Design, Implementation and Impact of the WINDOW OF OPPORTUNITY program in Nicaragua, Peru, Indonesia, Sierra Leone and Bangladesh

CARE International

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Acronyms

A&T	Alive and Thrive
ACS	Agente Comunal de Salud (Peru)
BCC	Behaviorchangecommunication
BF	Breastfeeding
CF	Complementaryfeeding
CHW	CommunityHealthworker
CMAM	Communitymanagementacutemalnutrition
DD	Doubledifference
DHS	Demographic and HealthSurvey
EBF	Exclusive breastfeeding
IR1	Intermediateresult 1
IR2	Intermediateresult 2
IR3	Intermediateresult 3
IYCF	Infant and young child feeding
LMIC	Lower and Middle income country
MMN	Multiplemicronutrients
MMNP	Multiplemicronutrientpowders
MN	Micronutrient
MOH	Ministry of Health
MtMSG	Mother to mother support group
rMN	Relevant maternal nutrition
RR	RelativeRisk
SAM	Severeacutemalnutrition
SUN	Scaling up Nutrition
Vit A	Vitamin A
WASH	Water, sanitation and hygiene
WHO	WorldHealthOrganization
WO	Window of Opportunity

ExecutiveSummary

Sections 1 and 2

Overall aim of WO

The overarching purpose of the global evaluation of WO project is to provide information that will inform decision makers of the performance and impact of the interventions, individually and as a package, thus contributing to the evidence and providing guidance for decisions about future programs and the desirability of scaling up.

The Design of the Study

The overall aim of the project Window of Opportunity was "to protect, promote, and support optimal infant and young child feeding and related maternal practices through advocacy and policy guidance, strengthening health systems, social and behavior change communication, monitoring activities, capacity strengthening, and sharing good practices" with the intention that this strategy would provide an example of how to combat and prevent infant and young child malnutrition without the necessity for Food Aid or other handouts.

The project was called "Window of Opportunity" to highlight the fact that there is a period in early life during which growth and development set the scene for the rest of life. This period, also called the 1000 days includes gestation through the first 2 years of life.During this period inhospitable intrauterine conditions, lack of adequate caregiving practices, parenting and stimulation; lack of adequate nutrition both in terms of quantity and quality; and exposure to unhygienic conditions and infectious diseases lead to retardation of linear growth. Linear growth during this critical period seems to be an expression of overall health and wellbeing and a pointer to future life course including childhood health and mortality, school performance, adult size and even work capacity and productivity(Black RE et al. 2008). At a population level the height for age of children at 2 years is a marker of the "human capital".(Victora CG et al. 2008).

Window of Opportunity is an especially apt phrase as it emphasizes the aspect of equity: although there will always be variation among human beings each individual should be given the chance or "opportunity" to fulfill their inherent growth and development potential and proving this opportunity to the youngest citizens will benefit the society as a whole.

The primary objective of the WO programs across all countries was to develop and implement interventions at different levels that result in improving Infant and Young Child Feeding (IYCF) practices - breastfeeding and complementary feeding - in the project areas. Appropriate IYCF practices are major contributors to child health, growth and

development of children under 2 years and thus influence the nutritional status of children, although they are not the only determinants of malnutrition. However in the target CARE WO areas (poor and ultra poor) inadequate IYCF practices are widespread and childhood malnutrition is prevalent.

Thus Windows of Opportunity was (is) a nutrition program to improve the nutrition of infants and young children project whose ultimate goal is to reduce childhood malnutrition and improve the lives of vulnerable children in deprived circumstances. In order to understand what had worked, and what not, to understand processes and ensure that lessons could be learned and experiences shared, CARE incorporated monitoring and evaluation into the design and as far as possible standardizing strategies. The countries chosen were countries where CARE already had a commitment and a presence among the least favored and poorest districts. The experimental nature of the study was thus secondary to the aspect of improving lives. This is unlike the situation for instance in a nutrition intervention in Trujillo, Peru (Penny ME et al. 2004) which was designed as a randomized trial, or the Alive and Thrive projects in Ethiopia, Bangladesh and Vietnam where the stated aim of the project as a whole was to "provide proof of concept that impact could be achieved at scale with quality IYCF delivery" (Baker et al.2013). These considerations explain why CARE included countries which were likely to present challenges to implementation: Sierra Leone for instance had recently emerged from a devastating civil war; Nicaragua presented a challenging political environment, and Indonesia had experienced the conflict in Timor that created divisions and distrust among the population. Part of the area chosen was a refugee camp.

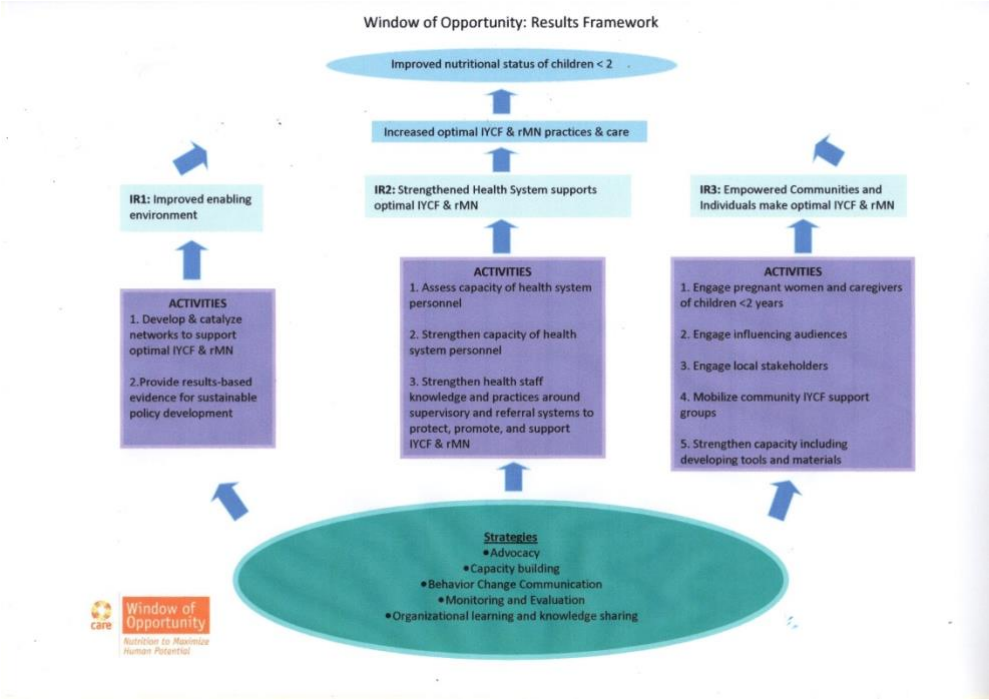
Nevertheless it is clear from the design that CARE gave considerable thought to contributing to public health and nutrition evidence based decision making through the WO project. The framework was designed before implementation and with respect to the basic activities was similar across the five countries. This parallel implementation in very different environments potentially could provide a strong level of plausibility to results, especially if similar results were obtained across countries. It also permits an evaluation of circumstantial evidence that might lead to success in some environments and not in others, a result that would be relevant to decision

The Logic Model

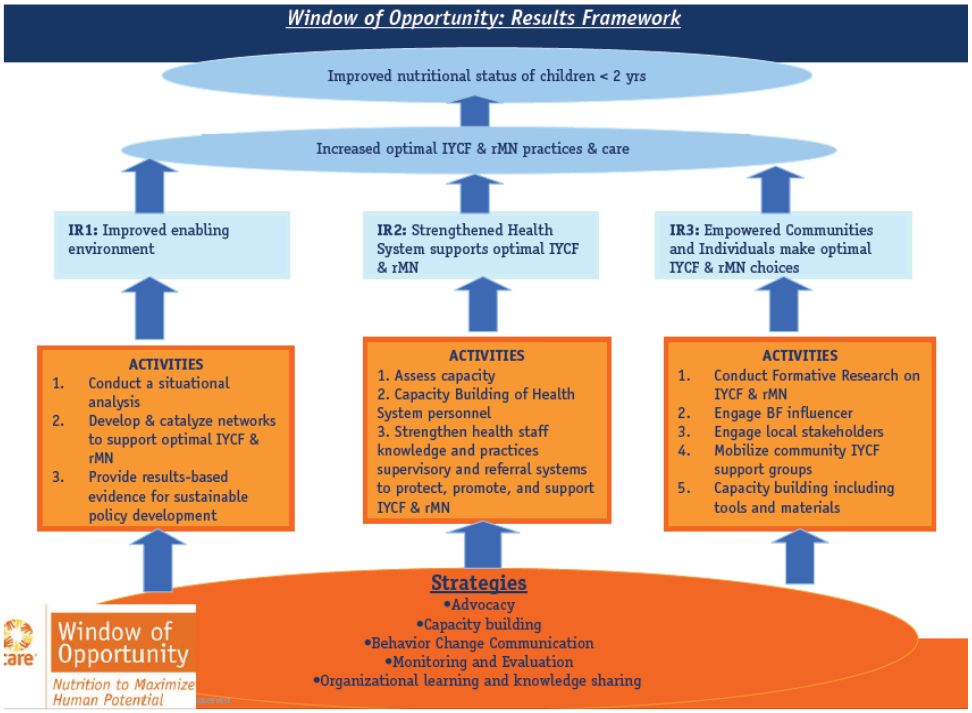
CARE WO used the UNICEF-CARE conceptual model that explains the determinants and their relationship to child malnutrition. Based on this widely accepted model,they designed the WO Results Framework. This framework consisted of a series of strategies that were expected to lead to certain activities that were grouped according to the

Intermediate results that would be expected from implementation of the activities. This provide three pillars of activities and results that would together result in an increase in optimal IYCF and rMN practices and care and so impact on the nutritional status of children <2 years old – the 1000 day Window of Opportunity. The expected Intermediate results were IR: Improved enabling environment; IR2: Strengthened Health System supports optimum IYCF &rMN and IR3:Empowered communities and individuals making optimum IYCF &rMN decisions. The three Intermediate results were the same in all five countries, except that In Bangladesh the presence of the health service in the chosen districts was minimal and it was outside the possibilities of the project to change this so this IR2 was not considered viable. The Activities could vary from country to country but were generalized at Activities en route to IR1: 1) Develop and catalyze networks to support optimal IYCF &rMN and 2) Provide results based evidence for sustainable policy development. The activities leading to IR2 were 1) Assess capacity of health system personnel, 2) Strengthen capacity of health system personnel and 3) Strengthen health staff knowledge and practices around supervisory and referral systems to protect, promote, and support IYCF &rMN. Finally the Activities for IR3 were 1) Engage pregnant women and caregivers of children <2 years, 2) Engage influencing audiences, 3) Engage local stakeholders, 4) Mobilize community IYCF support groups and 5) Strengthen capacity including developing tools and materials. The results framework for each country is shown in the following figures starting with the global framework:

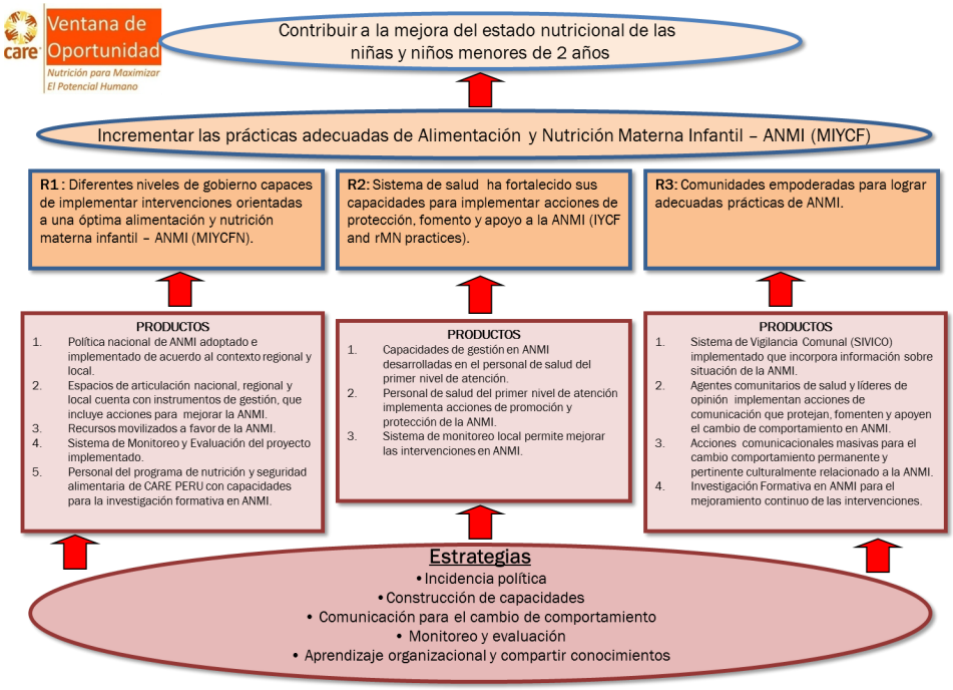
Global Results Framework



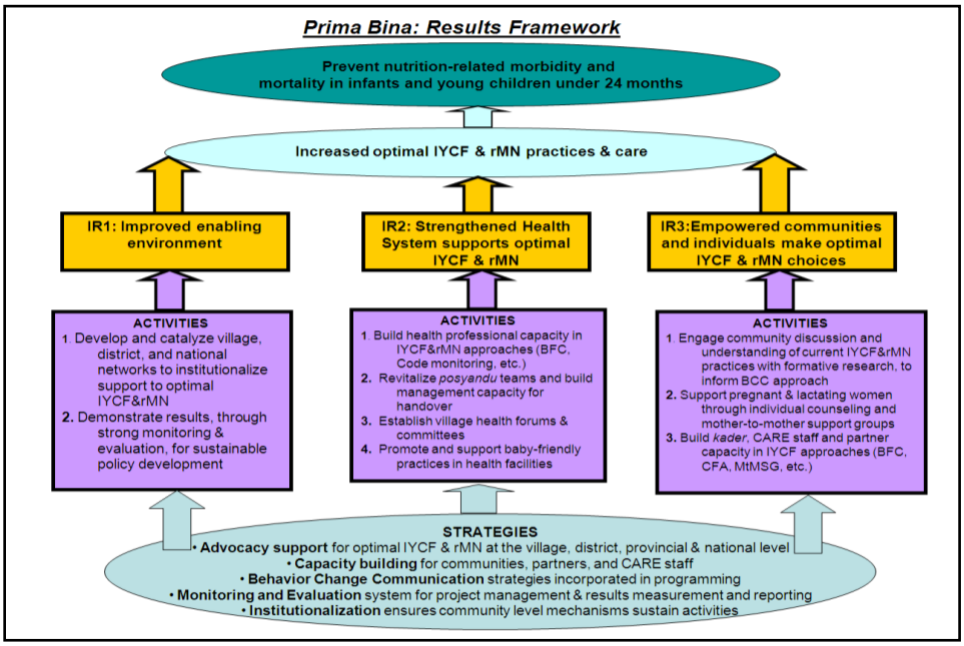
Nicaragua Results Framework



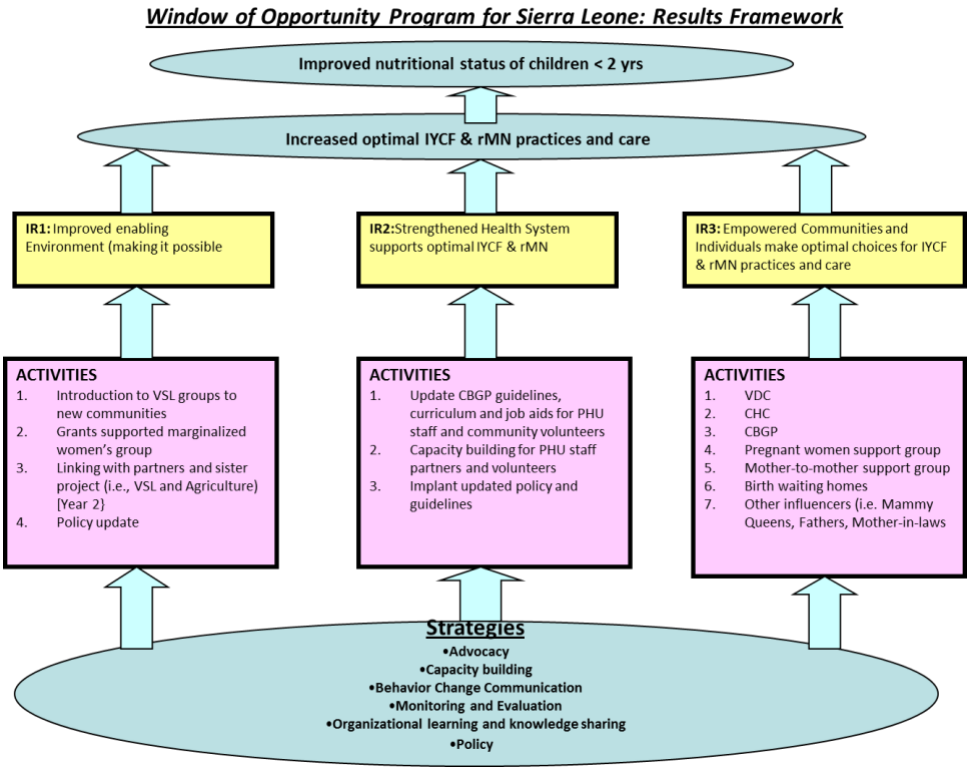
Peru Results Framework



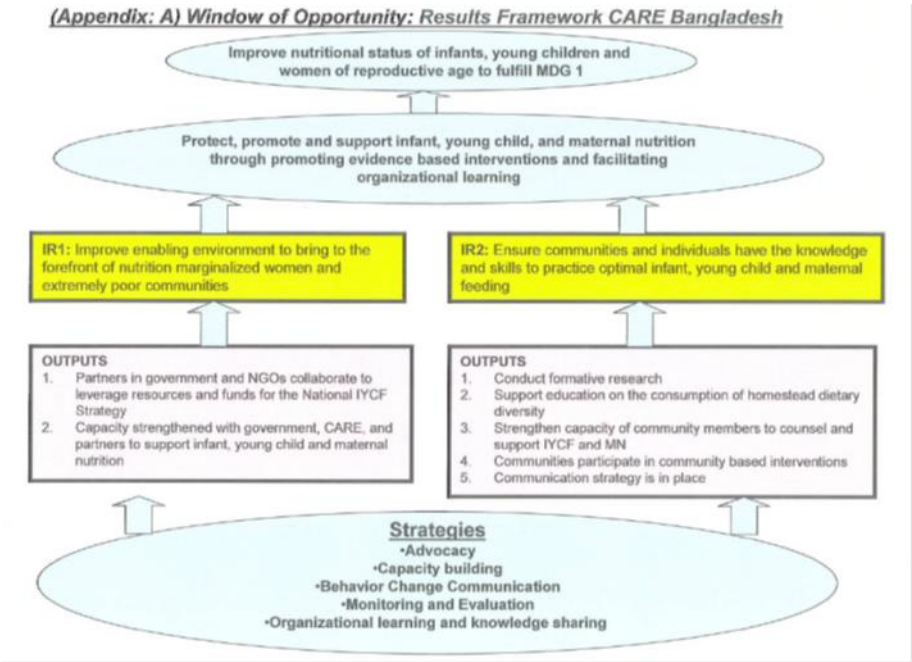
Indonesia Results Framework



Sierra Leone Results Framework



Bangladesh Results Framework



Bangladesh differed from the other countries in that they did not include "Strengthening the health services" because there was only minimal government health service in the area at the time of starting the study.

Overall the results framework provides a succinct summary of the pathway from the project strategies to the overall objective. One criticism is that the three pillars are quite separate giving the impression that they are unrelated whereas the interaction and coordination between activities is desirable and would enhance the chance of obtaining the final goal. It is not clear whether this separation was simply to produce a less muddled framework or whether there was also a distinct separation in the concept of the plan. We did find that the linkage across different activities of the project was a weakness in some countries as will be discussed later so maybe it is important.

Of the three pillars two are related to plans for delivery strategies, with two general subjects of intervention: strengthening **health services** and empowering **community**. The **enabling environment** is at the same level in the framework description but this could be considered as a strategy that cuts across all activities and platforms although perhaps all that is needed is a horizontal arrow clarifying the cross cutting role.

Was the basis for the underlying assumptions of the conceptual model valid?

Were the interventions evidence based, and appropriate in general-global terms?

Each country produced their results framework and a table of activities: the logic framework which included the specific activities and the way that these fitted into the three main IRs on the pathway to an optimization of Infant and young child feeding and relevant Maternal and Newborn nutrition (rMN) and ultimately to the overarching goal of improving nutritional status. This general scheme had the advantage of being evidence based, focused on the period of the child's life when IYCN could make a difference to the individual child's future health, nutrition and development and hence improve the long term human capital of each country

Optimum infant and young child feeding is considered to consist of exclusive breastfeeding for 6 months followed by the introduction of foods that complement continued breastfeeding and provide sufficient amount and variety of food to meet all the macro and micronutrients needed to satisfy the child`s requirements. (PAHO/WHO 2003).It is now recognized that the way the child is fed and learns to eat is also an essential part of the process of complementary feeding and is important for a child's development, this is referred to as responsive feeding and was included in the WO objectives.(Bentley et al. 2011, Vazir S et al. 2013)

At the time of the planning for WO a number of reviews (Jones G et al 2003) plus an influential series of articles in the Lancet(Bhutta ZA et al 2008)reviewed the interventions that were considered to be effective (evidence based) to reduce child undernutrition. The review emphasized the critical importance of IYCF highlighting exclusive breastfeeding which had been considered by Jones as the single most effective intervention in reducing childhood mortality (Jones G et al 2003). This influential review set out the available evidence on the efficacy and provides a framework to judge whether the interventions in WO were evidence based and likely to impact undernutrition. The series showed that one third of childhood deaths could be attributed to malnutrition (Black RE et al 2008), the importance of early nutrition in national human capital (as mentioned above) and presented the evidence to date on the effectiveness of nutrition interventions including behavior change (Bhutta ZA et al 2008). A fourth article reviewed strategies including international and national level (Bryce J et al 2008) and made some points that are relevant to CARE WO.

Table 1: WO Behavior Change interventions compared with behavior change interventions mentioned in "Lancet series"[1]

Interventions suggested by Lancet that affect maternal and child undernutrition	Interventions in WO	Information in Country
Mothers		
Iron folate supplement	Yes through prenatal support at Health services	**Anemia rates (MEFs 15-49)** Nicaragua No data DHS 33.6%[2] Peru 21.0% (2009)[3] Indonesia No data DHS[4] Sierra Leone 45.2% (2008)[5] Bangladesh 42.4 (2011)[1]
Maternal supplementation with Multiple MNs	Not part of the MOH practices in the countries at the beginning	
Maternal Iodine through fortified salt	Yes in ….Indonesia . All countries have iodized salt program	Nicaragua 96.8% (2003) Peru 90.5%(2009)[6] Indonesia 62.3%(2007) Sierra Leone 58.2%(2008) Bangladesh 84.3%(2006)
Maternal Calcium supplementation	No	
Promotion of Breastfeeding		**Breastfeeding rates**
Newborn babies	Yes in all countries	Early initiation[7] Nicaragua 54% Peru 51% Indonesia 29% Sierra Leone 45% Bangladesh 36%
Infants and Children	Yes in all countries	EFB

[1] Not measured in previous DHS, almost all mild, 6.7% mod and sev. 2009 study MinIMat rural Bangladesh maternal anemia 28% (Linstrom E et al 2010),
[2] From Mora J 2007 final report to MI,
[3] Mostly mild, 20% mod o severe,
[4] Report from Mothercare (Elder LK 2000,Utomo 2000)
[5] Mostly mild, 11.7% mod or severe
[6] Mostly mild, 20% mod o severe,
[7] UNICEF country statisti

		Nicaragua 31.1% Peru 66.6% Indonesia 32.4% Sierra Leone 11.2% Bangladesh 42.9%
Complementary feeding		
Promotion Complementary feeding (BCC)	Yes in all countries	**Indicators (Min acceptable diet)** Nicaragua Not available Peru 76.9% Indonesia 41.2% Sierra Leone 22.7% Bangladesh 41.5%
Others		
Zinc supplements	No, only if in MMN	Zinc Deficiency: No national data
Zinc in diarrhea	No	
Vit A Fortification/suppl	Yes Bangladesh - suppl	
WASH	Yes Bangladesh, in some included in counseling	
Treatment SAM	Not a specific focus of WO but included in complementary feeding. Community treatment MAM in Sierra Leone	Rates of mod+severe wasting[8] Nicaragua 1% Peru 0% Indonesia 13% Sierra Leone 9% Bangladesh 16%
Supplementation of children with Multimicronutrients (MMN)[9]	Country policy in Bangladesh but could not be promoted, MMNP started late Later introduced by MOH in Peru	Anemia rates in children<5yrs Nicaragua 56.0%(2001) Peru 42.5% (2007) Indonesia No data Sierra Leone 75.9% (2008) Bangladesh 51.3% (2011)

The interventions, mainly BCC for IYCF, were based on CARE`s previous experience of the WO team. Especially important was the experience of a previous project on IYCF in emergencies in which work had been done in Kenya, Indonesia and DRC and later

[8] From UNICEF, additional data: Indonesia MAM 11.1% in TTU, 15.3% in Belu (Nut Health survey HKI,CWS CARE, SAM 1.5% TTU, 2.8% Belu level of MAM considered very high public health problem

[9] This was not in Lancet but became a proven intervention shortly afterwards (give refs) and was a policy in some WO countries

reinforced bythe Lancet review (2008). Of the interventions mentioned in the Lancet as being evidence based, WO focused on the prevention of infant and childhood malnutrition through promoting appropriate feeding practices. It did not for example include treatment of SAMbut did include community management of moderate acute malnutrition in Bangladesh and Sierra Leone where IYCF was integrated into the CMAM workshop and was included in other trainings. rMN was included in the country plans but the emphasis depended on the country so while Peru advocated taking iron supplements, in Sierra Leone and Bangladesh the messages were to eat more food, and eat a greater variety of food. In Nicaragua where there is specific period called "Cuarantena" (Quarantine) after birth where certain foods are restricted, the project concentrated on improving the diet during this period.

