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How the Care Group Model Improves Adoption and Practice of Optimal Nutrition Behaviours through Evidence by CARE-International Zambia's Nutrition at the Centre

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Abstract

Creating sustainable behaviour change in nutrition has been a challenge that is important to acknowledge and has required innovative interventions to implement. The care group model, one method for creating sustainable behaviour change, is a peer-based system that uses groups of 10-15 community-based volunteers (health educators) that meet regularly to teach health messages and skills to beneficiary groups. CARE-International Zambia is using a care group model to implement Nutrition at the Centre (N@C), a five year multi-sectoral programme that aims to reduce the prevalence of anaemia in women of reproductive age and the prevalence of stunting and anaemia in children under two. This paper explores how the care group model facilitates adoption and practice of optimal nutrition behaviours. Research was conducted through a review of the literature and semi-structured interviews with community health volunteers and ministry workers involved in N@C. The care group model improves adoption and practice of optimal nutrition behaviours by minimising workloads for Care Group Volunteers to avoid overburdening so they can carry out their tasks well, creating an empowering environment for Care groups, providing social support and positive social pressure within Care groups, creating social networks for beneficiaries, and using small, interactive beneficiary groups that have close connections to community leaders and health facility staff. Sustained behaviour changes in nutrition and efficacy of Nutrition at the Centre's care group model could be improved and continued through an increased number of trained volunteers, improved monitoring for volunteers, and men incorporated into its model.

Acronyms

BCC	Behavioural change communication
CGV	Care Group Volunteer
CHV	Community health volunteer
CSP	Child Survival Programme
EE (EED)	Environmental Enteropathy (Environmental Enteric Dysfunction)
KPC	Knowledge, Practice, and Coverage
MAL	Ministry of Agriculture and Livestock
MoH	Ministry of Health
MLGH	Ministry of Local Government and Housing
MIYCN	Maternal, Infant and Young Child Nutrition
N@C	Nutrition at the Centre
NSG	Nutrition Support Group
NSGL	Nutrition Support Group Leader
SBCC	Social and behaviour change communication
SPRING	Strengthening Partnerships, Results, and Innovations in Nutrition Globally
TIPs	Trials of Improved Practices
V-WASH	Village-based committee to promote WASH practices in the villages
WASH	Water, Sanitation, & Hygiene
WHO	World Health Organization

Introduction

Zambia has severe issues of malnutrition, specifically regarding stunting, throughout their population, but most significantly in rural villages. In addition, the United Nations named zero hunger as one of their global goals, bringing the issue of nutrition and food security into a brighter spotlight.

The World Health Organization (WHO) holds the standards to begin complementary feeding at the earliest of six months to supplement the nutrients the breast milk can no longer provide. Moreover, the lack of complementary feeding can lead to malnutrition, especially stunting because it is such a crucial state in a child's life. Nutrition at the Centre (N@C) targets mothers and children less than 2 years of age to reduce anaemia and stunting. The program uses a multi-sectoral approach, targeting five keys areas: (1) infant and young child feeding, (2) maternal nutrition, (3) food security, (4) water, sanitation and hygiene, and (5) gender and women's empowerment.

N@C uses the care group model to implement their program into 22 total sites in rural Zambia. The care group model is a peer-based system that utilises the people within the community to spread the information. It is a chain of teaching from ministry workers down to the mothers of the village. This approach also includes sustainable social and behaviour change communication (SBCC). SBCC uses behaviour theory and encompasses the mechanisms needed to sustain these behaviours within the villages.

Research and interviews revealed that the care group model improves adoption and practice of optimal nutrition behaviours by minimising workloads for Care Group Volunteers to avoid overburdening so they can carry out their tasks well, creating an empowering environment for Care groups, providing social support and positive social pressure within Care groups, creating social networks for beneficiaries, and using small, interactive beneficiary groups that have close connections to community leaders and health facility staff. Sustained behaviour changes in nutrition and efficacy of Nutrition at the Centre's care group model could be improved and continued through an increased number of trained volunteers, improved monitoring for volunteers, and men incorporated into its model.

The rest of this paper is as follows: our research methodology is outlined, followed by a background in the importance of sustainable behaviour change in nutrition and an overview of care group models, as well as CARE-International Zambia's care group model for N@C. We then present our results, which include information from interviews with key informants and the results seen from previous studies that have implemented a care group model in their interventions. We then discuss key facilitators in the care group model, broadly and more specifically in N@C, and present recommendations to sustain the results seen at N@C once the programme ends.

Research Methodology

Research for the study began with a search through the trends of and the current status of malnutrition in Zambia as well as a review of the relevant literature. This early research was conducted in Ithaca, New York of the United States of America at Cornell University in late April and early May of 2016. This general review of the literature and research continued after and upon arrival in Lusaka, Zambia in June of 2016. Shortly after arriving in Lusaka, research began to be more tailored towards the N@C programme, the care group model that it was using in its approach, and creating sustainable nutrition and health behaviour changes.

Interviews with stakeholders and key informants then began on 28 June 2016. These included individuals at CARE International - Zambia, workers in the key-line provincial ministries in the Lundazi District of the Eastern Province, and community health volunteers in the Lundazi District. Interviews with workers of the key-line provincial ministries and community health volunteers were conducted over the phone during mid-July of 2016. Workers in the key-line provincial ministries included health workers from the MoH and agricultural extension workers from the MAL. Permission to use material from interviews was obtained first and notes were taken during interviews in order to record information.

