall coordination of program activities, monitoring and evaluation and nutrition programming. The highest levels of education completed by these participants were Master of Public Health/Rural Development (n = 3) and medical doctor (n = 1).

The 3 Care Canada/USA staff interviewed were females between the ages between 30 and 39 years. Their overall work experience ranged from 8 to 16 years and they have been involved in the Muskoka project for the last 1 to 2 years. The Care Canada staff had been in charge of the overall management of program activities in all countries

[2] Most mothers were unsure of their ages and guessed a number, thus these ages should be treated as tentative.

[3] Most leaders of the M2M groups were unsure of their ages and guessed a number, thus these ages should be treated as tentative.

where Care implemented MNCH activities, monitoring and evaluation and technical advising. The highest level of education completed by these participants was a Master degree (n = 3).

Participant Characteristics in Mali

All participating mothers (n = 26) were married, had between 1 (n = 2) and 8 children (n = 1) with 2 children being the mode (n = 8), and their ages ranged from 18 to 40 years[4]. About two thirds of the mothers did not attend any form of schooling and were illiterate. The remaining one third completed between 3 and 9 grades, and were able to read and write. All women were involved in farming and agricultural activities.

The CHWs participating in the FGDs groups (n = 22) were predominantly females (n = 18) and their ages ranged from 19 to 39 years. They had all worked on the Muskoka initiative project since the start of the project, for the last 2 years. The CHWs completed between 9 and 15 grades and were all literate. Through their paid[5], full-time work, most of the CHWs (n = 17) typically supported one village and travelled by foot to reach the assigned households. Five of the 22 CHWs supported 2 villages and received a bicycle to facilitate transportation between the villages.

The 3 GO employees interviewed were males between 36 and 52 years of age, and were heads of 3 different health districts in Mali. While they were not directly involved in the implementation of the Muskoka project at the community and individual levels they were in charge of planning, training, capacity building, and nutrition programming in collaboration with Save the Children staff. They have worked for the government for 8 to 22 years and with the Muskoka project for the last 2 years. The highest level of education completed by all three interviewees was medical doctor.

The 3 Save the Children Mali staff interviewed were males between 36 and 38 years of age. Their overall work experience ranged from 7 to 10 years and they had been involved in the Muskoka project for the last 2 years. Save the Children Mali staff interviewed had been in charge of the overall coordination of program activities, monitoring and evaluation and communication activities. The highest levels of education completed by these participants were Master in Psychology (n = 1) and medical doctor (n = 2).

Two Save the Children Canada staff interviewed were females, aged 29 and 54 years respectively. They had worked for 5 and 27 years in total, and had been involved in the Muskoka project for the last 2 years. These staff had been in charge of the overall management of program activities in all countries where Save the Children implemented MNCH activities, monitoring and evaluation and nutrition and technical advising. The highest level

[4] Similar to Ethiopia, most mothers were unsure of their ages and guessed a number, thus these ages should be treated as tentative.

[5] In Mali, the CHWs do not receive a formal salary but instead it is called a motivation as it does not fit into the salary scale for the health sector.

of education completed by one participant was Master in Public Health and for the other was medical degree and PhD.

Procedure

Ethical Considerations

Our study was approved by the Research Ethics Board at the Hospital for Sick Children, as well as by counterparts in Mali and in Ethiopia. Participants were fully informed about the purpose of the study and encouraged to ask for clarifications if the information provided and their role in the study were not clear. Subsequently, consent to participate in the study and to have the session recorded was obtained from all participants. Illiterate participants used their thumbprint on the consent forms in lieu of a written signature. No harms were expected to be experienced by the participants. There may have been minimal discomforts and inconveniences related to disruptions to the participants' every day schedules.

Qualitative Data

Qualitative data comprised of interviews and FGDs were collected on site by two SickKids researchers, with one interviewing and the other taking field notes. CARE implemented interventions in the East and West Hararghe regions and data were collected in three kebeles in these two regions: Ifa Aman, Jiru Belina, Biftu Geda. In Mali, Improving Community Health Program was implemented in the south region of Mali – Sikasso - and we collected qualitative data in three villages of this region: Sieou, Kiko, Nangola. Our in-country INGO partners selected the data collection sites ensuring that different project areas were covered, as well as easy access to the villages/kebeles. In Ethiopia, the interviews and FGDs were conducted in Oromo, Amharic and English with the help of a local male interpreter. In Mali, interviews and FGDs were conducted in Bambara, Senufo and French with the help of a local female interpreter.

Interview and focus group questions were based on those developed in a recent study by Damschroder and Lowery (2013) in which the authors applied the CFIR to guide collection and analysis of interview data from a large-scale weight management program in the United States (see Appendix A for the adapted interview guide). Minor changes were made to suit the LMIC context of the present study, and several additional questions were included to capture all aspects related to the maternal newborn and child health (MNCH) programs. Interview questions covered the five main categories of factors related to the outer setting, inner setting, characteristics of the intervention, characteristics of the CHWs, and the process of EBF implementation described in the CFIR. In addition, we included questions to explore the maternal and household of program recipients.

FGDs with mothers and CHWs and interviews with GO representatives in both countries were conducted in three distinct geographic regions where the program was being implemented. Participants were recruited by our INGO partners in-country based on specified inclusion criteria: mothers with infants 1 year of age and younger, and INGO and GO staff who had been most involved in the implementation of the program. Where lists of potential participants were available (i.e., mothers and CHWs), participants were randomly selected from those who met the inclusion criteria. Participants did not receive any incentive for their participation.

All interviews and FGDs lasted between 1.5 and 2 hours and were recorded on a digital device. In addition, the research team completed a field memo for each FGD and interview, and collected socio-demographic data for all participants based on a brief questionnaire (e.g., age, gender, education, etc.). The memos included observations about the group dynamics, information about non-verbal responses, questions that elicited hesitations or any interruptions or difficulties in running the focus groups. Upon data collection, all FGDs and interview audio files were translated to English by in-country interpreters and transcribed verbatim.

Quantitative Data

Baseline and endline household surveys conducted by the INGOs supplied quantitative data on maternal and child health, family factors and health knowledge and practices. Quantitative data were collected by independent consultants hired by the country offices through questionnaires administered pre- and post-program implementation, following an identical procedure at both time points.

The baseline and endline questionnaires had been developed by the INGO partners in collaboration with the consultants and data were collected by carefully trained enumerators hired by the consultants. The baseline sampling details were as follows: in Ethiopia, 1280 households were selected (a household with at least one child under 2 years was considered eligible), and in Mali, 449 households were selected from 4 health districts (mothers with children under the age of 5 were considered eligible). The endline sampling details were as follows: in Ethiopia, 1077 households were selected (a household with at least one child under 2 years was considered eligible), and in Mali, 450 households were selected from 4 health districts (mothers with children under the age of 5 were considered eligible). Baseline data collection took place in April-May 2012 and endline data were collected in September 2014 in Mali, and in January 2015 in Ethiopia. Once collected, data were entered and checked for completion by the in-country INGO teams and subsequently sent to SickKids. Data sets contained no identifiable information regarding the respondents. Prior to conducting statistical analyses for each of the target indicators, the SickKids team checked the data for duplicate identifiers, and to ensure that age ranges for mothers and children were consistent with the intended inclusion criteria (i.e., 15 to 49 years of age for mothers in Ethiopia and Mali; less than 24 months of age for infants in Ethiopia; less than 5 years of age for children in Mali).

Data Analyses

Qualitative analyses examined a range of contextual factors hypothesized to be associated with the successful implementation of the EBF programs in Ethiopia and Mali. Qualitative data were analyzed both inductively (i.e., bottom-up; the ideas or themes that emerged from the actual data, from what participants said during the interviews/FGDs), and deductively (i.e., top-down; data were coded and analyzed based on pre-determined categories, namely CFIR constructs). Both types of analyses were conducted using QSR NVivo version 10 software. In addition, quantitative analyses of household surveys determined the implementation outcome of the EBF programs, defined as the change in EBF rate from pre- to post-implementation.

Learnings from Respondents (Inductive Analyses)

The perspectives of a range of individuals were captured through FGDs and interviews and an analysis was conducted on some of the data: FGDs with mothers and M2M leaders (Ethiopia) and CHWs (Mali), and

interviews with HEWs in Ethiopia, for a total of 15 out of the 32 transcripts. Interviews conducted with GO and INGO staff were not analysed in an inductive manner because the questions asked were more structured and mapped closely to the CFIR constructs, thus, limiting how new themes might emerge from the discussion.

We used a thematic analysis framework to analyse the data. Thematic analysis is a method for identifying, analysing and reporting patterns or themes within data (Braun & Clarke, 2006) and does not require a pre-existing theoretical framework. Braun and Clarke (2006) define a theme as an idea that "captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set." (p. 82). The authors propose six distinct phases for conducting thematic analysis: 1) familiarization with the data (reading transcripts and writing down initial thoughts); 2) generating initial codes; 3) searching for themes; 4) reviewing themes; 5) defining and naming themes; 6) producing the report.

The data were analyzed by two researchers (RB, ES) who read the transcripts, generated initial codes (themes) independently, and subsequently met to discuss and finalize the codes. One researcher coded the data fully and the second coded half of the data. This was followed by consensus meetings to work out any disagreement between the coders. As a result of the consensus meetings, several codes were dropped because they lacked support in the data, and the remaining codes were organized and combined to form overarching themes. These themes were further refined by checking for consistency between the data extracted and the identified codes and themes.

Learnings about Key Constructs for Implementation (Deductive Analyses)

All 32 transcripts were coded deductively, following the qualitative coding approach for CFIR constructs developed by the QUERI research team in the US Veterans Affairs Department (Damschroder & Lowery, 2013). This type of deductive content analysis used the CFIR constructs as *a priori* coding categories. The analytic process was guided by consensual qualitative research methods. The process for our consensual research approach was as follows: 1) data were collected through open-ended questions in semi-structured interviews; 2) multiple judges were used throughout data analysis to foster multiple perspectives; 3) consensual validation was achieved through a process of deliberation and consensus. We did not follow Damschroder's fourth step; having an expert not integrally involved in the study review the process to help maximize validity of findings (Damschroder & Lowery, 2013).

The research team involved in the deductive analyses included two researchers (MB, RB) and two research assistants (RC, MH). The deductive analysis followed three main steps:

<u>Step 1: Developing case memos for each of the two cases.</u>

Initial coding of the data was done by all team members to ensure that definitions for CFIR constructs were applied consistently to the data. Once coding reliability was ensured, transcripts were split equally between the two research assistants for coding. All team members met on a weekly basis throughout the duration of the process and reviewed the coding, discussed differences, and refined the definitions of the CFIR constructs to fit the present implementation context. Upon completion of coding, the research assistants (RC, MH) wrote a case memo for each of the 43 CFIR constructs coded, organized by country and respondent group (i.e., mothers, CHWs, GO, INGO Canada, INGO in-country in Mali and Ethiopia, and HEWs in Ethiopia). Here we differed from the procedure developed by Damschroder and Lowery (2013), where respondents formed a largely

homogenous group and were thus considered a single group in the memos. Each construct included a summary statement with supporting quotes, following the template memo available online at www.wiki.cfirwiki.net. The entire study team met weekly via teleconference to review the case memos as they evolved. Thus, each case memo was developed through an evolving consensus process.

Step 2: Rating of the CFIR constructs for each of the two cases.

After all case memos were finalized the 4 members of the study team independently assigned a rating to all CFIR constructs within each country context. Appendix B lists the criteria used to guide assignments of the ratings. The ratings reflect the valence (positive or negative influence) and the magnitude or strength of each construct in each country relative to EBF program implementation outcome.

Briefly, each construct was rated with a score of -2 to +2, with a negative valence indicating a negative influence on implementation and positive indicating a facilitative influence. The strength of the influence is reflected in a score of 0, 1 or 2. Constructs rated as a 0 either had a neutral influence on implementation or a blend of positive and negative influences.

Consensus was defined as perfect agreement among 3 or 4 raters. For both Ethiopia and Mali, about 70% of the ratings were identical for at least 3 of the 4 raters. When there was no consensus among the four raters (i.e., less than 3 of the raters assigned the same rating), 2 of the raters (MB, RB) reviewed the memos, resolved discrepancies, and assigned a rating. When all constructs for all cases were rated (a project-oriented approach because ratings were applied within each project), we compared ratings for each construct across cases (a variable-oriented approach because each construct was compared across cases) to help ensure consistent application of ratings. This approach combines the strengths of case-oriented method which allows for rich context-specific consideration when rating each construct with a variable-oriented method, which promotes identifying patterns and relationships by construct across cases to heighten overall validity of ratings.

Step 3 – Comparing constructs across cases.

Subsequently, we created a matrix listing the ratings for the 43 CFIR+ constructs for each of the two countries and respondent groups. Decisions regarding which constructs were associated with implementation effectiveness in both contexts were based on the mode score for each construct: one for Ethiopia, by getting the mode of the ratings assigned for the six respondent groups, and one for Mali, by getting the mode of the ratings assigned for the five respondent groups. A mode of 2 for a certain construct indicated that most respondents commented on the strong facilitative influence of that construct on the implementation effectiveness. Similarly, a mode of 1 indicated that most respondents commented on the moderate facilitative influence of that construct on the implementation effectiveness. Based on these scores, we identified patterns in ratings of the CFIR+ constructs relative to implementation outcomes for the two countries.

Quantitative Analyses – operationalizing implementation success

The EBF implementation outcome for each country was based on the EBF indicator (i.e., percentage of living children aged 0-5 months who are exclusively breastfed), and operationalized as the change in EBF rates from pre- to post-implementation of the program. The purpose was to obtain a measure of the EBF implementation

effectiveness in the two implementation settings (i.e., high and low implementation effectiveness) based on the EBF indicator. Table 5 below presents selected EBF-related questions from household surveys administered in Ethiopia and Mali. EBF rates were calculated based on mothers reporting that a) infants were breastfed in the last 24 hours and b) infants were not fed others foods and liquids such as plain water, tea or coffee, juice, fruits, bread, etc. Analyses focused on a subsample of participants surveyed at baseline and endline in Mali and Ethiopia (i.e., mothers with infants younger than 6 months of age) in order to ensure similarity between the two countries in the sample characteristics and reduce recall bias. In addition, we examined selected demographic characteristics such as maternal education, age and marital status. All analyses were performed in Stata.

Table 5: Selected EBF-related questions from baseline and endline surveys administered in Ethiopia and Mali

Ethiopia	Mali
Is [child name] still breastfeeding?	Is [child name] currently being breastfed?
Was [child name] breastfed yesterday during the day or at night?	Over the past 24 hours, has [child name] been breastfed?
Did [child name] have any of these following liquids yesterday, during the day or night: • plain water? • infant formula? • milk (fresh, powdered, tinned, etc.)? • juice or juice drinks? • clear broth? • yoghurt? • thin porridge?	Over the past 24 hours, has [child name] received foods other than breast milk: • plain water? • sugar water? • milk? • fruit juice? • infusion? • rice water? • porridge?

RESULTS

Learnings from Respondents (Inductive Analyses)

The themes emerging from the inductive analyses are organized chronologically by country to increase their relevance to the global health and development actors for future programming and implementation planning. Specifically, the main ideas related to EBF from the perspective of mothers and CHWs, HEWs, and M2M leaders are presented as the implementation unfolds: at the initial stage pre-implementation, during implementation, and close to the end of the implementation (see Figure 1 below). In addition, our analyses show that gender roles and the relationship between men and women permeate all findings and are closely linked to EBF implementation at all stages; consequently, gender issues are discussed throughout the results, reflecting their connection with other themes, as well as separately.

It is important to note that the general themes from our analyses are the same for both countries and only the details of these themes manifested in the two contexts differed. For instance, in both Mali and Ethiopia, gender roles appeared as a salient influencer of EBF practice in mothers, although details differed with respect to the male and female roles in the two countries and how they changed from the start to the end of the implementation. The figure below captures common themes and the description that follows details the way these themes manifested in these two implementation settings.

Figure 1: Themes related to the EBF implementation

Pre-implementation / Initial Stage	Implementation process	Close to the end of implementation
- traditional beliefs, knowledge and practices regarding infant feeding	- change strategy: typical delivery of activities - obstacles to EBF implementation - 1st reactions to new EBF information - what convinced mothers and HEWs, M2M leaders, CHWs to change	- shifting traditional feeding beliefs and practices - shifting gender roles

Initial Stage: Pre-implementation

Dominance of traditional beliefs, knowledge and practices regarding infant feeding

Participants in both countries described their beliefs and practices regarding infant feeding and maternal nutrition during and immediately following pregnancy using the temporal antithesis of "previously" and "now". "Previously", that is before the implementation of programs to improve maternal and child health in Ethiopia and Mali, mothers and M2M leaders and CHWs relied on traditional practices and beliefs for guidance on to what to feed newborns and young infants, how to feed them, what to eat and what to avoid eating during pregnancy, and how to take care of a sick baby.

Although all women from both countries breastfed their babies, this was not done *exclusive* of other foods because of a pervasive belief that breast milk was insufficient to meet infant's nutritional needs. Consequently, breast milk was supplemented by various liquids and foods, many of which were country-specific.

FGDs in *Ethiopia* revealed wide variability in traditional practices and beliefs about infant feeding and maternal health and nutrition across the three kebeles. Infants typically received sugar and water solution; cow's milk; solid foods, often leftover from family meals and starting as early as 3 months; butter immediately after birth, to clean the digestive system; local breads mixed with water to help eliminate the worms believed to bite the newborn's stomach; traditional herbs mixed with water if infants showed signs of sickness; and breast milk from other women to supplement the milk received from their own mother. Boys and girls were sometimes fed differently (i.e., cow's milk for boys and water for girls, in addition to breast milk) based on cultural beliefs that girls are hot and need to be cooled down, whereas boys are cool and need to be warmed. It was also common for mothers to remove colostrum because it was believed either to have no nutritional value or to be dirty. Mothers from one kebele reported being advised to avoid eating fruits such as bananas, papayas, mangoes, and sugar cane, and to limit their food intake during pregnancy in order to avoid the baby growing too much and making the birth difficult.