Calcium supplementation in pregnancy was not included, despite the evidencethis intervention has not yet been widely adopted. CARE acting through health services was guided, and to some extent restrained, by what the country´s MOH policies and norms were.

Zinc supplements to children were not distributed other than when included in multimicronutrients such a "Sprinkles" - MMNP, and these were only distributed in some countries for some of the period of WO (Bangladesh and Peru). Zinc deficiency was not perceived as a problem in most countries and there is a lack of data on the prevalence of deficiency and prevention and treatment is therefore not part of country policy. Similarly giving zinc during diarrhea was not included.

Since Lancet 2008 there have been further publications that add to the data on the efficacy of breastfeeding counseling. In a recent review (Haroon 2013) analysis of educational interventions for breastfeeding showed that with these interventions in developing countries EBF on day 1 was increased 157% (RR 2.57 95%CI 1.39-4.77), in the first month by 35% (RR 1.35 (95%CI 1.15-1.58) and at 1-5 months by 188% (RR 2.88 95% CI 2.11-3.93). Both individual and group counseling were effective but the combination was best. These data complement previous studies that also provide evidence of the effectiveness of educational interventions to improve exclusive breastfeeding and breastfeeding duration including peer counseling and breastfeeding education during pregnancy (Lumbiganon P et al 2012) and after birth (ImdadA et al. 2011). Peer counseling was also effective in increasing exclusive breastfeeding (Chapman D et al. 2010, Haider R et al. 2000).

The efficacy of counseling to improve complementary feeding has also been demonstrated in reviews of published studies. Imdad et al. 2011and Dewey et

al.2008reported significant weight gains and increases in linear growth with nutrition counseling alone and with provision of complementary foods. The provision of complementary foods resulted in greater weight and height gains, a result that was driven by studies in food insecure environments,

From generic IYCF to specifics

So, the behavior change counseling interventions recommended as effective in the Lancet series were appropriate as the focus of WO (see Table 1). Nutrition BCC has been shown to be effective. At least in the right hands it can be and often is successful, but is it always? What is needed to make it effective? The interventions and the IYCFindicators developed by WHO and other international agencies and discussed in detail later specify what behaviors need to change and what is the ideal behavior; but how to achieve this is a challenge and limits application.

The next step in the design of the intervention was to find the ways in which the behaviors were to be translated into specific intervention strategies, determine the content and delivery and messages that could be understood and implemented by mothers in the different countries; for instance what specific foods would be encouraged, what local preparations were suitable for first complementary foods, how to overcome the barriers to exclusive breastfeeding. These vital steps were part of the remit of the formative investigation, especially the qualitative research and were used to evaluate whether the communication strategy was on the right path. For instance in Peru, after the results of the formative research were presented and discussed it was recognized that anemia was the main problem and focus shifted to promoting animal source foods in the diet. It was also noted that greater emphasis was needed on prevention as health personnel tended to react paying more attention to giving nutrition advice only when growth retardation was evident, once stuntinghas already occurred. Unfortunately, because formative research takes a long time to collect and analyze,interventions in some countries were starting or already started before the detailed results of the formative research could be discussed and used for developing the strategies, messages and materials.

In addition, there was the challenge of planning the detail of the dietary advice. Daelmans(DaelmansB et al. 2013)describes the challenges of converting food based recommendations into practice and they describe some of the tools that are available, specifically *Pro*PAN and Optifood (2013). At the time of planning WO, at least one toolon how to reach the detail of the dietary advice,*Pro*PAN was available but was not usedalthough it might have had a useful role in incorporating the results of the formative research into the behavior change communication messages and materials. Reviewing

these there was a tendency across the countries to return to standard messages rather than make full use of the formative research.

In 2013 a second series of papers in the Lancet updated information on interventions for which there is evidence of impact. Although not available at the time this review can be used as a retrospective assessment of the interventions planned and implemented in WO. In this case the authors divided into Nutrition specific interventions and Nutrition sensitive interventions.

Rational and evidence for the Delivery Strategies/Platforms.

We have discussed the content of the specific interventions but it is also important to consider the how, when, and who of the delivery of the interventions: the delivery strategy or platform, what the Lancet refers to as nutrition sensitive programs.

The three pillars of the conceptual model are 1)The enabling environment, 2)strengthening health services and 3)empowering communities.

Enabling environment:

It is now recognized that specific interventions to reduce malnutrition are not enough on their own to achieve meaningful, widespread, and sustainable reduction in malnutrition unless accompanied by an enabling environment. The enabling environment has been defined as "political and policy processes that build and sustain momentum for the effective implementation of actions that reduce undernutrition" (Gillespie S et al. 2013). Gillespie et al. consider that the enabling environment is shaped by three factors 1) knowledge and evidence, 2) politics and governance and 3) capacity and resources (Gillespie et al. 2013).

These factors operate at all levels from national government to village councils and contribute to the changing of social norms, giving credibility, leadership and example, thus influencing health workers, communities and families (Hajeebhoy N et al. 2013). The importance of the macro level enabling environment has received particular attention, for instance in the SUN movement.

The WO project design recognized the important potential of the enabling environment, even before this became popular, in the design of the project as one of the three explicit intermediate results, and advocacy, a fundamental tool to reach the this goal is included as one of the principal strategies. The WO advocacy plan included many components mentioned in a recent paper that describes the evidence base of plans for advocacy for

the Alive and Thrive IYCF project testimony to the foresight of the WO conceptual model (Hajeebhoy N et al.2013).

Components of the enabling environment were included in the WO plans for all countries. In terms of **knowledge and evidence** all country plans included working with central and local government to update politicians and influential stakeholders in the latest evidence about undernutrition, specifically the importance of the first 1000 days and the vital role of breast feeding and complementary feeding practices (IYCF) in preventing and combating malnutrition. Several country plans included mass media as an important complement to the creation of a general favorable environment and to raise awareness of IYCF. In terms of **politics and governance** WO plans included advocating and supporting activities at different levels for policies that affect IYCF. Plans also included providing the results of the baseline surveys and project monitoring to be used as tools for governance. Involvement of Nutrition Champions was also a feature of some country strategies. In terms of **capacity and resources** the WO plans all included capacity building including the activities to strengthen IYCF within the health services, coordination with the Ministry of health to raise the profile of IYCF and ensure coherence and local cooperation with other stakeholders such as other NGOs operating in the country so that resources were used efficiently without duplication to further IYCF goals.

Use of Media

Different forms of media can be influential ways to change behaviors. (Storey D 2011, Wakefield MA et al. 2010) Mass media may reach many people and can be used to reinforce messages as well as reach a much wider audience than face to face methods (Storey D 2011) although there are few published studies measuring the impact on IYCF (Wakefield MA et al. 2010). In this way media campaigns help create the enabling environment and most countries implemented some mass media activities ranging from soap theatre to distribution of calendars, brochures etc. These were mostly local media campaigns, for instance on local radio and were designed to enhance the enabling environment at community level.

Strengthening Health systems

Strengthening Health Systems is the second of the main strategies or platforms for WO. This includes the aspect of capacity building by strengthening capacity of health providers and strengthening their knowledge and practices and also contributes to proving an enabling environment. The intention is to facilitate understanding, acceptance and subsequent transmission of nutrition messages to clients by an influential sector as well as

support actions that favor the nutrition interventions at a higher political level within the Ministry of Health and government.

Government and facility health services

The health services available to families include government health services, both hospitals and primary care, alternative systems such as the social security system health service and municipality services in Peru as well as community based services such as the community health worker networks. In addition in all countries there are private for profit health providers of all types and probably alternative health providers offering "natural" or indigenous remedies. It is important to engage with the different health providers particularly the government health services which are those that usually have most outreach to rural areas and are the most likely to give IYCF advice; this aspect of health service strengthening was included in the framework ofWO,although in practice the degree of engagement with central, regional or local governments was necessarily variable depending on individual country circumstances.

Conscious of not being the only players in the field all country teams were also careful to coordinate and ensure as far as possible consistency in the content of nutrition advice, training, materials and media content. In this context CARE-USA was also diligent in keeping to the internationally accepted guidelines for rMN and IYCF, adapting content and priorities to regional needs without changing the desirable behaviors and using the WHO international indicators. This is an important decision as there are many different projects and programs working to combat infant and child malnutrition, and in a world shrunken by modern information technology it is especially important to have coherence. This applies at the level of national and regional governments and in the coordinations with international agencies; CARE, for instance worked closely, including joint training, with UNICEF in most countries.

WO was careful to respect Ministry norms and necessary authorizations and as far as possible the WO national teams maintained contact and coordinated with the central government health Ministry supporting IYCF activities such as World Breastfeeding week, helping with mass media, offering training etc, but these activities depended very much on the situation in each country.

The inclusion of this level of support, in contrast to a more straightforward but restrictive emphasis on training activities, was a positive feature of the WO framework. An example comes from a review of the introduction of the WHO integrated management of childhood illness into national health services that concluded that results were really only seen after supportive actions led to action by the central government in backing the

program (Bryce J et al.2005). A recent review of determinants of effective action for nutrition programs at national level reinforced the importance of political commitment (Bryce J et al.2008).

Health personnel

Capacity building for health service personnel is a critical component. It is self evident, although perhaps not always recognized, that health professionals have an important role in modifying behavior in relation to health. This is also true of nutrition. Pilot studies for our Intervention through the health services in Trujillo in Peru, (Penny ME, Creed-Kanashiro HM, Robert R, personal communication) showed that health services were a credible and accessible source of nutrition advice. Doctors especially, need to be taken into account. As others have also found, and was mentioned in the formative research, they are very influential. Given that medical consultation times are short and for mothers of sick children treatment is the priority, it was recognized that the most important behavior change for medical staff was to reduce the chance of their giving conflicting advice and ensure that they supported the advice given by other health personnel and community health workers. For these reasons it is essential that they are taught the latest evidence on rMN and IYCF behaviors and are included in health personnel capacity building as was the plan in WO.

Both doctors and other health professionalsalso often have limited counseling skills. WO recognizedthis deficit and includedtraining in counseling methodology.

Thus engaging health facility personnel in the process of introducing and ensuring consistency with the IYCF guidelines and strengthening counseling skills were important elements of the WO activities. This is an area that CARE has much experience and in most countries WO dedicated considerable time and resources to this training. Bangladesh was the exception and Nicaragua faced challenges because of the difficulty with coordination with the Ministry of Health. In Bangladesh formal health services were virtually absent in the project areas and it was decided that this aspect of the project would not be possible. In Nicaragua the site selection for the project was made with the MOH which reportedly specifically assigned areas that did not have fully functioning government health facilities as they were more difficult to reach and more challenging for community outreach. In practice the population did have access to MOH health facilities in the area, andthe surveys showed that the population did use these health facilities. The project made considerable efforts to engage with the health services offering training and support and did conduct training with most primary level health personnel but this was received with relatively little enthusiasm, probably in part due to the prevailing political climate where

political party affiliation affected many aspects of life and civil society was divided along political lines. The government did not encourage involvement of NGOs in national programs including health.

Community and Caregiver Empowerment

The third arm of the WO framework consists of empowering communities and individuals and involvement of the community to support optimum nutrition. In this context individual empowerment is conceived in the context of a mother or caregiver being able to put into practice the knowledge she has on IYCF, to what extent does the social context as determined by gender, status in the home and within the community enable or deter optimum child feeding practices? Community empowerment encompasses the concept of involving communities to create collective knowledge, peer pressure and a supporting environment to enable and sustain behavior change. These are not new ideas and rightly form core strategies in many development projects including WO.

Community Empowerment

WO involved several activities at community level to further the goals of the project. These varied between countries but in all cases included peer support groups (MtMSG) and community health workers. Community health workers defined as "members of the community where they work, should be selected by the community, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organization, and have shorter training than professional workers" (quoted in Gilmore S et al. 2013) although in practice there may be considerable variation in characteristics and roles and answerability. WO sensibly, chose to work with already established CHWs in Bangladesh, *ACSs* in Peru, *kaders* in Indonesia, and *brigadistas*in Nicaragua.The details of each are described in the performance of individual projects but in all cases their role was to instruct and support pregnant women and mothers or caregivers of children under 2 y in optimal IYCF and rMN practices., Their role was mainly in preventive education as opposed to curative activities although in relation to IYCF the distinction is a little blurred since it would be expected that CHW would help solve the problems of women who, for instance were having difficulty with breastfeeding.

What is the evidence that CHW in these contexts are effective? There have been several reviews and some randomized trials of CHWs some of which include the giving of nutrition advice. A recent review (Gilmore S et al.2013) published in 2013 and therefore not available at the beginning of WO, reviewed the results of CHW experiences in LMIC countries mainly from Africa and Asia, only including one WO country, Bangladesh. Peer counseling for breastfeeding was uniformly successful, with large improvements in rates

of exclusive breastfeeding. Home visits during pregnancy, visits early after birth, frequency and higher number of visits, and CHW with experience of breastfeeding themselves, seemed to contribute to successful outcomes. The strategy showed greatest changes in those communities where optimum breastfeeding was least practiced. An earlier review that concentrated on peer counseling, a strategy that shares many similarities with CHW counseling, also concluded that this improved breastfeeding rates (Chapman D et al. 2011).

So, there is no doubt the strategy of community health workers can work very well especially on a relatively small scale, in well supervised projects, and for breastfeeding. The potential is enormous, but can it be scaled up, as was the intention in WO and how about complementary feeding?

In an earlier review Peter Berman (Berman P et al. 1987)addresses the issue of scaling up, writing at a time when the subject of CHWs evoked some authors to express disillusion with the strategy while others maintained enthusiasm - very different perceptions of the impact of the strategy when implemented at government scale. Berman attributes these widely different perceptions of the success of CHW programs at scale to different expectations, some authors considered that achieving a change in behavior was laudable whereas others expected reductions in child mortality altogether a more elusive goal. His review of large scale programs includes Kaders in Indonesia and health promoters in Peru, two of the WO countries.

The programs reviewed by Berman are very diverse often with relatively little systematic evidence but there are lessons to be learnt. He describes a series of components of CHW program characteristics that are interdependent and necessary for effectiveness, including cost effectiveness. These include “emphasis on the priority health needs of the community”, adequate training, supplies and supervision, on the part of the CHW, together with technical competence, and improved accessibility and acceptability, and participation on the part of the beneficiaries.

Small scale operations have often been able to adapt to the felt needs of the population served, including provision of simple curative care, but in large scale programs such flexibility is not usually possible and as in WO the roles and activities of CHW were more proscribed. In relation to selection of tasks a balance has to be found between prevention, as is the emphasis in WO and other large scale programs, and curative care which is sometimes seen as necessary to gain popularity and win over the confidence of the population.

In terms of quality of care there are challenges in terms of providing and maintaining training for large numbers of CHW, and in the logistics and supervision. This requires time, resources and good management. Coverage may also be a challenge although surveys of the coverage of Kaders in 1980s in Indonesia showed that they achieved 70% coverage for growth monitoring compared with 11% in health facilities and 35% of children had been weighed in the last month by kaderscompared with 11% in health facilities(Berman P et al. 1987). Importantly, studies have also shown that CHW are more likely to reach the most needy population compared with facility based care which is generally more likely to be accessed by the better off. In Thailand CHW were shown to be a powerful tool for equity. In general CHW represented a lower cost than facility care.

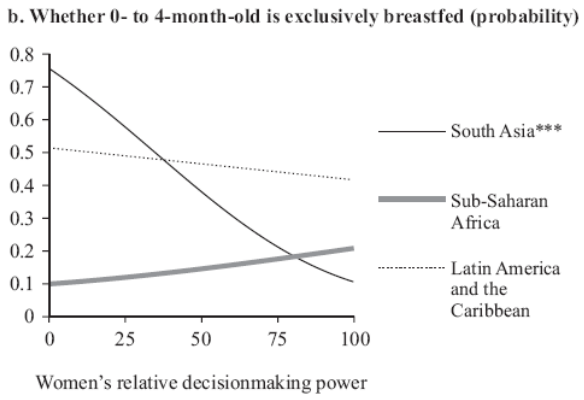
One issue related to CHWs that generates much debate, especially at local level is the issue of payment and incentives. One of the main objectives of WO was to develop and test programmatic models that did not include handouts nor food-Aid. Thus in WO the CHW were voluntary and not paid by the health services nor the project. In some cases this created some problems for the project in the field because there had been a previous project that had paid CHW, for instance in Bangladesh.

An interesting addition to the role of community empowerment is provided by Rosado M who suggests that the importance of community empowerment may depend not only on social cultural factors but also on the function of the health services. When a community has a well established and operational health care service community empowerment may be less important as a determinant of child nutrition (Rosado M Lancet 2008) and this may have been a factor in determining different degrees of success in WOdistricts.

Empowerment of the individual

Empowerment of mothers as defined above is fundamental to IYCF. An extensive review of womens´ status and its relation to child health and nutrition (Smith LC IFPRI)found that female empowerment, a women´s power to make choices explained much of the difference in children`s health and nutrition between regions, in particular the difference between South Asia and Sub-Saharan Africa, both similarly poor. They calculated that there would be 13.4 million fewer underweight children if women and men had equal status. In relation to IYCF,they reported that womens' empowerment was a crucial factor as illustrated by the following relation between exclusive breastfeeding rates and female decision making power:

Figure 1



*** Significant at the 1 percent level.

However, the authors also recognize that differences are not entirely explained by gender. The issue of empowerment is multidimensional and includes the status of women within the community and especially within the home. In societies, for instance in Bangladesh, girls are married young and join the household of their husband. In this scenario the mother-in-law has considerable power and mother's status depends on her age, whether she has give birth to sons, and her personal relationship with the mother-in-law and other women of the household (Malhotra A et al). CARE took this into account and the different countries included strategies to empower women and to influence the other influential actors in their society for instance men, mothers, and mothers in law. This was a particular feature of the program in Bangladesh.

Community governance and structure may also play a part in determining the extent to which women are empowered, or perhaps, which women? In Sierra Leone, for instance, the political unit is a chiefdom and the local authority is a chief. In this context the chief´s wife is a very influential person. When she became a champion for the project and was involved in the MtMSG, this gave legitimacy to the activity and encouraged other women to participate. The empowerment of the women in Sierra Leone largely through the experience of the MtMSGs, facilitated the mother`s decisions on improved breastfeeding, even though the women themselves didn`t consider it empowerment or that their status changed within the home (Ruth Harvey, personal communication). In Peru, although women are not necessarily empowered to take decisions within the home, there is a strong tradition of empowered womens´ groups, notably the "Vaso de Leche"(Glass of milk program) which dispenses milk or other products to families with children with national coverage which outdoes all other programs.

Mother to Mother Support Groups (MtMSG)

The other key community level activity, apart from individual counseling by different forms of CHW, that present across all 5 countries was Mother to Mother Support Groups (MtMSGs). What is the evidence for their effectiveness in these contexts?

As outlined in CARE's 2004 training manual for Mother-to-Mother support group methodology and breastfeeding and complementary feeding basics, MtMSGs were first introduced in the emergency setting of Dadaab refugee camps, in northeastern Kenya. MtMSGs were established to provide peer counseling in a group setting as a way to reach and empower more mothers through support and experiential learning, ultimately resulting in improved breastfeeding and complementary feeding behaviors (Lung'aho& Stone-Jiménez, 1999). CARE's MtMSGstrategy built on the experience of others in providing group peer support for breastfeeding, namely La Leche League and the Linkages project. The well known La Leche league, founded in 1956 in the U.S., now has breastfeeding peer support groups extending to 67 countries (http://www.llli.org/). The Linkages project was a large-scale community based program implemented in Bolivia, Ghana and Madagascar designed to improve breastfeeding practices. Among the many channels through which they delivered breastfeeding messages were MtMSGs. Results demonstrated both improved initiation and exclusive breastfeeding rates, although these were not attributed to a particular intervention (Baker et al., 2006; Quinn et al., 2005). CARE also used Pregnancy support groups in Sierra Leone in a previous project

While Deardenet al.2002 found no differences in breastfeeding rates in a controlled community intervention trial of individual and group peer counseling for peri-urban mothers in Guatemala, they did report higher rates among those women who participated in both interventions (Dearden et al., 2002).UNICEF's Baby Friendly Hospital Initiative includes MtMSGsin the community as one of the10 steps to accredit.

MtMSGs for IYCF can be seen as a natural next step that that builds on a successful history of using individual peer support (mother to mother), usually home based, for improving breastfeeding duration and exclusive breastfeeding for the first 6 months. This is well documented in the literature, especially for low and middle income countries (Sudfeld et al., 2012, Jolly et al., 2012, Leite et al. 2005). While the literature is clear on benefits of peer counseling for breastfeeding, there is less mention of improving complementary feeding behaviors. While training courses for breastfeeding peer support also usually cover initiation of first foods and some other aspects of complementary foods, the emphasis has been on breastfeeding support and breastfeeding outcomes. Thus, CARE's

approach in the WO project was to apply the known benefits of peer support on breastfeeding to MtMSG for improving both breastfeeding and complementary feeding behaviors. One criticism is whether existing literature supported taking MtMSG to scale in the 5 countries or whether it would have been better to study these more intensively on a pilot level in each of the countries.

As mentioned above, the premise of MtMSG is to provide an environment of peer support in addition to education, the former differentiating it from other groups or modes of education. This promotes mothers to share experiences, doubts, difficulties in a trusted space, provide mutual support and an emotional connection to other mothers, listen to and observe others' successes, validate and learn new practices and build confidence for breastfeeding (Kruske et al, 2004). These functions seem particularly important for first time mothers (Kruske et al., 2004). Foremost among the conditions listed for successful MtMSG is a skilled facilitator who can build an environment of trust and confidence where mothers are free and encouraged to express opinions. Facilitators must understand and be skilled in group dynamics as well as have command of the content (e.g. IYCF). This role stands in contrast to the usual "group leader" whereby a more didactic style of education or instruction takes place with a group of listeners. In a review of the literature on women's group, Akhund and Yousafzai2011 site the benefit of providing women with access to other women of the same cultural context, and the importance for groups to respond to a community need. They discuss sustainability of groups and suggest integration into existing health systems.

Monitoring and Evaluation- Was the monitoring well designed, useful? Was the evaluation pre-post and Intervention control appropriate?

Design of the Evaluation Plan

The overarching purpose of the global evaluation of WO project is to provide information that will inform decision makers of the performance and impact of the interventions, individually and as a package, thus contributing to the evidence and providing guidance for decisions about future programs and the desirability of scaling up.