Interviews were first grouped according to the part of the care group model each informant represented: health worker, agriculture extension worker, community health volunteer, and CARE. Interviews were then grouped and analysed according to recurring themes and facilitators that appeared in the literature: successes of the care group model in N@C, changes in behaviour in the mothers and communities involved in the N@C program, factors that are making the model effective in N@C, and potential improvements to the model, among others. We were then able to compare the evaluation of the impact of the care group model used by Food for the Hungry's Mozambique CSP with findings from our key informants. As our study was carried out approximately six months after Perry, et. al'.s 2015 article discussing evidence and successes from other projects using a care group approach and analysis of this approach, we were able to place our findings within the context of this article.

Background

In the recent years, nutrition has been brought to the forefront in topics on the world agenda. Zero hunger was named the second goal on the list of global goals for sustainable development published by the United Nations. The goal of Zero hunger includes improved nutrition and food security. Some of the biggest issues with areas of malnutrition is stunting and wasting. Stunting is characterized as low height-for-age and wasting characterized as low weight-for-height. In a recent paper published in *The Lancet* series on maternal and child nutrition, it is stated that the prevalence of stunting in children in developing countries has gone from 40% in 1990 to 28% in 2011 (Black et al., 2013).

The World Health Organization (WHO, 2006) holds the standards to begin complementary feeding at the earliest of six months to add the nutrients needed for growth that the breast milk can no longer sustain. Recommendations include complementary feeding 2-3 times a day for 6-8 months of age, 3-4 times a day for 9-24 months of age. Snacks can be added at 12-24 months of age. Moreover, the lack of complementary feeding can lead to malnutrition and potentially stunting because it is such a crucial state in a child's life.

In Zambia, stunting is still a severe issue. Stunting levels are still at 40% with 17.5% being severely stunted. Stunting rates are especially high in the eastern province, being 43.3%, with 15% underweight and 6% wasted. Vitamin A deficiency was at 54% and iron deficiency at 53%. In addition, 9.3% of children had low birth weight and only 45% of women took iron during their last pregnancy for more than 90 days. Moreover, 7% of mothers are starting complementary feeding at 2-3 months.

Children who are stunted and wasted have been proven to have more issues throughout life including diarrhoea, pneumonia, and other diseases (Black et al., 2013). In addition, women who are undernourished during pregnancy are setting their children up to face malnutrition issues and be more susceptible to illness.

Nutrition at the Centre (N@C) is a multi-sectoral program designed to improve the nutritional status for women and children less than two years of age by improving anaemia and stunting. This program runs from 2013 to 2018. N@C many stakeholders including Ministries of Health, Education, Agriculture and Livestock, Local Government and Community involvement. It has been implemented in four countries including Bangladesh, Benin, Ethiopia and Zambia. The goals set include improved nutrition-related behaviours, improved use of maternal and child health and nutrition services, household adoption of appropriate water and sanitation practices, and increased availability and equitable access to quality food.

Within Zambia, it is implemented in 15 sites in Lundazi and and 7 sites in Chadiza. The targeted areas include infant and young child feeding, maternal nutrition, food security,

water, sanitation and hygiene (WASH) and gender and women's empowerment[1]. To implement these goals, Nutrition at the Centre uses the care group model. The care group model uses groups of 10-15 volunteers (care groups) to convey health messages and skills to communities. While a more recent development, care groups have shown improved nutrition behaviours and outcomes and have offered a better solution to sustain good nutrition practices in communities.

WASH and the One Health Project

There are many factors that can affect a child's growth and nutrition status. Environmental enteropathy (EE) is an invisible infection of the gut that if often caused by exposure to bacteria from human and animal faecal matter. In the rural villages, where is little awareness of this issue, children are often found playing and crawling in areas where the animals are also defecating. Moreover, because of the lack of access to water and to soap, hand washing is either not or sporadically used.

The One Health Project for N@C by Cornell University and CARE-International Zambia was designed to eliminate EE through the use of play yards. Two were distributed to villages throughout Zambia: (1) a plastic, western play yard and (2) a mud-brick, traditional community play yard. In addition to the implementation of the play yards, an education module was also taught during the education visits. This education module involved 5 key points: (1) dispose of all faeces in latrine, (2) wash hands, (3) put baby in clean, protected area, (4) treat drinking water, and (5) feed baby freshly prepared or reheated food. There were three trials of improved practices (TIPs). By the end of the trials, the caregivers became more aware of the issues regarding eating soil and faeces, and how to prevent these instances (One Health Report, 2015).

Sustainable Behaviour Change in Nutrition

Several nutrition practices, including exclusive breastfeeding until 6 months of age and proper complementary feeding, can impact the nutritional status of the first 1000 days of a child's life. As such, it is important to foster and sustain good nutrition behaviours and practices in communities and individuals. However, growing evidence suggests that single activities or simply increasing knowledge of good nutrition practices is less effective at creating sustained behaviour changes because of a complexity of factors. The Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project funded by USAID conducted a systematic literature review identifying evidence of effective approaches to social and behaviour change communication (SBCC). SBCC is comprised of tools and approaches informed by behavioural theories. SPRING identified three main SBCC mechanisms in the SBCC literature review: interpersonal communication, including one-on-one counselling, group education, and support groups, activities that can be led in

[1] Interview with Ms. Catherine Pongolani of CARE-International Zambia, 28 June 2016.

facilities and communities by health care providers, lay health workers, or peers; media, including mass media, community radio, local billboards, posters, and flyers; and community/social mobilisation, including campaigns, events, and issue groups. The SBCC approach used the most frequently was interpersonal communication; the other two mechanisms were usually used in combination with at least one other SBCC approach. In the articles reviewed, SPRING found that SBCC approaches improved women's dietary practices during lactation and pregnancy, promoted breastfeeding practices, and improved complementary feeding practices (Lamstein et al., 2014).

