CREATING 'MOMENTS WITH MOTHERS':

APPLYING BEHAVIOUR-CENTRED DESIGN TO IMPROVE INFANT AND YOUNG CHILD FEEDING IN MOZAMBIQUE

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ABOUT GAIN

The Global Alliance for Improved Nutrition (GAIN) is a Swiss-based foundation launched at the UN in 2002 to tackle the human suffering caused by malnutrition. Working with governments, businesses, and civil society, we aim to transform food systems so that they deliver more nutritious food for all people, especially the most vulnerable.

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SUMMARY

Improving infant and young child feeding (IYCF) practices is key for reducing the high burden of malnutrition in Mozambique. This working paper describes the application of the Behaviour Centred Design (BCD) framework to develop the 'Moments with Mothers' campaign, an intervention to improve IYCF practices supporting pregnant women, mothers, and other caregivers in Nacala Porto and Mossuril, Nampula province.

The BCD approach focuses on the emotional drivers of behaviour, rather than knowledge, to promote behaviour change. The framework's five-step process – Assess, Build, Create, Deliver, and Evaluate – was used to conduct a situation analysis, develop a theory of change, identify key behavioural determinants, and implement the project. The core of the project is a series of activities called Emo Demos (short for emotional demonstrations). The emo demos brought mothers together and used games, song and dance, group discussions, and talks to promote early breastfeeding, exclusive breastfeeding for the first six months after birth, optimal complementary feeding practices, and improved hand washing techniques. These were adapted from a project implemented by GAIN and partners in Indonesia and bolstered by a communications campaign and community mobilisation activities.

An evaluation conducted after the 100-day pilot found that participants appreciated spending time with their peers gaining contextually relevant knowledge and skills that were valuable for their families and communities. The lessons learned from this pilot project and the earlier work in Indonesia informed the scale-up of the approach in Nampula province and its testing in Tanzania.

KEY MESSAGES

- BCD is an imaginative and provocative approach to behaviour change, which taps into less evolved, more reflexive motivations and reinforces learning.
- GAIN and partners applied this approach to devise and pilot a three-pillar IYCF intervention: a communications strategy and campaign; interpersonal communication; and community mobilisation.
- The results of the pilot implementation illustrated that using surprise and other fundamental human emotions, like love and disgust, provoke interest that can facilitate learning and engagement.
- Women who took part in the intervention felt that they were spending time with their peers doing something important and valuable for them, their families, and communities: building confidence, breaking down myths, and gaining strategies to advocate for their needs and those of their babies.

BACKGROUND AND OBJECTIVE

In Mozambique, an estimated 37.8% of children under five years of age suffer from stunting – a condition in which children are unable to reach their full growth potential. Stunting is a marker of

chronic malnutrition, and its prevalence in Mozambique is classified as very high and greater than the average for the African region (30.7%) (1). Malnutrition is estimated to cost the country 1.6 billion USD per year, equivalent to 11% of its GDP (2). Optimal infant and young child feeding (IYCF) practices, including early initiation of breastfeeding, exclusive breastfeeding up to six months of age, and appropriate complementary feeding between 6 and 23 months of age, are key for preventing stunting and ensuring children's adequate nutritional status and optimal development (3,4).

Poverty and poor access to clean water and sanitation are major drivers of child malnutrition (5). In Mozambique, many households are unable to afford a diet adequate for their nutritional needs, and IYCF practices are suboptimal, with diets dominated by unfortified staple starches, such as cassava and maize (6). Sanitation infrastructure and hygiene practices, especially food handling and storage, are often poor, leading to frequent gastrointestinal infections and diarrhoea in infants and young children (7)—which further exacerbate malnutrition.

Caregiver knowledge and sustained behaviour change are also key to improving IYCF practices (8). Recent systematic reviews have identified good practices for designing and implementing effective behaviour change interventions that lead to sustained improvements in IYCF (5,9,10). These include conducting formative research to identify barriers and facilitators of optimal practices and using these findings to shape strategies for behavioural change at the individual or societal level (11). In addition, effective behaviour change interventions articulate an evidence-based and plausible pathway to impact, specifying the process through which planned activities lead to impacts on nutritional outcomes.

Behaviour Centred Design (BCD) is one framework employed to guide the design and implementation of effective behaviour change interventions. Developed by researchers at the London School of Hygiene and Tropical Medicine, BCD is a provocative approach to behaviour change, which taps into less evolved, more reflexive motivations as enablers for change. The general theory of change – or pathway to impact – grounding BCD is rooted in evolutionary theory, psychology, and commercial marketing and based on the reinforcement learning paradigm. This states that any behaviour change intervention must make a change in the physical, social, or biological environment that serves as a stimulus (*surprise*), which alters the brain or body of an individual (*revaluation*), which leads to the selection of the desired behaviour (*performance*) and is rewarded (*reinforcement*) (see Figure 1, below) (10). BCD was first applied to topics such as handwashing, food hygiene, and diarrhoea prevention (12,13).

BCD has also been used by GAIN and its partners to improve IYCF practices through the Baduta project, which was implemented in Indonesia from 2015 to 2021. A healthcare-based initiative, the Baduta project used a two-pronged BCD approach avoiding purely educational messaging in favour of employing emotional drivers of behaviour, such as affiliation, nurture, and disgust (14). First, trusted healthcare workers employed interpersonal communications via 'emo demos' (short for 'emotional demonstrations'). These participatory and game-like activities aimed to create good habits – or break bad ones – by encouraging caregivers to associate emotions or interests with desirable or undesirable behaviours. Implementation of the emo demos used printed guides and various props for performing the sessions. Second, a context-specific mass media communications campaign, the 'Healthy Gossip Movement,' was developed to complement the emo demos and raise awareness of essential nutrition services and nutrition behaviours. Results from a 2019 external evaluation of the project suggested

improvements in exclusive breastfeeding rates, the proportion of children aged 6 to 23 months consuming an adequate number of food groups, and mother's knowledge relating to breastfeeding (14).

