

**Addressing Child Malnutrition in Kopanga:
Lessons in Transitioning from a Homegrown Nutrition Program to a
Community-Based Program**

*A project in collaboration with Partnering for Progress (P4P) and the Comprehensive
Rural Health Dispensary- Kopanga, Kenya*

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ABSTRACT

Problem Statement: Malnutrition and undernutrition contribute to over one third of all child deaths in developing countries. Millennium Development Goal 4 (MDG 4) aims to decrease child mortality by two-thirds between 1990 and 2015. Addressing malnutrition/undernutrition will be critical to attaining all of the MDGs, particularly MDG 4.

Specific Aims: The project had the following aims:

1. To evaluate the *Power of Milk* nutrition program in the context of evidence-based practices
2. To gather feedback from clinic staff about nutrition services provided and identify barriers to effective tracking of child growth and management of child undernutrition
3. To assist the nutrition staff with the implementation of the nutrition program by serving as a mentor to the Nutrition Assistant, creating forms and a database for storing child visit and demographic information, providing health education to mothers and caregivers, and conducting home visits.
4. To provide recommendations (based on evidence-based knowledge) to improve the quality of services at the Comprehensive Rural Health Dispensary (CRHD)

Setting: Kopanga, Kenya

Methods: This project was carried out using mixed methods to collect child anthropometric measurements and care information from nutrition program staff and mothers/caregivers through monthly child visits, informal meetings, and a group session.

Results: During the 10 week duration of this assessment, the student conducted an evaluation on the implementation of the nutrition program, visited local nutrition programs and child health personnel, provided health education, and conducted home visits with mothers/caregivers. The project culminated with a compilation of recommendations for the nutrition program and a discussion on next steps.

Conclusion: Malnutrition is a complex issue, impacted by a variety of interacting factors. Effective interventions to combat malnutrition require comprehensive, multi-sectoral approaches that include clear communication, involvement by various stakeholders, and commitment from community members, ministries of health, and country governments to ensure the highest level of impact and program sustainability. The Kopanga experience underscores the need for programs to develop program theories that serve as road maps for the implementation of a program, and to develop appropriate “feedback systems that allow learning and ongoing improvement to occur.”¹

¹ <http://ftp.cdc.gov/pub/Publications/mmwr/rr/rr4811.pdf>. Accessed: 05/01/2013

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DEDICATION

To the children of Kopanga- thank you for allowing me to be a part of your stories. To Jacob and Maurice, may your souls rest in peace, and may your very short-lived lives serve as reminders for the importance of promoting maternal and child health and care globally- to reach beyond to the unknown places, where the needs are greatest.

XXXX

ACRONYMS and ABBREVIATIONS

CDC - Centers for Disease Control and Prevention
CHWs – Community Health Workers
CRHD - Comprehensive Rural Health Dispensary
DGH - Department of Global Health
HAZ - Height-for-Age Z-Score
LAZ - Length-for-Age Z-Score
IRB - Institutional Review Board
MDGs - Millennium Development Goals
NGO - Non-government organization
P4P - Partnering for Progress
SD - Standard Deviation
WAZ - Weight-for-Age Z-score
WHO - World Health Organization
WLZ - Weight-for-Length Z-score

INTRODUCTION

Background

As the world looks toward the year 2015, world leaders, global health practitioners, and globally minded citizens consider the advancements that have been made in achieving the Millennium Development Goals (MDGs). A campaign initiated in 2000 by members of the United Nations, the MDGs aim to “eradicate extreme poverty and hunger, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, combat HIV/AIDS, malaria, and other diseases, ensure environmental sustainability, and develop a global partnership for development” through the universal achievement of various targets. [1] This effort is a result of a commitment by world leaders and leading development organizations “to meet the needs of the world’s poorest.” [2] Cutting across all MDGs is a fundamental human right - nutrition.