In addition, mothers spoke of traditional beliefs about the timing of breastfeeding: when to start and for how long to breastfeed. Some *Ethiopian* mothers held the belief that they could not breastfeed immediately after birth because there was no milk, and so for the first few days fed their babies cow's milk and breast milk from other women. In most cases, breastfeeding for many months was thought to be detrimental for mothers (i.e., it sucks the bone marrow, mothers become very thin), and for infants (i.e., they become foolish and ignorant, the brain does not develop properly).

In Mali, infants younger than six months of age commonly received cow's milk; water; water in which infants had been washed; traditional plants, to either heal the baby or help the baby grow fat; shea butter and hot water solution to help babies become fat, and to treat constipation and respiratory difficulties; porridge; water and lemon when mothers did not have sufficient breast milk; goats milk, believed to stimulate intelligence; and date juice, as part of religious ceremonies. The Malian belief that infants could not survive without water, particularly in the hot seasons, was ubiquitous.

The manner in which infants were breastfed was also based on traditional beliefs and practices. In Ethiopia, mothers reported breastfeeding their babies while walking, with babies typically positioned on their side so that they could still engage in their household activities. Similarly, because women had no break from their household work, they used to carry the young babies on their back everywhere and spend long periods of time in the heat, working the fields, and breastfeeding their infants irregularly.

> *"Before, we never heard of exclusive breastfeeding. When travelling, we carried babies on our side while breastfeeding, as we did not know." (mother, Ethiopia)*

> *"I am older than them. Before Muskoka project came here, I gave birth to many children. After birth, I didn't give much attention to the baby since I had so many household responsibilities to perform. When I fed breast, since I felt pain when I stayed for a long time without feeding the breast, I just milked the milk to the ground and fed a little and then ran to my work" (M2M leader, Ethiopia)*

> *"The first baby that I gave birth [to] faced many nutritional problems…because I used to take him everywhere in the sun and I also left him in the house to fulfill my work for the family. I used to give him all kinds of food and water when he was younger than 6 months and he developed malnutrition and I had to take him to the health centre." (mother, Ethiopia)*

Ethiopian mothers, HEWs and M2M leaders talked about a specific "scissors-like" way of holding the breast between the index and the middle fingers while breastfeeding the baby because of fear that babies would suffocate if they received the full milk flow, their mouth would get wider, and milk would go into the respiratory tract.

All these beliefs and practices were long-standing and well-established in the everyday life of these communities, having been transmitted from generation to generation, likely through observation of older family members and direction by elders.

> *"Had we not received this information, we would tend to follow what our mothers were doing. There is a saying that the camels would look at the other camels walking in front of them and so follow the same way…therefore, without such information we would just continue breastfeeding the way our mothers used to do it." (mother, Ethiopia)*

> *"We are all born and grow up drinking traditional medicines…when we got married and had kids, we followed the same path" (mother, Mali)*

In both countries, mothers, HEWs and M2M leaders described delays observed in infant cognitive, physical and motor development (i.e., infants spoke their first words late and started walking sometimes as late as the third year of life), as well as poor health status (i.e., malnutrition, stunting, various illnesses) among babies who were not exclusively breastfed. Practices such as removing the colostrum and giving water and sugar to newborns resulted from a lack of information of what they should be doing for health development.

> *"You know, at that time it was not known…" (mother, Ethiopia)*
>
> *"We didn't have awareness, we didn't have education, we didn't have training." (M2M leader, Ethiopia)*
>
> *"We used to know nothing about the effect of breastfeeding on placenta, bleeding before…" (mother, Ethiopia)*

The implementation of interventions to improve maternal, newborn and child health targeted traditional beliefs and practices. Understanding the traditional, longstanding practices that preceded EBF implementation was highly significant in shaping the implementation approach.

Implementation Process

Change Strategy: Typical Delivery of Activities and CHW Beliefs

In both *Ethiopia* and *Mali*, EBF promotion was one of several health behaviours targeted through activities implemented by the INGOs, although there were differences in the emphasis of these health packages: in Ethiopia, the main focus was on nutrition whereas in Mali other components of the overall health package targeted hygiene, malaria prevention and treatment, and family planning.

> *"There are many points of discussion; there are about 11 or 12. One week we discuss one and we report that to the extension workers through our village and kebele facilitators and then to health office; second week, another point. If there is no report, it means no discussion happened. If we missed a week discussion the reason will be explained to the extension worker. So based on the topics and schedule they will visit us as see our reports." (M2M leader, Ethiopia)*
>
> *"Most of the topics in the package are interrelated. For example, breastfeeding requires hygiene education so I can educate on the other topics while talking about exclusive breastfeeding. I can also provide family planning education while talking about exclusive breastfeeding. Therefore, since I am providing education by linking one to another, there is no problem." (HEW, Ethiopia)*

CHWs, HEWs, and M2M leaders in both countries considered EBF to be important and it was generally prioritized and received its due emphasis, yet CHWs and HEWs differed in terms of their personal beliefs about its importance.

> *"We give priority to sanitation, giving birth at the hospital, exclusive breastfeeding, and giving supplementary foods for babies greater than 6 months." (M2M leader, Ethiopia)*

> *"For me exclusive breastfeeding matters because you simply recognize well-fed babies from the others. This is my favourite topic." (CHW Mali); "It depends on cleanliness. Even if you breastfeed a baby for six months and give him dirty water after, it's a nonsense." (CHW, Mali); "I insist on vaccination, the mother has to vaccinate her children. People must avoid mosquitoes, especially babies and pregnant women." (CHW, Mali)*

Health Promotion Strategies

Health interventions, including EBF, were implemented through a variety of activities, some of which were common to both countries (e.g., home visits, radio messages), and some that were unique (e.g., M2M groups in Ethiopia).

Ethiopia

In Ethiopia, EBF promotion was done through M2M groups, home visits, educational materials, radio messages, health facilities, and training of influential community and family members such as fathers, grandmothers and religious leaders. All Ethiopian women are organized in groups of five, known as *M2M groups*, using the organizational structure of the savings and loans groups created before the Muskoka project. Mother-to-mother groups are led by Lead Mothers who are part of the *women's development army (WDA)*, a structure created by the government. The M2M groups meet weekly for at least one hour to discuss topics from maternal nutrition and infant and young child feeding package implemented by Care. There are strict rules regulating the way in which these groups function, and there are consequences for breaking these rules, such as fines for being late or missing a meeting.

> *"Our meeting is in the morning. We meet at 9 am. We have a rule, starting time is fixed. If someone is not on time, she has to pay a penalty as per our rule and then can be part of the discussion until the end." (M2M leader, Ethiopia)*

Each week, M2M leaders cover in detail a specific topic from the health package, combining discussion with use of educational materials and practical demonstrations. Mothers were encouraged to put into practice what they had learned during the weekly meeting (e.g., correct position for breastfeeding) and received immediate and concrete feedback from the HEWs and M2M leaders. M2M leader facilitation style typically encouraged full participation from all group members.

> *"When meeting (…) we sit in a circle, facilitator at the centre, and we start discussion on EBF, if the topic is EBF. Among us, some are shy while still having good ideas, you know, some people are like that (…) people are not alike, some are shy (…) and we give chance to those who are not raising their hands to speak. We ask the shy ones questions and we try to participate and let the group discuss. You know, misconceptions are still there in the community and they ask questions for discussion." (M2M leader, Ethiopia)*

Implementation of EBF activities involved coordination at various levels (mothers, M2M leaders, HEWs), and although not all parts worked together smoothly at the beginning, with close collaboration between HEWs and M2M leaders and the creation of information flow protocols, the groups "started working effectively. […] they are like a telephone. Like a telephone." (HEW, Ethiopia).

Participants emphasized that the unique advantage of using the mother-to-mother group *infrastructure* to disseminate health information was that it allowed for in depth, systematic discussions, as well as wide spread of health information in the community because all women were part of a group. Before the start of the Muskoka project, the HEWs did not have sufficient capacity to reach the entire community, and the discussions were often superficial because of limited time.

> *"[before the Muskoka project started, the information] was shallow and not down to every household. HEW cannot go house to house; they cannot reach all mothers with information. Now we know and have been trained a lot on EBF can reach many neighbours after getting back to our village and teach our groups…as a result, the community got good understanding." (M2M leader, Ethiopia)*

> *"We are facilitators; our main responsibility is to transfer to our group members who are organized in groups. We do not keep what we learned but teach others. We facilitate discussion to enhance changes." (M2M leader, Ethiopia)*

> *"What we will do is we teach them that breastfeeding is a good experience. We don't have to feed the baby as we used to feed, for only short time, mothers have to sit down and feed the baby. Doing this has an advantage for you and your child. You will not give birth while feeding breast. For the child too, it will sharpen his or her mind. Those children who are fed enough breast milk will be healthy, strong and they will interact with you when you call them. We saw this for evidence. For this reason we teach the mothers how to breastfeed and how to keep sanitation. That is what we teach." (M2M leader, Ethiopia)*

In addition to mother-to-mother groups, M2M leaders and HEWs conducted home visits to provide individual and family counselling. Topics for discussion were generally chosen based on the mother's and family's expressed needs or on household observations made by the M2M leaders and HEWs (e.g., mosquito nets, latrines, cleanliness, breastfeeding position, age of the child, etc.). The M2M leaders and HEWs talked about giving priority to and spending more time during these home visits with mothers who showed resistance to the new information during the M2M groups.

> *"I chew chat and drink coffee with them and take the time to discuss." (M2M leader, Ethiopia).*

Home visit discussions occurred with mothers, fathers and other members of the extended family such as grandmothers, because as one M2M leader stated, to achieve change "it is not sufficient to train only mothers." In addition, HEWs organized meetings with all men in the village and influential community members - religious leaders and village leaders – to educate them about optimal feeding practices so that they could advocate for these practices.

> *"The religious leaders got the training; they accepted the program and therefore provide education for the community when they gather for pray." (HEW, Ethiopia)*

> *"The religious leaders also make follow-up visits to see whether mothers are exclusively breastfeeding or giving any other things to the baby…yes, they are actively supporting breastfeeding." (Mother, Ethiopia)*

> *"There is a house where we usually meet to rest and have tea and chew chat with the neighbours. At this place, [the religious leaders] urge us to do what we are told by the health extension workers on exclusive breastfeeding." (Mother, Ethiopia)*

> *"There is a challenge for me to do things alone. Therefore, with the kebele leaders I convince the community to construct latrines; we also take the immunization vaccines with us and provide vaccinations. We also provide family planning services in the outreach sites for those mothers who don't come to the health centre. During our house to house visits we also follow up on the lactating mothers by observing how she gives breast milk to the baby or ask her how she does it." (HEW, Ethiopia)*

For all these activities, M2M leaders and HEWs used visual educational materials in the form of flipcharts to illustrate the new information (e.g., correct and incorrect breastfeeding positions, examples of how the father can support the mother with breastfeeding and child feeding, examples of appropriate solid foods to be introduced in the baby's diet after six months), and the benefits of applying this new information to practice (e.g., pictures of babies who were breastfed versus those who were not). The images of healthy, well-developed babies represented in the educational materials became a kind of ideal promoted by the HEWs: "we tell them if you feed like this as displayed on the pictures, your children can reach higher levels of education and won't remain in the village." (HEW, Ethiopia). All mothers had these educational materials posted on the walls at home and during the focus groups were able to discuss in detail, from memory, the details of these illustrations, demonstrating the strong impact these materials had on mothers:

> *"What we observed in the pictures are very beautiful things, like, for examples when eating food together and the mother starts breastfeeding the baby, the husband shows his affection by feeding the mother." (Mother, Ethiopia)*

> *"One thing I learned from the pictures is that it showed a father who is bringing the vegetables home from the market to support the mother, when the family doesn't grow vegetables." (Mother, Ethiopia)*

> *"We posted them and when we look at them we can observe the differences between those children who get the balanced food and those who don't get it, the ones who get balanced food are very healthy while the others not. Therefore we are working to feed our baby to have the same good growth observed in the pictures." (Mother, Ethiopia)*

Mothers also learned about EBF at their antenatal care visits. All mothers who participated in the focus groups had four antenatal care visits during their last pregnancies, following the beginning of the CARE project, and delivered their babies at health facilities. Local authorities have instituted fines for husbands who do not bring their wives to deliver at health facilities and this measure has led to drastic increases in the number of women experiencing a health facility delivery. Typically, during the antenatal care visits, mothers received minimal information about EBF and early initiation, and "the detailed information about how we should breastfeed and care for our babies is given to us after delivery time." (Mother, Ethiopia)

Radio was another channel for communication about EBF, although there was variability among the villages in terms of whether mothers had access to a radio or time to listen to it. In one of the three villages we visited, fathers and children typically listened to radio at the "berecha" time, in the evening, while chewing chat. During

this time, mothers prepared dinner for the family and had no access to the radio messages. In the other villages, all women were familiar with the EBF messages disseminated through radio dramatizations. Mothers who heard the messages stated that although the EBF information on the radio was the same as that shared by M2M leaders and HEWs, simply hearing it on the radio did not result in practice change. All mothers agreed that the great advantage of being educated by the CHWs or HEWs was the access to in depth, detailed information and practical demonstrations that made the information come to life:

> *"We heard it from the radio a long time ago. But no one has put that into practice. When people heard it through radio they were saying that it is drama, it is drama play, it is not facts. But now we get educated through demonstrations, we observe the changes in our children – because of this we changed and continue to practice it." (Mother, Ethiopia)*

Mali

In Mali, EBF promotion was done through home visits, educational materials, radio messages, health facilities, and whole village gatherings. CHWs did home visits, giving priority to women who have just given birth, who were visited right after birth and a week later. During these visits, CHWs typically educated women but also the other adult family members, although in some cases when women seemed uncomfortable because of the men's presence, CHWs had separate discussions with men and women. All the CHWs talked about including EBF in their discussions if young women were present at home, even if they did not have children, in order to sensitize them to the topic. Other topics covered during the visits were diarrhea, hygiene, family planning, malaria; and the focus also varied as a function of the season. For instance, during the rainy season, which is associated with an increase in malaria cases, CHWs typically emphasized malaria prevention and the use of mosquito nets. In addition to following the pre-established order of topics during home visits, CHWs encouraged mothers to ask questions about any health topic on which they needed clarity. In order to have access to the mothers during these home visits, the CHWs had to obtain permission from the husbands:

> *"When women deliver and I go visit them, I will ask permission from her husband first, and if the husband allows it, I go to see the baby and the mom, and I try to talk to the women about exclusive breastfeeding, its advantages, and family planning, and, after this, I try to see the husband also and give him some explanations." (CHW, Mali)*

In addition to home visits, CHWs and the Rélais (volunteer health workers, typically two per village, one male and one female, who preceded the CHWs, and had a high status in the village) organized weekly gatherings with the whole village where they educated men and women on a variety of health topics (e.g., EBF and best feeding practices related to complimentary feeding, such as what food groups to introduce gradually and when to introduce them, malaria, diarrhea, etc.). The Rélais enjoyed an influential and authoritative status in the community and thus, played a key role in facilitating the communication between CHWs and people in the village. For instance, the Rélais typically announced the village meetings, informed CHWs about which women were pregnant, ensured that children received required immunizations, and brought the mothers or children in need of care to the CHWs. The CHWs and mothers described a very high attendance for these meetings, with all elderly men and women in attendance, motivated to "seek information which can help them understand various issues…" (Mother, Mali).

> *"The reason why they take part is because of the importance of the talks for us; for instance, some like me didn't even know how to care for a baby, I would not cover the meals nor sweep the household before cooking; she taught us how to do cleaning properly, to always cover the plates with the meal…we knew none of these formerly. That's why we come to the meetings and learn how to be safe." (Mother, Mali)*

In some villages, meeting participation was also enforced by fines:

> *"For example for me, here, there is a law which is that on Tuesday nobody goes to the field. By 4 o'clock the entire village comes to the market because the one who fails to do so will pay a fine of 500 francs. You take advantage of that to inform everybody, this is the way I proceed." (CHW, Mali)*

CHWs commented that because these gatherings brought together men and women of different ages, young women did not typically feel comfortable asking questions or voicing their opinions, and so they visited the CHWs at night to seek clarifications. When women expressed their opinions and questioned or disagreed with the new practices proposed by the CHWs, they were visited at home by the CHWs the following day in order to be given provided with more detailed information.

For home visits and village meetings, CHWs and Rélais used educational materials to illustrate their messages, although the availability of these resources varied across villages. In some villages, CHWs only saw these materials during training did not have them available for use as aids during educational sessions. Consequently, in these villages, most mothers had never seen the picture booklets and few saw these educational materials at the health facilities. In other villages, all CHWs and Rélais were equipped with these visual materials and used them during home visits and meetings, but there were insufficient materials to distribute to families to post in their homes. Despite having only limited access to these pictures during the meetings with the CHWs, mothers remembered vividly and described in detail the content of the educational materials, and some expressed their preference for the EBF pictures because of the clear depictions of babies who were and were not exclusively breastfed:

> *"Every time we meet for the talk, she [CHW] always shows us the pictures. Not only she shows us the pictures, but she also explains the meaning." (Mother, Mali)*

> *"There is an image of a woman breastfeeding her baby. She uses one single breast until the baby is fed up…we can see that she is comfortably seating in a clean area and breastfeeding properly her baby…she also washes her hands with soap before she gives breast milk to the baby." (Mother, Mali)*

Antenatal and postnatal visits to the health centres were another channel for EBF communication, although generally, mothers gave birth at home with the help of older women in the village and went to the health centers to deliver only when they had complications. Preference for home delivery was due to high costs and long distances travelled to reach health facilities. Those mothers who attended antenatal visits and gave birth at health facilities learned about EBF from health staff.