In addition to a common design of the intervention WO also had a common evaluation plan. This included an evaluation of nutrition impact in terms of behavior change and growth based on cross sectional population based surveys of intervention and control communities at baseline and at the end of the project. These surveys also included

measures of implementation; coverage, fidelity, utilization, exposure and adoption of practices and were enriched by extensive qualitative research.

The article by Habicht et al.1999, and the later one by Menon et al. 2013)provides a useful frame to discuss the design of the evaluation plan for WO.Habicht et al. 1999 defines three type of inference adequacy, plausibility and probability. WO was designed to include all three levels of inference although as we will see, we have doubts about the probability inference.

In terms of evaluation of adequacy (provision, utilization and coverage) this will be covered by the section 2 on evaluation of performance plus the descriptive in the final surveys on coverage, utilization etc. Although Habicht et al. 1999 hardly mentions it, we should add in time as a factor here, the final surveys only measure coverage at one point in time but in most cases the monitoring reports enable us to know for how long the intervention was in place and could allow more detailed analysis of the interaction of duration and coverage as a factor in determining results. This was not really fully utilized in WO.

Plausibility assessment. The project included pre-post evaluation and also an Intervention versus control design. Exposure and coverage indicators are also included in the final survey and there is information from the monthly reports, project timelines and qualitative studies that allow us to draw conclusions about exposure.

As with many interventions the area in which the project was to be developed was not chosen at random, it was decided because this was an area where CARE had had previous projects, it had to be sufficiently safe and accessible for WO to function and local authorities had to be willing for the project to enter “their” area. In some countries the districts in which different NGOs can work is prescribed. Under these circumstances the results cannot be considered representative of other areas and certainly not of the whole country but this does not necessarily detract from the value of the study nor the lessons learned. It may be possible to compare with national level data, for instance DHS surveys to compare the performance of indicators in the intervention area with trends across the whole country.

The design of WO allows for some**plausibility assessment**. The evaluation of WO included comparison of changes in the intervention areas with changes in other localities, referred to as control areas but more accurately as comparators. This strengthens the design in that it provides a way of knowing whether there were “background” changes that occurred in nearby areas at the same time. However, interpretation is very difficult and can be misleading when these control areas were not randomly assigned in the first place

and were simply accessible contiguous areas with broadly defined similarity, for instance similarly rural or the same ethnic group.

Bias can creep into these comparisons at different levels, for example there will probably be better data of the population that facilitates the selection of the sample of homes for the survey, in areas where the project is known acceptance of the survey interview by families may be higher.

Changes in the control areas that are not matched in the intervention area such as building a new road or natural disasters may also significantly alter the outcomes being measured and distort results. Even if intervention and control areas had been randomly assigned at the beginning these events may make interpretation of results impossible which is why a single, or even two or three, intervention and control areas are not recommended. Activities even, other nutrition interventions may be taking place in the "control" areas which may be known to the project, or not, may well affect results.

For this reason, although we have analyzed the results of both control and intervention areas before (baseline - BL) and at the end of the project (endline-EL)and have used the double difference methodology suggested by World Bank in the presentation of results we believe that these results should be interpreted with much caution and also present the results including multifactorial models only using the BL and EL data for the intervention areas.

Plausibility is also linked to coverage; it is difficult to believe that an intervention worked if it was shown to have reached very few people (Bryce J). But the important thing may not be blanket coverage but the coverage of those most needing the intervention.In these circumstance we also need to look at before and after (as we are doing) and those exposed vs. non-exposed which is what we hope to do with the model albeit with a lot of limitations because the surveys are rather weak in indicators of information on exposure.

Thus in terms of **probability ofimpact**although CARE designed the project with pre-post Interventionvs.controls since essential requirement that control-intervention be randomized prior to intervention was not fulfilled probability of impact analysis is not possible These criteria are very difficult to fulfill in large scale programs, not only does it require considerable resources and multiple intervention areas but interventions have to be circumscribed which pretty much excludes strategies to support an enabling environment at macro political levels. Even the well resources A&T project was unable to implement a randomized controlled trial design in Ethiopia, they also failed in the Linkages project and were honest enough to admit it.

When using a quasi-experimental design, as in the case of WO, assessing program implementation via process evaluation is particularly useful for attributing impact to intervention programs (Rawat et al. 2013). This helps ensure that differences in impact are the result of the WO intervention and not due to inherent differences in the communities themselves.Ideally, a thorough process evaluation is included from the start of the intervention project and developed from program impact pathways--that is, intervention activities are mapped out to bring clarity and understanding to how they are expected to lead to impacts. Once this is completed, critical points can be identified for monitoring and evaluation leading to a greater understanding of how the program is working and to help explain its impacts (Rawat et al. 2013).

The results framework provides an excellent starting point and overview of how the WO project expected to achieve impact. Further detail by country of the mechanisms through which selected activities were expected (individually and in combination) to work to strengthen the delivery platforms would have been helpful. A meaningful global monitoring system to capture identified important aspects of implementation and further understand how and why they were working was not included. This is recommended to contribute to greater understanding of what how and why interventions work, and create clear lessons learned. Nonetheless,each of the WO country had several questions on coverage (e.g. participation in MtMSG) in the endlinesurvey that were used to make statements about program implementation. The final qualitative evaluation also covered performance and provided meaningful data to help interpret final results.

In conclusion the evaluation of WO does not permit conclusions about causality or probability of impact but it can be used to establish plausibility when interpreted with caution.

In addition to design issues there were also some weaknesses in the way that the surveys were implemented. Different institutions designed and carried out the baseline survey and although it was intended to cover the same topics there was little coordination between the institutions implementing the survey so that there were differences in the sampling strategy, and questions were often asked and coded in different ways. In addition, and often for reasons outside the control of the project, the timing of the surveys was a problem. For instance in Nicaragua the final survey was conducted at a different time of year when agricultural activities and the weather influenced access to families and an imminent general election further hampered implementation.

The surveys were designed as cluster randomized surveys of the intervention and control areas but unforeseen circumstances complicated this. In Nicaragua it became clear after the BL survey that the area designated by the MOH was much too large to be feasible and had to be reduced thus removing a substantial number of communities from the baseline survey, the allocation of new communities at end line caused further incompatibility with the final result that the sample that could be compared at BL and EL was considerably decreased. Unfortunately there were also some problems with data entry of the surveys, particularly in Nicaragua and Bangladesh which also complicated the analysis. Nevertheless it has been possible to conduct BL vs. EL analyses and the inclusion of indicators of exposure and coverage, albeit fewer and less consistent across countries than would have been ideal, has enabled us to conduct plausibility analysis in each country and to design an analytic model for the global project.

Were the WO project sites well chosen?

Two of the WO countries were in Latin America, Peru in SouthAmerica and Nicaragua in Central America; one was in West Africa (Sierra Leone) and two in South Asia. These countries all include populations with high rates of infant and young child chronic malnutrition (stunting) and are all countries where CARE has been present for many years and has had experience of implementing health and nutrition interventions. For a project with a short time frame of only 4 years, this was an essential prerequisite.

Indonesia and Bangladesh included in the 34 countries that in 2013 accounted for 90% of global burden of malnutrition

Were the interventions appropriate for the specific countries?.

All countries, at least in the regions in which the project took place had high prevalence of stunting >40% either in the specific region or in the country as a whole. However, they are very different in terms of the pattern of malnutrition (stunting vs. stunting and wasting) and feeding practices for instance EBF rates. Sierra Leone had higher infant mortality, stunting and wasting, and poor breastfeeding and comp feeding indicators. Peru is generally better on most indicators but still has high stunting rates and relatively high child mortality despite excellent Breastfeeding and relatively good comp feeding indicators. The five countries also provide a mixture of contrasting social, ethnic, religious and cultural realities and this is a significant strength to the WO, both in relation to drawing conclusions about the overall results but also in learning about the potential strengths and limitations of the strategies.

The following table 2 shows data highlighting some of the health and nutrition indicators for the WO countries and districts and indicates that all countries have child nutritional problems but of different types and severity.

Table 2. DHS and other available survey data for indicators for each country and region

Indicators	Nicaragua	Jinotega	Matagalpa	Peru	Apurimac	Ayacucho	Indonesia	East NusaTenggara (Belu&TTU)	Sierra Leona	North province (Koinadugu &Tonklili)	Bangladesh	Kis (
	2001	**2001**	**2001**	**2007**	**2007**	**2007**	**2007**	**2007**	**2008**	**2008**	**2007**	
Birthweight												
Birthweight	7.6%	5.7%	8.5%	6.5%	6.4%	5.6%	6.7%	13.9%	19.9%	18.7%	N/A	
Nutritional status indicators												
HAZ <2SD	20.2%	36.7%	28.9%	27..8%	43.6%	40.3%	36.8%	46.7% (61.1)[1]	57.0%	62.1%	43.2%	
WAZ<2SD	2.0%	4.9%	2.9%	0.8%	0.9%	0.5%	13.6%	13.3% (47.8)[1]	14.4%	11.9%	41.0%	
WHZ<2SD	9.6%	19.4%	13.4%	4.2%	6.6%	5.2%	18.4%	33.6% (15.3%)[1]	28.2%	31.0%	17.4%	
Infant and Young Child Feeding Practices												
Breastfeedingindicators												
Exclusive Breastfeeding<6m	31.1%			66.6%			32.4%	48.2[1]	11.2%		42.9%	
Median months Exclusive Breastfeeding		3.3	2.2		4.9	5.5		2.0		0.5		
Continuedbreastfeeding 12 - 15.9m	63.5%			75.9%			79.1%	18.8	81.9%	21.4	94.5%	
Complementaryfeedingindicators (6-23mo)												
MinimumDietaryDiversity	no hay			90.3%	94.1%	91.1%	76.3%	64.9%	53.8%	48.4%	43.8%	
MinimumMealFrequency				81.0%	89.9%	87.9%	52.9%	58.7%	36.6%	25.7%	81.0%	
MinimumAcceptableDiet				76.9%	86.0%	83.3%	41.2%	42.1%	22.7%	18.2%	41.5%	
Healthcare												
Prenatal care by health professional	86.4%	74.8%	81.2%	94.5%	90.2%	94.7%	73.0%	87.1%	86.9%	81.9%	57.7%	
Place where child born : health	66.3%	35.6%	62.7%	79.5%	93.9%	81.7%	46.1%	20.7%	24.6%	15.5%	14.7%	

facilities											
Percentage of diarrhea in the last 2 week[10]s	13.1%	19.6%	12.7%	13.2%	17.0%	13.8%	13.7%	15.2%[1]	13.0%	15.8%	9.8%
Infant, child, perinatal & maternal mortality											
Infantmortality	35	40	42	25	35	37	34	57	89	113	52
Childmortality	45	66	52	33	42	41	10	24	56	67	14
Perinatal mortality	21	21	28	19			25		34	29	55
Maternal mortality							228		857		351
Anemia in children & mothers (% w anemia)											
Anemia in children less than 5 years	56.0%			42.5%	49.9%	55.2%		58.3%[1,2]	75.9%	79.3%	N/A
Maternal anemia	24.0%		90.0%	26.2%	25.3%	33.0%		35.8%[1,3]	45.2%	45.2%	N/A
Mother'sage at birth											
% women aged 15-19 who had a live birth	20.6%	33.8%	20.6%	10.6%	14.7%	16.4%	6.6%	4.6%	27.8%	32.6%	26.6%
Mothers' (25-49) median age at first birth	19.6	18.4	19.1	21.9	20.3	21.0	21.5	23.0%	19.3	19.0	17.9
Maternal nutritional status											
Maternal nutritional status : BMI<18.5	3.5%	2.5%	3.8%	1.8%	1.2%	0.8%		24%[1,4]	11.2%	9.1%	29.7%
Maternal nutritional status : BMI>=25	48.2%	36.3%	42.8%	49.1%	41.0%	39.6%			29.7%	27.0%	11.8%
Women'sEmpowerment (decisionmaking)											
Wife decides how to use wife's cash earnings	84.4%	87.2%	87.8%	81.6%	68.0%	73.4%	68.7%	35.2%	34.2%	25.0%	30.5%
Jointly decide how to use wife's cash earnings	12.1%	9.5%	8.3%	0.7%	1.2%	0.5%	27.5%	57.2%	37.1%	27.5%	56.2%
Husband decides use of wife's cash earnings	2.5%	3.4%	4.0%	15.0%	26.5%	21.9%	2.7%	5.0%	26.5%	46.0%	11.8%
Literacy (Education) incomplete primary or less. Vs. complete primary or more.											
Literacy (Education) : incomplete primary or less	53.9%	84.1%	68.2%	19.8%	37.2%	33.8%	23.8%	24.2%	75.5%	85.6%	61.5%
Literacy (Education) : complete primary or more.	46.0%	15.9%	31.9%	80.0%	62.8%	66.2%	76.1%	75.8%	24.5%	14.3%	38.4%

[10] From Nutrition survey in West Timor 2007 (CARE, CWS, HKI), [2]3-59 months West Timor, 60.0% TTU, 63.7% Belu; children 3-23m 80%, [3]39.0% in TTU, 33.2% Belu, [4]20.2% TTU, 29.3% Belu,

The information about the countries and justification of the interventions was based on information from DHS, and some were done a while ago, was the appropriateness of the countries born out in information from Baseline surveys?

The following table shows the results for the IYCF indicators and the nutritional status of the children in the intervention areas of the projects in each country. As can be seen the diversity shown in the previous table is maintained and at this level we can appreciate the range of different patterns of IYCF practices as well as differences in nutritional status. Peru stands out as having apparently much better indicators of IYCF despite almost 1 in 4 children being stunted. However these data do not include anemia and this was found to be a major nutritional problem in the area and became the focus of the project.

Table 3: Comparing Baseline data in each country – selected indicators

Baseline Survey Indicators(Intervention area)

	IYCFIndicator	Nicaragua	Peru	Indonesia	Sierra Leone	Bangladesh
1	Timelyinitiation of breastfeeding	74.8	77.5	54.6	62.8	55.4
2	Exclusive breastfeedingunder 6 months	60.2	83.8	62.8	51.2	57.5
3	Timelycomplementaryfeeding	85.7		77.7	52.9	
4	Introduction of solid, semi-solid or soft foods	85.1	100.0	90.7	51.8	81.0
5	Continuedbreastfeeding at 1 year	79.5	95.1	77.7	94.9	97.8
6	Minimumdietarydiversity	46.6	92.7	11.5	19.2	19.2
7	Minimummealfrequency	66.1	85.9	70.1	22.5	91.1
8	Minimum aceptable diet	32.0	77.9	6.7	6.6	
9	Consumption of iron-rich or iron-fortified foods	34.8	76.5	18.0	64.5	48.6
10	Bottlefeeding	31.2	19.9	17.0	15.2	

Nutritional status 0-23 months	Nicaragua	Peru	Indonesia	Sierra Leone	Bangladesh
Stunting (H/A >-2SD)	19.8	24.6	47.5	32.8	33.5
Wasting (W/H >-2SD)	2.3	1.1	9.8	12.6	14.2
Underweight (W/A >-2SD)	7.5	6.2	33.7	21.4	32.2

Section 3: Assessactivitiesimplementation

Many activities were implemented in each of the countries, and at each level of the delivery platform **(Table 5)**. The first 2 levels are discussed briefly, the enabling environment and health services. More in-depth discussion on the community activities follows with emphasis on the 2 key interventions across countries: MtMSGs and individual counseling. The questions to address in this section are as follows:
Were the activities implemented culturally appropriate and of high quality?
Was coverage adequate?

Enabling Environment

All WO countries had an established CARE presence in country, and this position was used to facilitate advocacy for nutrition, supporting the enabling environment at the national and sub-national levels. All worked together with other NGOs such as UNICEF to advocate a favorable environment for IYCF. All participated in, and supported activities related to World Breastfeeding week. Among the many examples of advocacy for an improved IYCF environment that occurred during the WO project include WO Bangladesh, who supported the CARE National Nutrition Coordinator, giving greater involvement and visibility in the national nutrition arena, along with other prominent NGOs. CARE Peru continued its long and successful history of national advocacy for IYCF including being a major voice in the international SUN movement for Peru (Scale up Nutrition) and WO project staff worked hard to successfully influence MOH norms favoring interventions for IYCF at the regional levels. WO Sierra Leone worked with the District MOH to launch the Free Health Care Initiative.WO Indonesia conducted district-level workshops targeting different groups including local government, the House of Representatives and religious leaders. Finally WO Nicaragua worked through its activities to strengthen and support the national program entitled Community Program for Health and Nutrition (PROCASAN).

Health Services

As mentioned in section 1, **capacity building** was a large focus of the WO project and all countries carried out capacity building as a main activity. This included training of MOH officials and health personnel, as well as community level implementers such as CHW and mother facilitators. All were trained using the UNICEF IYCF counseling course, which is considered to be a high quality course and this maintained consistency across sectors. The course facilitates adaptation to local foods thus facilitating counseling that is culturally appropriate in terms of foods discussed. Capacity building was done to improve raise awareness of IYCF within the health services and to develop counseling skills among health personnel. This was particularly true for Peru, where a

focus of the intervention was on improving the quality of counseling interactions, and cooking demonstrations of IYC foods. These will be discussed in greater detail with the other countries under community interventions.

Community

The two key interventions that were implemented across the 5 countries included MtMSG and individual counseling with are discussed in greater detail below. In general, coverage was quite high for individual counseling, whether provided by community health worker (CHW) or health personnel. Coverage for MtoMSG, on the other hand, was below expectations.

Mother to Mother Support Groups

MtMSG for IYCF represent one of the key community activities and unique to the WO project. As discussed in Section 1, MtMSG provide a forum in which mothers of IYC come together and share in a conversation of learning and emotional support to foster optimal feeding practices. The implementation of MtMSGs began by training selected mothers to become mother facilitators. Selected mothers were often those with standing in the community, and that were respected by other mothers. Some mother facilitators had been health promoters while others did not have any health background. Training consisted of group facilitation/management, often applying the learned concepts to subject of breastfeeding. Training was interactive and allowed for actual practice of group facilitation with other mothers (who were likewise being trained).

A Training of Trainers approach was applied, with a consultant to CARE (Chipita) conducting the first training in each of the 5 countries to CARE staff, MOH personnel and selected mothers. In most countries, group facilitation training was followed by more specific training in IYCF using the UNICEF Community IYCF Counselling course. However, In Peru, mother facilitators did not attend additional IYCF training, and in Nicaragua there was a significant delay between the two trainings.

Orginially, MtMSGs were planned tobe implemented in the majority of WO communities in the 5 countries. First, a small group of mother facilitators were trained, and sent back to their communities to start groups. Later, additional mother facilitators were trained and sent back to start more groups and in this way the intervention was taken to be taken to scale. The general expectation was to hold groups on a monthly basis; groups consisted of 1-2 facilitators and 4-15 mothers.

In Peru, CARE staff decided to first conduct formative research to understand potential barriers to initiating groups, before pilot testing MtMSGs.Results of the formative

research suggested implementation would be challenging as mothers had limited time, and were already involved in other women's/mothers groups that may take priority. The government group JUNTOS was a priority, which provided mothers a financial incentive for attending its meetings. JUNTOS also provided educational sessions on health and other topics as well as a time to socialize with other mothers. For the health personnel that were to help establish and provide support for the groups, challenges were increased workload and the groups not being a part of MOH norms. Nonetheless, Peru moved forward with their pilot of 17 groups split between 2 regions and including both rural and periurban locations.

At its best, Sierra Leone had mother facilitators operating in all 192 communities and Nicaragua had groups in 38of its 40 intervention communities **(Table4)**. Indonesia started groups in 14 of its 23 communities (initial goal was to have 98 groups, 1 for each posyanadu subunit of the village) and Bangladesh scaled up considerably after the midterm review with groups in 92 of 195 communities. While groups were slotted to meet monthly, this did not always occur; fluctuations occurred depending on weather, harvesting season, interest of participating mothers, other priorities, etc.While exact numbers at project end were not available, data suggests that the number of MtoMGs dropped significantly in all but Sierra Leone. In Bangladesh, all MtMSG groups dissolved, in Peru 3 groups remained, and in Indonesia, few if any remained. Groups also declined some-what in Nicaragua, and their sustainability was questioned after project closure. As mentioned data suggests that Sierra Leone's groups were strong with good attendance, and had a supportive infrastructure for supervision with a connection to the PHU.

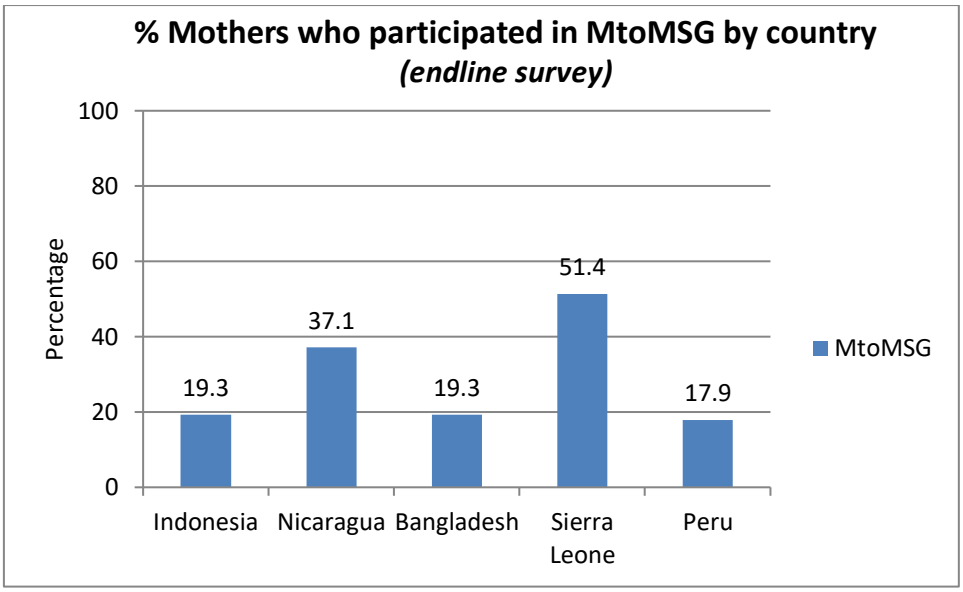
Table 4: Mother to Mother Support Groups at Height of WO Project and Project End

Country	**Indonesia**	**Nicaragua**	**Sierra Leone**	**Bangladesh**	**Peru**
# of communities with MtMSG at **height** of WO project/ total # WO communities	14/98 posyandus (23 villages)	38/40 communities	192/192 communities	92 (289?)/195 communities	17/105* communities
# of communities with MtMSGat**end** of WO project/ total # WO communities	0-few/98 posyandus	18-32 in lastmonths/40 communities	192/192 communities	0/195 communities	3/105 communities

**While the goal in most countries was 1 group per community, Peru readjusted their goal to 17 pilot groups*

At endline, all 5 counties survey included a question on MtMSGparticipationin the last 6 months, providing a measure of coverage for this intervention. Results shown in Figure 2 are reflective of the challenges encountered in implementing groups. Sierra Leone, with the most stable MtMSG had the highest coverage at 51.4%. As expected, Peru's pilot groupshad the lowest coverage (17.9%), and these numbers may reflectinflation as mothers in the comparison group also reported attending (likely confusing WO groups with other mother's groups). Interestingly, participation rates in Indonesia and Bangladesh were not much better than Peru at 19.3% each. While the question was asked in relation to any attendance in the past 6 months, qualitative data suggests that mothers in Sierra Leone consistently attended once having joined aMtMSG.

Figure 2



To better understand what happened during the implementation, various aspects of the mother to mother support groups are examined. Data to answer these questions were derived from both the quantitative and qualitative sources.

Issue 1: The first aspect was the nature of the group and cultural context influences. That is, did it function optimally as described in the literature providing both benefits of peer support and education? A few groups did achieve this balance, across countries, and qualitative data suggests such groups provided a rich experience for mothers and facilitated continued participation. Interestingly, while Sierra Leone's groups were reported to be more educational in nature, a sense of camaraderie was felt among the women and facilitators encouraged discussion and sharing. Sierra Leone also had the benefit of having pregnancy groups in place, which were generally

well accepted and attended. Many MtMSGs across countries, however, became largely educational in focus, becoming similar to group education sessions. While certainly, many MtMSG included information sharing, the peer group sentiment of emotional support was less apparent. This was mentioned as a barrier to participation; MtMSG were seen as repetitive to other groups or ways of obtaining the same information, and run by a less informed or less trusted group leader (vs. health personnel). Table X provides some specifics related to each country.