Nutrition is essential for human life and global productivity. Despite the fact that the world produces enough food to feed everyone, millions of people suffer from hunger and malnutrition on a daily basis. [3] Women and children have been and continue to be particularly vulnerable to the impacts of malnutrition. One in three (195 million) children under the age of five in developing countries is stunted, with more than 90 percent of these children living in Africa and Asia. [4] Malnutrition has been described as “the most important risk factor for the burden of disease in developing countries,” [5] contributing to about half of all mortality in young children. [3,5] According to Concern Worldwide, “one child dies every 12 seconds from problems related to malnutrition.” [6] Because malnutrition causes diseases and often exacerbates the effect of a disease, [3] which

limits human development and productivity, addressing malnutrition is key to advancing development efforts worldwide, and achieving the MDGs. [7, 8]

Partnering for Progress (P4P)

Inspired by a volunteer medical mission trip to Kopanga, Kenya in 2007, Partnering for Progress (P4P) was created in 2008. [9] It is a 501(c) 3 nonprofit organization located in Spokane, Washington, USA, with the mission to “help provide access to health care, education, sanitation, and clean water to residents in developing countries.” [9] P4P has five core principles: empowerment, collaboration, commitment, accountability, and sustainability. [9] Since 2007, following a meeting with a woman named Alice Wasilwa, the organization has been involved with Kopanga - a rural village in Southwestern Kenya (Figure 1). Mrs. Wasilwa is a Kenyan nurse “who has dedicated her professional career to providing medical care to the people of the Kopanga region.” [37] In 2008, P4P helped construct a medical facility (now known as the Comprehensive Rural Health Dispensary), which is operated by the head nurse, Mrs. Wasilwa and local health workers. Twice a year, P4P sends a team of medical professionals to provide medical services to the Kopanga community and train local health workers. [9] Over the past two years, struck by the high prevalence of infant and child malnutrition, the organization has taken an interest in addressing malnutrition in Kopanga through the “Power of Milk” initiative which is discussed in greater detail below. An annual fundraiser takes place in Spokane to raise funds for the Kopanga facility.

Rationale

Rural communities are often the areas with the greatest needs. However, as a result of the remoteness of some rural areas, these communities are often neglected. P4P

is addressing this problem by channeling its organizational efforts into areas of isolation and low-resources. One such effort was the building of a health dispensary in 2008 to serve the people of Kopanga. The facility provides services to surrounding villages in addition to serving patients from Tanzania. [27] These services include: HIV testing and counseling, health education, immunizations, and maternal and child health services (i.e., family planning, antenatal and neonatal care). [26] The dispensary sees “more than 30 patients seeking medical attention” daily [28], with children under 5 years of age accounting for 40% of the clinic’s monthly patients [29]. Clinicians at the dispensary have noted- based on clinical and physical observations- many cases of malnutrition (undernutrition) among infants and children attending the facility; however, the magnitude of the problem has not been systematically evaluated.

In early 2011, P4P began implementing an informal, small-scale nutrition intervention to mitigate the rising rates of child undernutrition observed around Kopanga. According to one of the directors of P4P, “the intense focus on [Kopanga] has clarified yet another glaring obstacle, yet amendable issue; malnutrition in babies and toddlers.” [10] The initiative was called the “Power of Milk,” and began as a formula-purchasing program to provide infant formula to babies who were not being breastfed. “Breastfeeding is always recommended, but if the mother is unable to produce enough milk due to illness or her own nutritional issues, the babies and toddlers suffer and often die. Formula is the obvious solution...” [10] The overarching aim of the program was to reduce the number of malnourished children in the dispensary’s service area.

The *Power of Milk* program soon evolved into a pilot project to provide dietary supplements to undernourished children and nutrition education to mothers and caregivers around Kopanga. The pilot project began in late 2011, and was to be evaluated

at the end of six months to determine impact and further investment in the program. Months into the pilot project, however, challenges were observed in regards to the implementation and sustainability of the program. Noted challenges included: high cost of infant formula, lack of evidence-based knowledge on nutrition interventions, poor management of program data, and need for a culturally appropriate and sustainable program model. This thesis project was initiated in response to P4P's inquiry for an assessment to evaluate the status and future prospect of the program in the context of evidence-based knowledge. We sought to answer the following questions: 1) How does the *Power of Milk* program model fit into best practice nutrition program models? and 2) What lessons can be learned from the implementation of a small-scale nutrition program in a low-resource setting? In answering these questions the student assessed gaps in the implementation and delivery of the program.