The Care Group Model and Care Group Difference

It has become essential to find and develop a method to create sustainable behaviour changes that improve nutrition and nutrition-related outcomes. The care group model is a method of interpersonal communication that has been successfully implemented in low-income countries that are malnourished.

In 1995, Dr. Pieter Ernst, a physician and the director of the World Relief's first child survival project in Gaza Province, Mozambique, developed the care group model and approach in order to reach a large population in a cost-efficient manner that was sustainable and offered support to volunteers in the model without overburdening them. The care group model was developed because Ernst recognised that the small number of health promoters he was using in his project was not adequate for reaching a large population. The care group model is a peer-based system that uses community volunteers to disseminate health and nutrition messages to mothers and communities. Care groups are groups of 10 to 15 community-based health educators who meet regularly for training by paid supervisors and visit and teach individual households. Care groups are distinguished from other types of groups because of the greater support volunteers can receive from their peers, as well as the opportunity to create solutions in a group setting. Care groups allow projects to have a smaller number of paid staff while reaching a large number of beneficiaries without requiring numerous hours of work from staff or individual volunteers (Laughlin, 2010).

Food for the Hungry's Mozambique Child Survival Program

The care group model has been adopted and implemented several times over the past two decades. A recent use of the care group model occurred from 2005-2010, with results published in 2013, the beginning of CARE's N@C programme. Food for the Hungry/Mozambique, in collaboration with the Ministry of Health (MoH), implemented its Child Survival Program (CSP) in Sofala Province of Mozambique to reduce and prevent diarrheal incidents in children between 0 and 23 months of age. Pregnant women and mothers with children between 0 and 24 months were organized into blocks of 12 households, with each block selecting a Care Group Volunteer (CGV). Twelve CGVs met with paid promoters (project supervisors) every 2 weeks in a Care Group to learn a new

health message or skill. Each CGV then went back to their block and shared the message or skill with each woman/mother, either in small groups or through one-on-one household visits (Davis et al, 2013). An adapted diagram of the Mozambique CSP care group model is shown in Appendix A.

CARE's N@C Programme Model

The N@C programme has used a care group model to convey nutrition and health messages to the women in each of the Nutrition Support Groups (NSGs) that bring together pregnant and lactating women to collectively learn and support each other to practice optimal nutrition behaviours. There are two main delivery groups associated with the four different integrated thematic areas. The first concerns Maternal, Infant, and Young Child Nutrition (MIYCN) and water, sanitation, and hygiene (WASH). The MoH and Ministry of Local Government and Housing (MLGH) train health workers in these areas, who in turn train community health volunteers (CHVs). These CHVs are then sent into the communities and work with each of the NSGs, explaining the importance of different nutrition behaviours, such as exclusive breastfeeding for an infant until 6-months of age and appropriate complementary feeding. Teaching involves both individual household visits and small group lessons. Initially, a village-based committee to promote WASH in the villages (V-WASH) was meant to deliver messages about WASH as a part of the delivery model. Although not one of the delivery groups, V-WASH is an important part of each village, and includes members of the community as well as CHVs. The second delivery group concerns food security and gender equity (gender and women's empowerment). Agricultural extension workers from the Ministry of Agriculture and Livestock (MAL) train Nutrition Support Group Leaders (NSGLs) in these areas, with great focus on promoting a more diverse diet with nutrition dense foods for children under the age of two. Each NSGL is a woman who is chosen from each of the NSGs in the N@C programme. The NSGLs then teach each of members in their NSGs what they have learned from the workers[2]. Both CHVs and NSGLs are included in CARE's care group model. A diagram illustrating the care group model specific to CARE's N@C programme is shown in Appendix B.

[2] Interview with Ms. Catherine Pongolani, 28 June 2016.

Results

Several major themes arose from the key informants throughout the interviews that could be responsible for why the care group model improves adoption and practice of optimal nutrition behaviours. Many of these opinions from informants are in support of facilitators suggested by Perry et al (2015) and Food for the Hungry's Mozambique CSP evaluation. Key informants also provided factors that could be helpful in sustaining improved nutrition practices and in furthering the impact of the care group model, particularly in regards to N@C. The analysis of previous use of the care group model and several facilitators suggested by Perry et al. (2015), with support from the evaluation done by Food for the Hungry's Mozambique CSP and findings from information with key informants involved in N@C that include support of the former, as well as potential barriers, are discussed in the following sections.

Effect of the Care Group Model

As discussed above, care groups are being utilised in various projects to implement programs through the community. Through analysis of evidence-based interventions, is has been shown that care group models effectively improve the health of 'resource-constrained populations'. Various projects were analysed using LiST to quantify the effectiveness of the care group model. These included increases in the use of insecticide-treated nets, oral rehydration therapy and use of the health clinic. In almost all projects, the care group model produced the best results. In 13 care group projects, all saw decreases in the mortality rates of under-5 children.

In a specific example, the care group model was used in a behavioural change communication (BCC) intervention in Cochabamba, Bolivia. The study was used to attempt to reduce diarrheal prevalence. There were four group interventions established: (1) the use of a special water filter with the BBC, (2) the use of the special water filter with the BBC, (3) the BBC without the special water filter, and (4) a control group where weekly messages about life skills were expressed using the BBC, but with no other intervention. Over the six-month period of this study, all interventions saw a decrease in diarrheal prevalence. However, the interventions that incorporated the BBC saw a decrease from the baseline level by one-fourth. Moreover, the BCC that just implemented life skills and attitude worked just as well as just the water filter invention (Perry et al., 2015). This showed that targeting behaviour change and implementation through care groups is more effective than not.