At least in some groups in Sierra Leone, a structure in which the beginning of the group was more educational and allowed a wider audience to attend, including fathers and grandmothers who are influential household members. Then, when mothers wanted to talk about more personnel issues, other attendees were asked to leave and the more peer support portion of the group began. This created advocacy in favor of the MtMSG existence. In addition, MtMSG In contrast in other countries, individual examples were mentioned of husbands questioning the need to attend the group, suggesting it was a place for gossip. In Bangladesh, participation in any group was heavily influenced by husbands and mother-in-laws.

In Indonesia, the idea of sharing problems outside of the family with other women was not common practice; thus, the basis of MtMSG a place of sharing confidential information and feelings was outside usual cultural norms. In Bangladesh, having mothers facilitate groups, and make decisions about what to discuss was a difficult concept to understand, outside of the cultural norm of what constituted a group for improving IYC health. In Nicaragua and Peru at least, MtMSG really embodied a new concept of a group – and while acceptable, this was also challenging to create and facilitate. This returns to the need for a skilled facilitator, with appropriate training and support to manage aMtMSG.

In one region of the Peru, where the groups were piloted, they quickly turned into an educational group, missing the intended supportive peer function. However, interestingly, some mothers in this same region were attending community surveillance meetings in which individuals including mothers came together to reflect and discuss how the community's IYC were growing.

Issue 2: Skilled facilitator: As mentioned in section 1, a skilled facilitator is vital to the groups functioning. For WO, this meant a mother facilitator skilled in group dynamics, who could instill confidence and trust in group members, facilitate sharing of experiences as well as be confident in her IYCF knowledge. For many mothers, this was the first attempt at running a group, and with groups being held only 1x monthly, it is not hard to imagine that time was needed to gain confidence in facilitating. As many MtMGs became more educational in focus, this reflects on the skills of the facilitator.

Accompaniment and observational monitoring were provided by CARE staff, and this supportive feedback was critical in improving groups function and in motivating facilitators to continue. Monitoring data (while limited) and qualitative comments demonstrated difficulties with optimizing group dynamics, so that a true peer support experience was had by those in attendance. However, over time, as in Nicaragua, definite improvements were seen in group facilitation skills. Some of this may have to do with the topic of group, which will be as discussed later in the report.

Facilitator training was criticized/questioned by the local CARE nutritionist in Nicaragua as being out of touch with the reality of rural low literate mothers. In addition,backup educational materials were not provided, and mothers in Nicaragua did not feel confident in their group skills, and asked for reinforcement of counseling steps. CARE Nicaragua staff created counseling steps, then simplified them after discovering they were too complex for their low literacy mother facilitators (and brigadistas). However, the criticism about MtMSG training was not heard in other countries. The training manual used was centered on group dynamics, and was very limited in IYCF content. However, CARE USA mentioned they are creating new materials to better reflect a balance of the two.

The selection of mothers for training was discussed, for example in Sierra Leone it was felt to be important to select someone with standing in the community. In Peru, the most successful group was fun by a skilled facilitator who described her role as facilitating other voices; she was also a health promoter and comfortable with IYCF content.

This also speaks to the need for appropriate training, and close supportive supervision afterwards. Interestingly, again in Sierra Leone, mother facilitators were also trained as individual peer counselors to make home visits, follow-up on mothers and attend to mothers not participating in MtMSG. This dual function, but both embodying the ideal of a peer is of interest.

Issue 3:Otherdemands on time and logistics--when living in a context of poverty and where other groups exist. Mothers mentioned demands of chores, keeping house and child rearing as time consuming and limiting the ability to participate in groups. For many, other groups existed that women were involved in – some of these included financial incentives such as the social program JUNTOS in Peru, or a weaver's group in Indonesia where women created products they could sell and bring in extra income for their families. Other groups included some portion of IYCF education into their group, and also included benefits making it difficult for the WO MtMSG to compete (e.g. Project Amor-Nicaragua; USAID funded project in SL).

Mothers commented on the difficulty getting to groups, specifically in some of the remote rural areas, where houses were widely dispersed, such as Nicaragua. In

Indonesia, transportation costs were mentioned as a barrier to attending groups. Mothers in Sierra Leone scheduled groups on Fridays, a day when mother typically did not go to the fields, and Peru, one group always scheduled MtMSG sessions in the afternoon after chores and when school children were home.

Issue 4: Topic of discussion: As mentioned in section 1, MtMSG have their origins in providing breastfeeding support to mothers from birth on. The inherent emotional connection between mother and baby and between breastfeeding mothers is easy to understand. However, of question is whether the topic of complementary feeding necessarily generates the same emotional response, particularly in settings where groups are working to prevent malnutrition. In Peru mothers expressed an interest in attending MtMSG groups, but wanted to talk about other pressing issues of concern in their lives such as domestic violence and alcoholism. Again the inherent emotional charge in these topics is easy to grasp.

In some countries, mothers were providing individual peer counseling to other mothers in their homes, for example community counselors in Bangladesh and the mother facilitators in Sierra Leone, who in addition to being trained in group facilitation were trained in 1:1 counseling for home visits. Another modality for conveying complementary feeding counseling seen in several countries were cooking demonstrations, including feeding of children, in which a group of mother could learn and exchange ideas, observe others, practice preparing foods and gain confidence to feed their children. Sierra Leone conducted cooking demonstrations in their MtMSG, and in Peru, health personnel conducted them in the community with mothers. Coverage for this activity was only measure in Peru, where it reached 54.6% of mothers at endline.

Issue 5: Participation and Supervision. While over the entire 5 country project, many groups were initiated, their continued success was predicated on mothers attending, and actively participating. This proved to be quite challenging in most settings, with the notable exception of Sierra Leone, and a handful of groups among in the other countries. Interestingly, Sierra Leone had some initial difficulty getting mothers to join, but once they experienced aMtMSG, they continued to attend.

CARE staff in all countries provided necessary monitoring and supervision for MtMSG. During interviews, almost mentioned the need for close supervision and feedback in order to improve the quality and achieve the true dynamic of what aMtMSG should embody. Observation instruments helped to monitor quality and provided data for discussion with facilitators. What was difficult to achieve was supervision outside of the CARE staff. Expectations were for MOH personnel to take over this function, but this did not occur in Nicaragua, Peru, Bangladesh or Indonesia. Sierra Leone, again was the notable exception, they actually created a system to bring together mother facilitators from various communities to share experiences, learn from each other,

problem solve and gain confidence and motivation to continue their groups. They also had district level meetings with MOH nutritionist.

Individual Counseling for Mothers

Individual counseling represents the other key intervention applied across all countries. In all, 1:1 counseling was implemented at the community level, but to a lesser extent in Peru, where the health services, and in particular the well-baby clinic, was the focus for individual counseling. As discussed in Section 1, counseling to promote adequate breastfeeding and adequate complementary feeding are interventions suggested by the 2008 Lancet review.
All countries had a system of volunteer health counselors in place and WO took advantage of this network to train and implement them to conduct IYCF counseling with mothers. As the community health volunteers were from the communities in which they worked, they represented a culturally appropriate vehicle to provide IYCF counseling. The community health workers recognized this important aspect of their role and commented on it during qualitative research-- how it differentiated them from health personnel and complemented the work of the health centers. Training in IYCF counseling (UNICEF IYCF course) was provided for all community health workers to build capacity before initiating counseling sessions with mothers. This included the steps of counseling in addition to the content on IYCF. Training was interactive providing opportunities to try out new skills before going back to their communities. Supportive supervision by CARE staff was provided after training to ensure fidelity to the counseling training steps and accurate IYCF information. What is clear is that supportive supervision was vital to improving the quality of individual counseling. However, what was not clear was unclear just how soon after training, and how often, individuals were supervised. The qualitative comments across reports as well as the quantitative observational assessments yielded data that counseling was not conducted as it was supposed to be, that is, counseling was of lower quality than hoped for. As IYCF counseling represent a different manner to interact with mothers than usual vertical message delivery (which most were accustomed to) it proved to be challenging across country contexts. However, where it was monitored closely, and significantly supported as in Nicaragua, improvements in CHW counseling were seen.

Some counselors had support materials and some did not. Most received the materials well after they had begun their initial counseling sessions, and this was cited as a limitation by the CHW. In most countries BCC was initiated late, and this brings to question how culturally informed the messages were that CHW were delivering during their 1:1 counseling sessions. The most effective message delivery would be that grounded in the formative research, which brings to light the typical barriers to

overcome and the motivations of mothers for their children. Messages developed in this manner are relevant to the mother's context and can be used consistently across intervention channels. Thus it is unclear if the messages that CHW used were grounded in BCC, or when they might have started using these types of BCC communications. WO country staff were able to state the IYCF behaviors that were emphasized in country, but exactly how and when this was transferred to the CHW is not entirely clear. That said, in Peru, the emphasis on animal source foods to prevent anemia was a message that clearly came through the quantitative and qualitative data.

Coverage by a community counselor in the past 6 months was specifically assessed in Nicaragua, Indonesia and Bangladesh and found to be 55.5%, 69.4%, and 87.5% respectively. In the other countries a more general question was asked in relation to hearing advice about IYCF, in Sierra Leone, 91.9 % reported having heard IYCF or rMN message in the last 6 months. As mentioned, in Peru, the main counselor was the health personnel, and IYCF counseling during the last well-baby visit was reported to be 58%. However, when asked an open ended question about who has talked to mother about IYCF, 87% mentioned health personnel. Adequate and quality coverage of counseling may also be interpreted to include timing – that is, does counseling occur at the times identified by formative research to be most critical for mothers. For example, in Indonesia, giving water was common practice in first days of life, and this practice was specifically challenged through the BCC messaging developed, although it's less clear how and when mothers were expected to receive these messages. In Peru, early initiation of complementary feeding was identified, thus, the health services prioritized the 4 month visit to be more focused on IYCF counseling.

To further address whether the activities implemented were of high quality, the consistency in message delivery and support for IYCF by other activities is addressed. The health centers represent another pillar in the results framework and capacity building for IYCF counseling for health personnel was a main activity of the project. In turn, health personnel were to counsel mothers; some also became IYCF trainers (using the train the trainers approach). The UNICEF IYCF course was the standard training course used across the 5 countries. Where observed, counseling was also found to be of lower quality than desired, and in need of supportive supervision. These observations provided opportunities for 1:1 feedback and support for improved performance. This included Peru and Indonesia, and in fact, in Indonesia, it was commented that no counseling was taking place. In addition to poor quality counseling, the turnover in the midwives led Indonesia to abandon the midwife intervention and instead concentrate on kader (CHW) counseling skills. The challenges faced in IYCF counseling, again point to the need for close supportive supervision.In Nicaragua, it is unclear whether health personnel implemented any of the counseling skills after training. Bangladesh did not have accessible health services for IYCF

counseling and in Sierra Leone, health personnel were trained but not observed. As not all countries have specific question about health services and IYCF counseling received, it is difficult to address their implementation coverage/quality.

Behavior Change Communication Materials

All countries developed a BCC strategy and most produced materialsin support of the BCC.Many were culturallyappropriate showing context specific images of mothers and foods in familiar settings, for example with beautiful coloredphotographs oflocal food preparation in Sierra Leone, breastfeeding mothers in Indonesia and the steps to mixing and consuming MMNP"Chispitas" in Peru. However, other educational materials used were of lesserquality, with pictures that were not always clear to mothers and generic messages. Materials were not used in Bangladesh. Unfortunately, the materials from Indonesia arrived very late in the project (logistical problems), so distributed was very limited and coverage poor. In general, photographs/pictures dominated in the materials, appropriate to the literacy level of the target audience. In terms of coverage 31-73% of mothers reported having seen different materials shown in Peru, and about ½ reported used of materials during the last well-child check.

Mass Media Interventions

As part of the BCC in several countries, mass media interventions, in the way of radio dramas for Nicaragua and Peru or radio jingles for Sierra Leone. In Nicaragua coverage was good; 65.4% of mothers had heard the program broadcast on the morning MOH channel,and most commonly remember a message about maternal nutrition during pregnancy.In Peru, coverage was low, only 18.3% reported hearing the program in the region where it was broadcast.A coverage question was not included for Sierra Leone; however, challenges with radio station broadcasting were mentioned in the beginning, but which improved over time.

Additional Activities:

A number of other activities were included that are described in more detail in each of the country reports. They are listed next.

Multiple micronutrient powders (MMNP) were distributed in Bangladesh and Peru. High coverage (100%) was achieved in Bangladesh, and to a lesser extent in Peru. While this was a central activity to address anemia in Peru, distribution issues occurred a national level in Peru, affecting the projects intended distribution.

Cooking/food preparations demonstrations were central activity in Peru, connected to the health services required activities. Other countries also included demonstrations, for example in Sierra Leone's MtMSG, and in Bangladesh. Coverage was only measure in Peru where it reached >50% of mothers, but this represents a culturally relevant intervention that uses local foods, and can a theoretically strong motivator of behavior change.

Meetings with Other household and community members

All projects included information/education meetings geared toward household/community members to garner further social support for IYCF. Culturally appropriate audiences that wielded influence over the mother were included, such as fathers who did food shopping, and grandmothers who were influential during IYC meals.

Table 5: Activities Implemented in the WO countries

Country	Activities Implemented
Indonesia	Training/Capacity Building IYCF many partners World Breastfeeding Week support 1:1 counseling kaders (CHW) 1:1 counseling bidens (midwives) 1:1 counseling health workers MtMSG BCC materials Advocacy work National and Regional levels
Nicaragua	Training/Capacity Building IYCF many partners World Breastfeeding Week support 1:1 counselors brigadistas (CHW) MtMSG Maternity waiting homes counseling Father group Grandmother group Radio Novela Advocacy work National and Regional levels
Sierra Leone	Training/Capacity Building IYCF many partners World Breastfeeding Week support MtMSG 1:1 counselors community based growth promotion volunteers 1:1 peer counselors mother facilitators 1:1 counseling health personnel Community health clubs Village development committees Radio jingles Cooking demonstrations within MtMSG Baby shows BCC materials Advocacy work National and Regional levels
Bangladesh	Training/Capacity building in IYCF many partners World Breastfeeding Week support Fathers meeting Men`s meetings Grandmother meetings MtoMSG Adolescent girls meetings Adolescent girls school based activities Community counselors (volunteer) Nutrition support workers (salary) Multiple Micronutrient supplement powders (MMNP) Advocacy work National and Regional levels
Peru	Training/Capacity building in IYCF many partners World Breastfeeding Week support 1:1 counseling in health centers Cooking demonstrations Community surveillance activities (umbrella of interventions at community level) Mother to Mother support groups Micronutrient supplement powders “Chispitas” Advocacy work National and Regional levels including influencing MOH norms

Section 4: Identify barriers and enhancers to the implementation of activities

It is well known that projects, especially those taken to scale, are rarely, if ever, delivered exactly as planned. Identifying the barriers and enhancers to the actual implementation of activities provides the opportunity to learn from and build upon this knowledge when undertaking future projects. Ultimately this should help to advance the state of programming aimed at improving IYCF and rMN.

As demonstrated in Section 3, the WO project in all countries had challenges with implementing project activities. Activities implementation for the WO project relied on a series of factors, such as capacity building and contextual fit, which are captured within the WO results framework and provide structure to the discussion of barriers and enhancers. Data for this section came from multiple quantitative and qualitative data sources and includes the perspective of many informants – from WO staff in the 5 countries and CARE USA to those directly involved in delivering interventions and receiving them.

Within the overall enabling environment, a number of contextual barriers were identified as barriers to implementation of the WO project as detailed below.

Geographical barriers--location of communities selected for WO

The WO project covered large population and geographical areas in each of the 5 countries, many of which were rural, widely dispersed, with challenging terrain and difficult to access, especially during rainy season. This was the intent of WO, to intervene in resource poor, remote settings but certainly created challenges to accessing the communities for providing ongoing supportive supervision and monitoring of activities implementation. Whereas ideally, project staff might have opted to visit communities more frequently, the time to reach communities was often considerable, and more frequent visits were not possible. Geographical inaccessibility often meant less government health services involvement, weakening the ability to link the community and health services. For example, in Bangladesh, government health services were non-existent in WO project areas. In Nicaragua, the government health services purposively assigned communities that were remote and difficult for them to access. Geographic dispersion also created challenges within communities, for example, gathering mothers together for MtMSG meetings.

Human Resource barriers

The scale of WO in terms of the number of communities and number of women/children planned to reach was considerable in this project. The number of CARE staff in country was minimal, as the intention of WO was to strengthen existing structures and organize and empower communities. Nonetheless, the amount of time

and effort to support this approach was considerable; investments in the beginning to introduce and gain cooperation of communities and health services and other high level influential parties (e.g. MOH, NGOs, other governing bodies), capacity building that extended from high level MOH officials to mother facilitators, and ongoing supervision and monitoring of project activities to inform, improve and readjust. These challenges to WO staff were further increased owning to the aforementioned geographical factors as well as the inevitable issues of multiple turnovers in staff and project implementers.

This also speaks to the **time to produce measurable results** through the named WO activities. Ideally, project implementation achieves high coverage and quality for a demonstrated time period so that children are exposed to optimal project activities for a sufficient amount of time (ideally the first 1000 days) after which evaluation of impact is measured. However, due to multiple barrier encountered, the time to produce results was not ideal in any of the WO countries within the 3-3.5 year time period of the project. Each of the project phases could have benefitted by additional time, including lead time for project preparation, conduct and analysis and sharing of baseline/formative research, implementation and delivery of intervention activities. In particular, Nicaragua had to repeat its baseline and formative research. Indonesia's baseline survey was very late, delaying the rest of WO implementation.

The **background context** of several of the WO countries merits mention. These larger contextual factors were specific to country and were responsible, in part, for creating real and challenging environments for implementation. In one of the 2 Western Timor districts in which WO operated in Indonesia had a sizable number of refugees from East Timor (war between central Indonesia government and East Timor ended in 1999). This situation was mentioned as creating a more difficult context in which to intervene, where established trust and community social capital was less than in those communities without refugees. In Nicaragua, the political context was very influential, and those outside of the governing party's politics had a more difficult environment in which to operate (eg. NGOs). In SierraLeone, the WO project built on upon a very successful Child Survival Project in many of the same chiefdoms. While this context was generally seen as favorable, it also initially created barriers in that project staff continued with the original Child Survival Activities and were slow to shift to different new WO activities. In Bangladesh, the absence of government health services in the area meant their original results framework was devoid of this delivery platform.

In addition, the status of **food security** was mentioned in all projects as a barrier to implementing promoted IYCF behaviors. Although food security was not included in all baseline surveys, it was measured at endline. The results below demonstrate food security across the 5 countries, dichotomized by overall food sufficiency. However,

within the category of sufficient food are those with access to the types of foods they would like and those without; many reported the latter. As noted, food security in Sierra Leone is a considerable barrier, with less than one-half of the population reporting sufficient food. Bangladesh and Indonesia also have challenges; about 1/3 of their population not having sufficient food. Comparatively speaking, Peru and Nicaragua are more food secure, however a significant percentage of those food secure households reported not eating the type of foods they like. This has the potential to influence dietary diversity.

Table 6

Food Security (dichotomized)				
Indonesia	Peru	Nicaragua	Bangladesh	Sierra Leone
Sufficient food: 66.8% Insufficient food: 33.2%	Sufficient food: 93% Insufficient food: 7%	Sufficient food: 91.3% Insufficient food: 8.7%	Sufficient food: 69.7% Insufficient food: 30.3%	Sufficient food: 40.6% Insufficient food: 59.4%

The lack of **free time**, and or due to the demands on time to complete work, farm and household chores and caring for children creates barriers to engaging in outside activities. In addition, mothers often have a choice of activities that they are offered , from which they must select. Other government or NGO programs offering a material benefit, such as food aid for participation, often have leverage over programs that do not offer such benefits. This was mentioned as a barrier to participation in MtMSG in which country/countries

Staff turnover was a barrier to implementation of activities, operating at different levels of project implementation. Most notable was Indonesia, at the level of CARE project staff. Turnover at this level and possibly the discontent that generated people wanting to leave or not being renewed created a breach in project continuity and affected activities implementation in addition to longer-term strategic planning and capacity building for the WO project. The other countries had relatively stable country level WO staff; however they were all affected by high turnover of health personnel in the government health centers, both at the administrative levels as well direct implementers of the WO activities. This obviously created barriers to capacity building for, and implementingof, WO specific activities; however, it did create a larger pool of health personnel exposed to IYCF, which in the long run should support an environment more enabled for IYCF. It is unclear to what extent a training system was put into place to address the high turnover in the 5 countries. In Ayacucho, Peru, continued group training of IYCF were not doable; instead they initiated a 1:1 training session with regional WO staff.In Indonesia, the decision was made to drop the

training of midwives, and instead invest energy into kader (community health worker) training. Turnover also occurred at the community level, with volunteers leaving roles due to other demands on time, moving out of the area or disinterest of mothers.

For the main project activity of MtMSG, **coverage was generally low** (as measured by mothers' participation) and the available data suggest that **quality was questionable**. While mothers might have attended one time, many chose not to continue participation, with the notable exception of Sierra Leone. However, even there, coverage only reached ½ of mothers. Barriers to this community level intervention were discussed in section 3 in greater detail.

In general, the **number of activities** implemented in the WO project was significant and demonstrates the dedication of the country WO staff to improve IYCF within their populations. In particular, some countries identified with more of a social and behavior communication strategy, as in Bangladesh where interventions were aimed at multiple audiences. In this way, the household and community level environments were targeted to support IYCF. Similarly, through Peru's community surveillance activities, community awareness, and support for IYCF was targeted. However, this emphasis on a range of activities may have resulted in **lower quality of key interventions** of the project, namely individual counseling and MtMSGs. High quality counseling and group facilitation were observed to be challenging across all countries and required significant support (through accompaniment, supportive supervision and monitoring) to improve. This difficulty represents a barrier for effective BCC.

In general, the **timing of the BCC including associated materials production** occurred late in the project, which was a barrier to activities implementation. Again, this points to the challenges of implementing the WO project within the demanding 3+ year timeframe. For many of the projects, materials were not available until after the mid-term, and in Indonesia, materials distribution was not ready until project end. Because the ideal BCC strategy should help focus messaging and address local barriers to IYCF, it is obviously ideal to implement it as soon as possible. Appropriate use of the formative research together with baseline data is critical to targeting specific behaviors and barriers within local context; all 5 countries carried out formative research; however Trials for Improved Practices (TIPS) were not included which may have helped further refine doable actions for the BCC. Despite the many challenges faced by the household environments of these 5 countries, improvements can often be made in IYCF. This is no way to lessen the importance of poverty and other influential social variables, simply to say, that formative research helps to optimize IYCF within a given context. The **extent to which formative research was incorporated into the BCC**was not always clear, and may be a function of data available for review versus actual practice in country. For example, how was the finding in Sierra Leone that adults

generally eat 2 meals per day translated into a message that really motivated caregivers to give more frequent feedings to their young children? On the other hand the use of photos with local foods provided specific and acceptable combinations for mothers to try. In Nicaragua, how was the message about needing to increase dietary diversity translated into something specific and concrete and motivating for the mother? A nice example from Bangladesh was a message inviting fathers to buy healthy foods versus "shop snacks" relevant to this context.

BCC materials ranged in quality from beautiful local photographs of foods (Sierra Leone) to rather generic and sometimes confusing materials in Nicaragua. Peru produced a number of materials, ranging in quality, but their use in the health services was limited as reported by mothers.Three of the five countries produced mass media using radio to provide additional awareness and support for IYCF. While the program was heard by the majority of mothers in the endline survey in Nicaragua, a much smaller percent of the population recalled hearing the BCC program designed for Peru—a barrier to creating awareness for BCC.