Motivated by the experience with the Baduta project, GAIN adapted the BCD approach in 2019 to design and implement a community-based intervention to promote adequate IYCF in Mozambique. This paper will discuss how the BCD framework was employed to create a communications campaign, community mobilisation, and interpersonal communications (via emo demos) aimed at improving exclusive breastfeeding, complementary feeding, and handwashing behaviours, and highlight how key lessons learned from the 100-day pilot can be used to inform future programming.

METHODOLOGY

The paper was developed via a review of internal materials, including published and unpublished reports, presentations, planning documents, and project evaluation materials.[1] Background and supporting information were supplemented via Google and PubMed keyword searches for publications on IYCF, nutritional outcomes in Mozambique, behaviour-centred design, and behaviour change in IYCF. Literature searches were limited to the past five years unless a paper appeared to be of particular significance, as evidenced by frequent referencing by other articles. Abstracts were reviewed for relevance, and full-text papers in English were considered for inclusion if they explored the determinants of success in IYCF outcomes of theory-based interventions or in applying BCD steps. Additional supplementary information was obtained from reports from governmental agencies, the World Health Organization, the United States Agency for International Development, and UNICEF.

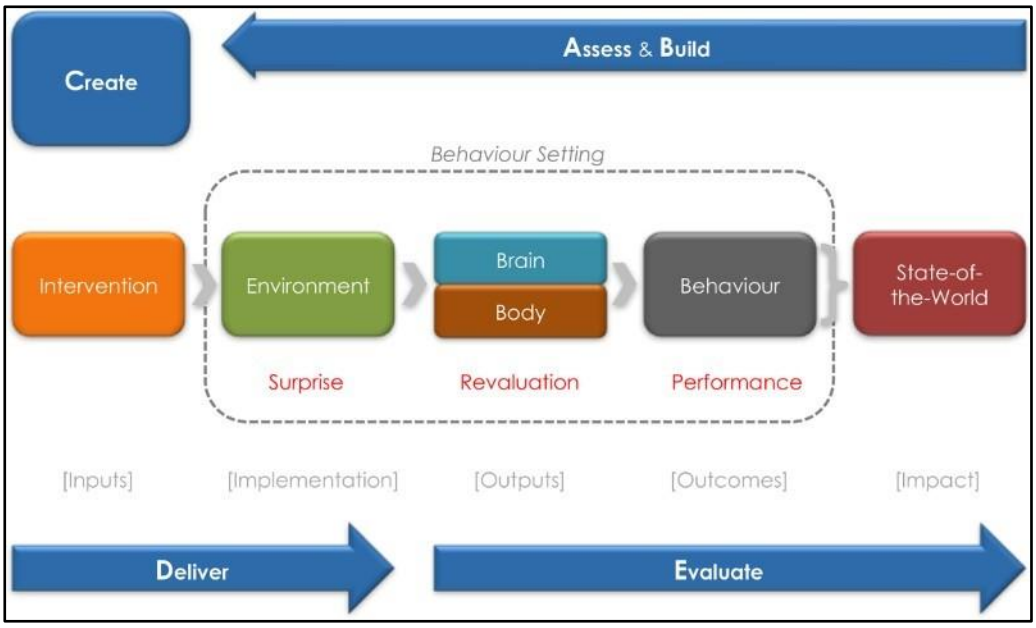
PROGRAMMATIC OVERVIEW

Nutrition education interventions using didactic, informational approaches have been implemented in Mozambique for decades. These approaches rely on a theoretical premise that assumes that knowledge, or lack thereof, is a key determinant of suboptimal IYCF practices. Many of these approaches have indeed improved knowledge, but they have had limited effect on achieving sustained behaviour change (8,15). GAIN theorised that using BCD would lead to the design of a more effective approach to behaviour change (8,15,16).

[1] Internal unpublished documents included formative research reports, ideation workshop presentations, creative briefs, and campaign outline presentations and evaluation reports.

The BCD framework proposes both a theory of change for behaviour and a practical process for guiding intervention design and evaluation. The BCD theory of change states that an intervention should produce changes to the environment, which would cause changes in the brains of the target audience, which, in turn, would cause them to behave differently. Specifically, an intervention must create surprise in the environment (through implementation), cause revaluation in the brain (via reinforcement learning), and then facilitate performance of the behaviour itself in its behavioural setting. Interventions guided by BCD theory employ emotions, such as love and disgust, and other desires (play, affiliation, status) to motivate learning (16).

Figure 1. The five-step 'ABCDE' process of Behaviour-Centred Design (16)



BCD proposes five steps for intervention design: assess, build, create, deliver, and evaluate (Figure 1). The steps proceed as follows:

Assess: Information is gathered to identify what is known about the target behaviour and its likely determinants in specific contexts.

Build: Formative research fills in knowledge gaps and builds the hypothetical theory of change.

Create: Insights derived from the assess and build steps are used to develop a fuller theory of change and ultimately the intervention, preferably with the help of creative professionals. An intervention (inputs) should produce changes in an external environment (implementation), which cause changes in the brains of the target audience (outputs); these changes alter their behaviours (outcomes). The consequences (impact) relate to the 'state of the world', such as better nutrition or health.

Deliver: The intervention approach is set up and rolled out to the target population.

Evaluate: The intervention approach is evaluated both for its outcomes and for its process, again following the expected theory of change.

The subsequent sections explain how this framework was used in Mozambique in collaboration with the Ministry of Health Mozambique and the Provincial District Office for Health in Nampula and the Provincial Service for Social Affairs.