In Food for the Hungry's Mozambique CSP, baseline and endline household Knowledge, Practices, and Coverage (KPC) were conducted to evaluate the project; mini-KPC surveys were also conducted approximately every six months. KPC surveys indicated several statistically significant improvements in behaviour changes in the project area. Nutrition practices such as exclusive breastfeeding, appropriate complementary feeding, adding oil to weaning foods, and consumption of foods rich in vitamin A were all reported to be

statistically significantly increased as compared to baseline. Mini-KPC surveys also revealed that there was rapid uptake of these behaviours. In the early intervention area, (Area A), which covered 42% of the target population, reported a significant decline of 8.1% in global undernutrition in children ages 0-23 months. In Area B, where the intervention was delayed, global undernutrition in children ages 0-23 months significantly declined by 11.5%. It was also found that between the two intervention areas, the annual rate of decline in global undernutrition of children 0-23 months old was four times that of children 0-59 months old throughout Mozambique. It was also shown that there were statistically significant improvements on indicators from other maternal and child health interventions, such as HIV/AIDs promotion, use of properly treated bed nets, and recognizing childhood illnesses (Davis et al 2013). The KPC survey reveals that Food for the Hungry's Mozambique CSP made great improvements in nutrition practices and behaviour changes in the area.

Several changes have been making little waves throughout the groups and their communities in the N@C programme. Mothers originally had many misconceptions about what foods the infant could eat when under six months. They would often introduce porridge early in a child's diet, which can induce diarrhoea in the child[3]. Mothers would often introduce these types of foods as early as a week into an infant's life, as they believed that a child cried because of hunger. When a child is born, mothers would give the baby water with root from a tree, a traditional medicine believed to protect the child from diseases[4]. Since N@C has begun, many mothers have stopped feeding their babies soft foods under the age of six months. Moreover, after being taught about the necessity to feed the children a variety of foods so they are receiving all of the important nutrients, they seek more diverse diets for their children. All of these changes came from cooking demonstrations and education on food preservation to maintain the diversity of food year round. These changes are then sustained by the changes in behaviour from the women. One specific highlight for an agricultural extension worker was a mother telling him how much weight her daughter had gained since the program began[5].

Further misconceptions come from the mothers taking care of themselves during pregnancy. A low birth weight can mean that the mother was not receiving enough of the right nutrients in her diet during pregnancy. Some traditional teachings included the mothers believing they couldn't eat any foods that came from animals[6], restraining them to just vegetables and mealie meal. This can hinder the iron levels of the mother, which is already subject to decrease because of the pregnancy. Obvious Phiri, a health worker from the MoH in Mwasempangwe, stated that mothers often avoided eggs when they were pregnant because of the belief that their child would be born without hair if the expectant mother consumed eggs. Moreover, because of the lack of preservation methods of the foods, there would be less constantly available to provide the proper nutrition needed[7].

[3] Interview with Mr. Obvius Phiri, MoH partner in Mwasempangwe, 14 July 2016.
[4] Interview with Ms. Elizabeth Zimba, MoH partner in Lusuntha, 21 July 2016.
[5] Interview with Mr. Edward Phiri, MoA partner in Mwasempangwe, 19 July 2016.
[6] Interview with Ms. Elizabeth Zimba, 21 July 2016.
[7] Interview with Mr. Chipe Webby, MoA partner in Chanyalubwe, 19 July 2016.

Lastly, hygiene and the safety of the water were rarely acknowledged before N@C. Parents did not realise that the water they were giving their children should be boiled to remove any bacteria present[8].

Facilitators

There were five key facilitators identified by Perry et al. (2015) that may be responsible for why the care group model is successful in improving and adopting optimal nutrition behaviours: minimising workloads for CGVs so they have adequate time with all beneficiaries; the empowering nature of care groups that meet regularly to promote better nutrition behaviours; social support CGVs and mothers receive that is positive; modelling of key behaviours by CGVs selected by their peers, where CGVs act as 'hubs' of social networks; and small, interactive groups of beneficiaries that meet frequently and that have a good connection to community leaders and health facility staff. These facilitators also emerged throughout the interview process. While some of these facilitators are specific to Care Groups as described by Perry et al. (2015), interviews revealed that beneficiaries in N@C are receiving many of the same social benefits; results for both volunteers[9] and beneficiaries is included in findings for each facilitator where appropriate. Each of these is discussed below with supporting evidence from Food for the Hungry's Mozambique CSP and results from interviews with key informants in the N@C programme.

Workload of CGVs

Community-wide behaviour change in nutrition is best seen when interventions can properly cover the population. Volunteers are most effective when their workload is minimised and when they are not overburdened. Food for the Hungry's programme used 4,095 volunteers that covered 90% of the target beneficiaries. Davis et al. (2013) suggests that using this large number of volunteers to minimise workloads contributed to the 95% annual retention rate of CGVs in the programme, as well as making it easier to work with small groups of mothers to invoke behaviour change. Perry et al. (2015) estimate that each beneficiary in Food for the Hungry's programme worked with their respective CGVs for approximately 3.3 hours each month; this is stated to be an appropriate amount of time to avoid overburdening volunteers and to ensure health messages and skills are adequately delivered to beneficiaries.