Specific Aims

1. To evaluate the *Power of Milk* nutrition project in the context of evidence-based practices.
2. To gather feedback from clinic staff about nutrition services provided and identify barriers to effective tracking of child growth and management of child undernutrition.
3. To assist the nutrition staff with the implementation of the nutrition program by serving as a mentor to the nutrition assistant, creating forms and a database to monitor child growth and demographic information, providing health education to mothers and caregivers, and conducting home visits.
4. To evaluate the current clinic nutrition program as a potential intervention site.
5. To provide recommendations (based on evidence-based knowledge) to improve the quality of services at the Comprehensive Rural Health Dispensary (CRHD)

Review of the literature

Nutrition is an essential factor in human development. Malnutrition, defined as “a state when the body does not have enough of the required nutrients (under-nutrition) or

has excess of the required nutrients (over-nutrition)” [11] is caused by a variety of factors including: immediate (inadequate dietary intake and disease), underlying (food insecurity, poor access to health services, and inadequate caring practices), and basic (poverty) causes. [12] Malnutrition poses a heavy burden on our global society and has been described as “both a consequence and a determinant of underdevelopment.” [13] Although obesity (a form of malnutrition) is becoming a problem in both developed and developing countries, undernutrition accounts for much of the child mortality in developing countries, particularly in the first two years of life [12]. Malnutrition is categorized by level of severity: acute and chronic malnutrition. [11] Child undernutrition is reflected in three ways: stunting (low height-for-age), wasting (low weight-for-height), and underweight (low weight-for-age). [3, 11] A child’s level of undernutrition is assessed based on the World Health Organization’s (WHO) child growth standards that were developed based on results from the WHO Multicentre Growth Reference Study (MGRS). [38] The study “collected primary growth data and related information from approximately 8500 children from widely different ethnic backgrounds and cultural settings (Brazil, Ghana, India, Norway, Oman and the USA).” [38] This reference population serves as the international reference for measuring child nutritional status.

Stunting reflects chronic malnutrition and is the more prevalent problem in countries with high rates of undernutrition such as Kenya. [4] Stunting is caused by “chronic insufficient protein and energy intake, frequent infections, sustained poor feeding practices, and micronutrient deficiencies (particularly iron and zinc).” [12, 4] Eighty percent of the global burden of stunting is localized in 24 countries in the developing world (Figure 2). [4] Worldwide, 10% of deaths and disability-adjusted life-years (DALYs) in children under the age of 5 years are due to micronutrient deficiencies

- mostly deficiencies of zinc and vitamin A. [14] Wasting, an indication of acute malnutrition threatens the lives of an estimated 51 million children under the age of five (8%) globally. [24] Wasting is caused by “inadequate food intake, poor feeding practices, disease and infection, or mostly, a combination of these factors.” [4, 40] Acute malnutrition is categorized as global acute malnutrition (GAM), severe acute malnutrition (SAM), and moderate acute malnutrition (MAM) depending on the extent of wasting. [11,39] Acutely malnourished children “face a markedly increased risk of death” due to impaired immune systems. [4, 24] Nearly one in four children (129 million) under the age of five in developing countries is underweight. [4] Of this 129 million, ten percent are severely underweight. [4] An underweight child can also suffer from stunting, wasting, or both conditions. [4]

The effects of undernutrition are intergenerational - unhealthy girls become unhealthy mothers, and give birth to unhealthy children. [15] Research suggests focusing interventions on the life cycle and intergenerational impacts of malnutrition. [4] Simple interventions at key stages in the life cycle - pre-pregnancy, during pregnancy and post-pregnancy, such as micronutrient and vitamin A supplementation for women of reproductive age and young children can greatly reduce undernutrition. [4] Poor maternal health impacts delivery outcomes as children are often born underweight when mothers are poorly nourished. The period from conception to 24 months (the first 1000 days) has been identified as “important for optimal growth, health, and development.” [17, 41]

Poor nutrition during the first 1000 days is associated with the most damaging effects on child development. [12] According to Faber and Wenhold (2007) “[t]he period 6 to 24 months, in particular, carries a great risk of growth faltering and malnutrition, because of the inadequate nutritional quality of complementary foods and the increased

risk of infections due to the decline in breastfeeding.” [40] This period serves as a critical window of opportunity to prevent irreversible cognitive impairments that lead to poor school performance and loss of productivity. [12, 17] Several countries have joined the Scaling Up Nutrition (SUN) movement and 1,000 days partnership to highlight the importance of this critical window of opportunity for reducing undernutrition. [18, 19]