ASSESSING IYCF PRACTICES IN MOZAMBIQUE

As part of the **Assess** stage, a situational analysis was conducted using secondary data and reports to gain a better understanding of the local context, explore IYCF practices, and identify barriers and opportunities for change in Mozambique. This assessment helped identify the target audience, prioritise intervention areas, and select implementation partners. In addition, this phase helped prioritise key knowledge gaps to be explored during the formative research activities in Build phase of the assessment.

The situation analysis demonstrated wide nutritional disparities across the country and led to the decision to locate the project in Nampula province, the most populous region in Mozambique, in the northeast of the country. Many nutritional outcomes for infants and young children in this province are worse than the national average: it has the second-highest prevalence of stunting at 55% (17), and 73% of children between six months and five years of age are anaemic (the third-highest prevalence)(18,19). These outcomes are driven in part by poor ICYF practices, including a median duration of exclusive breastfeeding of just over six weeks (compared to the recommended six months). More than half of all children do not receive meals frequently enough to meet their nutritional needs. More than three quarters of children do not eat an adequately diverse diet, and almost nine in ten children do not eat a minimally acceptable diet (i.e., one that includes both sufficient diversity and adequate meal frequency). Household expenditure on food is also lower in Nampula than most areas of Mozambique, and around 72% of households are unable to afford a nutritious diet. The north is characterised by a mostly rural and dispersed population where poverty rates have largely remained unchanged since 2002 (17).

Specifically, the project focused on Mossuril, a rural area on the coast of the province, and in Nacala Porto, an urban/peri-urban area home to Africa's deepest port. These two locations were selected based on the nutritional status of the children and pregnant and lactating women who live in them and the efficiency of partner operations.

The situation analysis helped gain a better understanding of the community context (e.g., infrastructure, organisations, services, and existing social and behaviour change communication strategies), to ensure the intervention approach built on, and learnt from, experience. The Ministry of Health and its partners had delivered years of educational programmes, and caregivers knew about some appropriate IYCF practices, such as the benefits of breastfeeding and the need to enrich porridges for their babies. However, this knowledge often failed to translate into action, and more insights were needed into why.

We found that mothers were the primary caregivers responsible for IYCF but struggled to maximise their agency in this decision-making role, as they were often influenced by traditional views of the wider family and community. In addition, mothers were heavily reliant on their peers and elders for guidance on appropriate IYCF. Whilst this network provided strength and support to mothers, inappropriate advice on IYCF was often given. In addition, opportunities to dispel myths, promote

appropriate IYCF strategies and practices, and strengthen mothers' confidence and agency were limited. Based on these findings, we selected pregnant women aged 18-35 and mothers and caregivers of children under age two as our primary target audience. The secondary target audience was other household influencers of IYCF behaviour, especially grandmothers of children under age two.

Finally, healthcare services and community health volunteers were very well respected and known in many communities in Mozambique, especially as a trusted source of information about IYCF. However, the situation analysis found that they were under pressure and stretched to beyond their capacity. Rather than burden these heavily-relied-upon essential services, it was important to identify an alternative implementing partner that understood the local languages, Portuguese and Macua, and the socio-cultural norms and traditions. This partner would build trust with the local community and work with GAIN to build, create, and deliver the project in an accurate, respectful, and easy-to-understand way. Centro de Teatro do Oprimido (CTO) was recruited to fill this role. CTO is a non-profit cultural association that aims to disseminate alternative communication techniques in Mozambique and to harness the dynamism of culture to train and educate local communities. It was founded on the belief in the power of peace and the desire to collectively search for solutions to problems that affect the progress and development of communities in Mozambique. CTO applies participatory theatre techniques as pedagogical and mobilising tools to speak to social issues, fight against poverty and ill health, and improve access to knowledge and education (20).

BUILDING A BETTER UNDERSTANDING OF ENABLERS AND BARRIERS TO IMPROVED IYCF PRACTICES

During the **build** step, GAIN, supported by CTO facilitators, conducted formative research activities (shown in Figure 2 and Figure 3) to deepen its understanding of the target audience, especially motivational and emotional enablers and barriers to improving IYCF practices. Specifically, GAIN and CTO conducted i) 24 focus group discussions using projective techniques[2] with pregnant women and mothers and grandmothers of children aged 0 to 6 months and 6 to 23 months; ii) field visits, including observations in households and at points of purchase of food; and iii) community mapping using census data, semi-structured interviews with community leaders, and site assessment visits.

Figure 2. Formative research activities

[2] Game-like exercises that use images or imaginary situations to create some distance between respondents and the scenario, thereby allowing people to be less guarded, more playful, and honest about their beliefs and feelings.

Figure 3. Formative research activities

During group discussions and through household observations, GAIN found that community elders strongly shaped and influenced the decisions and practices of the target population. Communities are very respectful of elders, feel that they know best, and are trusting of their advice. However, some of the practices that older generations advised mothers to follow were counter to recommended IYCF practices. The study found that this advice was fuelling myths around the negative consequences of providing colostrum[3] and breastfeeding on demand, how much breastmilk young infants need to sustain them, and whether a mother's milk is enough to nourish an infant (which led to an earlier-than-ideal age for introducing complementary feeding). The group discussions and observations provided useful insights into practices, motivations, and emotions associated with breastfeeding and complementary feeding. Most mothers breastfed their babies regularly and on-demand and knew the benefits of breastfeeding, but they still often introduced other liquids, foods, and traditional medicines before age six months. Mothers lacked confidence that their milk was enough to sustain their baby and were often advised or pressured to introduce other foods or drinks before six months of age to help the baby grow and develop. Babies were breastfed unconsciously, not attentively, and in response to fussing and crying. Breastfeeding elicited positive emotions from women, filling them with love and happiness. However, mothers became frustrated if they were unable to feed their babies due to illness or other concerns, as they were unable to afford infant formula. Breastfeeding was stopped largely due to women becoming pregnant again and a deeply held belief that nursing while pregnant would harm the foetus.