A general barrier to activities implementation was the **lack of involvement of the MOH staff**. Not only was this important for improved activities implementation (both coverage and quality) during the project time, but also crucial for long-term sustainability. The majority of mothers listed health personnel as being the most trusted for delivery of IYCF. Thus establishing the link between MOH and community level workers appears to be logical. However, the hope that the MOH would take over some of the supervision of WO activities really did not occur. CARE Peru's strategy to work within the MOH norms and then work to update norms was a good start, but they also had difficulty collaborating with supervisors to monitor WO activities. Sierra Leone also linked mother facilitators to the district level nutritionist for quarterly meetings, but it is unclear if these will continue without WO support.

Overall, **monitoring and evaluation** for the project was limited in terms of providing information on a global scale that was easily accessible and useful for tracking progress toward meeting WO project goals for both individual countries as well as the overall WO project. While logframes were initially completed and provided a good starting point for each country, they were not updated in all countries, and did not always reflect baseline and formative findings. Quarterly reports were the mechanism for tracking progress, but these were not always completed, and were difficult to evaluate across countries for a global view of the project. The extent to which annual operative plans were used and tracked across the countries was not clear. Separate monitoring systems were created for each country to track progress; these varied in the extent of data collected and detail provided. There are examples where data was used to inform project direction, however this process was not always clear.

Enhancers

1. All countries selected had established CARE teams in country and this facilitated implementation of WO projects. WO projects built on successful strategies in some countries, for example pregnancy support groups in Sierra Leone, and cooking demonstrations in Peru among others.

2. The use of the WHO indicators helped to focus project on complementary feeding, and provide operational measures for these practice outcomes in addition to nutritional status.

3. Nutrition specific interventions were selected to promote and the intervention worked to improve the enabling environment, health services, and community levels.

4. Coordination with other organizations (NGOs) and government at both national and local levels to leverage more support and strength for IYCF interventions. In addition, working with community leaders such as tribal chiefs in Sierra Leone, religious leaders in Indonesia at the local level.

5. Use of the formative and baseline research to inform intervention strategies and BCC within each country.

6. The BCC materials developed for some countries enhanced activities implementation.

7. The midterm evaluation provided results on project performance and impact and gave new direction and guidance for the remainder of the project.

8. Observational instruments for monitoring the quality of individual counseling and mother facilitation of MtMSG provided tangible results to CARE staff, feedback for those implementing, and a tool for providing supportive supervision with educational components.

9. Annual operational plans were developed which helped evaluate progress and set goals for future year. However, the extent to which these were tracked and used was unclear.

10. Training and capacity building on a number of levels. For all, updates or new information in IYCF was felt to be helpful, motivational, and practical for counseling.

For CARE staff that attended other trainings, such as on formative and qualitative research methods (e.g. Peru), staff capacity was built throughout the project.

11. CARE USA involvement at key times, for example with development of the BCC, or development of a monitoring system.

5. Assess changes in IYCF practices

The IYCF Indicators

Growth faltering initiates prior to birth but birth to 24 months is when most of the decline in growth occurs, in fact especially from around 6 months Although it is well recognized that direct nutrition interventions alone do not necessarily prevent stunting, appropriate IYCF practices are critical and the period of breastfeeding and complementary feeding coincides with the decline in growth.

In order to measure whether a child is likely to be receiving appropriate feeding WHO has proposed a set of 8 core indicators that are designed to measure the behaviors that are associated with appropriate IYCF. (WHO/UNICEF/USAID/IFPRI 2008).In line with international acceptance of the indicators WO has used them in assessing the situation in each country, included in the baseline and final surveys for each country for evaluation and they provide a means of prioritizing interventions. These refer to IYCF, as yet there are no similar indicators for responsive feeding. There are published indicators for assessing dietary diversity, one aspect of a healthy diet for reproductive aged women, but these are less used and were not included in WO although the importance of women`s diets in general and as related to intrauterine phase of growth and development is recognized.

Table 7: Desirable IYCF practice and related indicator selected by CARE WO projects

	Desirable Behavior	IYCF Indicator
1	Put the child to the breast within the first hour of birth. Give the baby the first milk (colostrum)	Timely initiation of breastfeeding
2	Practice exclusive breastfeeding from birth to 6 months. Avoid giving other liquids or foods until 6 months of age.	Exclusive breastfeeding under 6 months
3	Start giving baby their first foods from 6 months. Give food of a semi-solid, solid or soft consistency	Timely complementary feeding Introduction of solid, semi-solid or soft foods
4	Continue to breastfeed as well as giving complementary foods until the child is 2 years old.	Continued breastfeeding at 1 year
5	Feed a variety of foods to the child. Meat, poultry fish or eggs should be eaten daily. Vitamin A rich fruits and vegetables should be eaten daily.	Minimumdietary diversity
6	For an average healthy BF infant meals of complementary food should be given 2.3 times a day 6 – 8 months and 3-4 times a day for 9 – 24 months	Minimum meal frequency
7	A combination of 5 and 6	Minimum aceptable diet
8	Meat, poultry or fish or a food fortified with iron specifically for IYCF (e. fortified pap, MMNP) should be eaten daily	Consumption of iron-rich or iron-fortified foods
9	Continue to breastfeed as well as giving complementary foods until the child is 2 years old.	Continued breastfeeding until 2 years
10	Do not use a feeding bottle, give additional liquids to your child after 6 months using a cup and spoon	Bottlefeeding

The internationally developed Infant and Young Child Feeding Practices (WHO 2008) were selected by CARE as the primary outcome indicators of the WO programme across all five countries. These standardized indicators have been developed by WHO, UNICEF, USAID, FANTA, UCDavis, IFPRI to assess IYCF practices in a given population. The indicators focus on selected food-related aspects of child-feeding and are appropriate for population-level measurement (WHO 2008). They are recommended for use to allow cross-country and cross-study comparisons and changes in feeding

practices as a result of interventions, although alone they may not capture all aspects of local interventions, specific messages and behavior change objectives. These indicators are minimum practices and do not pretend to reflect optimum infant and young child feeding but are more comprehensive than previous indicators, especially for capturing key aspects of complementary feeding. The dietary diversity and consumption of iron containing foods reflect dietary quality (nutrient content), however they are not intended to indicate that recommended intakes of all micronutrients are met, but rather reflect a "better "diet than a poor one. Thus they are designed as assessment tools and are not the same as IYCF practice recommendations as presented in the Guiding Principles (PAHO 2003).

WHO lists 8 core and 5 optional indicators. The key IYCF indicators used to evaluate the impact of the WO program included the 8 core indicators plus 2 of the optional ones. The definitions of these 10 indicators are listed below.

1. **Early initiation of breastfeeding, all children,** within the first hour of birth.
2. **Exclusive breastfeeding,infants 0 – 5.9 months**. Percentage of children 0 – 5.9 months who consumed only breastmilk yesterday
3. **Introduction of solid, semi-solid or soft foods, infants 6 – 8 months**: Percentage of children 6 – 8.9 months of age who received solid, semi-solid or soft foods yesterday
4. **Minimum meal frequency, children 6 – 23 months:** Percentage of children 6 – 23 months consuming minimum frequency solid, semi-solid or soft foods according to age, yesterday
5. **Minimum dietary diversity,children 6 – 23 months** Percentage of children 6 to 23.9 months consuming minimum number of food groups according to breastfeeding practice yesterday.
6. **Minimum acceptable diet, children 6 – 23 months:** Percentage of children 6 – 23 months of age with a minimum acceptable diet for children who are and are not breastfed
7. **Continued breastfeeding at one year, children 12 – 15.9 months.** Percentage of children 12-15.9 months consuming breastmilk yesterday
8. **Continued breastfeeding at two years, children 20 – 23.9 months**. Percentage of children 20-23.9 months consuming breastmilk yesterday (Optional)
9. **Consumption of iron-rich or iron-fortified foods (foods specifically fortified for IYC), children 6 – 23 months:** Percentage of children 6 – 23 months who consumed iron-rich or iron-fortified foods (includes sprinkles) (and sub age groups) yesterday
   9 i) Consumption of **meat foods** (meats), **children 6 – 23 months** yesterday
   9 ii) Consumption of **fortified foods** (e.g. porridge/papillas) or **sprinkles** yesterday.
10. **Bottle feeding:** Percentage of children 0 – 23 months fed using a feeding bottle yesterday.(Optional)

Indicators 2 – 10 are assessed from the child`s food intake on the day prior to the survey (24-hour recall of food intake). The formula for calculating each indicator is

found in the document: Indicators for assessing infant and young child feeding practices. Part I Definitions, (WHO 2008).

As well as those listed above we created 2 additional indicators for the construction of the regression models in order to collapse the different indicators into one variable expressing "minimum adequate IYCF 0 – 23 months":

- **AMA** (Spanish abbreviation) : Minimal acceptable feeding = Minimum acceptable diet MAD (children 6 – 23 months + EBF (infants 0 – 6 months)

In order to capture the dietary iron component we developed an additional composite indicator including iron containing foods to express minimum adequate feeding (including iron) 0 – 23 months.

- **FAMA** (Spanish abbreviation) = Minimal acceptable feeding + consumption of iron rich or fortified foods (6-23 months).

We also ran multivariate regression models for EBF as outcome for children 0 – 5.9 months to capture the effects on this particular feeding practice.

In the final evaluation questions to capture responsive feeding behaviours were applied. *This will be presented later*.

Design

Within the project areas administrative areas (districts, etc.) were selected for intervention and communities that were considered similar with respect to geographic and socio-demographic characteristics, were selected as control for comparison. The final analysis of impact was designed to be done using the double difference (DD) methodology. However, there were several limitations in using the control populations in all of the countries, as, in the analysis, it was clear that the control populations were different to the intervention communities and also there was no randomization to intervention or control, a requisite to be able to apply the DD. Furthermore in practice, the control populations were surveyed as best as possible resulting in a convenience sample due to difficulties in accessibility and logistics of reaching the selected communities.

For this reason we have compared the baseline and endline surveys of only the intervention populations as we consider that this may give the most valid results and interpretation regarding the change of feeding practices with the intervention implementation, even though this limits the possibility of attributing changes to the intervention itself. We also discuss results of DD but with the caveat that including the control populations in the analysis in the WO evaluation context may lead to misinterpretation of the results.

Sample Sizes

Sample sizes were calculated on the basis of selected IYCF practices. For the baseline local available data was used where available, from the most recent DHS country surveys and data from other local surveys available. An estimated increase proposed by each of the country offices (mostly around 10% prevalence of children with improved IYCF practice) for specific indicators was used to calculate the sample size, using a significance level of 5%, a power of 80% and a design effect of 1.5. Sample sizes in each of the countries at endline were calculated using the baseline prevalences for the selected feeding practices and the local country leaders` expectations of degree of potential change in the feeding practices in view of the interventions implemented and contextual situations and events (e.g. natural disasters, focus/intensity of intervention).

Table 8 Calculated simple sizes for baseline and endline surveys for each country

Baseline / Endline	CalculatedSampleSizes				
	Nicaragua	**Peru**	**Indonesia**	**Sierra Leone**	**Bangladesh**
Baseline	Total: 1152 Intervention: 722 Control: 430	Total: 1120 Intervention: 560 Control: 560	Total: 2366 Intervention: 1628 Control: 738	Total: 900	Total: 5200 Intervention: 2600 Control: 2600
Endline	Total: 826 Intervention: 544 Control: 282	Total: 1040 Intervention: 520 Control: 520	Total: 1347 Intervention: 788 Control: 559	Total: 960	Total: 3690 Intervention: 2460 Control: 1230

A similar number of infants and children were expected to be included for each age range: 0-5; 6-11; 12-17; 18-23 months.

Instrument

The generic survey instruments applied in each of the countries was designed by CARE USA. They contained the principal components that were relevant and of interest to the program evaluation and included associated topics of the health and nutrition situation of the mother/child (e.g. attendance at prenatal and young child health services, source of nutrition information, etc.). There was little socio-demographic information of the family included in most of the surveys. The baseline surveys were adapted and modified to the local situation in each country; the endline surveys were designed by CARE USA, IIN and the local evaluation consultant and team, incorporating relevant items from the baseline survey for comparison but with the addition of sections of interest to CARE to capture women`s decision making and their participation in the home and community and food insecurity, as well as exposure to the intervention activities and messages as much as possible. There was some variation in the content between the different countries (e.g. inclusion of household dietary diversity in Indonesia, Sierra Leone and Bangladesh and different ways for capturing food security, as shown in the section on Food security). However, the questions designed to capture the IYCF practices were identical to those at baseline in each country and almost identical across countries; the only adaptation made was to include the foods and liquids locally available and used in each country. All instruments were piloted and adjustments made where necessary.

Measurement

The assessment of the IYCF indicators was evaluated as part of the baseline and endline quantitative surveys in each of the 5 countries. However the specific methodology in the data collection varied slightly. For the BL surveys of Nicaragua, Sierra Leone, Bangladesh and Indonesia the DHS methodology of asking the mother whether the child had consumed breastmilk, specific liquids and different food groups on the day prior to the survey was applied. For the Peru BL the mother was asked whether the child had consumed breastmilk and specific liquids on the previous day (the same as the other countries) but the methodology recommended by WHO (WHO/UNICEF/USAID/IFPRI 2008, Part II Measurement) of using a 24-hour recall methodology of asking the mother about all foods and liquids consumed by the child at the different feeding episodes from the moment the child awoke in the morning to when the child slept at night (and during the night) was applied. This latter methodology was used for the endline evaluation for Nicaragua, Peru and Indonesia. However for the endline in Sierra Leone and Bangladesh the country evaluation team decided to use the DHS methodology which they felt worked well for them at baseline and would allow a direct comparison with BL. The WHO methodology tends to give a

more detailed and precise account of the foods consumed and so not all the methodologies are totally comparable, although we expected only minor differences for the feeding indicators for children 6 – 23 months.

Training

In each country an external consultant oversaw the survey as well as the qualitative evaluations. CARE selected the institution which would conduct the field work and data entry and these teams were trained by the external consultant. There was frequent communication with the IIN and CARE USA during the adaptation of the instrument for the endline survey including sharing ideas about the ways of asking the questions where appropriate. All countries used either clock balances or digital platform balances for weight and rigid stadiometers to measure supine length in children less than 24 months, and standard procedures were used.

There were presumably certain differences in the training, standardisation and implementation in each of the countries for the base line and endline surveys as there was a different external consultant in most countries and a different consultant and local institution conducted the baseline and endline surveys. Also in Indonesia difficulties presented with the evaluation team and several of the data collectors changed during the final evaluation, requiring subsequent training including "on the job".

Implementation of the surveys

The final evaluations were proposed to be implemented at the same season of the year as the baseline in each country, but this was not always possible, due to logistic and other situations. However, as far as possible they were conducted as near as possible to the same time of year. For instance the final evaluation Nicaragua was conducted 2 months later than at baseline and coincided with the rains and the coffee harvest season (women working in the field) which were difficulties faced during the data collection; similarly in Indonesia there were rains and floods which made accessibility to some of the project areas difficult.

The following table 9 shows the timing of the baseline and endline evaluation in the 5 countries.

Table 9. Timing of the baseline and endline quantitative surveys in the 5 countries

	Nicaragua	Peru	Indonesia	Sierra Leone	Bangladesh
Baseline	September 2009	Sept-Nov 2010	June-Aug 2009	March 2009	? 2010
Endline	Nov - Dec 2011	April-May 2013	Nov-Dec 2011	May – June 2012	February 2013

Data analysis

Each of the country evaluators analysed their survey data and wrote their report with support in some cases from CARE USA. The final data bases for baseline and endline were shared by CARE USA with the IIN and have been used to verify the data and construct the final data bases for use in the analysis models. There are some differences in these final data sets compared with the final evaluation reports due to additional data cleaning and exclusion of some data from the final combined data sets. In Nicaragua it was decided to select only data from communities that participated in both baseline and endline surveys. In Bangladesh the data had been entered in two parts and there was some difficulty in merging the two data sets which resulted in loss of data although there is no reason to think that this was other than random. The analysis of anthropometric data was done using WHO Anthro which automatically excludes extreme values for Z-score.

As mentioned above, using these final data sets we have compared baseline to endline for the intervention populations for each countryand have also calculated the DD for each IYCF practice using the intervention and control groups.

We developed a conceptual analytic model of the various components of the environment, health and health care, and of the intervention that could potentially impact the IYCF behaviors and nutritional status (anthropometry). From this we constructed multivariate logistic regression models to explain the dichotomous outcome dependent variables (e.g. met IYCF indicator versus did not meet IYCF indicator) using covariates for which there were available data. Analyses were conducted using SPSS version (version 20.0).

In developing the models we have selected the following IYCF practices as key outcome variables: i) exclusive breastfeeding (EBF), ii) minimum acceptable diet (MAD) and iii) consumption iron rich or iron fortified foods. Additionally, we have combined feeding practices to construct the following indicators as described above: iv) AMA: EBF (children 0 – 5 months) + MAD (6 – 23 months) (*Alimentación minima acceptable* = minimum acceptable feeding 0 – 23 months), and v) FAMA (AMA + consumption of iron rich foods or fortified foods 0 – 23 months). These latter composite indicators reflect minimum adequate feeding patterns during the 0 – 2 years period.

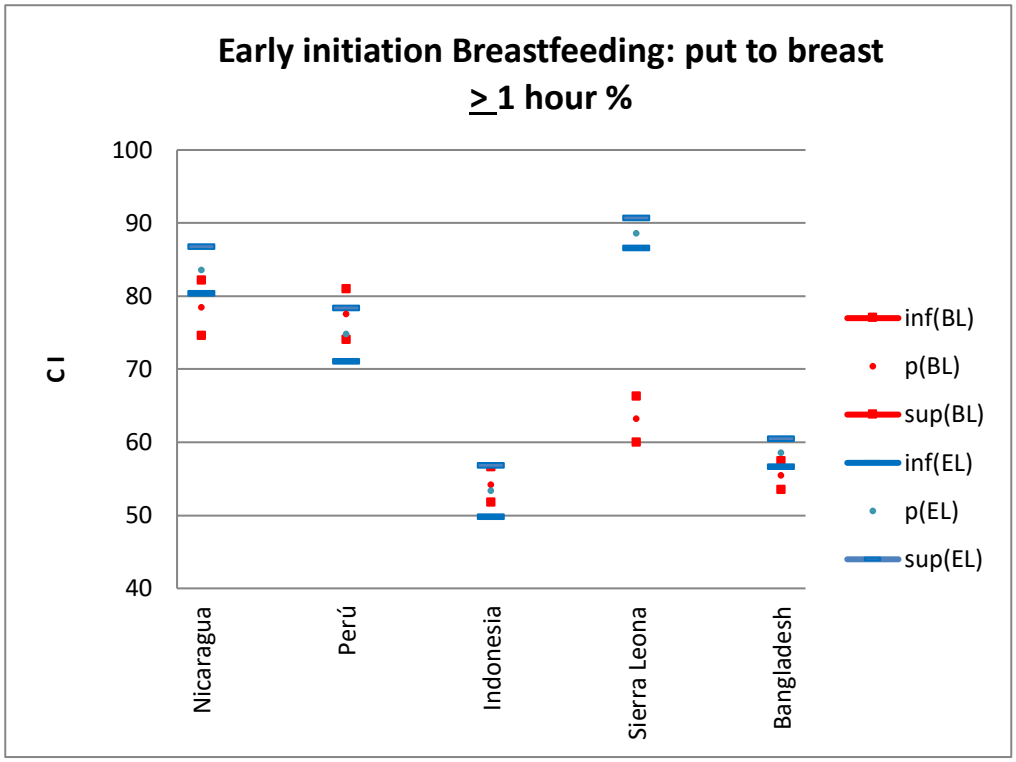
Results

Changes in each of the IYCF indicators for each country are presented. Due to the difficulties that we have discussed regarding the control group and thus the interpretation of the Double Difference, we present the differences in only the intervention groups between BL and El for each country. The results are presented in the following graphs showing the changes in prevalences for each country with the confidence limits. The double differences for each of the indicators for the 4 countries

where there was a control group are shown in Table A1 in the Appendix and discussed here but we consider that the interpretation is less reliable for the reasons already explained.

Early initiation of breastfeeding.

Graph 1

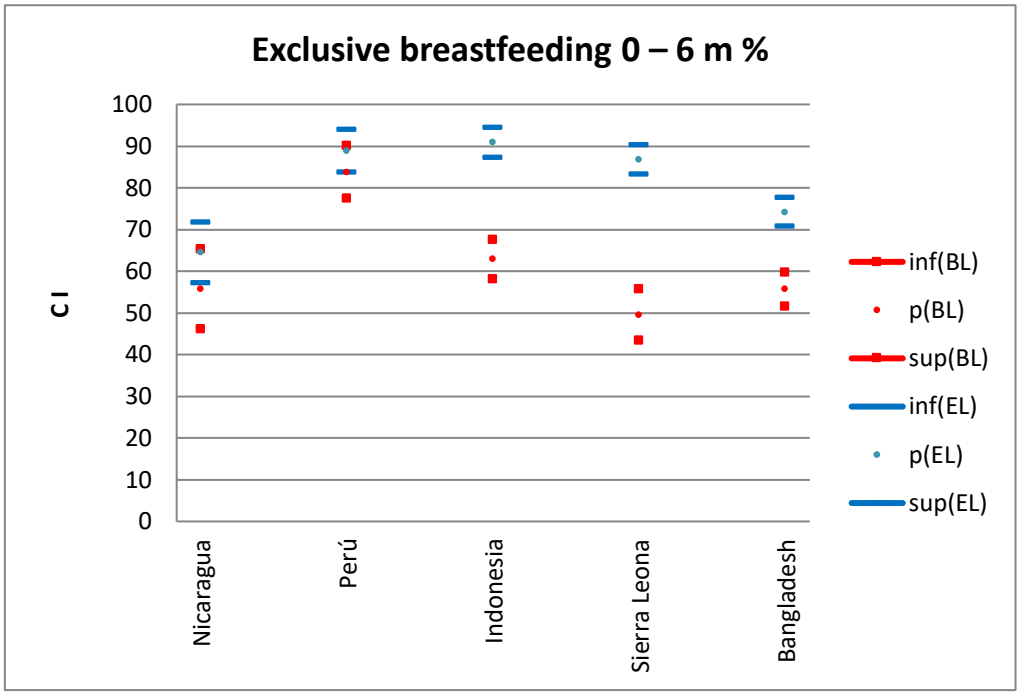


As can be seen in graph 1 a large and significant increase in the prevalence of early initiation of breastfeeding occurred in Sierra Leone from 63.1% to 88.5%. A small but non significant increase occurred in Nicaragua, where the rate of early initiation was high initially (78.4%) as it was in Peru. There was almost no change in Indonesia and Bangladesh and in Peru it appeared to decrease slightly, although the prevalence was high.

The results of the DD indicated that there was an increase in this practice in Nicaragua (DD, 2.0) and Peru (DD, 8.3) but the latter was due to a large decrease in prevalence in the control group. In Indonesia and Bangladesh there were large negative DDs, largely because there was little change in the intervention groups between BL and EL yet there were considerable increases in the control groups.