EBF promotion was also executed through radio and television messages. Most households had a radio, with men typically having access and women only joining after they were done with cooking meals and other household work. Despite limited time and access to media channels, most women had heard the radio messages about EBF and were able to reproduce them:

> *"[In the radio messages] they told women not to give water to newborns up to six months, it can be a source of sickness for the baby…to exclusively breastfeed children, allows them to grow faster and avoid little sicknesses […]he becomes stronger." (Mother, Mali)*

Overall, CHWs felt their job of communicating EBF information was made easier by the fact that most people were already familiar with the information from the radio and TV. Thus, the convergence of messages from the different sources (CHWs, mass media) helped the dissemination and uptake of information by mothers:

> *"Some of them believed us because when we told them [the EBF information], they answered that they have heard about it on the radio so the radio communication has been helpful for us, because all that you will tell them, they will believe you because they have heard it before on the radio" (CHW, Mali)*

Mothers unanimously expressed a strong preference and higher likelihood of changing their breastfeeding practices upon hearing information directly from CHWs as opposed to through radio and television programs. Mothers talked about needing to supplement radio and TV messages with deeper explanations from health workers and doctors in order to understand the message and become convinced.

> *"By listening to the radio, we may apply it but with someone in person to come to us and discuss with us, that is more convincing and we are pleased with that." (Mother, Mali)*

> *"On the radio, you may miss some points but with someone in person, you shall always remember what she told you and then apply it…with the health worker we have more: not only she shows us what to do, but also explains in words how to do it, which you can repeat yourself." (Mother, Mali)*

> *"What we didn't understand [from TV] – they talked about EBF, but before we get the present children, the former ones were given breast milk, water and medicine. We said if we must give only breast milk, we fear because of too much sun; old people badly need water, now let alone the newborn up to six months. So we went to ask for that, you see? The doctor told us not to get worries that the breast milk contains almost everything a baby needs so that there is no cause to worry." (Mother, Mali)*

Obstacles to EBF Implementation

A very small minority of participants in both countries commented that EBF implementation presented no challenges. They stated beliefs that breastfeeding is "so easy and naturally-existing" (M2M leader, Ethiopia), and that they had "high motivation for work" (CHW, Mali), had full access to information and education for the first time which overrode any possible problems (mother, Ethiopia), and understood the importance of practicing EBF for infants' health and development (mother, Mali).

In contrast, most participants, both program implementers (lay health workers) and program recipients (mothers) in Ethiopia and Mali identified several challenges experienced in the process of implementing EBF.

Ethiopia

The barriers to EBF implementation discussed by participants in Ethiopia existed at different levels of implementation and included maternal characteristics, traditional practices, gender roles (including work

division), the influence of mothers'-in-law, villagers' attitude toward the CHWs and HEWs, and implementation approach.

In their work, CHWs and HEWs noticed that certain maternal characteristics slowed down the implementation process. For instance, mothers were resistant or stubborn in being shown how to take care of their infants or refusing to bringing cereals to meetings for cooking demonstrations.

> *"Look, it is human nature, some people are stubborn and don't easily accept new ideas and being told how to take care of their kids…some are stubborn, during growth monitoring they do not let kids take off clothes, they don't want to be seen because they feel ashamed that their babies are malnourished and not clean. So we let them wait until all others leave the health post and no other mom looks at their kids…so they are counselled separately by mentioning the example of others…" (M2M leader, Ethiopia)*

Similarly, M2M leaders and HEWs noted that individual differences in how quickly mothers comprehended new information and the depth of their knowledge regarding child feeding influenced their breastfeeding practices. Generally, incomplete or inaccurate information regarding EBF typically led to mothers making erroneous interpretations of their infants' needs and the most appropriate ways to satisfy those needs. For instance, infant crying was typically interpreted as a sign of hunger and insufficient breast milk intake (i.e., mothers do not produce sufficient breast milk to feed their children), and, consequently, infants were given water and cow's milk to supplement breast milk. Moreover, mothers, HEWs and M2M leaders mentioned pain during breastfeeding and reduced milk production as significant impediments to EBF, typically as a consequence of lack of proper maternal nutrition. With respect to other maternal characteristics, such as age, HEWs and M2M leaders did not observe any systematic associations with EBF practices in their villages.

Reliance on deeply rooted traditional beliefs and practices regarding child feeding and health, learned from parents and grandparents and observed and reinforced in the everyday life of the village, made it more difficult for mothers to accept and practice EBF. The influence of traditional beliefs and practices was particularly strong because the new EBF information was in sharp contrast to traditional practices. Traditionally, mothers believed that breast milk was insufficient for infants' development and supplemented it with water for girls and cow's milk for boys, as well as leftovers from adult meals. Moreover, all mothers used a "scissors-like" finger position when breastfeeding the infants, which partially stopped the milk flow and, thus, interfered with proper feeding.

These traditional practices were strongly promoted by mothers-in-law who typically lived in the same household and were involved in child-rearing. Mothers, HEWs, and M2M leaders noted that mother-in-law influence varied as a function of implementation stage (stronger influence at the beginning of the implementation, with gradual decrease as mothers-in-law themselves accepted the new infant feeding practices), mothers' experience, and age (mothers-in-law had a stronger influence over younger, less experienced mothers).

> *"While we gave education, there was an opposing idea from mothers-in-law against our message, by urging mothers to continue the traditional way of feeding infants: giving cow milk, food and providing yeast for newborns immediately after birth. They were saying that we have all been raised in a traditional way, and not the way the HEW is teaching now, so don't listen to what they are saying." (HEW, Ethiopia)*

Where mothers-in-law continued to insist on traditional practices, mothers talked about avoiding having to leave their infants in the care of the mother-in-law and instead taking their baby with them, wherever they went.

> *"Mothers-in-law are still saying that but we don't accept it…for example, I don't trust the older people and leave my baby with them…if the child cries, they tend to give him water and milk and if you question them they will tell you that no human being has grown without providing such additional things." (Mother, Ethiopia)*

The contrast between old practices and new information presented a contradiction to their way of life, and villagers did not hold positive regard for HEWs early on. When HEWs began home visiting to teach the community about hygiene, building latrines, and infant feeding, villagers refused to let them enter their homes, in deference to preserving the old ways and protesting the new. Attitudes changed with the inclusion and training of women from the village as women development army leaders. This change facilitated acceptance by the villagers, and a gradual appreciation of the HEWs role and expertise and the resulting positive impact on their lives.

> *"There were mothers who informed their children to stop us at the gate and tell us, lying, that their family was not available at home. Before the group leaders had obtained the training, it was a hectic time for the HEWs – there was an event where they released the dogs at us. They called us names – "look, the feces girls are coming so let's run away from them". So after their own people, the army leaders, got the training, the pregnant and lactating mothers have accepted the education and started the practical implementation of EBF." (HEW, Ethiopia)*

Mothers, HEWs, and M2M leaders identified gender roles as another important barrier to EBF implementation, particularly as reflected in the division of work tasks between husbands and wives, and where men's needs were prioritized. Mothers' workload, which included farming, cooking, cleaning and taking care of children, made it difficult for them to adopt EBF practices that required feeding infants 10 to 12 times a day. In order to fulfill all their work responsibilities and take care of their infant, mothers used to breastfeed for short periods of time and then return to work, typically leaving infants at home with other family members who gave them water, cow's milk and food leftovers. All mothers commented on the time-consuming nature of EBF and the need to receive work support in order for EBF to be possible. In other words, even when mothers were convinced of the importance of exclusively breastfeeding their infants younger than 6 months, their ability to practice EBF was conditional on receiving support with household work, which required a shift in gender roles. Shifting gender roles was difficult at the beginning, with men refusing to help with what they considered to be women's work. This change occurred gradually, with repeated explanations and emphasis on the idea of parents mutually supporting each other.

> *"At earlier times there was a challenge that the mother had to prepare food for the father while the baby was crying and had to go to the farm, without having time for breastfeeding." (HEW, Ethiopia)*

> *"The first time I told him he has to give me support, he angrily asked me if I expected him to work on what he believed to be the work of women. So we should not become angry too, we need to calm him down, and slowly, day by day, inform and convince him. We tell him that he has to support me by sharing my role, and also, in return, that I can support him in his role. So this way he can slowly be convinced." (Mother, Ethiopia)*

HEWs experienced challenges implementing EBF during the initial stages of the implementation, as they attempted to spread the new information to the community by themselves. Without assistance from the WDA leaders who were trained to organize the M2M groups, HEWs were challenged in making home visits and were ineffective in educating the whole community on a wide range of health topics as they could only reach a limited number of households. In addition, HEWs did not have initial support from religious leaders, who sometimes emphasized messages that were contrary to those of the HEWs:

> *"They [the religious leaders] even used to inform the community, for example, that using family planning methods are forbidden by God." (HEW, Ethiopia)*

Religious leaders considered EBF as insignificant and implored HEWs not to discuss it within their communities, "as if it's not a big deal." This reality highlights the importance of engaging multiple communication channels and engaging influential community members such as religious leaders and other community members rather than merely relying on community outsiders who merely work there, such as the HEWs.

Mali

In Mali, participants discussed similar challenges to those encountered in Ethiopia: maternal factors, traditional beliefs and practices, community perception of the CHWs and gender roles.

Some of the barriers to practicing EBF were related to maternal characteristics, such as "being stubborn" or lack of knowledge or desire to change their behaviour. In cases where mothers were willing to change, they needed reminders, reinforcement, and repeated explanation of new information because they tended to forget, and traditional practices were more salient and automatized. In some cases, CHWs noticed that although mothers fully understood the messages and positive consequences of EBF for infant development, they hesitated to replace their old practices with new ones that they felt novel and unfamiliar.

> *"Some women understand, but because it's a new thing, they hesitate." (CHW, Mali)*

For some mothers, barriers to EBF were more concrete, such as painful and difficult breastfeeding experiences and lack of breast milk or reduced flow, sometimes due to mothers getting insufficient nutrition. Maternal age was a consideration, with younger mothers who still attended school tending to leave their infant at home to receive water and cow's milk from other family members.

> *"There are some women who do not have enough breast milk because they do not eat enough in the villages, so the baby didn't have enough milk, he cried a lot…this is the reason why they always give water or prepared other medicines." (CHW, Mali)*

The existence of deeply rooted traditional beliefs and practices related to childcare made it difficult for mothers to assimilate new information and change their behavior. Traditionally, mothers believed that infants could not survive without water and that breast milk was insufficient and had to be supplemented with other kinds of milk or solid foods. Infants were commonly given shea butter and hot water, believed to help them sleep well and grow properly, and traditional medicines such as plants boiled in water, intended to cure or prevent various diseases. As we saw in Ethiopia, older women, particularly mothers-in-law, were strong supporters of traditional practices, but with exposure to the new information they began to encourage mothers to only feed breast milk to their babies

until six months of age. In many cases mothers believed the old practices were harmless because they had not observed any negative effects on infants, and this made it more difficult to convince them to change their behavior.

> *"Some women feed the babies with dirty feeding bottles, which can give babies diarrhea, and some of them prepare traditional medicines, wash the baby with that, and give him some to drink." (CHW, Mali)*

Another common theme emerging from focus groups and interviews was related to gender roles; the position of women in the community and the division of work among household members. Women were typically busy with farming, childcare, and all household work, and with very little support from husbands found it difficult to find the time needed for EBF. In some villages women used to take their babies with them to work in the fields, while in other villages infants remained at home with other family members.

> *"The difficulty is they are all very busy, they have no time to breastfeed their babies, and the only time they do it, at the moment the baby likes the breast very much, they remove it from the baby's mouth, and if the baby cries, they give the baby to another person who feeds him something else." (CHW, Mali)*

> *"Most of them are farmers. If they leave the babies with the old women, we tell them to bring the babies to the mother when they are hungry. We tell them not to give anything else." (CHW, Mali)*

Younger mothers, in particular, were responsible for most household work and had no time to attend weekly educational meetings organized by the CHWs. This was especially true during the rainy season when the workload reached its peak. In addition, men unilaterally made most household decisions, including those related to spacing births, use of contraceptive methods, and infant feeding, and this limited maternal behaviour change and implementation of EBF. CHWs spoke of beliefs held by men that mothers' attention during the night was to be directed to them, making it more difficult for them to breastfeed at night. Gender of the health worker was also an important factor relative to EBF implementation. When the CHW was a man, fathers were less accepting of advice regarding breastfeeding at night and felt jealous, perceiving that the male CHW was trying to influence the behaviour of their wives.

> *"Sometimes as a man, if I explain it to some men, they will think that you like to put new ideas into their wives' mind – some are very jealous." (CHW, Mali)*

Similarly, men's resistance to spacing births affected the way in which women could take care of themselves and of their children.

> *"See, when you explain to your husband that the close pregnancies are unkind for me, he might say that he has no problem with it and is willing to care for them; therefore you can only comply with his decision. But when the baby gets sick and he says that he is not able to care for him, you may charge him – why did he let so many babies [be born] closely while he cannot afford to care for them. What a woman can do, since culturally the kid does not belong to her is to notice the parents so that they can intervene before ultimately taking the case to the court." (Mother, Mali)*

CHW work conditions presented another barrier to EBF implementation. All CHWs were assigned to villages other than their own, which meant leaving their families, husbands and children behind. This approach was

chosen based on the hypothesis that villagers might be more likely to follow advice and perceive the authority of an unfamiliar person in the new CHW role, as compared with someone familiar from the village. CHWs were typically allowed to visit their families once a month for 2 days, and husbands of female CHWs were discouraged from coming to visit because it led to arguments with men living in the villages in which the CHWs worked.

> *"Our feeling is that…we encountered some difficulties because we left our families to settle here; so they don't allow us to visit our children and come back. They don't want that…apart from the fact that sometimes we may go to spend a day or two. Some of us even left their husband to come to live here where we work." (CHW, Mali)*

Not all CHWs experienced work relocation as difficult, and some young, unmarried CHWs were satisfied with having found a job.

> *"We didn't have any problem. I was glad since we didn't get paid before. So to be here, work and get paid was a joy for me." (CHW, Mali)*

All CHWs spoke of transportation difficulties, particularly using bicycles to reach households in need during the rainy season, and insufficient work compensation. The full time commitment of being a CHW meant they did not have time to farm or earn additional income and, thus, relied entirely on incentives provided by Save the Children and Health Associations and the food and accommodation received from the villagers. In most cases, however, villagers failed to provide CHWs with any food, despite the original arrangement. Some CHWs talked about having insufficient educational materials to support their work. In some of the villages, the room in which CHWs slept also served as their work space.

> *"We do the work in our homes. They gave us a small room and this really causes problems because it is our bedroom and where we work too…really, that is not easy." (CHW, Mali)*

Several female CHWs spoke of being sexually harassed by village men who visited during night time, sometimes bringing a baby and pretending the baby was unwell and needing help. This harassment continued even after alerting the village chief and requesting that he talk to the perpetrators about their behavior.

> *"At night, when you are in your room, you lock the room…and they [men] just come. If you let them come, the man tells you they love you…If you don't agree, they will try to force you. If you refuse to open the door, in the morning he would go and spread the news that you are some sort of woman that you are not." (CHW, Mali)*

In Mali, villagers' perception of the CHWs' knowledge and expertise also influenced the uptake of new educational information and subsequent behavior change. Upon the CHWs' arrival in the village, people continued to travel to the health centres located kilometers away instead of seeking help from the CHW because they did not fully understand, trust and value the role of the CHW. People used to laugh at the CHWs early on, when they shared new information about infant feeding, because it was in stark contrast with their way of living:

> *"…when women deliver, they give the baby medicine to save him from sickness and to be fat. If you come and tell these people about exclusive breastfeeding which consists of only giving the breast to a baby*

> *during the first six months, they will laugh at you because that is a new thing for them, and they are born and grow drinking medicine so, to abandon that, it will be difficult for them." (CHW, Mali)*

Because CHWs were not authorized to give injections such as immunizations to infants and children, villagers initially perceived them to be incompetent or lacking the knowledge and skill to perform their tasks. This perception gradually changed as people began to experience the benefits of having quick and easy access to CHWs in their own village; removing the need to travel to the closest health centre, and observing improved health status of children in the community.

> *"[If the CHWs say] we are not authorized to give injections to your kid, go to the community health centre, they will just say that you don't know anything, that's why you are not doing it." (CHW, Mali)*

> *"We didn't even have a doctor before. Suppose a child was sick, we had to take him to Kebeni even by night. Sometimes when the sickness was serious, the child could even die on the way. But with doctor here now, whatever the moment of the day and night, we easily go to her and she helps us, you see the point?" (Mother, Mali)*

First Reactions to New EBF Information

Ethiopia

Focus groups and interview participants in Ethiopia noted mothers' initial disbelief and resistance to new EBF knowledge, mostly related to difficulties understanding that breast milk is sufficient for infant development during the first six months of life. In most cases, mothers learned about EBF practice for the first time from the Muskoka project. Some rejected this information in anger, invoking ancestral traditions of giving baby's water and cow's milk to supplement breast milk. Others demonstrated some resistance while attempting to understand, asking questions, and searching for explanations. Questions most frequently asked by mothers were related to how babies could survive very high temperatures with no water and what to do when they did not produce sufficient milk.