In general, women did not lack knowledge of the benefits of a good diet, knowing that it would improve child growth, give energy, and prevent illness. Terms like 'nutrition' and 'vitamins' were understood positively, but knowledge of which foods to feed to young children, especially those that are affordable and accessible, was suboptimal. Emotions around complementary feeding were mixed. Women sometimes associated happiness with watching their babies eat foods that they knew would help them grow and develop, but women also felt sadness, frustration, and anxiety that they were often unable to give their babies a nutritious diet. Animal-source foods and many fruits and vegetables were not perceived to be affordable or accessible for many in the target population. An important finding informing the selection of target behaviours was that infants and young children are rarely fed from their own plate. Consequently, mothers and caregivers struggled to estimate how much food their babies ate.

Mothers talked of pressure to live up to the social expectations and judgement about who they ought to be, how they ought to behave, and what foods they ought to feed their children. They dreamt of a better life ('*dinheiro e emprego*' or 'money and employment') for themselves, their partners, and children. There was a perception that a lot of money was needed to buy good food for children; food was not seen as a good investment. Instead, the little money a woman had, she would use on herself to show that she was living up to the social standard set by others, such as through the purchase of

[3] Colostrum is the nutrient-dense human milk produced in the first few days following an infant's birth.

colourful clothing, such as brightly patterned *capulanas*[4], accessories, or beauty products. Women felt that their household income – and their control over it – was not enough to give their children a good diet and that any spare income spent on foods perceived to be expensive would make little difference. Women reported that they often feel unfairly judged and held to unrealistic standards. The community mapping conducted during this stage was used to estimate the size of the population of women and children in the target area using census information alongside semi-structured interviews with neighbourhood officials and chiefs. These activities helped define the specific neighbourhoods of interest, based on a high population of women and children, and to identify suitable locations for conducting the emo demo sessions. The interviews also acted as a way of liaising with the community, gaining the buy-in of chiefs and influencers, and requesting their authorisation to operate in the area. As a final activity of this phase, site visits were made to the recommended locations for conducting the emo demo sessions.

CREATING THE INTERVENTION APPROACH

The Assess and Build steps helped identify and prioritise key behaviours that could be promoted to improve exclusive breastfeeding, complementary feeding, and handwashing. During the **Create** phase, GAIN sought to trigger change through a motivational and engaging intervention centred around the power of fundamental human emotions including love, disgust, surprise, fear, and joy. While improving affordability of nutritious foods or livelihoods was outside the scope of the intervention, GAIN theorised that it would be possible to shift desirability and *perceived* affordability of nutritious foods, and motivation to purchase them, by emphasising that small changes are feasible and can significantly improve the quality of commonly fed meals for infants and young children.

In the Create step, GAIN worked with a range of creative professionals to develop an intervention centred on three pillars, informed by the lessons learned from the Baduta project in Indonesia: a communications strategy and campaign, community mobilisation, and an interpersonal communication component – the emo demos.

COMMUNICATION STRATEGY AND CAMPAIGN

The communications strategy devised a brand and visual identity for the project. It helped frame the context and content of the project's messaging in a way that was appealing, relevant, and aspirational for the target population. For this, the communication campaign used the power of storytelling, which is important in Mozambican culture, to centre the campaign around the lives of three fictional and relatable female characters. These three characters, Mariamo, Anifa, and Salima, shown in **Error! Reference source not found.**, are good friends and powerful role models in their community, and they all have children under age two. They take motherhood very seriously, sharing experiences, challenges, and solutions to present a confident and assured picture of motherhood. These characters also feature in the emo-demos: participants are asked to wear *capulanas* and step into these characters' roles to act out alternative behaviours.

[4] A type of sarong worn by women in Mozambique.

Figure 4. Mariamo, Anifa, and Salima – the three fictional characters at the centre of the story

The characters were created to inspire other mothers, since they share their experiences and give input that helps them in their journey. Mariamo is a mastermind of exclusive breastfeeding; Anifa is an expert at hand washing, in a fun and entertaining way; and Salima can create colourful and varied meals for children in an easy and affordable way. The brand identity aimed to relieve mothers of the pressure to be perfect, despite poverty, and to illustrate the power of small choices in IYCF. The campaign also sought to associate the target behaviours with improved social status via praise and admiration of the mothers from peers and elders. In addition, it aimed to make women feel inspired to improve their IYCF knowledge and practices and be more confident in their choices as mothers.

Efforts were made to ensure that the campaign photography sensitively and accurately depicted the target community, like wearing appealing and brightly coloured clothing, and the intended behaviours, such as appropriate positioning of the baby while breastfeeding. Materials and images were pretested by CTO with the target population to tailor to preferences, aspirations, literacy, and values. The brand identity was used across a range of materials and media including props and flashcards, banners, and posters; examples are shown in **Figure 5**.

Figure 5. Examples of visibility materials

COMMUNITY MOBILISATION

Building and establishing trust was viewed as a critical aspect of promoting behaviour change in the community, particularly since CTO were not originally well known in the local community as a source of trusted health advice.[5] To build trust, CTO led community mobilisation activities to gain the support of trusted community leaders whose buy-in was crucial for implementing the intervention and to recruit women to attend the emo demo sessions. Community mapping exercises helped identify community influencers and leaders, then sensitisation sessions served to raise awareness about the campaign and about improving IYCF. Following the sessions, the trusted leaders leveraged their roles in the community to support participant recruitment for the emo demos.