Exclusive breastfeeding 0 – 6 months (EBF)

Graph 2

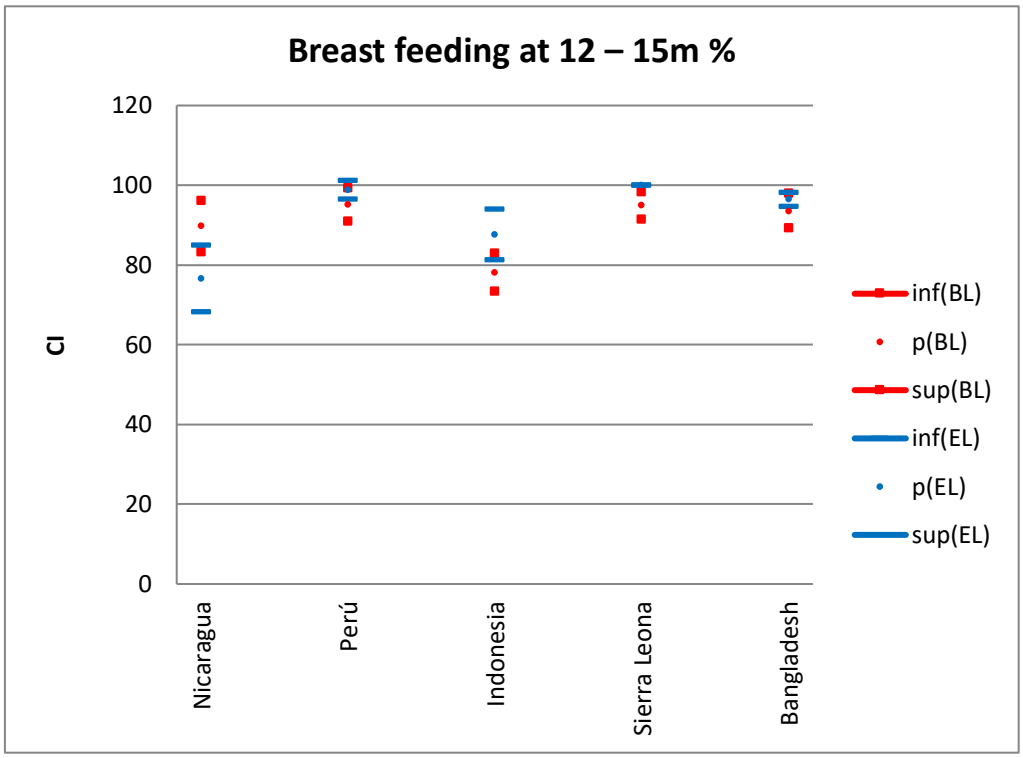


There were large significant increases in the prevalence of exclusive breastfeeding in children 0 – 5.9 months in Sierra Leone (from BL 49.6% to EL 86.0%), Indonesia (BL 62.9%, EL 90.9%) and Bangladesh (BL, 55.7%; EL 74.2%). There were smaller, non-significant increases in Nicaragua and Peru, in the latter the prevalence of EBF was high initially (83.8%).

Regarding the DD calculations there was a marked positive DD in Nicaragua (DD, 14.7), largely due to a decrease in EBF in the control group, and negative DDs in Indonesia and Bangladesh due to increases as well in the control groups.

Continued Breastfeeding at 1 year

Graph 3

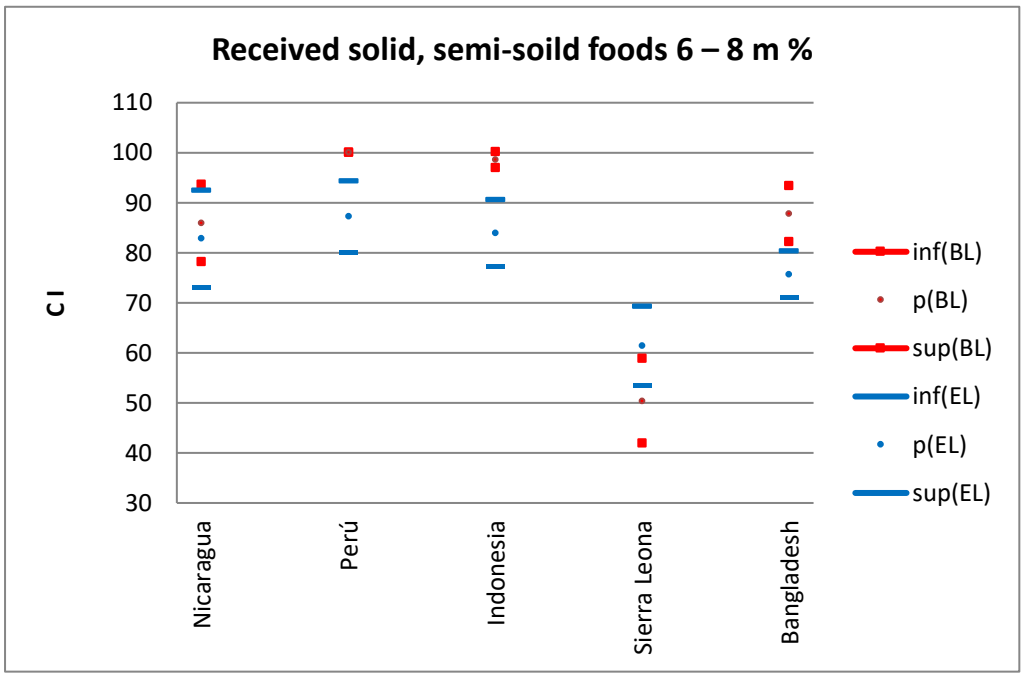


In all countries there was a high prevalence of breastfeeding at 1 year showing a tendency to increase to nearly 90 – 100% at endline in all countries except Nicaragua. The prevalence in Nicaragua appears to have reduced at EL.

Indonesia was the only country that showed a large positive DD for this indicator (DD, 15.8), as there was a decrease in prevalence in the control group as well as an increase in intervention. In Peru and Bangladesh there were positive DDs (5.2 and 3.7 respectively); In Nicaragua there was a negative DD (-6.7) as the prevalence decreased in both intervention and control.

Introduction of solid and semi-solid foods, 6 – 8 months

Graph 4

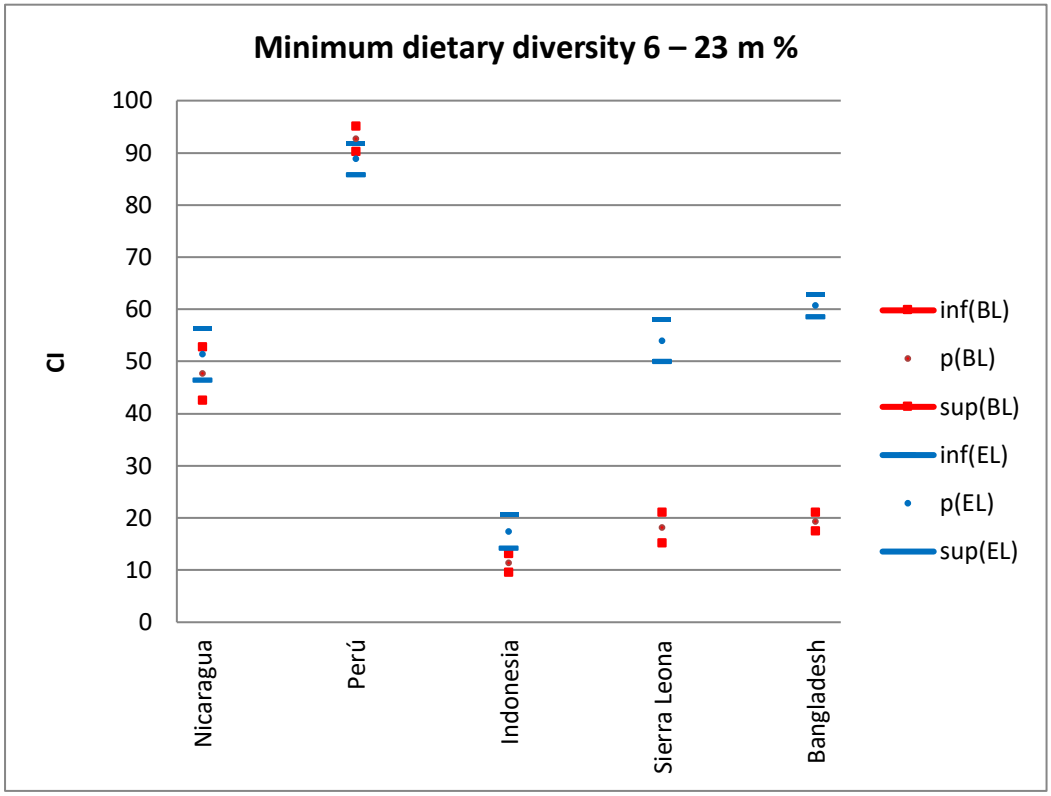


Sierra Leone was the country with the lowest prevalence of infants consuming semi-solid or solid foods 6 – 8.9 months at BL (50.4%) and was the only country where there was an increase (non-significant) at EL. In the other 4 countries there was a tendency for a decrease in this indicator although the prevalence remained high. All countries except for Bangladesh showed a small, negative DD as there were decreases in the control group as well as the intervention group; in Bangladesh, due to a larger decrease in the control group there was a DD of 5.5.

Minimum Dietary Diversity (MDD)

Dietary diversity is a reflection of the "quality" of the diet, i.e. in nutritional terms – adequacy of the nutrient content. This indicator is defined by the consumption of 4 food groups out of a total of 7 (shown in appendix, table 2A), where 5 of these groups include "good" micronutrient food sources. However it does not take into account the amount of food consumed, only if one or more foods in that food group was reported by the mother as being fed to child on the previous day.

Graph 5



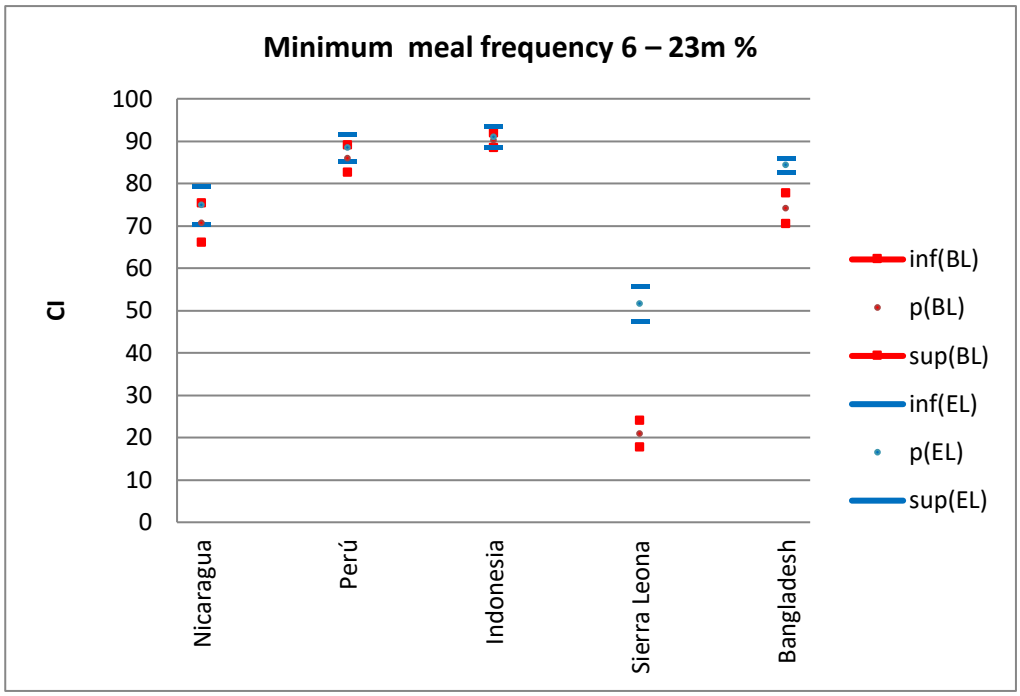
The prevalence of children 6 – 23 months consuming a diet with minimum dietary diversity was low initially in Bangladesh, Indonesia and Sierra Leone but improved markedly in Bangladesh and Sierra Leone between BL and EL in the intervention group (Bangladesh BL, 19.3%, EL, 60.7%) (SL, BL, 18.2% , EL, 54.0%). There was a small but significant increase in Indonesia (BL 11.5%, EL 17.4%). There was no significant change in Nicaragua nor Peru; in Peru the prevalence was very high initially (92.7% at BL), indicating a more diverse diet than the other countries, according to this WHO indicator.

There was a high Double Difference of 15.9 in Nicaragua because the prevalence of MDD decreased in the control group and a high DD in Bangladesh because there was a greater increase in the intervention than the control group.

Minimum meal frequency (MMF)

Minimum meal frequency – number of times the child consumed meals containing a semi-solid or solid food according to age – is a proxy for the energy adequacy of the diet. Again it does not refer to the quantity eaten but to the presence of a food or preparation of appropriate consistency (adequate energy density) in the meals.

Graph 6

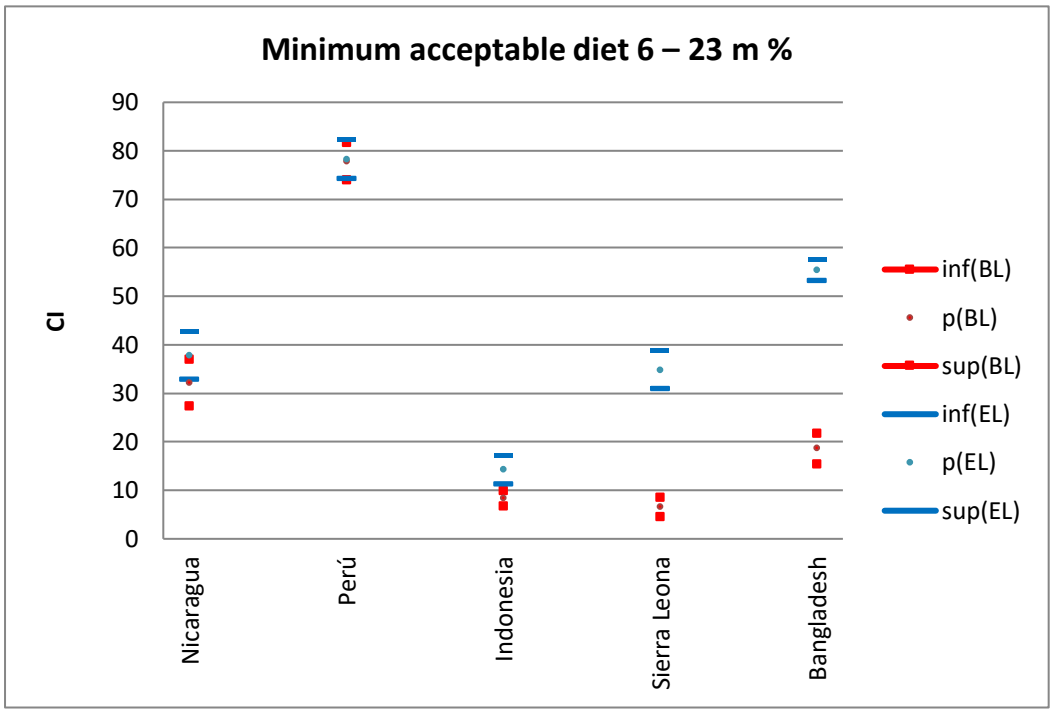


At BL the lowest prevalence for this indicator was found in Sierra Leone (intervention BL 20.9%) but this was also the country that showed greatest (significant) increase at EL (51.6%). Peru and Indonesia had high prevalences of MMF (85.9% and 90.2% respectively at BL) with little or no change at EL. There was a significant increase in Bangladesh between BL and EL in the intervention group (BL 74.1%, EL 84.4%). There was little change in Nicaragua (BL,70.7%, EL, 74.9%).

There was a DD of 9.9 for Nicaragua due to a decrease in the control group and an increase in the intervention group.

Minimum acceptable diet (MAD)

Graph 7



The minimum acceptable diet is a composite indicator combining MDD and MMF. In all countries except Peru (BL, 77.9%) MAD was low at baseline: between 6.6% and 18.7% for Sierra Leone, Indonesia and Bangladesh, and 32.2% for Nicaragua. There were marked and significant increases in Bangladesh and Sierra Leone (EL 55.5% Bangladesh; EL 34.9% SL) and a small but significant increase in Indonesia (EL, 14.3%). There were no significant increases in the intervention group in neither Nicaragua nor Peru.

The DDs were high in Nicaragua and Bangladesh, both 13.2; in Nicaragua due to an increase in intervention and a decrease in control, and in Bangladesh largely due to the considerable increase in minimum dietary diversity at EL in both groups but being greater in intervention.

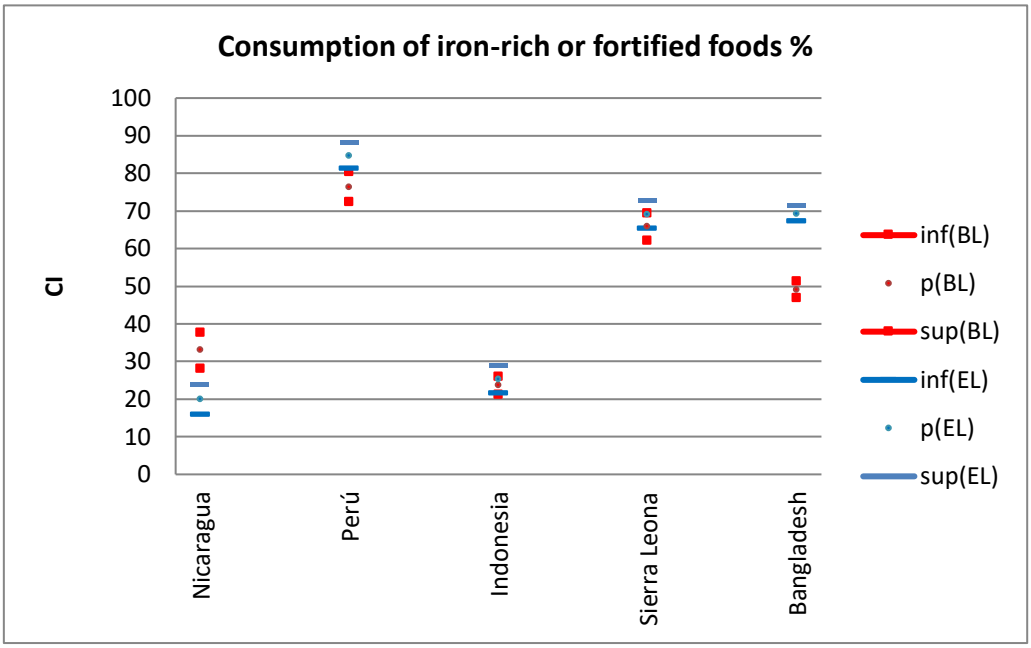
Iron rich foods or fortified foods

This indicator reflects the iron intake in the diet. Iron deficiency anemia is the most prevalent nutritional deficiency in the WO countries and in fact in all countries of the world, thus the presence of foods containing iron in the diet are necessary to help prevent anemia and promote good health.

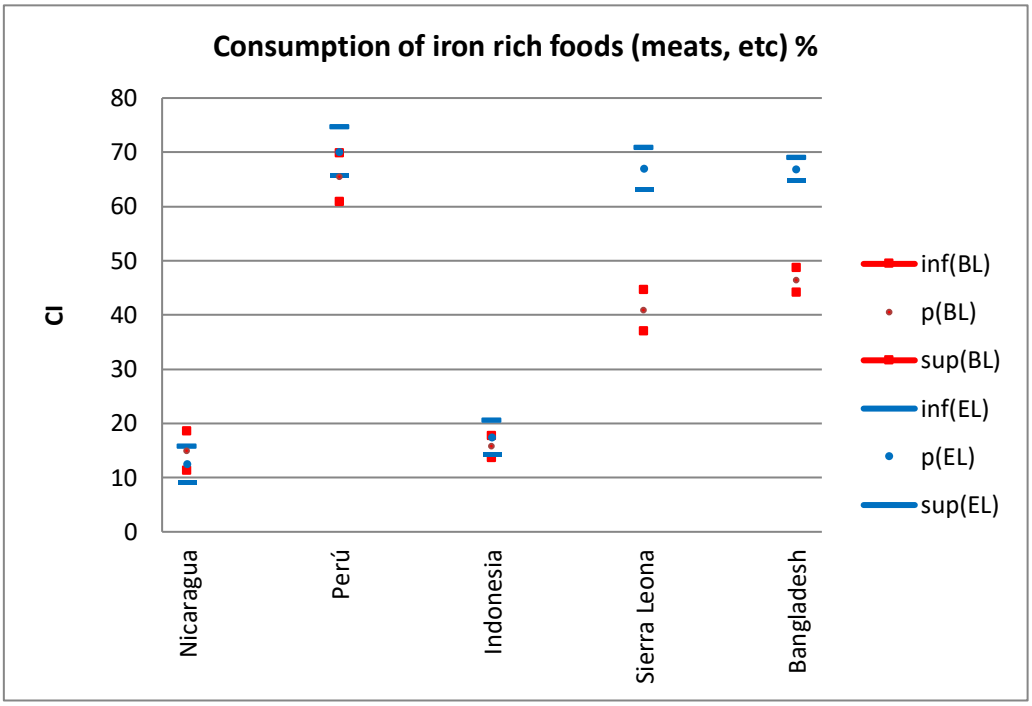
Again this indicator suffers from the same limitation as MDD in that the amount of iron rich food or fortified food is not included so it does not reflect an adequate intake of

dietary iron, only the presence of (at least) one of these foods in the diet on the previous day.

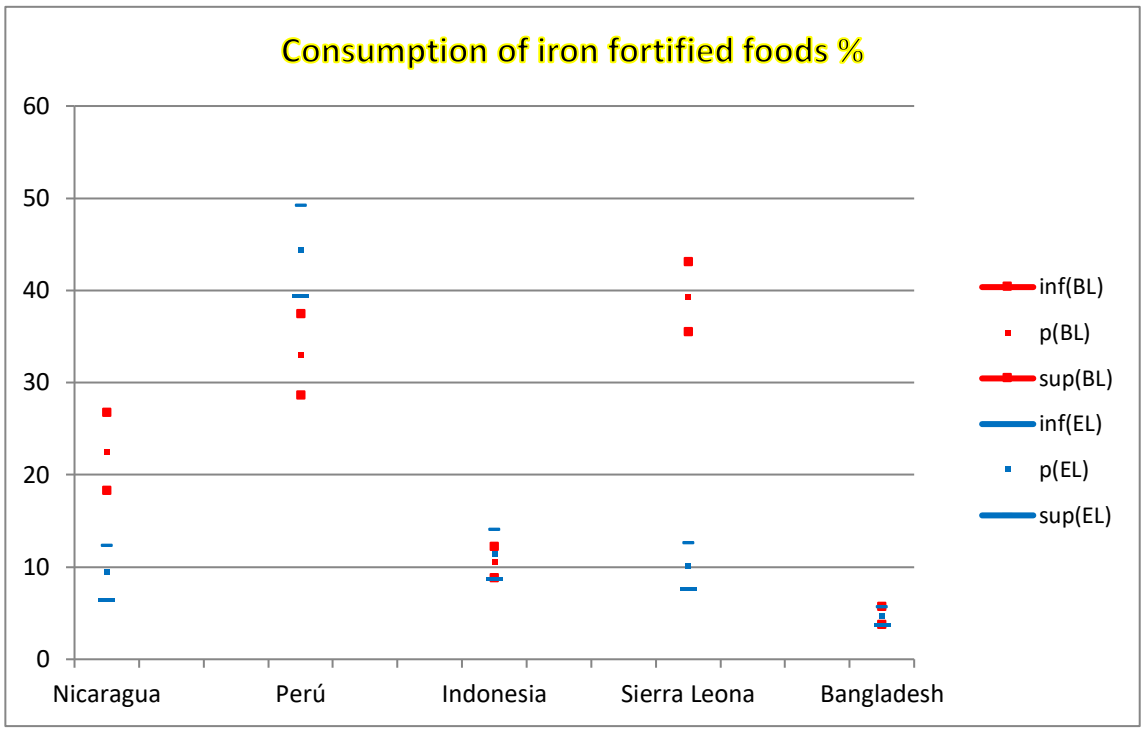
Graph 8



Graph 9



Graph 10

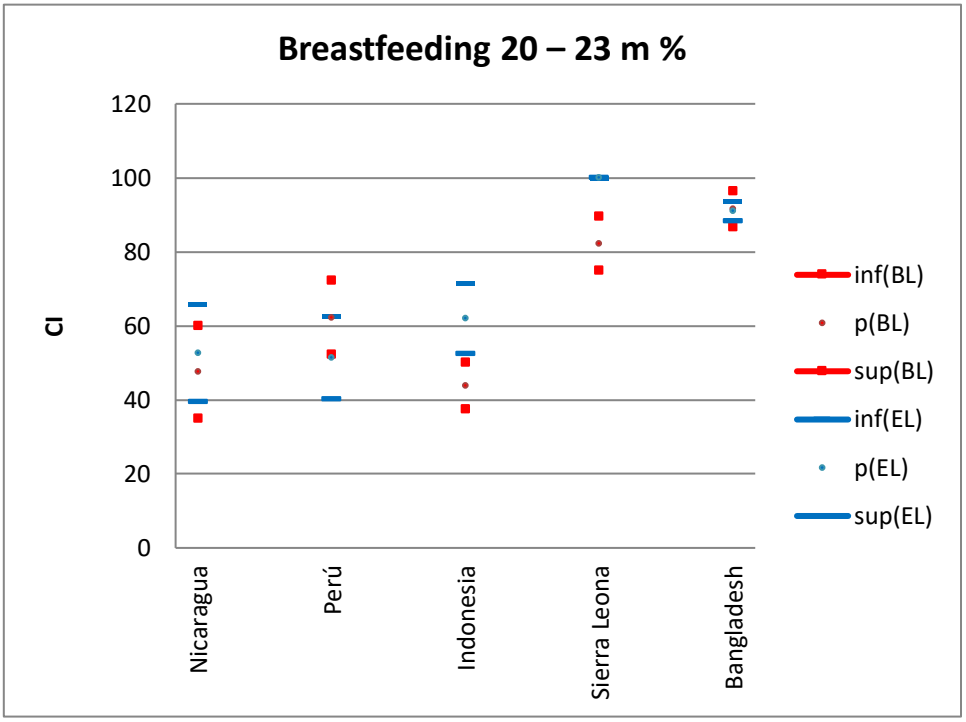


A significant increase in prevalence of consumption of iron rich foods or iron fortified foods occurred in Peru (BL, 76.5%, EL, 84.8%) where it was high initially, as well as in Bangladesh (BL,49.2, EL, 69.4%) where the increase was considerable. In Nicaragua there was a decrease in the prevalence of children consuming iron rich or fortified foods at EL. In Indonesia this was low (BL, 23.8%) and in both Indonesia and Sierra Leone there was little change after the intervention.