Malnutrition is impacted by a variety of complex and interacting factors (Figure 3). Providing children with adequate, nutritionally balanced diets is important for addressing the immediate causes of undernutrition. However, access to nutrient-rich foods is limited for many people who live in poverty, and poverty also impacts the kind of information that families and communities have about child health. Interventions to address malnutrition must be multi-sectoral and apply “integrated interventions to maximize effectiveness.” [7, 20] Feeding practices comprised of exclusive breastfeeding for the first six months and continued breastfeeding along with appropriate complementary foods are essential for reducing undernutrition and improving children’s quality of life. [4, 7, 11, 21] Breastfeeding interventions have been highlighted as “the most important preventive approach for saving child lives.” [7, 18, 21]

Bhandari and colleagues (2008) note that “exclusive breastfeeding... for the first 6 months of life protects infants against many childhood diseases, including repeated gastrointestinal infections and pneumonia, and thereby against some of the major causes of childhood mortality.” [21] According to the 2008 *Lancet* series on child survival, “child deaths could be reduced by 13 percent through exclusive breastfeeding alone and by another 6 percent through the practice of optimal complementary feeding.” [14] Evidence-based practice emphasizes promotion of good nutrition and hygiene practices as the best prevention and cure for malnutrition. [7, 22] Addressing malnutrition requires

critical considerations of the nutrition challenges and available resources in a community.

[12] It also requires the integration of child nutrition interventions with antenatal/maternal care and improvements in the underlying determinants of undernutrition, including poverty, poor education, disease burden, and lack of women's empowerment. [14, 23]

Current WHO recommendations for feeding include: “early initiation of breastfeeding, exclusive breastfeeding during the first six months of life, continued breastfeeding for up to two years of age and beyond, timely introduction of complementary feeding at six months of age, frequency of feeding solid/semisolid foods, [micronutrients], and the diversity of food groups fed to children between 6 and 23 months of age.” [11,12,24] Supplemental Suckling (SS) technique is also recommended to support breastfeeding. [11] Child growth monitoring is an essential aspect of promoting adequate child development.

The Kenyan government and Ministry of Public Health and Sanitation have increased efforts to combat malnutrition. However, inadequate resources continue to hinder progress in addressing malnutrition. Particular emphasis is being placed on equipping communities to provide sustainable and effective nutrition services. [11] The *National Guideline for Integrated Management of Acute Malnutrition* is a recent effort to address malnutrition. Published in June 2009, the document provides guidance to health workers and organizations involved in nutrition projects. The guideline recommends utilizing already existing resources such as community health facilities and community health workers to identify and manage malnutrition. [11] While this document provides vital information for assessing and treating children with acute malnutrition, it lacks a comprehensive strategy to address chronic malnutrition which is a major burden in

Kenya. Remote communities such as Kopanga still remain isolated from services. Partnerships are needed between non-government humanitarian organizations working in these communities and local health facilities to provide accessible, culturally-sensitive and relevant nutritional support.

Conceptual Model

A conceptual model (Figure 4) was developed by the student and applied in the evaluation of the *Power of Milk* nutrition program. The model comprises components, area of focus, and benefits (results) involved in the program assessment. The evaluation consisted of six components: 1) review of evidence base, 2) understanding P4P & CRHD infrastructure, 3) community engagement, 4) review of program implementation, 5) building partnerships, and 6) preparation of a final report. The area of focus and benefits provide specific details relating to each of the six components. All of these components are reinforced in the Centers for Disease Control and Prevention (CDC) “recommended framework for program evaluation,” (Figure 5) and were essential for the evaluation and enhancement of the *Power of Milk* program.

METHODOLOGY

Project Site

This project was carried out at the Comprehensive Rural Health Dispensary in a village called Kopanga. Kopanga is a rural town located in the Suba West Division, Suna West Location of Migori district in the Nyanza province of Southwestern Kenya. [25, 26] Kopanga comprises fifteen villages and sits on the border of Tanzania. While there are no available health statistics for Kopanga specifically, Nyanza province is reported to have

some of the worst health statistics in the country with the highest levels of postneonatal, infant, child, and under-five mortality rates [16, 27]. According to the 2008 Kenya Demographic Health Survey, the under-five mortality rate for Nyanza was 149 per 1,000 live births compared to the country rate of 74 per 1,000 [16, Figure 5]. Children in Nyanza have almost three times higher risk of dying before age five compared to children in the Central Province of Kenya which has the lowest under-five mortality rate at 51 deaths per 1,000 live births [16]. Further, 31% of children younger than five years of age in Nyanza are chronically malnourished (stunted) and 4% are acutely malnourished (wasted). [16] The national average is 35% for stunting, and 7% for wasting in children younger than five years of age. [16] Nyanza has limited access to electricity and piped water, and an HIV prevalence of 14% [16].