INTERPERSONAL COMMUNICATIONS

A set of 12 emo demos was developed to promote a specific IYCF practice, based on understanding of the local context and insights from the Baduta project in Indonesia (15). These emo demos were pretested with members of the target community to appropriately tailor the scripts to local literacy

[5] This was in contrast to the approach used in the Baduta project in Indonesia, where healthcare professionals who were already well trusted as information sources led sessions. The community-based approach was chosen in Mozambique due to the strain already placed on healthcare workers.

levels, norms, and values. Following pre-testing, the language was further simplified and aspects of emo demos that were perceived as unrealistic or problematic were refined.

GAIN used the results of a Comprehensive Nutrient Gap and Affordability Analysis (CONGA) to more accurately define the list of foods recommended in the emo demos on dietary diversity (21). This analysis uses data on existing nutrient gaps for young children together with information on seasonal/regional food availability to identify affordable and locally available nutritious foods that help close micronutrient gaps. This list of foods was validated with CTO facilitators who lived in the target communities and with local women to ensure that the foods were locally available, affordable, and acceptable. This validation helped improve the dietary diversity messaging to promote affordable options, especially in relation to seasonal fluctuations, as at certain times of the year some fruits and vegetables were in abundance in gardens and farms.

The emo demos were then narrowed down to eight topics (Table 1) based on predefined criteria, including feasibility of adoption of behaviour, message understanding, facilitators' ranking of acceptability and ease of implementation, and complexity of props required. Of the final eight, four emo demos related to exclusive breastfeeding, three to complementary feeding, and one to the importance of handwashing (examples shown in Figure 6 and Figure 7). These chosen behaviours directly link back to the practices promoted by the personas in the umbrella brand: Mairamo, Anifa, and Salima.

Figure 6. Emo demo guide and props for the 'Wash your Hands' session

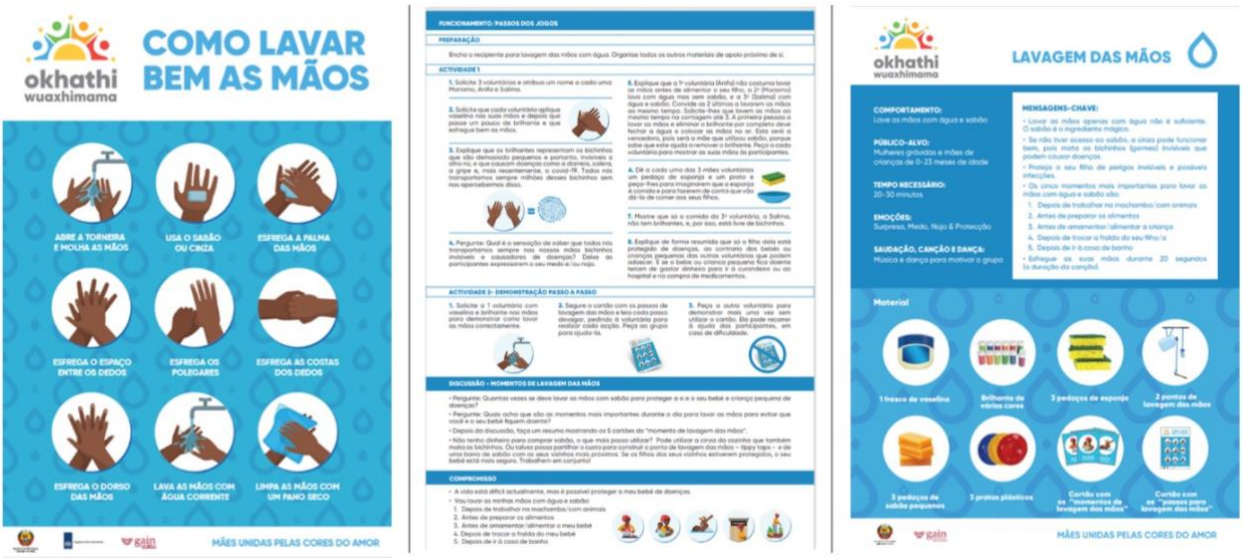


Figure 7. Emo demo guide and props for the 'Wash your Hands' session

Each emo demo began with an energising song (Figure 8) and dance, reinforcing an image of strong, beautiful, and confident motherhood. Emo demos were performed as interactive games, which minimises one-way information-sharing through lectures. In each emo demo game, a moment of shock or surprise is created, which encourages the participants to rethink their behaviour and heighten certain emotions attached to the target behaviour.

1.
Nipelenaka, Nipelenaka
Nenlaro, Nenlaro
Ninomphiyera, Ninomphiyera
Muanaka, Muanaka

2.
A saude, a saude mama
A saude, a saude mama
Ekhumi, Ekhumi mama
Ekhumi, Ekhumi mama, Ekhumi mama ekhumi mama
Yamuthetheni, yamuthetheni mama
Yamuthetheni, yamuthetheni mama, yamuthetheni yamuthetheni mama
Emodemo, emodemo mama
Emodemo, emodemo mama, emodemo-mama, emodemo mama.

Figure 8. The first two verses (of five total) of the emo demo song shown in Emakua, the native language of Nampula province[6]

[6] The song lyrics are as follows: 1. Lactation, lactation; Breastfeeding, breastfeeding; Hand washing, hand washing; Emo demos, emo demos. 2. Health, mama health; Health, mama health; Health, mama health; Health, mama health, mama health, mama health; From the community, from the community mama; From the community, from the community mama; from the community, from the community mama; Emo demo, emo demo mama; Emo demo, emo demo mama; Emo demo, emo demo mama.