There was a positive DD in Peru of 6.1 due to increases in both iron rich foods and fortified foods (in this case MMNP, *"Chispitas"*), with greater increases in the intervention than control group. In Bangladesh there was a DD of 4.5 due to the increase in prevalence of children consuming iron rich foods, in both intervention and control groups. The DD in Nicaragua was -8.5, mainly due to the large decrease in fortified foods in both intervention and control and a slight increase in iron rich foods in the control group.

Continued breastfeeding 20 – 23.9 months

Graph 11

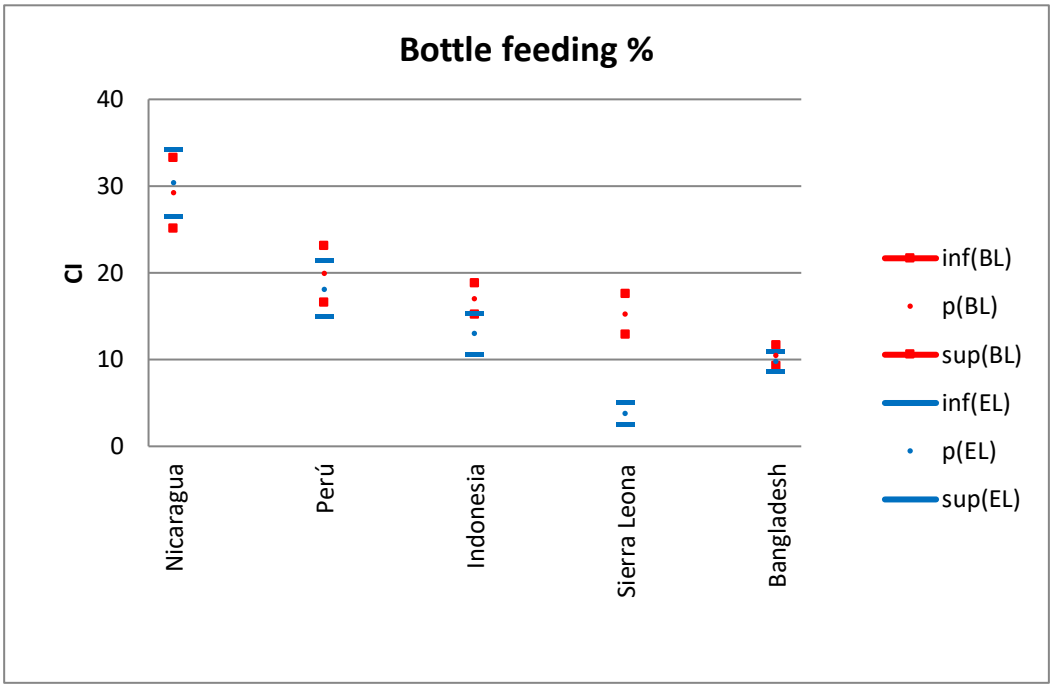


Indonesia and Sierra Leone both showed significant increases in the prevalence of breastfeeding near 2 years of age (Indonesia: BL, 43.8%, EL, 62.0%; SL: BL, 82.2%, EL, 100%); in SL all children surveyed in this age group at EL were breastfeeding. In Bangladesh it remained high (91%) and in Peru and Nicaragua remained around 50%, having dropped slightly in Peru (BL, 62.2%, EL, 51.3%).

Positive DDs were found for Nicaragua (17.3) because of a decrease in prevalence in the control group and a small increase in the intervention group; in Peru (4.8) due to a greater decrease in the control group than in intervention; in Indonesia (3.3) due to a larger increase in intervention than control group, but a negative DD in Bangladesh due to an increase in the control group and little change in the intervention group, although the latter was higher.

Bottle feeding

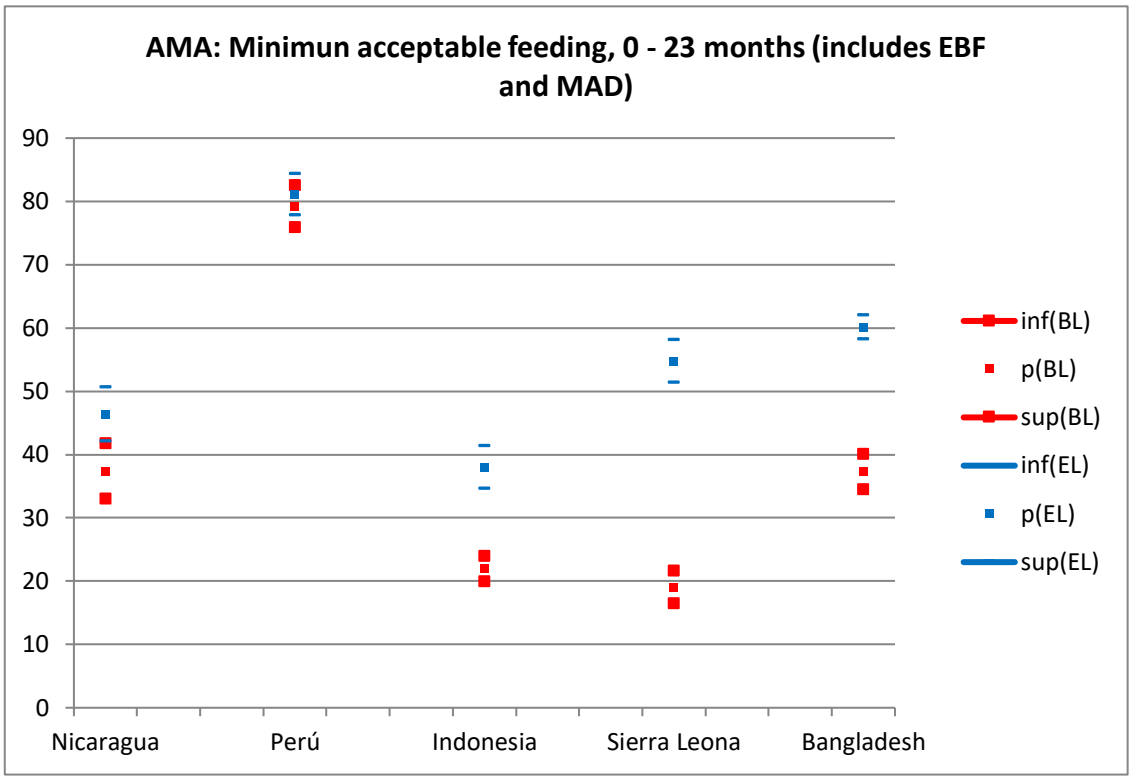
Graph 12



AMA and FAMA

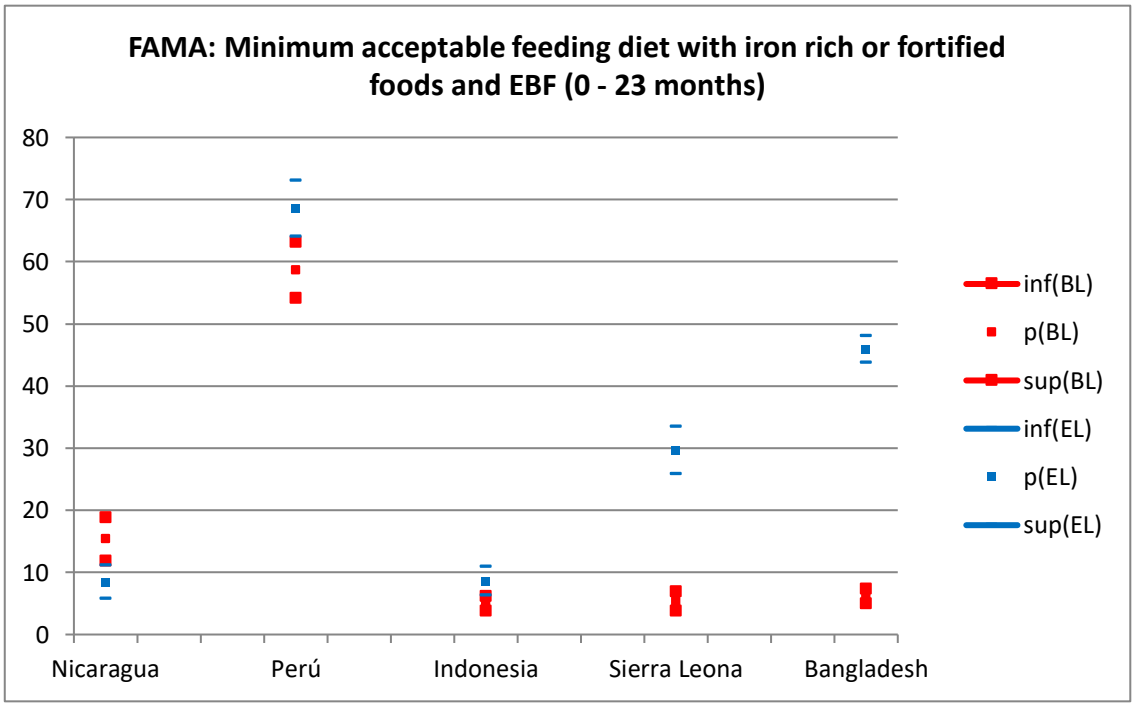
As well as the validated WHO IYCF indicators we have explored 2 additional composite indicators in this analysis: “AMA” and “FAMA”. AMA refers to the proportion of children meeting minimum acceptable feeding for the 0 – 23 month age group, thus includes LME for the 0 – 5 months and MAD for the 6 – 23 months.

Graph 13



As can be seen in the graph 13 there was a significant improvement in minimum acceptable feeding (AMA) in all countries except Peru, which in fact was high at both BL and EL (around 80%).

Graph 14



When consumption of iron rich foods or fortified foods is added to this indicator of minimum acceptable feeding including an iron rich food source (FAMA) as well as Bangladesh and SL, Peru also showed a significant improvement in the overall feeding practices, but Nicaragua and Indonesia did not, indicating that iron rich foods are a severe limitation to the overall minimum acceptable dietary practices according to these indicators.

The following table 10 summarizes the significant improvements in the IYCF indicators for the 5 countries

Table 10

Summary table of significant positive changes between BL and EL in intervention groups by IYCF indicator for the 5 countries.

Indicator	Nicaragua	Peru	Indonesia	Sierra Leone	Bangladesh
Early initiation of breastfeeding	High	High		X	
Exclusive breastfeeding		High	X	X	X
Breastfeeding at 1 year	High	High	High	High	High
Received semi-solids/solids 6 – 8 m	High	High		X	High (reduced)
Minimum dietary diversity		High	x	X	X
Minimum meal frequency	High	high	high	X	X
Minimum Acceptable diet		High	x	X	X
Iron rich foods or fortified foods		X			X
Iron rich foods		High		X	X
Fortified foods		X			
Continued breastfeeding at 20 – 23 months			X	X	High
Bottle feeding (reduction)				X	Low
AMA	x		X	X	X
FAMA		X	x	X	X

X = large significant increase
x = small significant increase
High = high prevalence initially >70%, little change

6. Assess changes in nutritional status – anthropometry and anemia

As mentioned above appropriate IYCF practices are major contributors to child health, growth and development of children under 2 years and thus affect the nutritional status of the children during this period and affects future growth, development, health and wellbeing. The final aim of the WO program was to improve the nutritional status of children through the promotion of optimum feeding practices using different channels and media to reach mothers and their families. Nutritional status (stunting, underweight, wasting) is a result of several adverse conditions to which the child is exposed: from the mother – before conception and during pregnancy – and on the child, including inappropriate feeding and illness, amongst others.

The following table 11 shows the frequencies of the prevalence of stunting and underweight in children under 2 years in the 5 countries.

Table 11 Nutritiona status indicators at BL and EL for the 5 countries

Indicator	Nicaragua %	Peru %	Indonesia %	Sierra Leone %	Bangladesh %
Stunting BL	18.4	25.3	37.6	37.1	42.8
EL	21.3	24.8	34.7	19.9	44.4
Underweight BL	8.3	6.6	28.1	22.9	37.8
EL	5.2	6.9	31.8	14.3	25.4
Wasting BL	2.8	1.1	9.7	12.3	14.1
EL	1.1	1.9	15.4	8.5	6.9
Anemia children		12 – 17 m			6 – 23 m
BL		67.9			82.7
EL		83.3			84.1

As can be seen from the above table there was little change in the proportion of children stunted between BL and EL in all countries except SL where there was a considerable reduction. Considering that SL was the country that had significant improvements in all the IYCF indicators, this is a very interesting impact.

Indonesia, SL and Bangladesh had high prevalence of underweight in the children at BL and there was considerable reduction in this indicator for Sierra Leone and Bangladesh although no change in Indonesia. Similarly there were considerable reductions in wasting in Bangladesh and SL at EL, but in Indonesia this increased, possibly due to the natural disasters, such as the flooding, that occurred in the area. SL and Bangladesh showed improvements in several of the IYCF indicators, both for breastfeeding and complementary feeding which could have contributed to the improvement in

underweight and wasting. Both countries showed a tendency to lower prevalence of diarrhea at EL although this remained high in SL.

The graphs in Appendix 3 depict the distributions of stunting and weight for height in the intervention populations (children 0 – 2 years) at baseline and endline for the 5 countries. These distributions reflect the changes commented on above, and even show a tendency for increased weight for height towards overweight, in the children in Peru!

Iron deficiency anemia is one of the major nutritional deficiencies in developing countries both in IYC and women of reproductive age, especially during pregnancy and can have lasting effects on cognitive development in the child. Anemia was measured in subsamples in Peru and Bangladesh in the WO evaluation, (hemoglobin measured by Hemocue). In Peru it was assessed in all children 12 – 17 months of age (whose mothers accepted) as this was considered both a vulnerable period with high prevalence's of anemia and an age group with most potential benefit from exposure to the approximately 2 – year intervention. In Bangladesh anemia was measured in a subsample of children 6 – 23 months.

In Peru MOH regulations include the giving of an iron supplement or multi-micronutrient fortification of food (MMNP with 5 nutrients including iron, folic acid, vitamin C, vitamin A and zinc) from 6 months of age, although this is not always adhered to by the health facilities. At the time of the planning of the intervention MMNP was distributed through the health facilities in the regions of the intervention but decreased during the course of the intervention. Iron supplements were theoretically distributed through the government health services when MMNP was not available. The prevalence of anemia in this group in Peru was very high at BL and appears to have increased at EL. DHS surveys in the country have also shown this tendency to increase; possibly due to the reduction in the availability and use of the MMNP.

In Bangladesh the WO project distributed MMNP as part of the intervention to children from 6 months of age; however this was discontinued when the intervention finished and was not being distributed at the time of the final evaluation. There was no change in the anemia prevalence in Bangladesh in spite of the distribution of MMNP by WO in the project areas. In Bangladesh some of the anemia could be non-iron deficiency (e.g. parasites?). However, this remains a serious problem and requires addressing further.

Multivariate logistic regression models for IYCF and anthropometric outcomes

To explore the influences that may have led to the improved practices in several of the countries we developed a conceptual model and identified variables that could be tested for their significance and potential effect.

For each of the variables we assigned a score for each individual according to the results of the relevant questions. These included demographic information, food security (whether sufficient quantity/quality or not), low birth weight, health indicators: diarrhoea, cough, attendance to pre-natal care and whether nutrition advice given/iron supplements taken, coverage of the project activities including MtMSG, mother`s knowledge and an empowerment score. An exposure score was developed for each country according to the intervention activities and components. These included aspects such as advice given by community health workers, attendance to and topics discussed in MtMSG, exposure to project materials and radio, source of information, participation in communal activities. A score (subjective - from our understanding) was assigned to the intervention delivery variables: health service intervention, community: MtMSG, CHW counseling or community surveillance and mass media. We were unable to assign a score to enabling environment. A full list of these variables, how they were constructed and the assigned numbers or scores for each are presented in the Appendix 2.

A list of the variables and prevalence's of the scores assigned for all 5 countries are presented in table 12.

Table 12 Summary of the variables used in the development of the statistical models and prevalences for intervention groups at BL and EL for the 5 countries.

Variable		Nicaragua		Peru		Indonesia		Sierra Leone		Bangladesh	
		BL % n	EL% n	BL% n	EL % n	BL % n	EL	BL	EL	BL	EL
Educational level of the informant	Illiterate or incomplete primary	**83.1** 393/473	**82.9** 461/556	51.0 290/569	42.5 232/546	32.6 531/1628	27.8 219/788		80.4 771/959	60.1 1489/2479	46.5 1176/2530
	Complete primary or higher	**16.9** 80/473	**17.1** 95/556	49.0 279/569	57.5 314/546	67.4 1097/1628	72.2 569/788		18.5 177/959	39.9 990/2479	53.5 1354/2530
Sex of child	Male	**49.5**	**48.7**	52.0	48.0	49.8	49.1	54.0	45.9	52.6	51.7
	Female	**50.5**	**51.3**	55.7	44.3	50.2	50.9	46.0	42.8	47.4	48.3
Low birth weight	<2.5kg	nd	**6.2** 14/226	7.9 44/554	5.4 29/541	12.2 126/1034	10.3 59/572		13.5 128/946		19.4 6/31
Diarrhoea in past 2 weeks		**41.6** 197/473	**32.4** 180/556	25.7 146/569	21.6 118/546	23.7 386/1627	9.4 74/787	27.2 243/895	24.8 236/951	17.5 425/2479	12.5 315/2530
Cough in past 2 weeks		**55.6** 263/473	54.0 300/556	38.5 219/569	41.9 229/546	59.5 968/1626	51.5 405/787	34.5 309/895		40.4 1001/2479	
Reported Food security	Insufficient amount		8.6 48/556		7.0 38/546		33.2 261/786		59.4 537/904		30.3 248/818
	Sufficient amount		91.0 506/556		93.0 508/546		66.8 525/786		40.6 367/904		69.7 570/818

Attended prenatal check		88.6 419/473	85.1 473/556	99.1 553/558	99.6 539/541	96.7 1544/1596	98.4 740/752	91.1 815/895	96.8 925/956	61.7 1543/2501
Received feeding advice		67.1 281/419	53.6 298/556	55.9 420/553	69.4 374/539			86.5 705/815	96.9 902/931	92.8 1432/1543
Mother took Fe supplements		98.4 377/383	75.2 418/556	50.5 251/497	54.2 266/489	93.8 1382/1474	95.1 683/718	84.9 572/886	97.8 913/934	
Women`s Empowerment score (see Appendix)	0				0.9 5/541		1.5 11/736		60.1 573/953	33.8 845/2501
	1 Low		3.6 9/528		0.6 3/541		3.4 25/736		19.9 190/953	20.7 517/2501
	2		8.1 43/528		3.1 17/541		8.8 65/736		12.0 114/953	14.6 364/2501
	3		21.2 112/528		9.4 51/541		12.4 91/736		4.5 43/953	13.0 325/2501
	4		45.5 240/528		37.2 201/541		39.5 291/736		2.2 21/953	13.5 337/2501
	5 High		19.9 105/528		48.8 264/541		34.4 253/736		1.3 12/953	4.5 113/2501
Knowledge score (see Appendix)	.00 Low	2.2 7/324	21.6 120/556	11.6 66/569	45.5 248/546	16.6 271/1628	22.8 180/788	5.4 138/895	8.8 84/959	0.9 24/2530
	.5	9.9 32/324	13.1 73/556	5.1 29/569	15.4 84/546	4.1 66/1628		12.3 110/895	3.9 37/959	0.0 1/2530
	1.0 High	88.0 285/324	65.3 363/556	83.3 474/569	39.2 214/546	79.3 1291/1628	77.2 608/788	72.3 647/895	87.4 838/959	99.0 2505/2530

In the last 6 months attended MTMSG			37.1 206/556		17.9 98/546		19.3 152/788		51.4 491/956		19.3 489/2530
Age of informant y (mean ±sd) (continuous)		25 ±7 473	26 ±8 556	28 ±8 568	28 ±8 546	29 ±7 1627	28 ±7 788		26 ±7 948	26 ±6 2467	
Caregiver exposure index, (continuous) (mean ±sd) (see Appendix)	0=low 1=high		0.63 ±21 556		0.35 ±0.2 546		0.62 ±0.28 788		1.0 458		0.63 ±0.20 2530
Delivery (implementation):											
If health service intervention delivered		0	0	0	1	0	0	0	1	0	0
MTMSG implemented	Yes+=2 Yes=1 No=0	0	1	0	1	0	1	0	2	0	1
Community surveillance implemented CHW counseling	Yes=1 No=0	0	1	0	1	0	1	0	1	0	1
Radio-mass media	Yes=1 No=0	0	1	0	1=Apurimac 0=Ayacucho	0	0	0	1	0	0

AMA

When examining endline results, the odds for meeting AMA (MAD or LME) were significantly greater for children in the intervention communities as compared to those in the control group in the countries of Indonesia, Nicaragua and Bangladesh, controlling for age of the child, age of mother, education of mother, diarrhea and sex. That is, children in the intervention communities were more likely to consume a minimally acceptable diet (6-23 mo) or be exclusively breastfed (0-5) than children in the control communities--Indonesia OR 1.74 (1.20, 2.53); Bangladesh OR 2.10 (1.82, 2.43); Nicaragua OR 1.77 (1.28, 2.46). However, at baseline similar significant differences in AMA also existed by group for Bangladesh, OR 1.68 (1.39, 2.0).

The exposure variable was created as an additive index and converted to a percentage. At endline, the odds for consuming AMA were significantly greater for each one unit increase in exposure to the intervention for the countries of Nicaragua, Indonesia and Bangladesh (see Appendix 4 table A3) controlling for controlling for age of the child, age of mother, education of mother, and diarrhea, sex, and group. Participation in MtMSG also increased the odds of consuming AMA in Nicaragua OR 1.63 (1.14, 2.33) and Bangladesh OR 1.64 (1.32, 2.04) after controlling for age of the child, age of mother, education of mother, and diarrhea, sex, and group.

FAMA

At endline, the odds for meeting FAMA (AMA + Fe or LME) were significantly greater for children in the intervention communities as compared to those in the control group in Bangladesh with an OR of 2.26 (1.95, 2.62), controlling for age of the child, age of mother, education of mother, and diarrhea, sex. However, at baseline the intervention children also had higher odds of this feeding behavior than did control children, although to a lesser degree OR 1.75 (1.44, 2.12). Interestingly, at baseline in Peru, control children had a higher odds of consuming FAMA than intervention children OR 1.36 (1.77, 1.05); however there was no difference between groups at endline for this feeding practice OR 0.69 (.92, 1.22), control compared to intervention. With respect to intervention exposure, the odds for consuming FAMA were significantly greater for each one unit increase in exposure, controlling for controlling for controlling for age of the child, age of mother, education of mother, and diarrhea, sex, and group in all but Indonesia. Participation in MtMSG also increased the odds of consuming FAMA in Sierra Leone OR 1.94 (1.37, 2.74) and Bangladesh OR 1.73 (1.39, 2.14), controlling for age of the child, age of mother, education of mother, and diarrhea, sex, and group (Appendix 4 Table A4).