Project Design

This project was carried out using mixed methods to collect child anthropometric measurements and healthcare information from nutrition program staff and mothers/caregivers through monthly child visits, informal meetings, and a group session. All participants were involved with the *Power of Milk* program. Using a mixed method approach to assess child nutritional status allowed the researcher to identify the types/levels of malnutrition and relate these levels to caregiver understanding and application (or lack thereof) of appropriate feeding practices. The student utilized an informal evaluation process to obtain feedback for refining the operation of the nutrition program. This assessment took the form of a combination of *case study*² and *process*³ and

² Case Study: "a detailed review of a unique or important program that captures the background, process, outcomes, successes, failures, and lessons learned." (University of Washington- Department of Global Health Master's Thesis Handbook. Accessed: 09/21/2012)

³ **Process Evaluation:** a type of evaluation used to "assess whether a project is being implemented according to its design." (http://www.healingclassrooms.com/downloads/IRC_Evaluation_Guidelines.pdf. Accessed: 10/18/2012)

*participatory*⁴ evaluations by looking at the implementation process of the CRHD nutrition program and gathering feedback from program staff and participants. The use of an informal process of evaluation was required given the early stages of implementation of the nutrition program, a lack of program structure and systematic data, and a lack of organizational capacity to conduct a formal evaluation.

The qualitative data received from the informal meetings provided vital information on knowledge, attitudes, and behavior around childcare and nutrition that were used to design nutrition education messages and materials for the clinic. The student developed a spreadsheet and forms to systematically capture clinic data on anthropometric information and child feeding (exclusive breastfeeding, complementary foods, formula, etc.) with guidance from the UW faculty, P4P leadership, and Kopanga Clinic teams. Collected data consisted of anthropometric measurements (length, weight, MUAC) and demographic information (i.e. date of birth, age, gender) obtained between May and August 2012. The nutrition assistant- the young lady “in charge” of the nutrition program- collected these measurements with guidance from the student. Recumbent length was measured using a child measuring board since all but one child was less than two years of age. Weight measurements were obtained using a hanging child weighing scale and MUAC tapes were used for measuring MUAC. Child age was determined using the date of birth noted in the child’s health booklet or by asking the caregiver when the child was born.

In evaluating the nutrition program, the student conducted a literature review on nutritional interventions and utilized the UNICEF conceptual framework for causes of malnutrition (Figure 3). Feedback on the program objectives and concerns was gathered

⁴ Participatory Evaluation: a type of evaluation that “involves stakeholders and beneficiaries in a collective examination and assessment of a project.” (http://www.healingclassrooms.com/downloads/IRC_Evaluation_Guidelines.pdf. Accessed: 10/18/2012)

from P4P directors, the P4P nutrition committee, the head nurse of the dispensary, and the nutrition assistant implementing the program in Kopanga. The student also conducted an exploratory semi-structured interview with the head nurse and initiator of the *Power of milk* program regarding the program status, barriers to adequate record keeping, child anthropometric measurements, clinic efficiency and nutritional supplementation. The interview was conducted using a list of pre-developed questions created by the student that served as a “start list,” and allowed for other questions as they arose. Responses were compiled in a recommendations report that was submitted to P4P. Using a clinic staff and a community health worker who spoke the local language (Luo), the student discussed family food sources, complementary feeding and breastfeeding issues in a group session with caregivers at the clinic and assessed the general knowledge and perceptions of malnutrition and its causes. Excerpts from this session were included in the final recommendations report to the NGO and the CRHD (Appendix 2).

In accordance with the desire for best practice knowledge, the student interviewed personnel at neighboring health facilities and organizations who address malnutrition, NGOs, the Kenyan Ministry of Health, Kenya Medical Research Institute, and University of Nairobi regarding potential resources and to gain further advice on approaches for the nutrition program. Information gathered from these meetings was shared with the nutrition program staff and P4P. In providing recommendations to P4P and the CRHD, the student employed program theory and process and impact evaluation frameworks such as the CDC Framework for Program Evaluation in Public Health (Figure 5). This evaluation was developed to inform future P4P and CRHD program designs, to improve the quality of nutrition services offered at the Comprehensive Rural Health Dispensary, and to determine critical areas of needs and guide investment decisions.