In the care group model used in Nutrition at the Centre, the volunteers are overburdened. In many interviews, the person of interest mentioned that the volunteer rarely had time to do anything other than volunteer work. This meant that their own personal work suffered because of their work with N@C. Their workloads are very large; each NSGL has a group of 20 beneficiaries, and each CHV has 40 beneficiaries (2 groups) to visit and teach[10]. In addition, it was stated that there is a need for more volunteers to be trained to lighten the workload of others. This would not only allow the volunteer personal time, but make their

[8] Interview with Mr. Michael Banda, CHV in Phikamalaza, 13 July 2016.
[9] 'Volunteers' encompasses both CHVs and NSGLs in the N@C programme. The appropriate acronyms will be used when referring to each type of volunteer separately.
[10] Interview with Mr. Ackim Ngoma, CHV in Mwasempangwe, 14 July 2016.

time with the groups more beneficial. Elizabeth Zimba, a health worker from the MoH in Lusuntha, stated that having 10 beneficiaries in a group would be ideal.

According to Davis et al. (2013), the use of care groups ideally minimises the number of paid project staff that need to be used. Edward Phiri, an agricultural extension worker from the MAL in Mwasempangwe with the N@C programme, stated that despite having CHVs and NSGLs that can help the government workers with N@C visits, because there are many beneficiaries that need to be visited, government workers are often unable to focus on other projects that they need to complete in order to ensure all N@C beneficiaries are reached. While these findings from N@C are not necessarily a facilitator suggested by Perry et al. (2015), they do support a need for more trained volunteers in the N@C programme, which could further benefit the women targeted. These findings also suggest that care group models can work very effectively when the workload of volunteers is minimised so as not to overburden them.

The Nature of Care Groups

Another key characteristic of the care group model is what Perry et al. (2015) describes as the 'iterative, empowering nature of Care Groups' that meet regularly and learn progressively how to promote change in their communities; this is evident in both Food for the Hungry's intervention and the N@C programme, particularly in beneficiaries.

In surveys conducted for CGVs in Food for the Hungry's intervention, many CGVs stated that there was an increase in respect for them from husbands, peers, family, community leaders, and health facility staff. Specifically, 61% reported being more respected by peers, 48% more respected by husbands, and 25% more respected by health facility staff. This provides a possible suggestion of why the retention rate of CGVs was fairly high in this programme. Many CGVs also reported that they would likely continue their health work once the programme ended; this is likely because these women were given an active role in the intervention and could see the results of the delivery model that they were an integral part of (Davis et al., 2013). In the N@C programme, Elizabeth Zimba stated that many NSGLs felt that they were more respected by peers, husbands, and other members of the community through their work with N@C. Through support from their community and from other group leaders, NSGLs felt empowered.

NSGLs and CHVs currently meet once a month with government workers to learn new health messages or skills to deliver to beneficiaries. NSGLs and CHVs meet with beneficiaries twice a month before their next sessions with government workers[11]. By meeting with volunteers twice for each lesson learned, beneficiaries have opportunities to practice new skills and perfect them. Volunteers also benefit from two monthly household visits and monthly trainings, as they have the opportunity to review each month's message or skill twice with beneficiaries and can also question their respective government workers at their monthly meetings if necessary to review information.

[11] Ibid.

The effects of the care groups have been evident in the all of the N@C intervention sites through the decrease in stunting and number of underweight children. While no specific numbers were stated, many of the volunteers have commented on the qualitative improvements they have seen since starting the program. Many noted that the women liked the program because they noticed the changes in their children. In general, the community has come to like the program because the health of the children is improving[12]. As the information received by beneficiaries is making clear changes, and the women are beginning to see the long-term impact, they may be more likely to keep up these behaviours and new practices[13]. This is in support of findings and analysis from Davis et al. (2013).

In a few Food for the Hungry KPC surveys conducted in 2007, CGVs were revealed to have had a high level of contact with each of their beneficiaries, with 91% of mothers with children ages 6-23 months and 94% of mothers with children ages 0-5 months stating that they had been visited by a CGV in the previous two weeks (Davis et al. 2013). This high level of contact and communication with CGVs is likely to have been important to the success of the care group model in this area and in invoking behaviour change and increasing adoption of optimal nutrition practices.

Social Support and Positive Social Pressure

Support from peers also resulting in positive social pressure to maintain optimal nutrition practices plays a large part in successes of care group models. Throughout many interviews it was re-iterated that CHVs, NSGLs, and beneficiaries felt substantial support from the group leaders, fellow members of the group, and other CHVs. This is one of the main facilitators in the effectiveness of the care group model because it enables the mothers, CHVs, and NSGLs to rely on each other when they are not aware of something.

The CHVs and NSGLs have an event each month called a field day where they come together to give support to one another. On these days, they share stories and personal experiences regarding their own groups. Through this, they overcome challenges and solve problems that each may be facing. In addition, they share successes and suggestions that can be helpful to the other volunteers. These field days generate discussions that provide support and are helpful to other volunteers.

The mothers work together similarly to the CHVs and NSGLs, in sharing information and supporting one another. In one specific village, where there is an issue with getting water, mothers will take turns going in groups to collect water for each other. They will also share the information amongst each other, and watch out for one another. However, sometimes there is also a lack of support depending on the area. Some mothers choose to withhold information from each other and keep it to themselves, and not share information with non-group members who could benefit from this information. This then weakens the care group approach[14].

[12] Interview with Mr. Eddie Kumwenda, CHV in Egichikeni, 18 July 2016.
[13] Interview with Mr. Gervanzio E. Phiri, CHV in Chanyalubwe, 18 July 2016.
[14] Interview with Ms. Elizabeth Zimba, 21 July 2016.