Following the game, participants discussed what they learned and how they felt about implementing the small, suggested changes in their families. Some of the emo demo activities involved the use of projective techniques, placing participants in game-like imagined realities to respond to new scenarios, unguardedly and less consciously than they might respond in reality. Working with CTO, a theatre company, allowed for fully exploring the theatrical nature of this work.

To support real-time monitoring, GAIN worked with a software engineer to build a monitoring app using the ODK data-collection platform, project monitoring forms with built-in geotagging to plot coverage, and a dashboard to track project progress. A participant registration system was devised using participant cards with unique barcodes, which the facilitator could scan to efficiently collect data on attendance.

Table 1: Focus of eight emo demos by topic, title, and description

Topic	Title	Description
The benefits of colostrum	'Liquid Gold'	A game showing the protective and rich value of colostrum using oil and water mixed with *mussiro* powder[7] to represent breastmilk. The three characters from the visual identity (Figure 2) each take on a different behaviour related to colostrum and sand/dirt is used to show how colostrum coats the baby's stomach to protect it.
Exclusive breastfeeding	'Your milk is enough'	A three-player game about the size of a baby's stomach, how breastfeeding stimulates breastmilk production, and that introducing porridge too early (before age 6 months) can limit breastmilk production. Props include water mixed with *mussiro* powder to represent milk, cups to represent the baby's tummy and the breast, and stones to represent the space in the baby's stomach taken up by low-quality porridge. The three characters from the brand identity take on different behaviours, such as exclusive and early complementary feeding, and the game allows participants to 'play out' what happens in each scenario.
	'Negotiating with Elders'	A role-play game involving a scenario with a grandmother and a mother differing on what is the best age to start to feed a baby something other than breastmilk. The aim is to boost the confidence and negotiation skills of the mother to respectfully communicate and enforce her desire to not give the baby anything but breastmilk during the first six months of life.
Complementary Feeding	'Feeding timeline'	A card game where participants work in teams to create a timeline to visualise a schedule for when infants and young children of different ages need to breastfeed and have breakfast, lunch, and dinner. The small size of a baby's stomach is emphasised alongside the need to feed babies often.
	'Child's Plate'	An interactive play-like session in which participants play with coloured pieces of card and empty plates to create plates for infants and young children. A group discussion follows to explore myths, taboos, recipes, and affordable options for feeding young children a diverse diet.
	'Strengthening Foods'	A card game about the power of iron-rich foods and what the best ones are. Players turn over cards and describe recipes/ways to feed different iron-rich foods to young children, including animal-source foods, legumes, and dark green leaves.
	'Feed the Rainbow'	A fun game-like demonstration with cards with different colours representing different food groups/nutrients and the benefits they give, nail polish, and pictures of women with smiling happy faces, dressed in bright colourful outfits – associating colourful plates with joy. Women are encouraged to share ideas about which foods in which colours are available/affordable, what to do with them, and what benefits they bring to infants and young children.
WASH	'Wash your Hands'	A game of surprise involving glitter to represent germs. Participants see how the glitter 'germs' transfer to the baby's food and can practice different ways of washing hands with/without soap, for longer/shorter durations, to determine how to clean hands.

[7] Mussiro is a white powder made from a protected tree that grows in Northern Mozambique and Tanzania. It was traditionally used by Macua women as a beauty treatment and as a cultural practice to signify beauty, purity, virginity, and chastity. Now, its use as a skin treatment is widespread.

DELIVERING THE 100-DAY PILOT

During the **Deliver** step, a pilot implementation was rolled out in four cycles over a 100-day-long period from September 2020 to February 2021. For each cycle, facilitators were trained on two of the eight emo demos followed by a four-week implementation period. The communication campaign materials were displayed at the emo demos' locations, during the emo demo sessions, and during the community mobilisation activities.

To deliver the first set of emo demos, a master trainer trained 26 CTO facilitators and two supervisors (**Error! Reference source not found.**9). A photographer filmed and edited the training sessions to be used for refresher training and future scale-up. Facilitators were provided with tablets and trained on how to use the monitoring app. Next, the facilitators formed eight teams in Nacala Porto and five teams in Mossuril to conduct the emo demo sessions. The two supervisors – one for Mossuril and one for Nacala Porto – supported and guided where needed, also providing quality control in relation to scheduling, locations, props, scripts, and monitoring data collection. Facilitators and supervisors met two to three times per week to troubleshoot, provide feedback, and share lessons learned. At the beginning of each cycle, the week-long training was used to train on subsequent emo demos, to troubleshoot issues related to logistics, content, and equipment, and to review monitoring data collection.

The facilitators delivered a total of 2,138 emo demo sessions across 12 neighbourhoods, three in Mossuril and nine in Nacala Porto. Of the 12 neighbourhoods, five neighbourhoods were exposed to all eight emo demos. GAIN registered almost 17,000 women, and more than half (a total of 8,975) attended at least one emo demo session.

Figure 9. Training of facilitators using guides and props

COVID-19 SAFETY MEASURES

As the intervention was delivered during the COVID-19 pandemic, GAIN took measures to adapt, including equipping the facilitators and supervisors with adequate personal protective equipment, soap, and sanitisers and ensuring that social distancing was maintained in training sessions and

meetings. Some issues posed challenges for adequate delivery of emo demos. In particular, wearing a mask affected the facilitators' ability to make themselves heard and project their voices. It was also difficult to enforce mask wearing among women who attended the sessions, especially if they were held outside. Restrictions on the numbers of people able to gather in one place also meant that facilitators had to be mindful of group size, separating into two groups if there were many women and children. Despite these challenges, the women reported that they felt safe and that suitable measures had been put in place to protect them.