> *"[…] we angrily quarrelled with her [HEW] …saying 'it is God who raises our children and not you, with what you are saying.'" (Mother, Ethiopia)*

> *"After the training, when we taught the community, they also refused to accept the new information." (M2M leader, Ethiopia)*

> *"The first day we told them [about EBF] they said 'What do you know about this?', 'What are you saying? We will do as we have previously known.'" (M2M leader, Ethiopia)*

> *"They used to ask 'how can our babies get satisfied from only breast milk?', 'how will it affect the baby if we only give breast milk, what is the value of breast milk?'" (M2M leader, Ethiopia)*

Similarly, fathers did not initially understand the value of feeding infants differently than adults, and resisted the new EBF and complimentary feeding messages: "No, let the baby feed what we are eating, why different for him?" Some of the M2M group leaders also questioned the new EBF information and practices, speaking of their dilemma in having to convince mothers in the villages to change their practices when they themselves were not

convinced. They felt confused by what they had learned during training, and were unsure of the validity of the information. Other M2M leaders welcomed the new EBF information because they felt a strong need for change in communities where women often died at birth and children were sick. They viewed the new feeding practices as solutions to these problems and consequently embraced them with hope.

> *"It took us a long time even to convince ourselves. We asked ourselves whether the new idea is correct or not. […] After I came back home [from training] I asked myself whether the society will accept me or not. When I became confused I went to the health centre and asked the health extension worker: I asked her how can I convince the community since the new idea confused me. She told me that the idea is actually correct and I have to be convinced before I go to the community to convince them." (M2M leader, Ethiopia)*

> *"…when they called us to the centre I said to myself "I have already given birth to children, so how can I apply what they are saying?". So I was confused and didn't understand the idea very well.[…]When we went back to the society, they responded that we were giving birth before your teaching and our children have grown up, so what is the importance of the new idea?" (M2M leader, Ethiopia)*

Mali

In Mali, variability in mothers' first reactions to the EBF information disseminated by the CHWs seemed to be related to whether they had been exposed to this information for the first time through the CHWs, or whether they have heard it before from the Rélais in the village or through media (TV, radio messages). In some villages, mothers welcomed the CHWs and their educational messages as a consequence of acknowledging the strong need to change health practices in the community. This observed need translated into an increased readiness to accept the CHWs and the health education they provided. Nevertheless, mothers remained confused about what the EBF practice actually entailed, expressing disbelief at the idea that babies could survive for the first six months only with breast milk, and asking questions about how to implement the practice in their everyday life (i.e., when to breastfeed, how many times a day, etc.).

> *"If you suffer and someone brings help to you, you follow him. If you do it well, no need for another person to tell it to you, so you will follow really that person." (Mother, Mali)*

In some villages, mothers were initially resistant and insisted they could not practice EBF. This was due to the fact that the educational messages were new, and the CHWs themselves were new to the community and not integrated, and thus perceived as lacking the authority to implement change. People used to laugh at the CHWs during the first few months upon their arrival in the village because of the contrast between their way of living and the practices they promoted. Men and women reacted to different parts of the information: mothers, to the "exclusive" aspect of EBF, questioning the idea that babies could live without water in a climate that is extremely hot, and that breast milk was sufficient for optimal development. Fathers reacted to the practice of breastfeeding at night, which interfered with their routines.

> *"The difficulty in the beginning was in understanding because it was a new thing for them. To start a new thing in a village is not easy." (CHW, Mali)*

> *"They didn't understand at first, so when we told them the first time they laughed at us, and we have been explaining for a long time and gave examples, and, after that, I asked them to practice this example with their babies and they will see the difference…and I told them about the importance of EBF for baby, mom, father and all the family and showed them examples." (CHW, Mali)*

> *"Their first reaction was negative because they didn't believe [us]. They would tell us that you are born and grow in this situation, how can you tell us something like that?" (CHW, Mali)*

In villages where the community was familiar with EBF messages from the Rélais, radio or TV, mothers initially reacted to CHWs by asking clarifying questions, looking for explanations underlying the proposed practices. Having a sense of familiarity with the new information reduced the community's resistance to CHWs. Converging messages from the Rélais, media channels and CHWs validated the EBF practice and contributed to the community building trust in the CHWs.

> *"Since we used to hear it from TV and radio, with her coming we put her questions and she answered the way the TV and radio did, that's why we believed her." (Mother, Mali)*

What Convinced Mothers and CHWs, HEWs, and M2M leaders to Change

The majority of participants talked about being persuaded to change their behaviour by a variety of approaches, many of them common to both Ethiopia and Mali.

Ethiopia

In Ethiopia, repetition and the use of testimonials proved to be the strongest motivators for maternal behavior change and uptake of EBF practice. Since the initial reactions to EBF were rarely positive, HEWs and M2M leaders persistently repeated information on how to implement EBF and its advantages during home visits (targeting primarily resistant mothers/families) and meetings. Repeated explanation of the new information was effective in convincing not only mothers, but HEWs and M2M leaders as well:

> *"After I repeatedly attended training, I understood the idea and started to regret it. Had I known the information previously, I might care for my children." (M2M leader, Ethiopia)*

In addition, HEWs and CHWs, as first adopters of EBF, used their own experience to model correct behaviors, to illustrate the process of change, and EBF outcomes (i.e., their healthy infants). This was a gradual approach that started with HEW training; once they became convinced and started implementing EBF in their own lives, they modeled these practices for the leaders of the M2M groups, who further modeled them for the rest of the community.

Mothers who were first convinced of the benefits of EBF acted as EBF champions and their experiences became increasingly strong testimonials for the advantages of adopting this new practice. Modeling new behaviours helped to convince others to change, as it resonated with a common saying in the community that "seeing is believing". HEWs noticed that once a few mothers started to implement EBF, others in the M2M groups observed, monitored and practiced, motivating one another. This modeling effect was most evident in the highest

performing M2M groups, highlighting the effectiveness of M2M groups as a platform for sharing knowledge and facilitating behaviour change.

> *"Just by taking my experiences of both exclusive breastfeeding and the gender roles, taking my husband's practical things, I facilitated a discussion with the 26 [group leaders]. Then we monitored down each of the leaders on how they correctly passed the message to the five leaders and then to the community. After observing ourselves, we make corrections on what they made mistakes and also show the practical things to the lactating mothers on the spot. And also if it is house to house visits we just teach them through practice and return to our base."(HEW, Ethiopia)*

> *"So we told them that if we practice the new information, our babies might not die of illness. The practice also helps the child to be brilliant. So you have to exclusively breastfeed until six months and after that you have to give them vegetables like cabbage, carrots, and also eggs, mixing it with oil. Our government gave us advice that we didn't even get from our mothers and fathers and we reduced child mortality. We said let us practice first and our neighbours will follow us. When we told the group the first Sunday, they refused but the second Sunday they said 'we understand your idea'. On the third Sunday we observed an improvement. This way, we gradually convinced them." (M2M leader, Ethiopia)*

> *"When I went back to my village from the training centre, the community did not accept me. But I did not give up since I accepted the new idea for myself. I repeatedly told them what the government teaches us taking the mothers who had children as an example. I approached the mother who gave birth first. I told her how to feed breast milk and I shared with her the information I got from the training. […] So I took this mother as a model and taught them since there are mothers who don't accept under six months breastfeeding.[…] So I showed them the baby who is exclusively breastfed and I told them that this is what our government is teaching us.[…] By the help of the baby we took as an example, we taught the other mothers and some of them started to accept the information, this way the number of mothers who accepted the idea increased from 2 to 3 and so on." (M2M leader, Ethiopia)*

> *"The reasons are: going deeply in the community and making them understand through showing them practically, and giving myself as an example, also contributed to these changes." (HEW, Ethiopia)*

> *"It is slowly, slowly, just by citing the experiences of good families. Also through linking the resistant people with other community members who have more knowledge to influence them through these people." (Mother, Ethiopia)*

Mothers commented on how using personal experience to influence change in others parallels a practice from Islam in which religious leaders pray first in order to guide people through their own prayers.

> *"In the Solat ceremony, the leader prays first to lead the others in prayer. So after I clean my house, build my own toilet, care for my children and practice exclusive breastfeeding, I go to my neighbours' house and teach them." (M2M leader, Ethiopia)*

Mothers' uptake of EBF was also influenced by specific communication approaches, including effective explanatory strategies and participatory, two-way information sharing (i.e., mothers were prompted to express their opinions and knowledge as well). This ensured mothers gained a deep understanding of the new information,

likely contributing to their sense of self-efficacy with respect to behavior change. By example, in the initial stages of implementation, when mothers refused to even hear new information about EBF, HEWs and M2M leaders used simple analogies to link new knowledge to familiar, common, everyday experiences in order to facilitate understanding and reduce the novelty of the proposed practices. Similarly, practical demonstrations and concrete feedback on procedural aspects of EBF (e.g., positioning) helped mothers build a solid understanding of EBF and confidence in their abilities to implement it.

> *"[…] we tried to convince them step by step. For example, we used analogies like, if I tell you that sugar is sweet, it is difficult for you to understand until you taste it. We invite them to discuss details and differences with what we have known before, telling them new things we trained on and observed. We show them, by using lactating mothers, the frequency and positions and they started experiencing and accepted. We also used examples of others." (M2M leader, Ethiopia)*

> *"The in-depth kind of information that helped us to create a ground to our current practices are obtained because of the health extension workers and the Muskoka project…that's why we started practicing it, it reached deeply at the ground level and made us do it because of the Muskoka […] it is the same information - it is about how you keep children's hygiene, how to breastfeed your baby, what type of food to give and how frequently to feed your baby - it is the same information we are getting from the Care Muskoka project and the radio. (…) the reason why we didn't change our practices after hearing it from the radio is that the messages we got through the radio is just hearing through our ear, no one came to us and practically demonstrated. But the message we get from Muskoka is not just information communicated orally…we heard it, we observed it through their practical demonstrations and this gave us a strong foundation and this is why we started doing it." (Mother, Ethiopia)*

A great advantage of EBF that increased the effectiveness of testimonials in convincing people to change was related to the concrete, unambiguous, and immediate outcomes observed in infant development and health. Many mothers mentioned that observing clear differences in the community between babies who were exclusively breastfed and those who were not was strong evidence in support of their behavior change. Most mothers had more than one baby, and could easily compare the physical, motor and cognitive development of babies who were exclusively breastfed and babies who were not (i.e., after and before the Muskoka project was implemented). Mothers noticed that exclusively breastfed infants talked and walked earlier than their non-exclusively breastfed siblings, sometimes with a variance of over one year. Mothers also observed differences in physical development, noting that their youngest, and exclusively breastfed infants looked as if they were older than their siblings. Given the limited timeframe of the Muskoka projects, it is possible that the differences mothers noticed between the youngest and the oldest children might be attributable to a range of factors, not all related to the Muskoka projects. Mothers also talked about experiencing beneficial effects of breastfeeding, such as getting support from family members with household work, being able to rest while breastfeeding, and contraceptive benefits. Importantly, mothers noticed that, in time, EBF meant healthier infants and fewer visits to the health centre, which brought economic benefits to the family as well. In some cases, HEWs worked to convince mothers by talking about long-term outcomes for children who are breastfed (i.e., contribution to the country, invoking a kind of patriotic motivation), as opposed to the more immediate or short-term outcomes. HEWs received this information as part of their training and shared it with mothers in the villages in which they worked.

"Doing this has an advantage for you and your child. You yourself will not give birth while feeding breast. For the child too it will sharpen his/her mind. Those children who fed enough breast will be healthy, strong and they will interact when you call them. We saw this for evidence. For this reason, we teach the, how mothers have to feed breast and how to keep sanitation. That is what we teach." (M2M leader, Ethiopia)

"After getting this education we started caring for our babies by only exclusively breastfeeding until six months and also starting to give complimentary food after six months. We are observing that our children get healthier as compared to the previous period when this information was not spread, and our babies don't get sick and do not visit the health facilities. The cost regarding the health care for our children has also become none. This time the babies started practicing walking at eight months. They are very healthy." (Mother, Ethiopia)

"I fed my youngest child breast milk only for 6 months as I was trained. The child grew up properly and now he beats his older brother since the first one is not as big as him." (M2M leader, Ethiopia)

"What makes us exclusively breastfeed is that, previously, when the mother went far to some places, the baby would starve and the mother would have a pain feeling. Because the baby starved, they would get malnutrition problems and repeatedly make us visit the health facility. So because feeding exclusively would avoid such problem, we do it practically. But now because of getting education we felt that exclusively breastfeeding is important to minimize the frequent visit to health facility and the related cost for the babies." (Mother, Ethiopia)

"We also observed the differences between exclusively breastfed babies and those who haven't been exclusively breastfed. This is the way in which the information and implementation get expanded and accepted in the community." (Mother, Ethiopia)

"Yes, because we have seen differences between the children we gave birth before having this information and the children we gave birth recently and were fed exclusively on the breast milk.[…] children who were born recently have very strong body and their mental growth is also very good." (Mother, Ethiopia)

"We tell them, if you feed like this, as displayed in the pictures, your children can reach higher levels of education, and won't remain in the village. Those under two who got sufficient care will have open minds, and will be capable of analyzing everything. But those children who didn't get care when under 2 years of age, won't be competent enough. We teach them by saying that it is those children who have obtained sufficient care that take the country forward and hence it is a must to feed your children properly." (HEW, Ethiopia)

Another change strategy was to highlight the need for change from the status quo in the community, evident in the high rates of malnutrition and infant death. M2M leaders and HEWs shared with mothers the overall health status of children in the villages, highlighting frequent sicknesses, need to access health centre services, and delayed physical and cognitive development in order to demonstrate that the need for practice change. HEWs and M2M

leaders connected these events to traditional beliefs and practices in order to persuade mothers to change their behavior.

> *"First of all, we started this implementation by selecting a village with high rate of child malnutrition. There are people who have changed by observing healthy and well-growing children as a result of being exclusively breastfed as compared to others who were malnourished. Not all individuals are the same in terms of early accepting of the new information they obtained. Some accepted fast while others delayed." (HEW, Ethiopia)*

> *"Observing a frequently sick child is always something that created sadness and challenges for the mother and myself too. But after people have changed [and are] implementing exclusive breastfeeding, the sickness of the baby has ceased. Previously, even before the start of the HEWs working here, babies used to die immediately after birth. Whenever there was an occurrence in a disease, there was a death toll of up to 20 children per village. But after we started working here, there is no such death of children." (HEW, Ethiopia)*

> *"What convinced us is…previously we used to give our babies breast milk from other mothers and we used to provide food to babies under six months of age, but we learned and heard that these practices exposed children to malnutrition. So because of these, we started practicing exclusive breastfeeding with our babies." (Mother, Ethiopia)*

Invoking support from authority figures, such as kebele managers and religious leaders also contributed to mothers accepting new practices. M2M leaders and HEWs set out to involve community members with authority after mothers initially rejected the new information. HEWs talked about making a deliberate decision to "not turn back" after experiencing rejection early on, choosing to garner the support from authority figures within the community to improve their success in disseminating the new information.

> *"First of all, the religious leaders are not supporting by going to one's home. Rather, they give education at every occasion they might have, like we invite them at different gatherings. They give education to the community by citing from the Sharia too, that a child should be breastfed for two years." (HEW, Ethiopia)*

Finally, mothers talked about how certain health worker characteristics contributed significantly to changes in their beliefs and behaviors related to infant feeding. Mothers most valued HEWs' extensive knowledge, their ability to answer all the questions mothers posed during the meetings, their patience and perseverance in educating the community, and their ability to keep mothers accountable by following closely how they fed they babies. In addition, living by example, in other words observing the HEWs and M2M leaders putting in practice what they were teaching, also added to the validity of the new practices and convinced mothers to practice EBF.

> *"They [HEWs] are very capable; they are more capable than us. They provide us with information since they are knowledgeable. Therefore we accept what they are saying and put it into practice." (Mother, Ethiopia)*

> *"They always explained to us…even when there was resistance from the community while they were giving us education. When they faced such resistance, they patiently convinced those resistant people." (Mother, Ethiopia)*

> *"Even when we don't accept her messages, she comes to our home and she tries to convince us slowly." (Mother, Ethiopia)*

> *"It is this organization that convinced us…because she never gave up when we resisted. She devoted her time and dedication to giving us education and a close follow-up until we changed. Even when we angrily quarreled with her, she systematically calmed us and also informed us that she was sent by the Muskoka project to pass those messages." (Mother, Ethiopia)*

Mali

In Mali, the most frequently mentioned ways of convincing mothers to change their feeding behaviours were repetition of the new information and use of testimonials from early adopters. CHWs specifically targeted resistant mothers, and during everyday home visits and weekly meetings explained the advantages of this proposed behavioral change as well as the causes of diarrhea and the reasons why children in the village frequently fell ill. CHWs talked about the gradual nature of the process of convincing mothers, which entailed patient repetition of the same information to reinforce main messages. CHWs emphasized the protective effect of EBF on infant health, as well as the sufficiency of breast milk for infant development (especially why water and solid food were not needed in the first six months of life). Interestingly, similar to Ethiopia, HEWs and M2M leaders relied on repeated explanations of the new information, as well as analogies to aspects of everyday experiences in order to enhance comprehension and be more convincing. In one of the villages, the CHWs talked about using the analogy with a cow to facilitate a discussion with women about what influenced milk production.

> *"It's a matter of courage. At the beginning they didn't understand; then we persevered, talked to them about the advantages, mainly from one month up to six, that's why we convinced them. […]I can't really tell [how long it takes to convince people] because it depends on the comprehension level of the person. If she doesn't understand, you must go and repeat." (CHW, Mali)*

CHWs also brought their exclusively breastfed infants to home visits or to the meetings as concrete evidence for their teaching. As well, mothers who were among the first to be convinced by the CHWs became EBF champions and further disseminated the practice by showing their well-developed and healthy babies to the community, validating CHW messages.