Selecting Their Own Volunteers and Creating Social Networks

With modelling of key behaviours by volunteers, selecting their own volunteers that become 'hubs' in social networks, and having peers for support, there may be better uptake of good behaviours and nutrition practices by whole communities and long-lasting changes in communities.

In Food for the Hungry's Mozambique CSP, CGV surveys were conducted to evaluate the CGVs and their work throughout the project. It was reported that 44% of CGVs were selected by their beneficiary groups, while 55% were selected by community leaders or promoters. CGVs that were selected by the mothers of their groups were 2.7 times more likely to stay and serve for the duration of the project, a result that was found to be statistically significant. This gives more power to the women in the groups as well as the women who are chosen. This creates a social network of sorts, with the CGV acting as a 'hub'. Recent behaviour change studies show that some behaviours spread through these social networks, and that those who are better connected have a greater chance of influencing the behaviours of those in their network (Davis et al. 2013). This characteristic is also in support of using SBCC methods, such as interpersonal communication like care group models, to invoke good behaviour change, and improve upkeep of nutrition practices.

One trial mentioned by Perry et al. (2015) specifically targeted the efficacy of utilising different individuals within the community. They used two different interventions: chlorine for water purification and multivitamins to prevent micronutrient deficiencies. Each intervention was implemented in randomised villages in three different ways: (1) randomly selected villages, (2) villagers with the most social ties, and (3) nominated friends. The interventions implemented by randomly selected villages and villagers with the most social ties lead to no difference in the uptake of the intervention. The biggest uptake came from the interventions implemented by the nominated friend (Perry et al., 2015).

The N@C programme has seen improvements in community involvement and behaviours through the creation of these social networks. In N@C, beneficiary groups choose their own leaders, giving agency to the women of the groups, both NSGLs and members of the NSGs, and creates the 'hub' mentioned by both Davis et al. (2013) and Perry et al. (2015). From these 'hubs', a network of peers has been created within the N@C communities[15]. The care group model used in the N@C programme is likely working in part because of the high level of community involvement, which is likely to continue to improve community-wide behaviours and practices[16]. While some beneficiaries are less open to sharing information with others outside of the groups, overall, the programme has helped non-group members, women who are not a part of the beneficiary groups; everyone in the community is slowly becoming involved. This means that the community can turn to many other members[17]. Elizabeth Zimba from the MoH stated that in addition to the gardens that each beneficiary

[15] Interview with Mr. Phiri Obvius, 14 July 2016.
[16] Interview with Mr. Simui Ingudi, MoH partner in Egichikeni, 19 July 2016.
[17] Interview with Mr. Eddie Kumwenda, 18 July 2016.

group has, beneficiaries have planted individual household gardens for new crops. Ideas for how to improve the home gardens have spread into the community: NSGs and other members of the community have come up with ways to improve the types of crops they have, such as having one main garden, and having different crops planted at different households in order to share amongst members of the community and to create diversity in foods available. The community has also proposed having a sunflower garden to obtain sunflower oil, as well as a maize garden. While the NSGs are the main targets of the N@C programme, their learning shows how this N@C community is changing its behaviours, supporting how influential social networks can be in creating community-wide behaviour change, as suggested by Perry et al. (2015).

Small, Interactive Beneficiary Groups with Close Connections with Health Facility Staff and Community Leaders

The organisation of beneficiaries into small groups that meet regularly and have good connections with community leaders and health facility staff benefits beneficiaries as well as communities in improving and adopting optimal nutrition behaviours.

In Food for the Hungry's Mozambique CSP, care groups connected pregnant women and mothers who may have had little to no access to community resources to CGVs regularly, who became connected to health facility staff and community leaders more regularly. Serving as a 'hub' for beneficiaries, CGVs create a critical connection between pregnant women and mothers and health facility staff and community leaders. There is a better stream of communication: information can flow through the CGVs, even if beneficiaries have only a small amount of contact with health facility staff and community leaders (Davis et al., 2013).

As mentioned previously, government workers are often in the communities of N@C helping with household visits. While connections with community leaders were not mentioned, beneficiaries have a good connection with ministry workers because these workers are often in the N@C communities. In addition, as NSGLs are trained once a month by government workers and also meet with their respective NSGs to deliver health messages and skills twice a month, NSGLs, as well as CHVs, serve as the key bridge between beneficiaries and the community and government workers, and information can flow from beneficiaries to volunteers to government workers, as shown in Appendix C.

Potential Barriers in N@C's Care Group Model

Male Involvement

N@C is focused on women's empowerment, and therefore, the care group model does not involve the men. Because of this, there seems to be uneasiness among the men, largely because they seem to not understand what the programme is trying to do and why it is important. Some husbands have said they think this programme is a waste of time[18]. However, on the flip side of these opinions, more and more men were showing up to the cooking demonstrations to learn alongside the women[19]. These vastly different opinions among the men stem from the lack of information the men are presented with. To create longevity for this programme, everyone must be involved. Similarly, to as not involving the men is a barrier, as is not involving extended families. Elders hold the largest impact for change, and without their influence, it is harder to have continued implementation of what is being taught.

Workload, Trainings, and Respect

The second barrier to this care group model is the workload of the CHVs. In N@C's care group model, the volunteers are covering 40 households. In Perry et al. (2015), it was estimated that the volunteer should be spending 3-4 hours per month with every beneficiary. With 40 households, this has the volunteers spending between 120 and 160 hours per month, just on volunteer work. Add this to the fact that every volunteer has their own families to think about and they have little time left to do anything else. In addition, not only are the volunteers taking on too much work, but also they are not always respected by their peers for becoming a volunteer[20]. This raises the question that if they are being overworked, and are being disrespected, why would they choose to continue to be a volunteer?