EVALUATING AND REFLECTING ON THE 100-DAY PILOT

GAIN commissioned a two-phase independent process evaluation of the intervention, which was undertaken by Ipsos Mozambique. The first phase, conducted in October 2020, consisted of a rapid assessment using both monitoring data and observations to assess participant responsiveness, including community mobilisation, attendance, attrition, and implementation fidelity. The second phase, at the end of the project in March 2021, examined awareness, satisfaction, and acceptability of the pilot's activities via a series of focus group discussions: four with the women attending sessions; four with the wider community (two with men, two with women); and four with emo demo facilitators.

The evaluation found that the facilitators considered the training useful and engaging due to the balance in the course content between theory and practice, the time dedicated to team building, the level of information provided, and purposeful empowerment. They valued the tone and style of the trainer, such as being kind, helpful, and patient. During the pilot, facilitators reported challenges in using the app, barcode system, and the tablets to gather the monitoring data. The barcode system did not allow for as assessment of mobilisation, participation, and attrition/retention of participants as was envisaged, as data were slow to come in from the field and often missing or duplicated.

As noted, the emo demos were piloted in 12 neighbourhoods, yet only five neighbourhoods were exposed to all eight emo demos. Partial implementation occurred because of limited facilitator guidance on which emo demos to run, confusion about when sessions should be held, and a mix of logistical challenges. Regarding logistics, for example, facilitators noted that they needed to transport a lot of tools and equipment to project locations. However, they did not always have transportation to do so. They also noted that sessions were scheduled too far apart in distance but too close in time. The project would have benefitted from employing an adaptive approach that used monitoring data and feedback obtained mid-way through the pilot to address logistical challenges.

Findings from all groups underscored the importance of engaging community leaders and receiving their approval to work in the neighbourhoods. Community leaders were instrumental in ensuring buy-in from community members and attendance. At times, there were expectations of food or financial support – from leaders and others – and in general, a bigger incentive, especially in relation to food, would have been appreciated, especially given that many people in these areas are food insecure. A way to integrate this into the delivery without crowding out the value of the session with other incentives could be to offer cooking demonstrations to complement and reinforce the emo demos' key messages.

In general, participants found the emo demo sessions enjoyable and engaging (Figure 10). They perceived their participation as important for their families and the community, were eager to learn about new concepts, and appreciated that the meetings were held close to home so that they did not have to travel far. Participants valued their friendly and welcoming atmosphere, facilitated by the storytelling, drama, and surprise of the scripts and props, and the singing and dancing. Participants understood the key messages of the sessions, and some reported having a better understanding of the importance of breastfeeding and improving child feeding practices at home. However, some participants and community members noted that recommended practices such as increasing the variety of foods offered to children were unaffordable and thus difficult to adopt. One woman discussed how the information applied to her and her community: 'We shared this knowledge with our best friends, our relatives, even our children and husband as well. We shared this information because we think these messages are useful not only for us mothers of the community but also our husbands and children, for the better world for the future generations.'

A high number of women were enrolled in the programme but did not actually attend sessions. Barriers to attendance likely included fear of contracting COVID-19; variable perceived importance of the sessions when compared to work among participants, husbands, and community leaders; and poor understanding of the programme's purpose and incentives. The high level of domestic labour, including childcare and agricultural work, that participants faced was likely the most significant obstacle. For example, one participant shared some comments received by community members following the sessions: 'They could start asking us awkward questions like: why did you waste your time there? Why didn't you go to the farm? Why did you miss doing your activities? Did they give you anything?'

Overall, the sessions provided an opportunity for learning new information, breaking down myths, and supporting women with new strategies to negotiate with their family or the community around the needs of their children. Women felt that they were spending time with their peers doing something important and valuable for them, their families, and communities. However, to encourage further participation, the women suggested additional incentives (e.g., money, food, clothing, bags). Researchers also found that cooking demonstrations, garden or farming support, and involvement of men in programming could potentially increase engagement and continued participation.

Figure 10. Facilitators conducting Emo-demo sessions and participants

CONCLUSION

This paper has described how a BCD approach guided the adaptation, design, and implementation of a novel and creative behaviour change intervention to promote appropriate IYCF practices. The lessons learned from the 100-day pilot illustrate that using surprise and other fundamental human emotions, like love and disgust, provokes interest that can facilitate learning and engagement. Participating women felt that the content of the emo demos was relevant to them, useful for their circumstances, and provided motivation for trying promoted behaviours, signalling their potential to help transform IYCF practices and outcomes in Mozambique in the long term.

The communication campaign reinforced key IYCF practices via the campaign characters – Mariamo, Anifa, and Salima – who were intended to represent strong community role models and the bond of motherhood. The women who participated in the emo demos felt supported and emboldened by other peers who joined. Facilitators, who were also women from the target communities, felt that they had learned useful and important skills and information that they could share with their families and wider community. While application of the new knowledge and skills was variable because of contextual limitations, including food affordability and water access, the intervention created an opportunity for improving participants' IYCF knowledge, strengthening peer-to-peer support systems, and building a learning network for sharing knowledge and experiences.

Using the BCD approach to adapt the delivery of emo demos from an earlier approach in Indonesia to this project in Mozambique demonstrates the possibilities for culturally sensitive and context-specific communication campaigns and emo demos to be scaled and delivered across delivery mechanisms –

from healthcare to community-based delivery – and geographies. For example, since 2021 the emo demos have been scaled up in 12 districts of Nampula province under the Transform Nutrition project, funded by the United States Agency for International Development (USAID). The project aims to empower communities and the Mozambican government to improve the nutritional status of pregnant and lactating women, adolescent girls, and children under two. Emo demos have been integrated into existing nutrition groups and delivered during weekly meetings on nutrition and health topics over eight months. More such adaptations will enable expanding the reach of the approach and enhancing its adaptability and applicability in a wider variety of settings, thus helping to foster more widespread behaviour change.