> *"You explain to them that the other kids are growing better and faster than theirs. They listen to those comparisons and when they see the difference, they get convinced." (CHW, Mali)*

> *"I talk about it during the meeting, and if I see that some of them who are not convinced, I go to visit them at home and tell them about the advantages of exclusive breastfeeding, and I show them my baby as an example, and some start to do it, and now they give the information about it to other women." (CHW, Mali)*

As we noted in Ethiopia, the effectiveness of role-modelling exclusive breastfeeding behaviour and the use of testimonials was strengthened by the fact that EBF is typically associated with concrete and immediate outcomes for infant health and development, lending credibility to the messages disseminated by HEWs and M2M leaders. Because some babies in the communities were exclusively breastfed and some were not, mothers talked about direct comparisons they could observe between these two groups. Mothers commented on the economic benefits of exclusively breastfeeding, noting that exclusively breastfed babies meant healthier babies, which meant fewer visits to the health centre and reduced costs. CHWs also used images of EBF to convince mothers to adopt new behaviors. Images helped to make behaviours and outcomes appear safe and concrete.

> *"So when [CHW's name] told us this and we obeyed, kids fell less sick". (Mother, Mali)*

> *"Exclusive breast feeding has many advantages; we did it for its benefits." (Mother, Mali)*

> *"They [people in the village] noticed themselves a reduction of their expenditures for children's health […], that's why the villagers agreed [to do EBF]." (Mother, Mali)*

> *"I convince one of the mothers to do exclusive breastfeeding and I follow this mother until the baby is six months of age and sometimes during the conversation I show them [other mothers] the baby and they will see that he is safe and they will also try to do it." (CHW, Mali)*

> *"Yes, it helps, because some people are convinced only with images. Even if you explain them all, they do not believe [it], but the images convince them…if you don't bring the proof, they don't trust exclusive breastfeeding up to six months or sleeping under mosquito nets."*

> *"What we noticed is that, we made a comparison between these children and the former children. The former ones mostly fell sick and we always went to see the doctor who explained us. So we saw that there is advantage with exclusive breast feeding; the money which served for medicine now serves for little things to eat for children." (Mother, Mali)*

As in Ethiopia, the alliance forged between HEWs, M2M leaders and community authority figures was a common strategy for convincing mothers to exclusively breastfeed in Mali. CHWs talked about forming village-level committees that included influential community members, such as the Rélais and village elders, who were consulted. When mothers refused to implement EBF, CHWs notified committee members who then visited the women and advised them to follow what the CHWs were teaching. If women were not convinced in this way, the chief of the closest health centre or the INGO counsellor was engaged and visited mothers at home, along with the CHW, to explain EBF advantages. CHWs also talked to husbands about the importance of EBF and asked them to convince their wives if they refused to practice it. CHWs noted that in more conservative villages, being a male CHW made it easier to convince fathers to accept the new information because men were not accustomed to learning from women.

> *"If it is a member of the committee who is very influent in the community, the villagers believe what they say." (CHW, Mali)*

> *"We talk to men and women, and, during the conversation, if there are men and women we talk to both, and if we talk to a woman and she didn't accept to do it, we will talk to her husband and we try to explain him the exclusive breastfeeding to convince his wife." (CHW, Mali)*

> *"Sometimes, if we talked to women about something and they didn't believe it, when the Save counsellor came for the supervision, we went to tell him to try to convince these women about it." (CHW, Mali)*

Mothers in all the Malian villages we visited talked about specific CHW characteristics that contributed to their behavior change. As we saw in Ethiopia, mothers noticed and praised CHWs for their perseverance, courage, patience, and deep knowledge. Mothers frequently used the words "true" and "truth" to refer to the CHWs educational messages and observed that following the CHWs' teachings meant that children became healthier. Mothers' comments suggested that at the beginning stage of the implementation, they were actively searching to validate the truth of these new practices.

> *She is very qualified, and when she got here everything she said turned out to be beneficial for them [people in the community]. That's why they kept following her recommendations." (Mother, Mali)*

> *"We followed her though we knew she was a stranger among us and didn't know her well; but later we realized that she was telling the truth and then we kept following her. She is currently helping us so much. For example, when your child is sick, before taking him to Farakala [health centre], she may help a lot at her level in caring for him. Thus, he can feel better and you may not even need to go to Farakala anymore; nonetheless, for complicated cases, she can direct you to Farakala." (Mother, Mali)*

> *"She only tells the truth. With the program, the children grow faster than before." (Mother, Mali)*

> *"Anytime you come to her, she will welcome you warmly. She is hearty with people and willing to help with any issue…and she is very qualified." (Mother, Mali)*

Close to the End of the Implementation Process

<u>Shifting traditional beliefs and practices</u>

Participants from both countries extensively discussed community changes resulting from the Muskoka project: "If we count, there are a lot of changes." (M2M leader, Ethiopia). Mothers, HEWs, M2M leaders, and CHWs in Ethiopia and Mali talked about changes in knowledge, in other words in what they knew and believed to be true regarding infant feeding, as well as changes in their behaviors. In both countries, mothers, HEWs, M2M leaders, and CHWs demonstrated detailed knowledge about the benefits of EBF for both mothers and infants (e.g., protects against infections and other diseases, speeds up removal of the placenta, serves as a vaccination for infants, increases affective bond between mother and infant, reduces bleeding post-birth for mothers, etc.), about correct positioning, timing, and frequency of breastfeeding, with most participants enthusiastically explaining what they have learned. Mothers, HEWs, M2M leaders, and CHWs showed a clear understanding of the relationship between old practices such as giving water to newborns and babies' health (e.g., developing diarrhea, malnutrition). Using the temporal antithesis of "before and after Muskoka", or "previously and now" they were able to contrast the past and the present.

> *"The new thing we knew after trainings is about immediate initiation of breast feeding…we used to think that the milk will not come out of the mothers' breast and give the infants other fluids and milk from other mothers. But now we know that the infant should be put to breast immediately. Starting breast feeding immediately, means that the mother and baby benefit, we learned. For babies, [EBF] makes them strong, cleans gut, increases love between mom and baby. For the mom, supports removal of placenta." (M2M leader, Ethiopia)*

> *"After training we knew a lot of things. The trainings helped us a lot. There is a big difference between now and before. A child used to eat food before 6 months, mothers are [now] feeding babies properly. Mothers are accepting what we teach and changing their behavior." (M2M leader, Ethiopia)*

> *"The community have practically observed that when they give the water for under six children that they became sick. It is practically observed that those children who are exclusively breastfed have grown up well, while those who have been provided with additional food have frequently been taken to the health facility because of sickness." (HEW, Ethiopia)*

> *"What we noticed, there is difference between the one who drank water or herb and the one who has been exclusively breast fed, they don't present themselves the same. Why? Because the one who drank water falls sick many times than the one who is exclusively breastfed." (Mother, Mali)*

In addition to changes in knowledge and beliefs, respondents acknowledged significant shifts in feeding practices and behavior. All mothers in Mali and Ethiopia talked about the new way in which they cared for their infants, which invariably involved cessation of traditional practices and feeding infants younger than six months breast milk, exclusively. In addition, mothers described changes in the way in which they took care of themselves during pregnancy that were triggered by the realization that in utero development has consequences for later development, and that infants' health depends on their well-being. For instance, Ethiopian mothers talked about how they no longer carried heavy loads, engaged in difficult and prolonged work, or ate poorly for fear of having difficult births, and that now, with the support of family members, they took better care of themselves. Because these outcomes were clear, concrete, easily observable, immediate, and beneficial for both mothers and infants, respondents expressed feelings of happiness with the changes, and gratitude to the government and INGOs for bringing about these changes.

> *"On this issue, in my village something happened. There was a mother who understood and one who did not. Due to different reasons they are at different stages. Babies were exclusively breastfed are happy healthy looking, fast growing and actively playing. But those whose mothers did not feed exclusively on breast can be identified, [they are] frequently sick, physically weaker, heads become big…" (M2M leader, Ethiopia)*

> *"But something, to add, we tell her that sitting down and breastfeeding befits you too. Before, I used to encourage babies to sleep longer until I collect firewood. Now we learned that it is also helpful to mother as she gets rest for her health, increased affection between baby and mother. This will continue after the child became older love." (M2M leader, Ethiopia)*

"Now we do not give food before 6 months, and for babies above six [months] we prepare and feed separate complementary foods; and children are trying to walk at about 7 months, but before the project, it was difficult for them to walk even after one year." (M2M leader, Ethiopia)

"We feel happy. Women previously gave birth at home and they passed away during delivery; we used to bury 2 to 3 mothers in one week. Our babies used to eat with their dirty hands and got sick. But now, after we got the training and we teach each other, we keep our babies clean and we praise our government for his help." (M2M leader, Ethiopia)

"As I told you earlier, I have five children. The last one is nine months of age. I properly, exclusively breastfed the last one but not to my older children. The last one has started walking by holding the standing sticks. She also very active and even can identify her older children while we are calling them by their name, she stared her eyes on that child because of identifying their name. But my older children have not even started walking at the same age with the last one. So the activeness and the mental capability is also observable in the last one as compared to my older ones." (M2M leader, Ethiopia)

"Previously we were practicing what our society did, but now we accepted the new information and we are teaching the society." (M2M leader, Ethiopia)

"Since the arrival of the CHW, we no longer give water to them [the infants]." (Mother, Mali)

"When I gave birth to my first kid, I gave water, breast milk and shea butter mixed with hot water, but the one on my back has only known breast milk." (Mother, Mali)

"Well, as far as we are concerned, personally I would say that it helps the growth of my baby, helps him crawl well and so, the mother herself may eat well so that the baby gets everything he needs from the breast milk; and more: right? (addressing the other women, who appear to agree with her)." (Mother, Mali)

Shifting gender roles

Gender issues were a frequent discussion topic across all focus groups, and the need to shift gender roles relative to EBF implementation was apparent in both countries. As mentioned earlier in discussing barriers to EBF implementation, mothers needed to be convinced of EBF benefits, understand how to do it, and be supported by family members – particularly husbands - in order to be successful. The critical role that fathers played in the adoption and sustainment of EBF was evident in both countries. The shift to husbands assuming a more egalitarian and supportive role significantly impacted EBF and was particularly apparent in Ethiopia. Although the authoritarian role of husbands in Mali remained the same close to the end of the implementation, men supported the practice of EBF by allowing or convincing their wives to adopt EBF practices. In some villages men customarily contributed to taking care of the children, and thus, were positioned to provide practical support that would enable their wives to breastfeed.

Ethiopia

In Ethiopia, participants described how the household duties that women were expected to perform prior to the Muskoka project hindered their capacity to breastfeed (as reported in detail in the obstacle to EBF implementation section above). Crossing firm boundaries between gender based work roles was considered shameful by both genders.

> *"Previously, for example, if her husband was just supporting her by fetching water, all of the women point finger and shaming him that he is out of his role." (M2M leader, Ethiopia)*

> *"Previously, there was an assumption that it is only women that who just goes to market to purchase household items. If the husband just try to visit a market, every one of us point finger to him. But now we stopped the thinking and now when the mother is busy breastfeeding, the husband just goes to market." (M2M leader, Ethiopia)*

> *"Yes, it was not known (helping one another); it was shame to let men help women." (M2M leader, Ethiopia)*

Men were also viewed as having priority over their children and as the main decision makers for most household activities, including what their children should eat. Educational activities on the importance of breastfeeding and the roles that men must assume to support their wives shifted their position. Consequently, with repeated education, husbands participated in activities that enabled their wives to engage in exclusive breastfeeding. They fetched water, washed clothes, cooked and carried heavy loads. Participants described how husbands gradually took part in other caregiving tasks for the baby and noted changes in their attitude. According to the participants, these shifts in men's behaviors lead to a more equal and mutually supportive relationship between husbands and wives.

> *"Previously, if our babies got sick and if our husband is not at home, we have to wait until he comes home. Even after he came home he may not want to take the baby to health center rather to take to 'Sheik' and other traditional medications. But after the MUSKOKA project come, our money and our life is equal. Now our baby become ill we will discuss together and we decide together where to take our baby and we took our baby to health center. The mother can take the money from the saving and take the baby to the health center even if the father is not at home." (M2M leader, Ethiopia)*

> *"During breastfeeding my husband helped me especially during dining by feeding me (giving me bits) that is a support for me. Another, he serves the family food if the food is prepared. When I am not home, he serves the children and himself and sometimes he prepares food. (M2M leader, Ethiopia)*

> *"After getting this training and education, fathers are now changing their behavior and attitude, even practice about caring for babies. Previously when I am feeding my breast to the baby, just asking me and nagging me to get food and other thing, something he requires by stopping feeding the babies. Now he is not doing like that. He considers that well-nourished baby is supporting him in the future, during maybe the pension time." (M2M leader, Ethiopia)*

"After giving birth, husband used to give priority for himself about food. But now after getting knowledge, he gives priority for the child and follows me if I wash my hand before feeding, their sanitation and the cleanness of the material I use to feed the baby after getting this knowledge. And when I work inside, the husband play with the child. We both are trained and this is how we are living supporting each other. We are happy about it." (M2M leader, Ethiopia).

"Before the MUSKOKA project came all things are controlled by husband. But after the project came the wife decide what her baby eats." (M2M leader, Ethiopia)

"We are just educating fathers and our husbands similar to what we are doing with women colleagues. And now there is a change, role change in supporting each other." (M2M leader, Ethiopia)

"After the MUSKOKA project came, our money and our life is equal. Now our baby will become ill, we will discuss together and we decide together where to take our baby and we took our baby to health centre." (M2M leader, Ethiopia)

"On daily routines we ask each other. We discuss with husband agree and decide on our assets or money and give solutions. We look for solution together." (Mother, Ethiopia)

"Even the money they have is kept with the mother because of the gender equality has been realized in the community." (HEW, Ethiopia)

"There is a mutual support from both of us. Whenever he goes to the farm, I carry farming materials with me. I will support. The same to that he also supports the household level things. So we support each other available time I have." (Mother, Ethiopia)

Men primarily learned about EBF from the wives, who relayed information they were taught in the women's groups and from community meetings with the HEWs, although these sometimes included husbands. Participants spoke of how husbands came to understand the importance of these meetings and supported their wives' participation.

"The change comes because of education. Every night after Wednesday and their meeting day, our husband asks us what type of training today you are educated. When he asked like this we just tell them what we learned and we discuss so because of these discussion that these changes happening." (M2M leader, Ethiopia)

"We again called a meeting being with the health extension worker and told the community to exclusively breast feed and to wash clothes of their baby. In this way we try to convince the community together. So, currently, the husband washes the babies' clothes and cook while the mother feed breast the baby. There is a great improvement, we all, men and women understand its value after MUSKOKA project started here." (M2M leader, Ethiopia)

"For example, my husband will not ask me for why I didn't get him a lunch to the farm if I told him that I was on the other groups discussions as contrary to the previous time." (Mother, Ethiopia)

Posters depicting pictures of husbands caring for their wives in various ways were also particularly helpful as visual role models. Radio messages, which were mostly heard by men as women were usually preparing dinner at that time, further supported the information provided by the women and HEWs/M2M leaders. In some cases, women talked about being invited by their husbands to listen to EBF radio messages, which may be an indication that they internalized the messages and acted in a way that reduced gender inequality. In other instances, however, men listened to these messages by themselves. Observing other men helping their wives and breastfed babies who appeared healthier also incentivized behavior change in men.

> *"What we observed on the pictures are very beautiful things like for example when we had eating food together and I put the breast to the baby mouth, the husband shows his affection by giving food into my mouth." (Mom, Ethiopia)*

> *"We just take those pictures with us to home and have a look at it with my husband. If husband can read, he will read and we will discuss on how we can practice it, but if can't read I tell him what the pictures showing and will get a common understanding." (Mom, Ethiopia)*

> *"When they take the baby to health facility together, while she is pregnant, we have all these pictures in our hall. Everyone can see the picture and understand the idea easily… the poster (is) very comprehensive and a lot of content how the father is helping the mother even during pregnancy, during preparation of food also the father bringing some vegetable from the agricultural lands to the mother to prepare for the baby." (M2M leader, Ethiopia)*

> *"The other is through observing from the husbands who is doing good at neighbourhood. It is because of all these things that makes them to be convinced." (Mother, Ethiopia)*

> *"After observing that the baby is very well grown and beautiful, he is now supportive for this program." (Mother, Ethiopia).*

The shift to more equal division of labour could also be partly attributed to government policies that were first introduced twenty years ago. Policy directed at gender equality provided a political base and authority for CHWs and HEWs to facilitate the shifts in gender roles needed to ensure successful EBF. It may be that access to information and education about the EBF benefits and activities was the main driver for change in practice and gender roles.

> *"Given the government (referring to policy that states that "both men and women are equal in all matters") by taking several training it is us who train the community to come to these changes…. I am just linking with breast feeding, with other economic involvement kind of things, I am just linking to my work." (HEW, Ethiopia)*

> *"What we lack previously was information and now after getting information, what brought change on both men and women is getting information." (HEW, Ethiopia)*

Despite reports of men accepting changes in the distribution of household chores to support their wives in EBF, participants suggested that the actual number of husbands actively engaging in these activities was low.

> *"Even though I can say that they are higher in number, there are few individuals/husbands who have supporting to the mother by fetching water and other works while the mother is exclusively feeding the breast milk to her baby." (HEW, Ethiopia)*

> *"They are few in number (in response to question of number of men who are practicing the support of EBF). I can estimate 10-15% from the total household I am serving." (HEW, Ethiopia)*

Mali

In Mali, men appeared to have a more ingrained and consistent authoritarian role. Not only were they the central decision maker in household matters, finances and the health of their wives and children, but in some villages it was customary for them to play a role in child care that included purchasing food, feeding and washing clothes. In other villages, men were mainly involved in financial provision but not in tasks around childcare.