STUNTING (height for age z=<-2ds)

Endline results in Peru demonstrate a significantly lower odds for stunting in the intervention group children as compared to control children OR 0.63 (0.47, 0.85), controlling for age of the child, age of mother, education of mother, and diarrhea, sex. At baseline the odds were not

different between groups OR 0.74 (0.55, 1.01). For the other countries--Indonesia, Bangladesh and Nicaragua—there were no differences between groups at endline. (Appendix 4, table A5)

WASTING(weight for height z=<-2ds)

There were no differences between intervention and control children for wasting at endline, controlling for accounting for age of the child, age of mother, education of mother, and diarrhea, sex. (Appendix 4 table A6).

Section 7. Women`s Empowerment

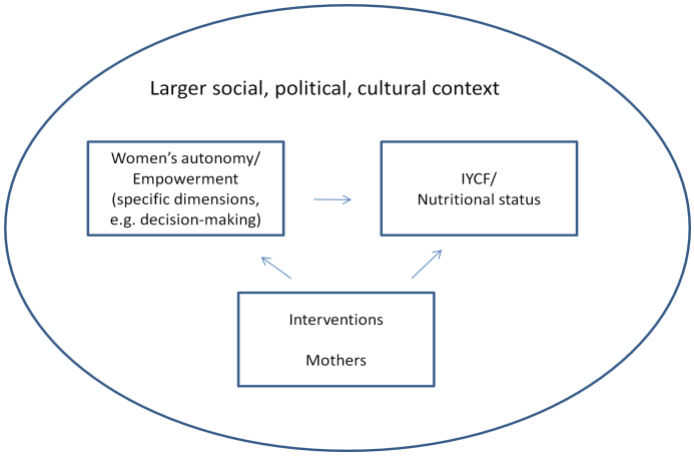
Women`s empowerment is an important aspect of the Windows of Opportunity program. Kabeer (2001) defines empowerment as *"The expansion in people`s ability to make strategic life choices in a context where this ability was previously denied to them"* (*http://siteresources.worldbank.org/INTEMPOWERMENT/Resources/486312-1095970750368/529763-1095970803335/malhotra2.pdf.*) Empowerment is a dynamic process that occurs over time. Kabeer (2005) outlines three dimensions of empowerment explaining that these are the pathways through which empowerment occurs: i) resources, a pre-condition which includes women`s education and financial and other resources that allows the woman to choose alternatives, ii) agency, the process by a women is the agent of change, her capacity to define her own choices as well as other contextual agents, and iii) achievements, the consequences of the choices made. Due to the multi dimensional and process aspects of empowerment it is not easy to measure. Autonomy is a more static concept and one that is easier to measure but both concepts reflect a woman`s ability to take charge of her life.

Variables that have been used to measure these concepts include those related to household and child care decision making, control over finances, mobility and domestic violence (Shroff 2011) as well as education level. Specifically women`s decision-making has been widely used as a proxy for empowerment and especially that related to child care.

Research in several countries has shown that women`s ability to make independent decisions impact on child health including improved woman`s and child nutrition (Shroff 2009) (although this was not found in the WO baseline survey in Bangladesh where it was explored). Specifically mother`s higher decision-making power surrounding child feeding has been shown to be a significant predictor of improved height – for –age Z scores (Begin et al. 1999). Other researchers have found that mothers are more likely to use their resources to benefit their children if they are free to do so (Castle 1993 and others) and that better child nutritional status was related to mothers with a higher contribution to the family income (Engle 1993). Thus interventions to enhance women`s empowerment have the potential to contribute to improving child feeding and nutritional status. The following diagram illustrates these dynamics between women`s empowerment/ autonomy and IYC nutrition within the social context and through interventions with mothers in which both empowerment and IYC nutrition can be addressed.

Figure 3

Women's empowerment and IYCF



In the WO program, women`s empowerment has been addressed, perhaps most specifically through the mother to mother support groups, and there is an interest to understand changes that may have occurred. In some of the Window program countries women`s decision making was explored in the baseline survey and/or in the mid- term review (e.g. decisions in relation to child feeding and health care seeking, use of financial resources) as components of autonomy. In the final evaluation questions focused principally to capture participation and leadership in community activities and decision making within the home including infant and young child feeding and health seeking.

To explore this component across the 5 countries we have used the endline data in the intervention groups to construct a score 0 – 5 to reflect degree of decision making within the home (0 = none, 5=high). We have included the following questions in the construction of this score:

1. Decisions regarding participation in community organizations (All)
2. Who decides where to take child if ill (All)
3. Who decides where you go for attention during pregnancy and birth (All)
4. Who decides regarding visits that you can make to family, friends (Peru, SL, Bangladesh, Indonesia)
5. Who decides on use of income that mother earns/may earn (All)
6. Who decides on large purchases in the home (Nicaragua)

The frequencies of these scores at endline are shown in the following table 13.

Table 13

Percentage of women by decision making score at EL in intervention groups

Variable		Nicaragua	Peru	Indonesia	Sierra Leone	Bangladesh
	Score	**EL% n**	**EL% n**	**EL% n**	**EL% n**	**EL % n**
Women`s Empowerment score (see Appendix	0, None		0.9	1.5	60.1	33.8
			5/541	11/736	573/953	845/2501
	1	3.6	0.6	3.4	19.9	20.7
		9/528	3/541	25/736	190/953	517/2501
	2	8.1	3.1	8.8	12.0	14.6
		43/528	17/541	65/736	114/953	364/2501
	3	21.2	9.4	12.4	4.5	13.0
		112/528	51/541	91/736	43/953	325/2501
	4	45.5	37.2	39.5	2.2	13.5
		240/528	201/541	291/736	21/953	337/2501
	5, High	19.9	48.8	34.4	1.3	4.5
		105/528	264/541	253/736	12/953	113/2501

It can be seen from the above table that the mother`s participation regarding these categories of decision making was extremely low in Sierra Leone, nevertheless changes in IYCF practices did occur. Nevertheless it was interesting to hear that the mothers were in fact quite empowered especially in the MtMSGs, including extending these to take decisions regarding the distribution of seeds and determining use of the communal land for cultivation in the community seeds, but they did not recognize this in relation to the questions regarding decision making in the home (Ruth Harvey, personal communication). This indicates that these questions did not capture the situation of women`s empowerment in this context. Similarly there was little independent decision making reported in Bangladesh where the mother-in-law is a main decision maker in the household; IYCF practices did improve and including the grandmothers in the intervention could have had a significant effect. The highest scores for women`s decision making were in Peru where almost half of the mothers had a score of 5. This was followed by Indonesia and Nicaragua which also tended to have frequencies of higher scores.

Household Food Security

Household food security exists when “all members, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO 1996). The four pillars of food security are availability, access, utilization and stability. Food insecurity can be an important limiting factor to achieving optimum complementary feeding

practices, due to a lack of availability or accessibility to nutrient rich foods for a healthy diet. In all of the WO country areas there was some degree of food insecurity, thus this is an important consideration in evaluating the achievement of appropriate IYCF practices.

Food insecurity and Household food availability and dietary diversity were evaluated in different ways in the different countries at both baseline and endline. This was largely due to the different emphasis based on these components in each country at baseline and the inclusion of at least a minimum measure of food insecurity at endline. However, because of these differences, it is difficult to compare aspects of food insecurity and household food/diets across the countries. The following table 13 shows the different instruments applied at BL and EL in the intervention group.

Table 14 Food Security or Household diet assessment measures

	Nicaragua	Peru	Indonesia	Sierra Leone	Bangladesh
BL	No	No	HDD & HH food distribution	Inadequate HH food provision by month	HH food availability and access
			FS (18 Qs)	HDDS	FS (11 Qs)
EL	FS (2 Qs)	FS (3 Qs)	FS (2 Qs)	FS (2 Qs)	HH food availability and access
		HH food groups	HH food distribution	Inadequate HH food provision by month	FS (11 Qs)
			HDDS	HDDS	HDDS

According to the answers to the different **food security** questions at EL these were summarized to give an estimated score of whether each household reported having a sufficient amount of food or an insufficient amount. Details of this assignation are described in Appendix 2.

Using this classification Sierra Leone and the Asian countries had high levels of food insecurity at EL: Sierra Leone 59.4%, Indonesia 33.2%, Bangladesh 30.3%, as compared to the Latin American countries: Nicaragua 8.6%, Peru 7.0% (Table 10). Nevertheless within the category of “adequate amount” there are 2 subcategories: “always eat enough AND of the foods desired” and “eat enough but not always the food desired”. These were captured in Nicaragua and Peru and the results shown in the following table 15.

Table 15 Categories of Food Security for "adequate amount" in Nicaragua and Peru

Category	Nicaragua %	Peru %
Always eat enough AND of the foods desired	30.3	42.3
Eat enough but not always the food desired	61.3	50.7

However it appears that food insecurity does not necessarily account for the ability to achieve minimum acceptable complementary feeding practices as both Sierra Leone and Bangladesh showed improved complementary feeding practices in spite of high prevalences of reported food insecurity. In Indonesia this could have been an important limitation to adopting complementary feeding practices, especially iron rich foods which tend to be less available and accessible. Although in Nicaragua there was a low prevalence of reported food insecurity most complementary feeding practices did not improve and indicators relating to nutrient-rich foods were low and in fact had decreased at EL.

Health related indicators.

Birth length and birth weight are important determinants of subsequent infant and young child nutritional status. Birth weight was reported at baseline for Peru and Indonesia and was included for all the 5 countries at EL although there were several children with missing data as the mothers were unable to report it and it was often not documented.

At EL in the intervention group, rates of low birth weight (LBW <2.5 kg) were highest in Bangladesh, 12.5%, followed by Sierra Leone, 13.5% and Indonesia10.3%, the same countries with the highest rates of malnutrition. It was lowest in Peru, 5.4%, and Nicaragua, 6.2%.

Diarrhea and cough in the past 2 weeks.

Infections, such as diarrhea, especially when accompanied by fever, affect nutritional status and the appetite of the child. The prevalence of diarrhea in the 2 weeks prior to the survey was high in all countries at both BL and EL, and especially in Nicaragua, BL 41.6%, although this decreased at EL, 32.4% (Table XX). A marked decrease in prevalence was also observed in Indonesia (BL, 23.7%, EL, 9.4%) (perhaps because of seasonal variations); in Peru and SL it remained high, between 20 – 25% and in Bangladesh reduced from 17.5% BL to 12.5% EL.

The prevalence of cough in the 2 weeks prior to the survey was very high, ranging between 35% (SL, BL) to 60% (Indonesia, BL) in all countries at BL and EL where measured. Cough also affects the child`s appetite and thus feeding and potentially nutritional status.

Prenatal check-ups, nutritional advice given and iron supplements taken.

A high proportion of mothers reported attending at least 1 prenatal check during their pregnancy in all countries: more than 90% of women in Peru, Indonesia and Sierra Leone at both BL and EL in the intervention groups. In Nicaragua more than 85% of women attended and in Bangladesh it was only reported at EL, 61.7%. However not all women reported receiving nutrition advice at their pre natal checks except for SL (BL, 91.1%, EL 96.8%) and Bangladesh (92.8%, EL) (Table XX). In Peru it increased from 55.9% to 69.4% at EL, in Nicaragua it apparently decreased from 67.1% to 53.6% at EL. This was not measured in Indonesia. In Indonesia and SL a high proportion of women reported taking iron supplements during pregnancy at both BL and EL, Indonesia 95%, and in SL it increased from BL 84.9% to EL 97.8%.In Peru only 50.5% of women reported taking iron supplements at BL and 54.2% at EL showing little change and it apparently decreased in Nicaragua, 98.4% BL, 75.2% EL, although this may have been due to slight changes in the way these questions were asked.

Section 8. Is it plausible to attribute changes to the project?

Due to the difficulties discussed with the control groups (differences between intervention and control populations) and consequently with the DDs (there was no randomization in assignation to intervention or control) in all of the countries we consider that the comparison of the intervention groups between BL to EL provides a more valid interpretation of the results and are discussed here. In addition, a global monitoring system that would provide inputs to understanding implementation and improve our ability to attribute intervention to impact was not included. For these reasons, we are not confident in our overall ability to plausibly attribute impact in the IYCF indicators to the intervention. We can, however, make confident statements of adequacy of impact from the pre-post design of the intervention group, as well as adequacy statements about the provision of counseling services during the intervention period, measured at endline.

There has been a marked change in several of the IYCF indicators in the intervention groups between baseline and endline in several of the countries. The biggest changes observed have been with breastfeeding, especially a marked increase in exclusive breastfeeding during the first 6 months in Sierra Leone and the Asian countries as well as a tendency to increase in Nicaragua and maintaining the high prevalence in Peru. Thus, breastfeeding has improved in the target population. Whether or not this can be attributed to the intervention is unclear, as an adequate control group was not available and the results may be due to secular trends in the population with respect to breastfeeding. This position is actually in keeping with what was seen in the control groups in both countries – increased breastfeeding rates. Nonetheless, we can say that the majority of mothers in Sierra Leone reported receiving counseling in the health centers and about ½ attended MtMSG. In Indonesia and Bangladesh, a high percentage of mothers also reported exposure to counseling, 69% and 87.5% respectively. Projects were also active in World Breastfeeding Week, creating awareness and support for breastfeeding. The use of a feeding bottle also diminished to quite low levels in the same countries where the impact on exclusive breastfeeding was higher. Breastfeeding at 1 year, a common practice, remained high in all countries.

In SL, a large and significant increase in early initiation of breastfeeding was also seen. Data was not collected on the use of birth waiting home use, but staff in the homes was trained on IYCF including early initiation of breastfeeding. There were also important improvements in complementary feeding practices across the 5 countries although not to the same extent as breastfeeding. There was wide variation between the countries for MDD, but the prevalence improved considerably in SL and Bangladesh, both countries where dietary diversity was low initially, indicating that accessibility and/or the inclusion of the young child in the intra-family distribution of nutrient rich foods were facilitated from the baseline time point to endline. In Indonesia availability of nutrient rich foods was likely low (more than a third of those surveyed at

EL expressed food insecurity - not having enough or of inadequate quality) and in addition the area had suffered severe rains and flooding.

In general meal frequency was fairly high in all countries except for SL but in this country at EL a higher proportion of children met the minimum meal frequency than at BL. A barrier found to increasing the number of meals for IYC was that many families normally ate only twice a day; however this was able to be overcome to some degree during the intervention period.

The MAD is mostly driven by the dietary diversity as the pattern across the countries is very similar.

There was also wide variation between the countries in the prevalence of consumption of iron rich or iron fortified foods. The prevalence of this indicator was highest in Peru where there appears to be more availability of meat foods or their being given to the young child, than in the other countries, and a significant increase was evident at EL. There appears to have been marked progress in overcoming barriers to eating more meats/offal during the period of the intervention in SL and Bangladesh. A limitation in Nicaragua was the availability of these foods; due to this meats were not promoted by the program as much as were eggs.

Iron fortified foods for IYC including MMNP “Sprinkles” can be another important source of iron especially where iron rich foods are not available or scarce. Fortified foods present at BL in Nicaragua and SL were not available or consumed at EL; in Peru the availability of the MMNP “Chsipitas” distributed by the government varied during the intervention period (periods with no Chispitas). MMNP were delivered as part of the WO program in Bangladesh but were discontinued at the end of the project and prior to conducting the EL evaluation, hence the consumption of fortified foods reported is negligible.

When considering the overall minimum adequate feeding practices (AMA) for the children 0 – 23 months a significant improvement was seen across all the countries except Peru, which anyway was high. When consumption of an iron rich food source was included (FAMA) the improvement in Peru became significant – due to increase in both iron rich foods and Fe fortified foods. Iron rich or fortified foods was a limiting factor for the FAMA indicator in all other countries. This needs to be interpreted with caution as these indicators have not been validated, but nevertheless do give an indication that the dietary practices improved in all countries during the intervention.

Section 9: Lessons Learned

The WO program has attained considerable achievements in its main objective of improving IYCF practices across these 5 countries through the implementation of several activities at the 3 levels of intervention during a relatively short period and with limited resources. The project has shown positive results in contexts that were often variable and extremely challenging and reflects the dedication, commitment and hard work of CARE personnel at country, local and international level as well as the many other stakeholders, especially community health workers, mothers and families. These experiences also provide valuable lessons that can be applied to future projects. We list some of these below.

1. Literature supporting MtMSG for IYCF was extremely limited and there was little experience of using the strategy in the communities chosen for WO except for the Sierra Leone where pregnancy support groups were established and successful but in a cultural context that was quite distinct from the other countries.
   Recommendation:
   Pilot new interventions on a small scale to really understand and learn from these opportunities.

2. MtMSG as implemented in this project were generally not successful in 4 of the 5 WO countries. There are a number of reasons for the lack of success of this strategy which have been outlined. The groups in Sierra Leone was the exception. The groups evolved over time to become more than a peer support group. Cooking demonstrations were introduced, education became a prime feature, fathers and grandmothers were permitted to take part in some aspects, and women still enjoyed camaraderie and peer support. In addition, it was found that some groups took on community development functions, for example developing a repository for seeds. Other countries, for instance Peru, also included cooking demonstrations in some of the communities and this provided a more tangible benefit for mothers--feeding their babies, and provided the opportunity to learn while doing a practical skill while still in the company of peers.
   Recommendation:
   Consider cultural context when implementing MtMSG. Allow for expansion of the group's function to meet mothers' identified needs. Tangible benefits are often preferred/expected in exchange for time spent in a group.

3. Implementation in the health services was, in general, less than desired and it was sometimes difficult to get them to be enthusiastic about supporting the behavior changes desired by the project. Involvement in supervision of CHW was limited.
   Recommendation:
   Health personnel are employees of the Ministry of Health and have their own priorities. They need to understand how the project goals and activities converge with their objectives. This process would be helped if at project start, the project staff investigate, dialogue and listen to

those who will be involved in project activities to understand their needs and to look for common ground, and to take advantage of their "insider" ideas and strategies for improving IYCF. This was especially necessary when Health personnel are asked to take on extra functions such as supervision of CHWs, it needs to be clear how this will help their work and how it can be accomplished and reduce their work rather than becoming an added burden. This can only be achieved by dialogue and give and take.

4. Staff turnover was high and disruptive to project implementation.
   Recommendation:
   Expect high turnover in project staff and in the health services. Build in strategies to cope with this. Consider working with health services as a "service" vs. training individuals, and set up a method for continual training of new staff. As well as working with professionals make sure that personnel such as technicians and auxiliaries are also informed and convinced as they are more likely to stay within the community and may have good communication with patients.

5. Sustainability of the project was generally not considered until the last year of the project.
   Recommendation:
   Build sustainability into the project from onset and develop interventions that consider this dimension, if ongoing implementation of interventions is desired. Consider whether sustainability will depend on other stakeholders taking on the activities or is the idea to institutionalize change in which case this needs to be clear from the start.

6. Difficulties in control group selection were encountered in the rural resource poor settings of the WO projects.
   Recommendations:
   Recognize the realities of what can be accomplished in terms of a study design in difficult geographic or political areas. Consider the merits of adequacy and plausibility designs, including process evaluation to design rigorous evaluations outside of randomized controlled trials.

7. Food insecurity may have limited the ability to benefit from interventions and recommended IYCF practices.
   Recommendation:
   Understand the realities of food security, and explore this dimension in the formative research, including why or how it occurs. Create interventions that work within these environments, whether they are interventions and/or behavior change that will help overcome barriers and work in concert with the IYCF behavior changes.

8. A high burden of morbidity was found in the population, likely affecting child growth, especially stunting.

Recommendation:
Consider including a stronger component of WASH interventions along with IYCF, and include analysis of barriers to and behaviors that contribute to poor hygiene. Work with other institutions and programs to improve water and hygiene in the area.

9. The results of the midterm evaluation were helpful in terms of project direction but occurred rather late in the time period of WO. Strategy of LQAS was used in addition to qualitative data. While individual countries had monitoring and importantly included observational data, a global monitoring system was absent to help guide project and learnings from the project.
   Recommendation:
   Consider an earlier midterm to allow for sufficient time to redirect priorities if needed. Create a simple and useful monitoring system that works in resource poor settings (may not be possible to have exact system but similar markers of implementation). Consider the use of mixed methods.

10. It is unclear how much consistency was kept across the intervention strategies in terms of focus and BCC. This may have been done, but data was not available to ascertain.
    Recommendation:
    Identify clear strategic points and key messages to consistently run through in the intervention strategies.

11. rMN was second to IYCF and generally received less attention although the pregnancy part of the 1000 days is also very important especially in countries such as Bangladesh with high maternal malnutrition. Bangladesh did engage in a number of strategies to attend this need but the messages and indicators of rMN are much less established, in particular there are no agreed messages for women with both micronutrient deficiencies and overweight a common occurrence in Nicaragua and Peru.
    Recommendation:
    Identify contexts in which rMN evaluation is a priority but also CARE is well placed to contribute to developing these BCC for future programs

12. Baseline results and formative research were presented in a forum in Peru, followed by a workshop to identify strategies and BCC to direct the project. The use of analytic matrices such as described in *Pro*PAN allows for data to be translated into relevant and appropriate interventions and messages.
    Recommendation:
    This sequence and especially the sharing of results were very helpful and is recommended for future projects.

13. Inconsistencies in baseline data, differing variable names for the same variable, data losses, and missing data were found when bringing the 5 data sets together. This resulted in a considerable investment of time and effort as well as loss of data.
    Recommendation:
    Develop a consistent data management system with oversight from CARE USA to facilitate optimal data management and analysis ensuring consistency and quality without sacrificing local input. The most culturally sensitive and important questions used in the surveys should be piloted in country before being incorporated. This can be used as an opportunity to strengthen local capacity.

14. Time to complete evaluations was underestimated considering the amount of quantitative and qualitative data desired.
    Recommendation:
    Build in sufficient time to facilitate quality data collection, management and analysis.

15. There were inconsistencies in data collection methods for IYCF indicators, minimal SES data collected, missing data at baseline that was collected at endline (e.g. food security) and season when data collected.
    Recommendation:
    Standardize where possible on data collection, training, and use recommended techniques for optimal data (e.g. 24 hour recall). Understand seasonal variation in country and plan for acceptable window to allow for best comparison of baseline and endline data.

16. Project time was less than desired for creating full exposure of children from pregnancy to 2 years.
    Recommendation:
    A longer project time, at least 5 years, is recommended to allow for sufficient lead time planning, analysis of baseline and formative research, planning of intervention strategy, full development of BCC and importantly allow for children to have exposure with the community from full pregnancy→2 years before endline evaluation.

17. Use of logframes was incomplete in some countries.
    Recommendation:
    Identify use of logframes, annual operative plans and monitoring of projects, ensure that they are sufficiently simple but clear to be useful to the people in the field as well as central staff. Require periodic review and update as needed by project or identify if other monitoring system are better suited to the purpose.

18. BCC materials were late in most countries, in particular Indonesia.

Recommendation:
Work with countries to facilitate quick turn around and optimal use of materials or look for alternative ways to maintain supplies.

19. Mothers were empowered but quantitative variable measures used were not sufficiently sensitive to the dimensions empowered as found in the qualitative data.
    Recommendation:
    Understand the contextual influence on survey questions related to empowerment. Include qualitative data on this important variable.

20. Counseling interventions are complicated and horizontal communication with mother is new for many.
    Recommendation:
    Understand the "cultural norm" that exists and the time, training and supportive supervision necessary to conduct counseling. Build follow-up visits into the training curriculum. Consider other effective and less complex communication strategies such as key message delivery where full counseling is not possible.

21. Knowledge sharing was limited between countries but when it occurred it was found to be a very positive experience.
    Recommendation:
    Promote knowledge sharing and exchange via face to face meetings and available on-line media options.

22. Many countries now experience a mixture of nutrition problems resulting from poor quality and imbalance in the diet. The most obvious example is overweight and undernourished/nutrient deficient members of the same household. This is a fast growing serious problem in Latin America and in parts of Asia in countries experiencing the "Nutrition Transition".
    Recommendation
    This reality should be taken into consideration in projects. A coherent approach to nutrition including quality, diversity and balance is necessary and this should be reflected in BCC.

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