The last barrier is the trainings for the volunteers. It was discussed that the trainings were insufficient for most and not often enough. Volunteers reiterated over and over that they thought there needed to be more frequent trainings, and refresher courses. Without these, the information can be forgotten or distorted from what was originally taught. The more frequent trainings align with the ideas of Perry et al. (2015) and the 'iterative nature' of care groups. More meetings means the information will be clearer to the volunteers and cemented in them. However, tying in with the current workload the volunteers face, there is room to question if the volunteers would have time for more training.

[18] Interview with Ms. Elizabeth Zimba, 21 July 2016.
[19] Interview with Mr. Phiri Obvius, 14 July 2016.
[20] Interview with Mr. Michael Banda, 13 July 2016.

Discussion

During this research, a number of suggestions for improving N@C's outreach and the efficacy of the care group model were suggested. Improved monitoring of volunteers in the N@C programme would likely help gauge the effectiveness of the programme as well as how the volunteers are managing with their tasks. A potential system of checks and balances among the CHVs and NSGLs could be created. This would continue to give agency to the volunteers and to increase their active role in the programme. One suggested idea was to create one-on-one pairings of CHVs with one another and NSGLs with one another[21]. In addition to having members of their respective groups these partnerships could potentially provide another path for CHVs and NSGLs in which to engage. Partners would be able to refresh each month's training with one another, and each partner would be able to monitor the other's work. Monitoring could also be improved by creating a standard survey for CHVs and NSGLs to complete at the end of each month, or after the delivery of each new topic. Potential broad questions could include how nutrition practices are improving, how receptive mothers have been that month, and if there have been any changes in the community; there could also be an additional section where CHVs and NSGLs could list any concerns they had. These could be kept together in order to monitor any patterns and changes. In addition, for each field day, it may be beneficial to have a running list of challenges and solutions and store them in a large binder or folder. During these field days, CHVs and NSGLs could review the previous field day statements and note any improvements or whether any of those challenges had been solved. This would also provide a starting point for discussion of new solutions that may not have arisen during previous field days. This system would also allow for monitoring of any patterns. The patterns mentioned here and before could be detected by creating and running computer coding through programs and data analysis software such as Dedoose. These suggestions for monitoring could make volunteers (especially NSGLs) feel more empowered, as well as provide a way to oversee patterns.

Throughout the interviews, key informants repeatedly stated that having more trained CHVs and NSGLs would likely improve how effective the outreach of N@C is in Zambia and help with workloads of volunteers and ministry workers. This common theme is in support of avoiding overburdening volunteers while allowing them to complete their tasks well, a facilitator suggested by both Davis et al. (2013) and Perry et al. (2015). CHVs currently lead groups of 40 beneficiaries, and each NSGL comes from a NSG of 20 beneficiaries. These numbers are much larger than the groups of 12 that CGVs were responsible for in Food for the Hungry's intervention. Since CHVs and NSGLs teach each month's lesson to their respective groups and make household visits, having a large number of beneficiaries per volunteer can be overbearing. As previously mentioned, some government workers then also need to take on some of these tasks, which pulls focus from other projects they are working on for their respective ministries. In addition, CHVs and NSGLs have less time for their personal matters. In order to engage beneficiaries adequately, it may be helpful to assign more than one CHV and NSGL to each group, or to increase the number of trained

[21] Interview with Mr. Michael Banda, 13 July 2016.

CHVs and NSGLs in order to make the number of beneficiaries each has to manage smaller. Although this factor presents a gap in N@C's current care group model, suggestions given above to improve monitoring and change beneficiary group sizes could potentially create closer bonds and a higher level of trustworthiness amongst beneficiaries, NSGLs, and CHVs in their respective groups. Many changes for N@C and its model are dependent on the number of trained CHVs and NSGLs; these numbers could also potentially influence the number of government workers that would need to be involved. Thus, it would be important to look into the feasibility and potential costs of obtaining additional volunteers for training.

A large aspect of N@C and care groups in general is women's empowerment. Because of this, the care group focuses only on teaching the lessons to the women, as traditionally, they are seen as the main care providers for the children. The role of the male counterpart isn't fully understood when it comes to N@C, there seems to be some. Currently, N@C is educating men on how to feed children properly while the mother is away; it would be helpful to the women if men were given more of this responsibility[22]. In other interviews, it was mentioned that the men need to be a part of the programme. Because of this, it is our recommendation to create an aspect of the care group model involving the men as a system of sustainability. To do, the best solution would be to create care groups of the men just as there are of the women. By creating groups with the men, this not only takes some of the strain off of the women, but also makes them more supportive. This then creates a level of sustainability to the programme. With the full support of men, it will be more likely that the programme and the interventions introduced would carry on after the actual programme had ended. These successes could be monitored through the use of surveys given at the beginning about the baseline attitudes of the men towards the programme. The group leaders could then use this as a way to shape their groups and how they present the information to the men. It does not go unrecognised the importance of the traditions of the roles of the individuals within the village, but we firmly believe that this would greatly increase an already effective model.

Many of the key facilitators suggested by Perry et al. (2015) revolve around the support volunteers lend to each other, as well as the support beneficiaries give each and the support that they receive from volunteers. This theme of social and peer support was apparent throughout the interview process. The design of the care group model and the workings of care groups easily allow volunteers to feel support from their peers and allow beneficiaries to feel that the taught nutrition practices are worthwhile and beneficial. This is why care groups work so well in communities with lower numbers of resources. By creating ideas and solutions and having discussions as groups, the care group model can encourage behaviour change in beneficiaries, and ultimately, the community. The care group model can help foster social networks through social support, and as beneficiaries create new connections and these social networks expand, community-wide adoption of optimal nutrition behaviours can result and can likely be sustained.