> *"The husband cares about children. For example, when we go somewhere leaving children to themselves, the husband can't keep silent when the child misbehaves or when he's hungry for example, he'll feed the child, take care of him." (Mother, Mali)*

> *"When the child is sick, the husband takes him to the hospital, he gives him the food, and he also helps take care of him." (Mother, Mali)*

Male household dominance had implications for the approaches taken to persuade both women and men in EBF practice. CHWs tended to speak to husbands first, as they often needed their permission to talk to the wives. In many cases, women could only be persuaded to engage in EBF by their husbands. Hence, workers targeted the husbands because they were gatekeepers and held decision-making authority.

> *"We talk to the men and women, and during the conversation there are men and women we talk to both, and if we talk to some woman if she didn't accept to do it, we talk with her husband and we try to explain him the exclusive breastfeeding to convince his wife."(CHW, Mali)*

> *"When we go to visit the woman, we talk to husband… as you are the head of the family she has in your authority you can try tell her to do the exclusive breastfeeding that is what we talk to the husband and we tell him about the advantages of the exclusive breastfeeding and he will accept it." (CHW, Mali)*

> *"Men talk about it and its importance since he is the centre of the decision, so, in this case, the wife will adhere easily." (CHW, Mali)*

> *"So, I think we must speak with them both because here in household the husband is a chief of its family. If you tell something to the women if its husband doesn't agree with that, women can't do it without his husband agreement." (CHW, Mali)*

As we noted in Ethiopia, training and education also took place at community meetings. In Mali, however, men would be provided with details regarding meeting date and time to ensure that both husbands and wives attended.

> *"They will inform all the men who will allow the women to be there." (CHW, Mali)*

> *"We didn't talk with the women only, we talk with the men because if the man didn't like what his wife does, it will be difficult; but if you convince the men he can tell his wife to do it, reason why we talk to all of them, men and women." (CHW, Mali)*

Men were purposefully selected as community workers with the knowledge that it would be more appropriate for them to talk to the husbands. Yet, participants acknowledged that certain messages were not best conveyed by male CHWs, such as informing husbands to allow their wives to breastfeed at night, as this had the potential of provoking jealousy and fear.

> *"If you are a woman and go to speak to man this can be wrongly interpreted. But a man talking to a man is quite understandable." (CHW, Mali)*

> *"Some men, if you tell them that your wife has to be breastfeeding a baby at night – some are very jealous – they think that they are trying to separate them and to get their wife" (CHW, Mali)*

By the end of EBF implementation, women reported that their husbands agreed with the EBF practice and understood its importance for infant health and development. The full extent to which the husband's activities changed as a result of EBF was unclear, although may toook their wives to the health clinic for antenatal visits. Some husbands continued to engage in the traditional roles they had prior to implementation, which included providing money for medicine, clothing and food, as well as feeding and caring for the baby. Overall, participants reported that most husbands became supportive of EBF practices.

> *"They take us there (health clinic). Our husbands give us money and take us there to see we are well keeping so that he himself can feel relaxed." (Mother, Mali)*

> *"Our husbands' opinion is to exclusively breast feed the baby because its advantages concern not only the baby but his father too." (Mother, Mali)*

> *"My husband gets it well; he realized that exclusive breastfeeding is excellent for the baby". (Mother, Mali)*

Changes in Rates of EBF

As mentioned in the analyses section, quantitative analyses were performed only on data from respondents with children younger than 6 months. The sample sizes for 0-6-month old infants at baseline were n=121 in Mali and n=173 in Ethiopia. The sample sizes for 0-6-month old infants at endline were n=101 in Mali and n=269 in Ethiopia. Selected demographic characteristics for mothers surveyed at baseline and endline in Mali and Ethiopia are presented in table below.

Table 6: Demographic characteristics of mothers surveyed at baseline and endline in Mali and Ethiopia

Characteristic	Save Mali	CARE Ethiopia
Baseline		
Maternal mean age (years)	26.6 ± 6.7	27.5 ± 6.4
Maternal education (n[%])	none: 96 (79) first cycle: 12 (10)	none: 142 (82) primary: 27 (16)

Characteristic	Save Mali	CARE Ethiopia
	second cycle: 11 (9) secondary/technical school: 2 (2)	secondary: 2 (1)
Marital status (n[%])	single: 1 (1%) monogamous marriage: 64 (53%) polygamous marriage: 55 (45%) living together: 1 (1%)	married: 168 (97%) divorced: 2 (1%) separated: 2 (1%) widowed: 1 (1%)
Endline		
Maternal mean age (years)	27.2 ± 6.5	26.9 ± 6.4
Maternal education (n[%])	none: 80 (79) first cycle: 14 (14) second cycle: 5 (5) secondary/technical school: 2 (2)	none: 148 (55) primary: 105 (39) secondary: 11 (4)
Marital status (n[%])	single: 1 (1%) monogamous marriage: 44 (45%) polygamous marriage: 54 (53%) separated: 2 (2%)	married: 263 (99%) divorced: 2 (1%)

The percentage of living children aged 0-5 months who were exclusively breastfed was calculated by dividing the number of children aged 0 to 5 months who were exclusively breastfed by the total number of children between 0 and 5 months in the sample. Comparing the baseline and endline results for each country (see Table 7 below), results showed that in Mali there was a 39% increase in the EBF rates from baseline to endline, and in Ethiopia, there was a 5.7% increase in EBF rates from baseline to endline.

Table 7: Percentage of participants reported as exclusively breastfed, based on a 24 hour recall

Study site	Numerator (n)	Denominator (n)	Coverage (%)	95% CI
Save Mali				
Baseline	33	121	27.3	19.2, 35.3
Endline	67	101	66.3	57.0, 75.7
CARE Ethiopia				
Baseline	120	173	69.4	62.4, 76.3
Endline	202	269	75.1	69.9, 80.3

In addition, Table 8 presents EBF rates at baseline and endline as a function of maternal age (i.e., less than or equal to 19 years of age, and more than 19 years).

Table 8: Percentage of participants reported as exclusively breastfed, based on a 24 hour recall by maternal age

Study site	Numerator (n)	Denominator (n)	Coverage (%)	95% CI
Save Mali				
Baseline	33	121	27.3	19.2, 35.3
≤19 y	*6*	*20*	*30.0*	*8.0, 52.0*
>19 y	*27*	*101*	*26.7*	*18.0, 35.5*
Endline	67	101	66.3	57.0, 75.7
≤19 y	*8*	*12*	*66.7*	*35.4, 98.0*
>19 y	*59*	*89*	*66.3*	*56.3, 76.3*
CARE Ethiopia				
Baseline	120	173	69.4	62.4, 76.3
≤19 y	*16*	*21*	*76.2*	*56.3, 96.1*
>19 y	*104*	*152*	*68.4*	*60.9, 75.9*
Endline	202	269	75.1	69.9, 80.3
≤19 y	*18*	*27*	*66.6*	*47.7, 85.7*
>19 y	*184*	*242*	*76.0*	*70.6, 81.4*

Key Factors for Implementation Success

Given that both settings showed increases in the EBF rates from baseline to endline, for the purpose of the qualitative deductive analysis we examined the CFIR factors that were associated with implementation success in both countries. Of the 43 constructs assessed[6] (36 core CFIR constructs plus 7 additional constructs related to the mother's environment, process, and outer setting), thirteen constructs were strongly associated with implementation effectiveness in both countries and two other constructs were strongly associated with implementation effectiveness only in Mali (see Table 9). Another thirteen constructs exhibited a moderate association with implementation effectiveness in both countries. Two constructs showed a neutral association with the implementation outcomes and the remaining 11 constructs had insufficient (INSUF) data to assess.

[6] Other Personal Attributes was not coded. Intervention source was coded but not rated, as it typically receives a descriptor indicating if source is internal, external or a combination of the two.

Table 9: Constructs Associated with Implementation Success in Mali and Ethiopia [• indicates a factor added to CFIR]

CFIR Construct	Ethiopia Mode	Mali Mode	Strong influence of construct on implementation in both countries (**) or in one country (*)
INTERVENTION CHARACTERISTICS			
1. Adaptability	2.0	2.0	**
2. Complexity (REVERSE CODED)	-2.0	-2.0	**
3. Cost			INSUF
4. Design Quality and Packaging	1.0	1.0	
5. Evidence Strength and Quality	1.0	1.0	
6. Intervention Source			
7. Relative Advantage	2.0	2.0	**
8. Trialability			INSUF
OUTER SETTING			
9. Patient Needs and Resources	2.0	2.0	**
10. Cosmopolitanism	2.0	2.0	**
11. Peer Pressure			INSUF
12. External Policy and Incentives	2.0	2.0	**
13. Remuneration Status ♦ [SUB external policies and incentives]	0.0	2.0	*
INNER SETTING			
14. Structural Characteristics			INSUF
15. Networks and Communications	1.0	1.0	
16. Culture			INSUF
17. Tension for Change	2.0	2.0	**
18. Compatibility	1.0	1.0	
19. Relative Priority	1.0	1.0	
20. Organizational Incentives and Rewards	1.0	1.0	
21. Goals and Feedback	1.0	1.0	
22. Learning Climate			INSUF
23. Leadership Engagement	1.0	1.0	
24. Available Resources	0.0	0.0	
25. Access to Knowledge and Information	2.0	2.0	**
CHARACTERISTICS OF INDIVIDUALS			
26. Knowledge and Beliefs about the Intervention	2.0	2.0	**
27. Self-efficacy	1.0	1.0	
28. Individual Stage of Change			INSUF
29. Individual Identification with the Organization	1.0	1.0	
30. Other Personal Attributes			
PROCESS			
31. Planning	1.0	1.0	
32. Sustainability ♦ [SUB planning]	2.0	2.0	**
33. Champions	2.0	2.0	**
34. External Change Agents			INSUF

CFIR Construct	Ethiopia Mode	Mali Mode	Strong influence of construct on implementation in both countries (**) or in one country (*)
35. Formally Appointed Internal Implementation Leader	1.0	2.0	*
36. Opinion Leaders			INSUF
37. Executing			INSUF
38. Reflecting and Evaluating	1.0	1.0	
39. Supervision Model ♦ [SUB reflecting and evaluating]	1.0	1.0	
CHARACTERISTICS OF MOTHERS ♦			
40. Education	0.0	0.0	
41. Family Composition	-2.0	-2.0	**
42. Socio-Economic Status			INSUF
43. Spiritual, Religious, Traditional Beliefs and Practices	-2.0	-2.0	**

NOTE: *Each construct was rated -2 to +2, with a negative valence indicating the construct has a negative influence on implementation and positive indicating a facilitative influence. The strength of the influence is reflected in either a 1 or a 2. Constructs rated as a 0 either had a neutral influence on implementation or a blend of positive and negative influences. Decisions regarding which constructs were associated with implementation effectiveness in both contexts were based on the mode score for each construct: one for Ethiopia, by getting the mode of the ratings assigned for the six respondent groups, and one for Mali, by getting the mode of the ratings assigned for the five respondent groups. A mode of 2 for a certain construct indicated that most respondents commented on the strong facilitative influence of that construct on the implementation effectiveness. Similarly, a mode of 1 indicated that most respondents commented on the moderate facilitative influence of that construct on the implementation effectiveness. Based on these scores, we identified patterns in ratings of the CFIR+ constructs relative to implementation outcomes for the two countries.*

The following section describes all but the insufficient constructs and how they manifested in each implementation setting (country). Constructs annotated with an asterisk (*) were strongly associated with implementation success.

Intervention characteristics

Adaptability*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia In both countries, EBF intervention was perceived as highly adaptable, having a positive influence on implementation. Respondents shared many examples of how the EBF intervention was adapted to local contexts, e.g., pictorial materials presented to mothers and fathers to match their level of education; implementation process was adapted to fit the existing health system infrastructure.

Complexity[7]*

Respondents in both settings identified the implementation of EBF interventions as complex, yet they managed to address this well. Examples of implementation complexity in both Ethiopia and Mali included having a large number of individuals and groups involved in the implementation process and delivering a large health package to the communities, of which EBF was only one component.

Design Quality and Packaging

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. Respondents in both countries perceived the EBF intervention to be somewhat well designed in a way that facilitated implementation. Overall, respondents in Mali and Ethiopia perceived the educational materials used in the EBF implementation as helpful and well-designed, particularly the EBF posters depicting correct procedural aspects of EBF such as infant positioning, that mothers could take home and put on the walls.

Evidence Strength and Quality

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. Respondents in both countries had moderately strong perceptions of how the quality and validity of EBF evidence supported implementation efforts. In both settings, most respondents referred to evidence for EBF success that relied on mothers' and CHWs/HEWs' direct observations of the benefits of EBF for infants' health and development (e.g., exclusively breastfed infants were healthier, and started to speak and walk earlier than their same-age peers or older siblings who have not been exclusively breastfed).

Intervention Source

Although not rated numerically, respondents in both countries identified the EBF intervention as influenced by both internally (i.e., INGO experience) and externally (i.e., GO experience) driven evidence. Both INGOs adapted evidence from internationally recognized programs (e.g., Gates Foundation Alive and Thrive) and followed WHO recommendations.

Relative Advantage*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia. In both countries, the study groups indicated strongly positive perceptions about the advantages of the EBF intervention relative to the status quo (i.e., breastfeeding augmented by solid foods or other liquids, that is, non-

[7] It is important to note that we followed Damschroder et al's (2013) procedure and reverse rated this construct to be consistent with the other constructs, i.e., a positive sign denotes a perception of a less complex implementation process, and negative sign indicates a more complex implementation.

exclusive breastfeeding). The study group identified advantages of optimal breastfeeding practices such as healthy infants, age-appropriate cognitive and motor development, fewer visits to the health centers and thus more savings for the family, and more support from family members, particularly husbands due to male involvement strategies.

Outer Setting

Patient Needs and Resources*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia: strongly recognized and prioritized the needs of the target population relative to exclusive breastfeeding. Programme implementers at the government and INGO levels conducted baseline evaluations and were thus very knowledgeable of the needs and characteristics of the communities targeted by the Muskoka programs, as well as possible barriers to implementation and key actors to facilitate implementation.

Cosmopolitanism*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia. Respondents in both countries described a high level of networking with like-minded, external organizations which benefitted their implementation efforts. For example, the collaboration with Alive and Thrive in Ethiopia and the use of educational materials on infant and young child feeding developed by Alive and Thrive was further adapted by CARE to the local context. Similarly, in Mali, Save the Children collaborated with UNICEF and shared training and educational materials on EBF.

External Policy and Incentives*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia: both countries recognized a strong positive influence of government policies on implementation efforts. EBF was a priority of the national health programs. In Mali, the government dedicated the month of March to EBF promotion at the national level. In Ethiopia, the greatest policy influence was the development army which created an enabling environment for the education of women.

Remuneration Status♦ [SUB external policies and incentives]*

An added construct within External Policy and Incentives captures the remuneration status of the community health workers, who were the lead agents of change on the ground. This construct showed a strong positive association with implementation effectiveness in Mali, where the basic motivation and incentives received by the CHWs facilitated successful implementation. In Ethiopia, as part of the GO policy, HEWs received a salary and M2M leaders perform volunteer work, yet overall remuneration status seemed to have a neutral effect on implementation effectiveness here, with no evidence of positive or negative influence on implementation outcomes.

Inner Setting

Networks and Communications

This construct showed a moderate positive association with implementation success in both Mali and Ethiopia. Respondents in both settings regarded the quality of social networks and the nature and quality of formal and informal communications as positively related to their implementation efforts. They described generally effective communications between all parts involved, synergies believed to have a positive impact on the EBF implementation process, as well as the complexities and difficulties associated with having so many parts involved in the communication chain.

Tension for Change*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia: both settings perceived a strong tension for change relative to exclusive breastfeeding, expressing concern about the current situation as intolerable. This was expected given the context of maternal newborn child health as a recognized high priority and need in low and middle income countries. This is driven by critical needs at a country level rather than organizational or individual level.

Compatibility

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. Respondents in both settings commented that EBF programming aligned well with the existing government infrastructure, workflow and values, which contributed to positive implementation outcomes.

Relative Priority

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. We note that in both settings, EBF was part of a larger intervention package aiming to improve maternal and child health. Respondents in both settings shared a moderately positive perception of EBF as an important intervention and at the same time recognized the importance of other components such as hygiene, malaria protection and treatment, and their link with the EBF intervention. It is important to note that by design the package of interventions in Mali and Ethiopia differed in terms of focus: the only intervention that CARE did was maternal nutrition and IYCF, whereas Save the Children delivered a larger and more heterogeneous package of interventions.

Organizational Incentives and Rewards

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. Both settings recognized the positive influence of extrinsic incentives (e.g., performance reviews in Mali, increased stature in the community, as reported by the leaders of the mother-to-mother groups in Ethiopia) on supporting the EBF initiative.

Goals and Feedback

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. In both countries, respondents talked about the goals and feedback system (i.e., the degree to which goals were clearly communicated, acted upon, and fed back to staff) and its positive association with implementation efforts. Both settings struggled with collecting program data and translating it into usable information mostly because of the limited timeframe of the project, and lack of specialized staff. However respondents at all levels (i.e., CHWs, HEWs, and M2M leaders, GO, and INGO staff) described that data collection and feedback processes, such as having GO and INGO meetings to review reports, facilitated implementation.

Leadership Engagement

This construct, capturing the commitment, involvement, and accountability of leaders and managers within the implementation initiative showed a moderately positive association with implementation efforts in both countries.

Available Resources

This construct showed a neutral association with implementation effectiveness in both Mali and Ethiopia. In both settings, respondents described a mixture of positive and negative resource dedication. The most common constraints were lack of specialized monitoring and evaluation personnel in-country, effective transportation for HEWs, M2M leaders, and CHWs, with bicycles being difficult to use during the raining season, and lack of time. Respondents commented on the large scope of the project, which aimed to achieve behavior change at a large scale, and the limited time frame, dictated by funding timelines, to achieve these kinds of results.