REFERENCES

1. United Nations Children's Fund (UNICEF), World Health Organization, International Bank for Reconstruction and Development/The World Bank. Levels and trends in child malnutrition: key findings of the 2021 edition of the joint child malnutrition estimates [Internet]. New York: United Nations Children's Fund; 2021. Available from: https://www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb

2. World Food Programme (WFP). Setsan and WFP present a study to help reduce malnutrition in Mozambique | World Food Programme [Internet]. 2018 [cited 2022 Sep 13]. Available from: https://www.wfp.org/news/setsan-and-wfp-present-study-help-reduce-malnutrition-mozambique

3. Bégin F, Aguayo VM. First foods: Why improving young children's diets matter. Matern Child Nutr. 2017 Oct;13:e12528.

4. United Nations Children's Fund (UNICEF). Early childhood nutrition [Internet]. 2022 [cited 2022 Sep 13]. Available from: https://www.unicef.org/nutrition/early-childhood-nutrition

5. Krasevec J, An X, Kumapley R, Bégin F, Frongillo EA. Diet quality and risk of stunting among infants and young children in low- and middle-income countries. Matern Child Nutr. 2017 Oct;13:e12430.

6. Global Alliance for Improved Nutrition (GAIN) and United Nations Children's Fund (UNICEF. Affordability of nutritious foods for complementary feeding in Mozambique [Internet]. Geneva: GAIN; 2021 [cited 2022 Sep 13]. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/affordability-of-nutritious-foods-for-complementary-feeding-in-mozambique.pdf

7. Zaba T, Buene D, Famba E, Joyeux M. Factors associated with acute malnutrition among children 6-59 months in rural Mozambique. Matern Child Nutr [Internet]. 2021 Jan [cited 2022 Sep 13];17(1). Available from: https://onlinelibrary.wiley.com/doi/10.1111/mcn.13060

8. Webb Girard A, Waugh E, Sawyer S, Golding L, Ramakrishnan U. A scoping review of social-behaviour change techniques applied in complementary feeding interventions. Matern Child Nutr [Internet]. 2020 Jan [cited 2022 Sep 13];16(1). Available from: https://onlinelibrary.wiley.com/doi/10.1111/mcn.12882

9. Graziose MM, Downs SM, O'Brien Q, Fanzo J. Systematic review of the design, implementation and effectiveness of mass media and nutrition education interventions for infant and young child feeding. Public Health Nutr. 2018 Feb;21(2):273–87.

10. Dewey KG, Adu-Afarwuah S. Systematic review of the efficacy and effectiveness of complementary feeding interventions in developing countries. Matern Child Nutr. 2008 Apr;4(s1):24–85.

11. Atkins L, Michie S. Designing interventions to change eating behaviours. Proc Nutr Soc. 2015 May;74(2):164–70.

12. Tidwell JB, Chipungu J, Chilengi R, Curtis V, Aunger R. Using a theory-driven creative process to design a peri-urban on-site sanitation quality improvement intervention. BMC Public Health. 2019 Dec;19(1):565.

13. Czerniewska A, Muangi WC, Aunger R, Massa K, Curtis V. Theory-driven formative research to inform the design of a national sanitation campaign in Tanzania. Goodman ML, editor. PLOS ONE. 2019 Aug 23;14(8):e0221445.

14. Global Alliance for Improved Nutrition (GAIN), Keats S, Mallipu A, Menon R, Poonawala A, Sutrisna A, et al. The Baduta programme in Indonesia: What Works in Communicating for Better Nutrition? [Internet]. Global Alliance for Improved Nutrition (GAIN); 2019 Aug [cited 2022 Sep 13]. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/gain-working-paper-series-1-the-baduta-programme-in-indonesia.pdf

15. White S, Schmidt W, Sahanggamu D, Fatmaningrum D, van Liere M, Curtis V. Can gossip change nutrition behaviour? Results of a mass media and community-based intervention trial in East Java, Indonesia. Trop Med Int Health. 2016;21(3):348–64.

16. Aunger R, Curtis V. Behaviour Centred Design: towards an applied science of behaviour change. Health Psychol Rev. 2016 Oct;10(4):425–46.

17. World Food Programme (WFP). Fill the Nutrient Gap Mozambique, Summary Report. WFP; 2018 Jul.

18. Ministry of Health (Mozambique), Helen Keller International, Global Alliance for Improved Nutrition (GAIN). Mozambique Micronutrient Survey 2012-2013 [Internet]. Maputo, Mozambique; 2017 [cited 2022 Sep 30]. Available from: https://groundworkhealth.org/wp-content/uploads/2021/04/Mozambique-Micronutrient-2012-Survey-Report_170705_FINAL.pdf

19. Ministerio da Saude (MISAU), Instituto Nacional de Estatística (INE), and ICF International (ICFI). Moçambique Inquérito Demográfico e de Saúde 2011 [Internet]. Calverton, Maryland, USA: MISAU, INE, and ICFI; 2013 Mar [cited 2022 Sep 30]. Available from: https://dhsprogram.com/pubs/pdf/FR266/FR266.pdf

20. Centro de Teatro do Oprimido do Maputo. Centro de Teatro do Oprimido do Maputo [Internet]. CTO-Maputo /Arte e Cultura Moçambicana. 2019 [cited 2022 Sep 13]. Available from: https://ctomaputo.org.mz/

21. Global Alliance for Improved Nutrition (GAIN) and United Nations Children's Fund (UNICEF. Comprehensive Nutrient Gap Assessment (CONGA): Micronutrient gaps during the complementary feeding period in Mozambique [Internet]. Geneva: GAIN; 2021 [cited 2022 Sep 13]. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/comprehensive-nutrient-gap-assessment-conga-micronutrient-gaps-during-the-complementary-feeding-period-in-mozambique.pdf