[22] Interview with Mr. Ackim Ngoma, 14 July 2016.

Concluding Remarks

Vast improvements have already been made from the use of the care group model in the N@C program. These include a decrease in the level of malnutrition, coming from the improved practices taught through the volunteers, peer support between volunteers and mothers, and positive social pressure. While our analysis was short, we firmly believe that with a few changes, this model could make this programme that much more successful. These recommendations include lessening the workload of the volunteers, including more training, improving monitoring, and incorporating the male counterpart. This will make the volunteers more effective and create longevity for the teachings of the program. With these changes, Nutrition at the Centre and its use of the care group model will effectively continue to tackle the issue of malnutrition within Zambia.

Limitations

One of our main limitations was our inability to meet with the ministry workers and volunteers face-to-face and interview them in-person. Instead, we conducted phone interviews, which eliminated the side of human expression that explains just as much as talking. Moreover, the connection between Lundazi and Lusaka was not ideal. There was often a lot of static over the phone. Because of this, it was hard to hear and sometimes understand what was being said.

In addition, because of ethical standards and our level of clearance for whom we could interview, we could only interview people in the professional capacity. This restricted us to interviewing CHVs and ministry workers. Because of this, we lack the perspectives of the mothers actually being impacted by N@C, and we are unable to know their opinions of the fellow members of the communities as volunteers. The perspective constructed is thus informed only from the observations of CHVs and ministry workers.

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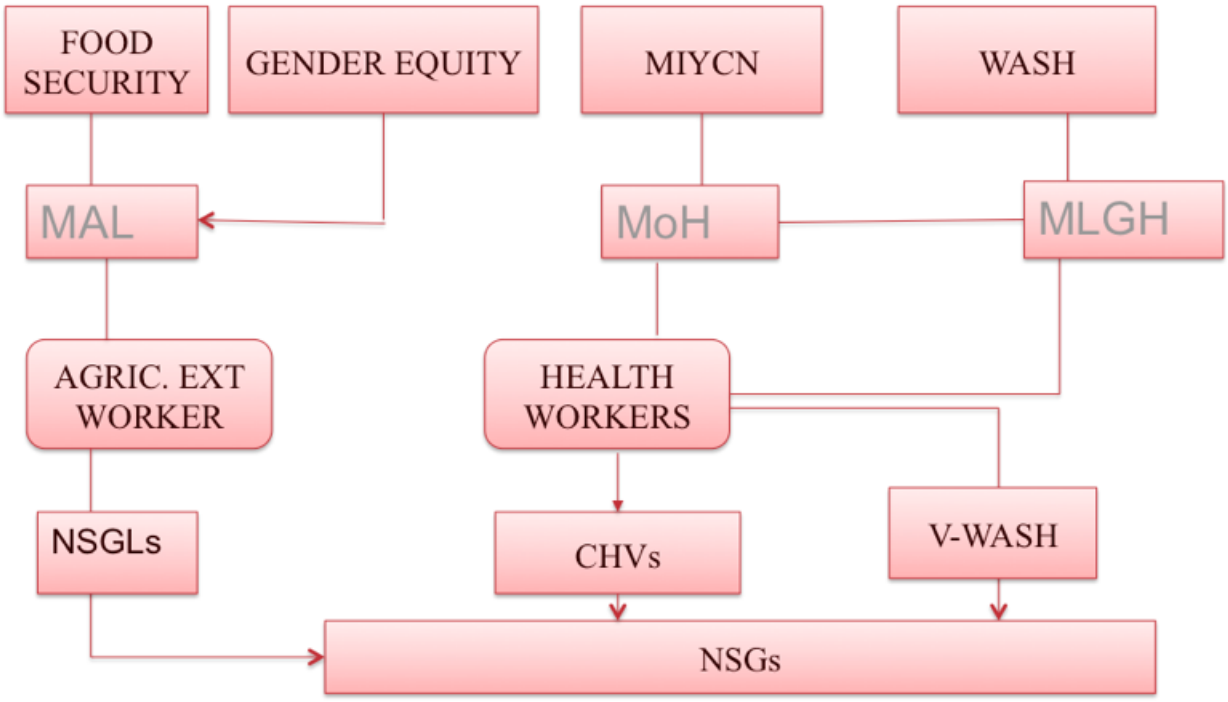
Appendix A

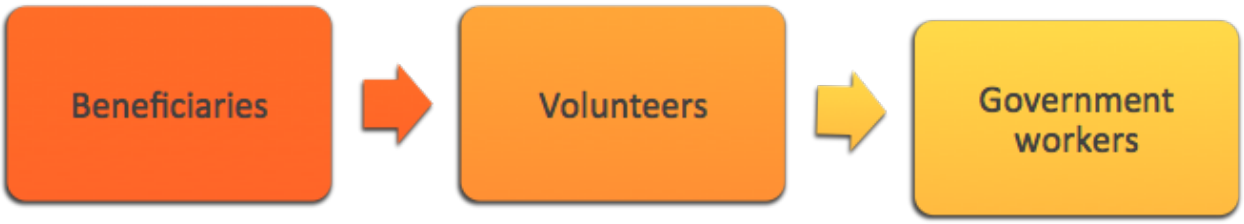
Adapted from: Davis, et al. 2013

Appendix B



Source: CARE Zambia's N@C Overview Presentation, 11 July 2016

Appendix C



Source: (Blacker and Hanselman, 2016)