Access to Knowledge and Information*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia. Ease of access to information and knowledge about EBF and how to incorporate that knowledge into work tasks had an equally strong influence in both settings. For example, participants in Mali and Ethiopia reported high satisfaction with training quality and materials received and significant changes in their knowledge and expertise post-training.

Characteristics of the Individual

Knowledge and Beliefs about the Intervention*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia. Respondents held strong positive attitudes and values about EBF, as well as familiarity with facts, truths and principles related to the intervention. Respondents showed in-depth knowledge about EBF and best ways to deliver it to the communities targeted, as well as observed benefits for both infants and mothers.

Self-efficacy

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. CHWs, HEWs, and M2M leaders commented on their sense of self-efficacy and expressed moderately strong beliefs in their own capabilities to execute the EBF intervention and to achieve the implementation goals. Although respondents acknowledged a number of challenges, such as difficult transportation between villages, the task of changing traditional beliefs and practices, and insufficient salary/financial motivation, they expressed motivation and confidence in their abilities to slowly educate the communities with respect to health practices and successfully solve problems and barriers along the way.

Individual Identification with the Organization

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. In both settings, individuals perceived the organization and their relationship and degree of commitment with the organization in a slightly positive light.

Process

Planning

This construct had a moderately positive association with implementation effectiveness in both Mali and Ethiopia. Both settings were equivalent with respect to the degree to which the implementation plan was developed in advance and of high quality. Respondents described a collaborative and comprehensive approach to planning that involved GO and INGO working together very closely to build local capacity, maximize use of resources, learn about the needs of the targeted communities, and tailor the implementation strategies for the groups involved.

Sustainability♦ [SUB planning]*

The degree to which implementation planning considered sustainability, specifically at the front end, showed a strong positive association with implementation effectiveness in both Mali and Ethiopia. Sustainability pertains to whether the settings would be able to sustain the EBF intervention beyond the currently funded implementation initiative; this is something that remains unclear at the conclusion of the study and would require assessment over a longer term. In the present study, we coded the extent to which respondents noted a sustainability focus during the planning phase and in both cases there was strong evidence of planning for sustainability.

Champions*

This construct showed a strong positive association with implementation effectiveness in both Mali and Ethiopia. Champions were identified purposefully as individuals who could potential facilitate or hamper EBF implementation, e.g., religious leaders, fathers, mothers in law. These individuals received training and were gradually persuaded to join the implementation efforts of the CHWs, HEWs, and M2M leaders.

Formally Appointed Internal Implementation Leader

Though this construct was a positive influence on implementation effectiveness in both settings, respondents in Mali showed a slightly stronger recognition of individuals within the organization who had formal or informal influence on the attitudes and beliefs of their colleagues with respect to implementing the EBF intervention. This included individuals at all levels of the implementation such as CHWs, INGO staff and GO workers.

Executing

It is important to point out that while both settings described activities undertaken in carrying out the implementation, there was insufficient data to assess whether the implementation activities were executed with quality and/or according to a planned approach (fidelity). This construct requires one to establish quality of implementation a priori, and there is, as yet, no established set of standards for assessing implementation quality in the literature. It is also important to note that we cannot conclude there were no such plans, but there was no explicit mention of them.

Reflecting and Evaluating

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. All respondents described quantitative and qualitative feedback about the progress and quality of implementation and were supportive of implementation efforts. In both setting many types of data were collected at different levels (INGO, GO, on the ground by HEWs/CHWs), and at different stages of the implementation (baseline, midterm, endline, continuous monitoring), and there were similar constraints related to time dedicated for reflection and evaluation of the data in order to understand and monitor the process and specialized personnel.

Supervision Model♦ [SUB reflecting and evaluating]

This construct showed a moderate positive association with implementation effectiveness in both Mali and Ethiopia. Whereas reflecting and evaluating assesses progress and quality of the implementation process at the group and individual levels, the supervision model construct is intended to capture processes, policies, and procedures for individual supervision related to the fidelity of the intervention (i.e., to what extent did CHWs provide the EBF intervention as intended and with competence). In both countries, CHWs and HEWs were directly observed by GO and INGO staff and provided with specific feedback regarding their work, and mothers and other family members were asked about what they had learned during educational sessions as a way of assessing CHWs and HEWs' adherence to delivering the intervention.

Characteristics of Mothers/Households♦

Education♦

This construct aimed to capture the influence of maternal education (literacy) on maternal behavior change and we observed a neutral association with implementation effectiveness in both Mali and Ethiopia. We rated respondent perceptions of the influence maternal education had at the initial stage of implementation because we noted that both settings made efforts to address this through their implementation efforts. We see that

respondents in both settings were aware of the potentially negative impact maternal education could have on their success, and as such, made efforts to mitigate this. However, there was a mix of opinions, and low maternal education was not always perceived to be related to low EBF uptake.

Family Composition♦*

Similar to maternal education, we captured respondent perceptions of the influence family composition could have on implementation success at the beginning stage of implementation. Respondents strongly recognized the potentially negative influence that mother-in-law or husband influence, and number of children could have on maternal EBF behavior. These factors were clearly addressed in planning and targeted during the implementation in order to mitigate their negative effects.

Religious, Traditional Beliefs and Practices♦*

Similar to the other mother/household characteristics, we captured respondent perceptions of the influence religious, traditional beliefs and practices could have on implementation success at the beginning stage of implementation. Both settings strongly recognized the potentially negative influence that traditional practices such as feeding babies cow milk, butter, fenugreek water, shea butter, etc., could have on maternal EBF behavior. These traditional influencers were specifically addressed by the HEWs, M2M leaders, and CHWs during implementation, in explaining the reasons why babies fell sick and the link between traditional practices and infant health.

DISCUSSION

This study focused on EBF, a program implemented by the DFATD funded MIC-KMI projects. Specifically, the field study explored the range of contextual influences associated with the successful implementation of EBF in two countries, Ethiopia and Mali. Using the CFIR framework as a conceptual guide, we explored a range of factors associated with successful implementation through focus group discussions and interviews analyzed both inductively and deductively.

Main Findings

Program activities were similar yet tailored to external country contexts. In Ethiopia, HEWs supported M2M leaders, yet, based on government policy the M2M leaders were unpaid whereas the HEWs received salary. In Mali, CHWs were paid by the government and INGO, and their work was supported by the community in which they worked. In both countries, EBF was part of a larger implementation health package, although, by design, the CARE interventions focused on maternal nutrition and IYCF , whereas Save the Children package was broader and included diarrhea and malaria treatment, hygiene, sanitation and other components. In both countries, the EBF intervention was implemented through various activities such as home visits, use of educational materials, training of influential community and family members, and radio messages.

Themes emerging from our respondent focus groups and interviews largely support findings from previous research and they are similar for both Mali and Ethiopia (i.e., although the details of how they manifested in the two contexts differed, the general themes were the same). In particular, the predominance of traditional beliefs, knowledge and practices regarding infant feeding as well as gender roles and their impact on mothers' decision-

making and workload distribution emerged in both countries as significant considerations relative to EBF implementation and behaviour change. Although these practices were known to the INGOs who considered them in planning the activities employed in their programming, traditional beliefs, knowledge and practices were nonetheless difficult to shift. This was largely related to the limited timeframe of the projects (i.e., 2-3 years of implementation) which is insufficient to produce long-term and significant behavior changes.

In both countries, mothers, HEWs, M2M leaders, and CHWs initially reacted with disbelief and resistance to the idea that breast milk was sufficient for infants' optimal development and that water was not necessary for infants in the first six months of life; this posed an obstacle to EBF implementation. Importantly, these initial reactions were not only the reactions among mothers, but also by CHWs during training, when they were first exposed to these EBF messages. This is a significant point as it has implications for training, follow up and program quality how best to prepare staff for work on the ground, and for ensuring that workers understand and believe in what they teach. This means that initial and refresher trainings need to be supplemented by ongoing mentorship and support in order to ensure high-quality implementation. Other obstacles included strong reliance on traditional beliefs and practices, having a low regard for HEWs and CHWs at the initial stages of the implementation, and lack of support from husbands and other family members. Gender roles emerged as a significant obstacle to EBF in both contexts at the beginning of the implementation process. With time, however, shifts in gender roles were reported, and toward the end of the implementation, husband support was noted as a facilitator of maternal behavior change. This is a very important aspect of the implementation process because mothers could not implement EBF without help with household work, even if they understood and were persuaded by the information.

Behaviour change was facilitated by focusing attention on potential champions in the household and community, by developing trusting relationships over time with community health workers, and by use of materials that bypassed issues of low literacy. Behaviour change was greatly supported by observing EBF behaviours and exposure to testimonials regarding its benefits. Mothers also reported that repeated education on EBF received through multiple channels such as meetings, home visits, radio messages, educational materials, etc. contributed to their gradual understanding and acceptance of the new EBF information. Mothers felt compelled to change their infant feeding practices upon observing the health outcomes of infants under six months who received exclusive breast feeding compared to those infants that were not exclusively breastfed.

The study also contributed to our more general understanding of factors related to implementation success in LMICs, through our analysis of the CFIR. Our data revealed several factors associated with implementation effectiveness that are not explicitly captured in the existing CFIR framework, including remuneration, sustainability, supervision model, and maternal/household characteristics such as education, family composition, socio-economic status and religious and traditional beliefs and practices. Although it can be argued that these factors are embedded and bear mention in the existing CFIR, our data highlighted the distinct and essential nature of these factors to the implementation process, recommending that they be added as constructs on their own merit.

A number of factors had a strong positive association with implementation effectiveness in both countries, such as *adaptability* of the intervention to the local context; the *relative advantage* of the EBF intervention compared to traditional feeding practices; mitigating the *complexity* of the intervention; efforts that recognized the *needs* of the population targeted and *resources* available; *linkages and collaborations* with organizations with a similar mandate that work in the same regions; the support of national *policies and incentives*; working in areas where

there is a high *tension for change* of the status quo; change agents with access to *information and knowledge* about EBF; CHWs, HEWs, and M2M leaders developing solid *knowledge and beliefs about the intervention*; considering *sustainability* in planning the implementation process; having strong *champions* of the EBF intervention; *maternal and household characteristics* such as who lives with the mothers, how decisions are made, and the role of traditional beliefs and practices.

The study makes an important contribution to our understanding of factors that support implementation in LMICs while also contributing to the refinement of the CFIR model, enhancing its utility for further research and planning.

Limitations

- Several limitations must be considered in light of the findings. We note that the eligibility criteria for participation in household surveys differed between the Save Mali and CARE Ethiopia projects (mother or guardian and child <5 years of age and mother 15-49 years and child <2 years of age, respectively).

- Baseline and endline data captured regional representation of health behaviours rather than specific behaviour among mothers (households) who received the intervention.

- There were differences in the level of representativeness for each project. For example, while the Save Mali endline survey was intended to be representative of all villages within the four districts where EBF implementation occurred, the CARE Ethiopia endline survey was representative of purposively selected geographically accessible kebeles (wards).

- Sample sizes for the household surveys were determined using a certain level of precision overall, or 'acceptable error,' rather than assessment of statistical power needed to assess change in EBF rates. For both country samples, the indicator for EBF included infants <6 months of age among women 15-49 years.

- In addition, although both INGOs implemented largely similar activities to promote EBF, there were still differences in the activities implemented, as well as the way in which they were implemented, and their frequency. This means that variation in implementation success is related to both larger contextual differences between the two countries, as well as differences in EBF promotion activities, with their individual impact being impossible to assess. It is also important to note that EBF was not implemented on its own, but as part of a package of health interventions, which limits the extent to which conclusions can be drawn solely about EBF implementation. Specifically, by design, CARE interventions focused on maternal nutrition and IYCF , whereas Save the Children package was broader and included diarrhea and malaria treatment, hygiene, sanitation and other components.

- One of the challenges of conducting implementation research is ensuring that implementation outcomes are measured alongside health outcomes. In the EBF context, this could involve tracking details of actual CHW contacts with mothers; CHW and HEW fidelity in delivering the EBF intervention as intended; and duration of CHW visits with unique households. The lack of an implementation outcome is not uncommon in implementation studies generally, but there is growing recognition of its importance.

Distinguishing implementation outcomes from program or health outcomes is critical, since efforts to transport new programs from 'controlled' settings to community settings may fail, and if they do, we must be able to determine if the failure occurred because the intervention was ineffective in the new setting (intervention failure) or if a good intervention was implemented poorly (implementation failure), or both (Proctor et al., 2011). In this study, INGOs did not intentionally seek out to capture implementation outcomes in this manner. We recognize there are challenges to collecting this level of systematic data in LMICs, but the extent to which EBF rates shifted over time is likely related to the extent to which CHWs had contact with mothers, provided the EBF components of the larger programming, and the quality of those contacts.

- Our methodology did not enable us to demonstrate how CFIR constructs interact with one another, and only captured the extent to which individual factors were associated with the health outcome (EBF rates).

Implications for future EBF programming

- This research highlights *behaviour change strategies* perceived by mothers to be most compelling, for instance testimonials and EBF champions, observed in both Mali and Ethiopia. Future health programming should incorporate these strategies for optimal impact.

- Our research identified *key obstacles* to EBF implementation in both countries, including gender roles, influence of traditional beliefs and other household members (mothers in law). Although INGOs were aware of these influences, based on their situational analyses, more could be done to address them in monitoring and evaluation efforts (i.e., tracking knowledge shifts in CHWS pre/post training; tracking CHW contacts (frequency and quality) with households; tracking CHW fidelity to specific components of the intervention/activity being measured.

- Our CFIR analyses also revealed several *contextual factors* that had a strong positive association with implementation effectiveness in both countries that could be used to guide future programming focus and measurement: *adaptability* of the intervention to the local context; the *relative advantage* of the EBF intervention compared to traditional feeding practices; mitigating the *complexity* of the intervention; efforts that recognized the *needs* of the population targeted and *resources* available; *linkages and collaborations* with organizations with a similar mandate that work in the same regions; the support of national *policies and incentives*; working in areas where there is a high *tension for change* of the status quo; change agents with access to *information and knowledge* about EBF; CHWs, HEWs, and M2M leaders developing solid *knowledge and beliefs about the intervention*; considering *sustainability* in planning the implementation process; having strong *champions* of the EBF intervention; *maternal and household characteristics* such as who lives with the mothers, how decisions are made, and the role of traditional beliefs and practices. Consideration should be made to these factors in the planning stage in a more deliberate manner, to guide activities as well as evaluation strategy.

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APPENDIX A

Semi-structured interview (adapted from Damschroder & Lowery, 2013)

CFIR CONSTRUCT	INTERVIEW QUESTION	RESPONDENT
General	1. Where do you work (organization name, location) and what is your job title? a. What are your main responsibilities in this position? 2. Can you describe the history of the MNCH program in (*country name*) 3. What can you tell me about the exclusive breast feeding component of the MNCH program? 4. When was the start of EBF program implementation in (*region, country name*)? 5. How was it decided that (*country name*) would participate in the MNCH program? 6. What is your role in the MNCH/EBF program implementation? 7. How long have you been involved in the MNCH/EBF program? 8. Were you working in the region at the time the EBF program was implemented? a. If YES: Did you see a need for this type of program? Why or why not? 9. Can you describe a typical MNCH/EBF program delivery? a. How is the program running right now? b. What are the program's goals? c. To what extent is the program meeting its goals? d. What do you like about the program? e. What challenges are you encountering?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative
Personal Attributes Cosmopolitanism	1. Do you network professionally with other individuals who are outside of your organization? a. What is the nature of those relationships? b. How often do you meet with them? c. How have your professional affiliations influenced your work?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative
Engaging & Opinion Leaders	1. What people or organizations have been especially instrumental in implementing the exclusive BF program in (*region, country*)? a. What did this people do?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative

Formally appointed internal implementation leaders	1. Were program leaders formally appointed to lead the MNCH/EBF program implementation, or was it more of an informal role?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative
Champion	1. Apart from the leaders you've identified, who would you identify as champions of the MNCH/EBF project? That is, people who worked to support the program in important ways? a. Did they help persuade people who may have initially been indifferent or resistant to the program? b. How so?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative
Leadership Engagement	1. What level of involvement does top management at your organization have with the program? a. What kind of support do they give you? Specific examples.	1. Canada NGO representative 2. In-country NGO representative 3. Government representative
Networks and communications	1. What kinds of communications take place that are important for supporting the MNCH/EBF work? a. Why are they important? b. Do you think some methods of communication are more effective than others? c. Is there any communication that's lacking? If so, for what kinds of issues? 2. What other services or organizations in the community do you work with to implement MNCH/EBF? 3. What other departments within the NGO do you work with to implement MNCH/EBF? 4. Some people rely more on formal communication (e.g., email communications through the chain-of-command) while others use informal communication (e.g., a hallway conversation with a co-worker) to accomplish things. Which type of communication has tended to be most helpful for you to accomplish your EBF-related activities? (*Focus on informal communications that include unscheduled discussions between staff outside of formal meetings)*. a. Were the informal communications helpful? b. If there was not much informal communication, why not?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHWs

	c. Was the lack of informal communication a detriment? (*Ask for examples related to EBF*) 5. What types of healthcare professionals (doctors, nurses, CHW, other?) are involved with the MNCH/EBF program in your region/country? Please describe their involvement? 6. **CHWs only**: How would you describe the working relationships with the health units/ facilities in your region? a. How empowered do CHWs feel in doing their work? b. Does your work feel important to you? i. What about your work experience makes you think that your work is important? c. How are the relationships between CHWs and other staff? i. How do these relationships affect the home visits to mothers?	
Relative Priority	1. When you first began to implement the MNCH/EBF program, was there competition for time or attention to devote to it because of other initiatives that may have been taking place concurrently? a. What were the other initiatives? b. Were any of these other initiatives related to the MNCH/EBF program? c. If so, to what degree? d. Which initiative has the highest priority? i. How was priority decided? ii. From your perspective, who decides the priority?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Compatibility	1. Did this region/country have a program for improving maternal and child health in the region before this one? a. If yes, were you able to successfully merge the existing operations and practices with EBF program? b. How was this done? 2. Do you have other programs dedicated to improving maternal and child health in the region? a. How does the MNCH/EBF fit with those programs? b. Is the implementation of EBF causing	1. Canada NGO representative 2. In-country NGO representative 3. Government representative

	any issues with the other programs?	
External Policy and Incentives	1. Do you know what the rate of EBF was in your targeted regions prior to implementing the MNCH/EBF? a. Is there pressure to meet this EBF target? 2. How did the NGO know that the community needed an EBF program? 3. How will you know if the EBF program is working? 4. Outside of your NGO who else is advocating or pressuring for maternal and child health? 5. What is the government's involvement? a. Were there any recent health policies that influenced the implementation of the MNCH/EBF? b. Any other government-led programs, activities or policies (national or local) that either supported or hindered the implementation of the EBP? c. Was there government any pressure to implement EBF?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Tension for Change Intervention Relative advantage	1. Did you see a need for an EBF program? a. Why or why not? b. Do you think EBF will meet the needs of mothers and babies in the region/country? c. To what extent do you think it is actually meeting these needs? 2. To what extent do you feel CHWs value EBF as an important thing for MNCH?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Patient needs & resources	1. To what extent is EBF needed by mothers/babies in the region? a. Why or why not? 2. To what extent do you think families perceive EBF as important?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Intervention Evidence Strength and Quality	1. What know about how effective EBF programs can be? a. What are your sources of information about EBF? b. What kind of information did you see that showed whether the EBF program would work? (*Information from published literature? From colleagues? From professional*	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate

	organizations? Other sources? Consensus guidelines? From supervisors? What did you think about the evidence? To what degree did the evidence influence your opinion of EBF before it was implemented?) 2. How do you usually get information about the health programs that you plan to implement? 3. To what degree did people involved with the EBF, buy-in to the intervention before it was implemented? Why? 4. When you first heard about EBF, how did you feel about it? Excited/ Apprehensive? What about your colleagues, how did they feel?	
Intervention Relative advantage	1. What kinds of programs for improving child and maternal health were you already offering to mothers and infants in this region? a. Do these other programs still exist? b. Do you perceive EBF as being a better alternative? c. Why or why not? 2. To what degree is there "competition" for funds, time or attention because of other initiatives that may have been taking place at the same time?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Intervention Complexity	1. On a scale from 0 to 10, with 0 being very easy and 10 nearly impossible, how difficult has it been to implement the **MNCH/EBF** in your country/region? a. Why? b. What barriers are you experiencing in implementing EBF? c. What factors support the implementation of EBF? 2. Once EBF was begun and CHWs started visiting mothers, how much time and effort was/is required to provide EBF on a day-to-day basis? a. Does it require more or less time and effort that you had thought it would?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Intervention Source	1. How did your NGO become involved with the MNCH/EBF program in this region/country? 2. How did you personally get involved? 3. Who decided that EBP will be implemented in	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate

	the region? a. Who had the idea of implementing EBF? b. Would you say the implementation of EBF was more externally driven or internally motivated? Why? c. Did someone at your site or you have a say in whether you participated? d. Did you feel like your region's participation was voluntary? e. How did you feel about having a say or not?	
Peer Pressure	1. To what extent are you aware of other facilities/NGOs within or outside the community that are implementing **MNCH/EBF**? 2. How do you think this affects your own support for the program? 3. Are there other NGOs in the community implementing EBF programs?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Process/ Planning	1. Now I would like to hear about the process you went through to implement the EBF program. Later in the interview we will talk about some parts in more detail. a. For now though please describe how EBF was implemented in your region /country to the best of your recollection? b. If you can, please tell me about the major milestones and the month and year in which they occurred. Use any background information that might be available in terms of milestone dates, etc. c. Who was involved in the planning process? i. Do you think the appropriate people were involved in planning the implementation process? 1. Was anyone left out? d. Can you describe the planning that was done to get the program implemented? e. How do you track what tasks needed to be done? f. How do you track progress? g. What is your training approach?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate

	h. What is your supervision approach? 2. How is it decided which mothers receive the program? 3. Who determines eligibility? 4. How many times do CHWs meet with mothers? 5. Who schedules follow-up appointments? 6. Who tracks mothers' progress? 7. Where are you now in the process of implementing the **MNCH/EBF** program, on a scale from 1 (not at all) to 10 (fully implemented) with 5 (½ way)?	
Planning **(Sustainability)**	1. Are there any plans for the continuation of the EBF program in the region beyond the end of this funded project? a. Please describe:	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Executing (Fidelity)	1. Is there anything that keeps you from progressing with program implementation as planned? a. If yes, how do you deal with this? b. Are these issues resolved? 2. How do you ensure that CHWs deliver the EBF program the way they are supposed to?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Reflecting & Evaluating	1. Do you receive any regular feedback on the program a. If YES: What kind of feedback did you receive? b. How was it used? c. Was it discussed with others? d. Do you still receive this feedback? On a regular basis?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Design Quality & Packaging	1. What materials are available for supporting the implementation of the EBF program? 2. How well do the program materials support the implementation process? Please describe: 3. How were these materials helpful? 4. How would you describe the quality of the materials? 5. What other materials would have been helpful to support the implementation of the program?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Adaptability	1. Do you feel that you have enough flexibility to change aspects of the program to make it work in a way that would work best in your	1. Canada NGO representative 2. In-country NGO representative 3. Government representative

	region/country? Why or why not? a. What about the program is adaptable? b. What about the program is inflexible or not adaptable? c. What aspects of the program did you change/adjust? d. What aspects of the program would you have liked to change? i. What barriers exist to making these changes? 2. How could the program be more flexible? 3. How could the EBF program better accommodate unique differences at your site? 4. Will you please describe the process you used to schedule home visits by the CHWs? (What kind of support did you have from others, for example supervisors?)	4. CHW, if appropriate
Organizational Incentives and rewards	1. Can you think of any incentives that influenced the implementation of the program (for CHWs? For families?) a. If YES – how did they influence program implementation? b. If NO, have you or others involved in the program received any kinds of special recognition? Incentive awards? 2. How is workload reported? Credited?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Available resources	1. Are you paid or rewarded in any way for your work in the EBF program? (Money? Relief from other duties?) a. Were there resources or support that would have helped you implement EBF that you didn't receive?) 2. Have you had consistent funding support for the EBF program? Can you tell me more about that? 3. Did you have any resource constraints while getting the EBF program implemented? (Inadequate staffing? Inadequate time? Competing priorities?) a. If YES: what were they and how did that make a difference? 4. What kind of external support did you receive during implementation? a. What support is there fo mentoring, problem-solving,	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate

	training? b. Do you have adequate communications with program staff? Externally? Internally? c. Do you feel adequately supported by program staff? d. Do the EBF materials support the work?	
Available Resources Complexity	1. Will you please describe the resources needed by the CHWs for the EBF program implementation? a. What kinds of resources were used for home visits? b. Where are you located relative to others working on EBF?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Relative priority Leadership engagement	1. Do you feel that you have enough time to dedicate to fulfilling your responsibilities for EBF implementation? a. If not, which of your responsibilities are affected? b. Have you had to put off other responsibilities you have to make time for your EBF implementation responsibilities?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Individual Identification with organization Culture (?) Learning Climate	1. Overall, how do you like your job? a. Why do you say that? b. What do you most like about your job and working at the [NGO name]? c. What are the biggest challenges of your position? 2. How would you describe the culture of the organization in a word? i. Why did you chose that description? b. How does your organization incorporate new programs or ideas? Can you give me some examples? c. How much input do you have into the design and running of the EBF program? How comfortable are you making suggestions for program improvements? i. Any examples? 3. Do you have any suggestions for improving the functioning of the EBF program?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate

	4. Is there anything else you would like us to know about the EBF program or care for maternal and child health issues at [site]? 5. If you were asked to learn something new, would you feel supported, comfortable to make mistakes?	
Access to information & Knowledge	1. What type of support do you have when implementing EBF? a. How much support? b. Has this sustained for over? 2. Did you encounter any issues? a. How were they resolved?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Patient needs and resources Tension for Change Compatibility	1. Why do mothers want to participate in the EBF program? 2. In what way does the program appeal to them?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Patient needs and resources Relative Advantage Compatibility	1. What do mothers think of the EBF program? 2. What kind of impact did EBF have on mothers and children? – for example: Opportunity to improve their health? Motivation to improve their diet or eating habits? – 3. What expectations did mothers have in participating in the EBF program? 4. How difficult was it for mothers to comply with goals? 5. Was age a factor in how mothers perceived the program? 6. Were other characteristics a factor in how mothers perceived the program (SES, family composition, religion, education, culture)?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate

Individual knowledge and beliefs **Evidence strength and quality**	1. Generally speaking, what do CHWs at your facility think of the EBF program? 2. What do CHWs think of your NGO?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate
Available Resources **Relative priority**	3. CHWs: Even without implementing the EBF program, do you feel like you are able to get everything done you would like in a typical day? Why or why not? Is this true for the other CHWs in your region? Why or why not? (Describe other competing priorities? What is the nature of those conflicts? Short term? Long term?)	1. CHW, if appropriate
Success	4. On a scale of 0 to 10, how successful do you think EBF is at your site? Why? (*Note: We are interested in the "perception" of success; the interviewee can define success in any way*.) 5. If you had the option, would you recommend continuing EBF in the region/country? Why or why not? a. What would it take to keep EBF going in the region/country? b. What type of justification would you need to show in order to keep this intervention going over the long-term? 6. Would you recommend EBF implementation to other countries or regions within the country? Why or why not? 7. Do you have any specific suggestions for other regions/countries that have not yet started implementing EBF? 8. How would you improve the EBF program implementation? Why?	1. Canada NGO representative 2. In-country NGO representative 3. Government representative 4. CHW, if appropriate

Focus group protocol for mothers and community health workers

CFIR CONSTRUCT	INTERVIEW QUESTION	RESPONDENT
Family Structure, work, decision-making at home	1) What does your family look like? 2) Who lives with you? *3)* Describe a typical day for you. *(Probe Note: If in the mother's answer it is suggested/stated that she works outside the home, follow up with questions re: type of works she does outside home, for how long a day, how frequently, if it requires travelling, if kids come with her)* *4) (If there is a partner)* What does your partner's day look like? *(If in the mother's answer it is suggested/stated that the partner works outside the home, follow up with questions re: type of works he does outside home, for how long a day, how frequently, if it requires travelling, if kids come with him)* 5) What does a typical day look like for your children? 6) Do you get help around the household? Taking care of the children? 7) Who makes decisions in your household about food? Other resources? Regarding work division? About when and how to seek healthcare?	**Mothers**
Perception of the CHW & program information	We are interested in mothers' experiences with exclusive breast feeding, and what they think about EBF. 1) Have you attended antenatal care sessions? (If yes, were you counselled on exclusive breastfeeding during antenatal care sessions? Are your children enrolled in child clinics? How many visits did the children have?) 2) In the past year, have you had a visit from a community health worker to talk to you about your health and the health of your children? a. What do you remember about that visit? 2) Did the CHW talk to you about BF? a. [probe for EBF] 3) How many times did you meet with the CHW? 4) Had you met the CHW prior to this visit?	**Mothers**

	What this person known to you in the community? 5) What did the CHW tell you about EBF? 6) When you met, did you learn things about EBF that you did not know before the visit? 7) Did the CHW show you materials or booklet with information? a. What did you think of the materials that the CHW showed you related to EBF? 8) Did the CHW seem knowledgeable to you? 9) Did the CHW change your opinion about EBF? 10) What could the CHW say/do to convince you to use EBF? 11) How important is it to you that the CHW met with you to talk about EBF? 12) Would you have breast fed exclusively if you had never had this visit with the CHW?	
Perception of EBF & Knowledge	1) What do you think about EBF? a. Why do you think mothers are encouraged to breast feed exclusively? What is good about EBF? b. How do you think a child who is younger than 6 months should be fed? c. Do you think that a child who is younger than 6 months should receive any other foods? d. For how long should children be breastfed exclusively? 2) If you don't know about what to do when there is a health issue with you or your child, who do you ask? 3) How do you know what to feed your child? a. Did someone teach you? Did you learn from others, observing or helping other family members?	**Mothers**
Mothers' use of EBF	1) At present, are you breastfeeding any of your children? 2) For those of you who have other children: Have you exclusively breast fed your other children in the past? a. Why or why not?	**Mothers**

	3) If you don't exclusively breastfeed your child, what do you feed him/her? a. Why do you give him/her this type of food? 4) Does EBF help your child (children) in any way that you have observed?	
Factors influencing use of EBF & resources needed	1) Are there any religious or cultural practices that you follow that prevent you from exclusively breastfeeding your children – that is, only giving breast milk to your baby? 2) What is difficult about exclusively breast feeding your child? 3) When you could not do it, what was the reason? 4) What would need to happen for you to be able to exclusively breastfeed your child? 5) Do you know other mothers who exclusively breast feed their children? 6) Are there other people in the family/community who influenced your opinion about EBP? a. Thinking about the medical staff at the hospital/medical facility, your family members (mother/mother in law) – did they encourage/ discourage you from EBF? 7) The CHW works for the [name the NGO]. What do you think about this NGO?	**Mothers**
CFIR CONSTRUCT	**INTERVIEW QUESTION**	**RESPONDENT**
Characteristics of individuals (for the other CFIR constructs, questions will be adapted from above)	We understand that one of the things that you talk to mothers about when you visit them is exclusive breast feeding. We are interested in your experience of talking to mothers about EBF. *NOTE: Start with the general questions at the beginning of this document and then continue with the questions below.* 1) What do you think about EBF? 2) Have you implemented an EBF program before? 3) What kind of training did you receive? a. Did you feel prepared to go and visit mothers to tell them about EBF after the training? 4) Describe a typical work day for you?	**CHWs**

	5) Do you visit families or do they come to you? a. How many home visits can you make per day/ week? b. Is there a target number of families you must visit every week? 6) Who decides which mothers you visit/ how many times? 7) How much time do you spend with each mother? 8) Do you offer the program in a similar way from household to household?) 9) Does anyone monitor or supervise your work? 10) Do you receive any feedback on your work? a. If yes, do you find it helpful? How so? i. What sort of feedback do you typically receive? b. If not, would you find it helpful to receive feedback on your work? i. What sort of feedback would be helpful to you? 11) If you have questions or encounter difficulties when you meet with mothers, who do you talk to? 12) Do you receive any incentives for your work? *(NOTE: including pay)* a. If yes, what are they? b. Are you pleased with this? Why? 13) If you do not receive incentives, would it make a difference to you if you did? a. How so? 14) How do you travel from home to home? 15) What resources do you need to provide this program (EBF)? a. Do you feel you have the resources you need to do your work? 16) How successful are you in getting mothers to exclusively breast feed? a. What would you need to be more successful? *17)* What kind of barriers do you encounter in your work? *(NOTE: probe for things specific to mothers or other factors)* 18) What do mothers think about EBF? a. What are the reasons why they exclusively BF?	

	b. What are the reasons why they do not exclusively BF? 19) Are there any cultural or religious practices that are in contradiction to EBF? 20) Do you meet with the other CHWs in the region? 21) Do you like your work? a. Why do you do this kind of work? 22) What do you think of the NGO? 23) How long have you worked for this NGO? 24) Have you worked for other NGOs in the past – how does this compare with that experience?	

APPENDIX B

Table 3. Criteria used to assign ratings to constructs (from Damschroder & Lowery, 2013)

Rating	Criteria
-2	The construct is a negative influence in the organization, an impeding influence in work processes, and/or an impeding influence in implementation efforts. The majority of interviewees (at least two) describe explicit examples of how the key or all aspects (or the absence) of a construct manifests itself in a negative way.
-1	The construct is a negative influence in the organization, an impeding influence in work processes, and/or an impeding influence in implementation efforts. Interviewees make general statements about the construct manifesting in a negative way but without concrete examples: • The construct is mentioned only in passing or at a high level without examples or evidence of actual, concrete descriptions of how that construct manifests; • There is a mixed effect of different aspects of the construct but with a general overall negative effect; • There is sufficient information to make an indirect inference about the generally negative influence; and/or • Judged as weakly negative by the absence of the construct.
0	A construct has neutral influence if: • It appears to have neutral effect (purely descriptive) or is only mentioned generically without valence; • There is no evidence of positive or negative influence; • Credible or reliable interviewees contradict each other • There are positive and negative influences at different levels in the organization that balance each other out; and/or different aspects of the construct have positive influence while others have negative influence and overall, the effect is neutral.
+1	The construct is a positive influence in the organization, a facilitating influence in work processes, and/or a facilitating influence in implementation efforts. Interviewees make general statements about the construct manifesting in a positive way but without concrete examples: • The construct is mentioned only in passing or at a high level without examples or evidence of actual, concrete descriptions of how that construct manifests; • There is a mixed effect of different aspects of the construct but with a general overall positive effect; and/or • There is sufficient information to make an indirect inference about the generally positive influence.
+2	The construct is a positive influence in the organization, a facilitating influence in work processes, and/or a facilitating influence in implementation efforts. The majority of interviewees (at least two) describe explicit examples of how the key or all aspects of a construct manifests itself in a positive way.