Data Analysis

Anthropometric data were summarized as weight-for-age z-scores (WAZ), length-for-age z-scores (LAZ), and weight-for-length z-scores (WLZ) using the WHO Child Growth Reference Standards and the WHO Anthro software. [11, 42] Children with a Z-score < -2 SD were classified as underweight (WAZ), wasted (WLZ), or stunted (LAZ). A child with a LAZ below minus two standard deviations (-2 SD) is considered chronically malnourished, or stunted, while those whose LAZ was below minus three standard deviations (-3 SD) is severely stunted. Likewise, a child with a WLZ score below -2 SD is considered thin (wasted) and acutely malnourished, and below -3 SD is severely wasted. A WAZ below -2 SD is classified as underweight, and below -3 SD severely underweight. Child sex and age were taken into account in accordance with the WHO Growth Reference Standards. Child anthropometry data were summarized by the student using Microsoft Excel and Stata 11 and used to describe the status of children in the nutrition program. Due to the small sample size (18 children) used in this assessment and the lack of adequate data, no scientifically significant statistical analyses were computed. However, the data and trends observed are useful for child growth monitoring for enrolled children, and can inform routine growth monitoring of children in Kopanga.

The student wrote down notes using a notebook on demographic backgrounds and perceptions of malnutrition during group sessions with caregivers in the nutrition program. Only one interview with the nutrition staff was recorded and transcribed and presented in the final report to P4P. This interview addressed questions about the implementation of the nutrition program and the major challenges of the program.

FINDINGS

History of the *Power of Milk* Program

The history of the *Power of Milk* nutrition program is ambiguous. When asked when the program was started, the CRHD head nurse responded “I can’t remember because... I didn’t have any records. I was doing it not for funding. I was doing it to help the community.” However, in 2011, a partnership/agreement was made between members of P4P and the head nurse to implement a “malnutrition treatment program.” [30] The program was to be an expansion of the formula-purchasing *Power of Milk* program, and serve as a pilot project to provide dietary supplements to undernourished children and nutrition education to mothers and caregivers around Kopanga. The program objective was to reduce the number of malnourished children in the dispensary’s service area. A nutrition coordinator/assistant with background in social work was hired in April 2012 to oversee the program with guidance from the CRHD head nurse. The program was to be evaluated at the end of six months to determine impact and further investment. At the time of the student’s arrival the program had *officially* been in place for about three months, however, many participants had been receiving supplements for a longer and varied period of time (range: 2 months to 1 year).

Based on feedback from the P4P nutrition committee, the nutrition program was designed to enroll 20 malnourished children at a time based on the recommendation of the CRHD head nurse. Five children were to receive a bag of VitaMeal® - a fortified rice and lentil meal for malnourished children [31] - each month. Ten infants were to receive a locally made supplement consisting of finger millet, maize, and green gram, in addition to milk. In addition, five infants under 6 months of age were to receive infant formula. With the exception of the infants receiving infant formula, no particular age

specifications or formal entry criteria were established for enrollment in the program and distribution of supplements – this decision was left to the discretion of the head nurse. Anthropometric measurements (length, weight, arm circumference) were supposed to be assessed every 2 weeks. Exit from the nutrition program were also based on the discretion of the head nurse. When asked about the exit requirement, the head nurse responded “[u]ntil the child walks. That is what I’m looking at... my context is very different... It’s not possible for me to phase these children after 6 months... If the child is already walking, then we can enroll the child for six months and then exit the child from the program.”

Power of Milk Approach and Status in June 2012

The *Power of Milk* program utilized the following interventions which were distributed on a monthly basis: 1) provision of 300 Kenya shillings (Ksh), approximately \$3.75 US, to mothers and caregivers for the purchase of cow's milk, 2) provision of 2 kg of flour mixture composed of green grams, maize, and finger millet, 3) provision of 1 package of VitaMeal® rice supplement, and 4) nutrition education for caregivers. Vita Meal was engineered for malnourished children, and is composed of rice, lentils and 25 essential vitamins and minerals. Each package feeds “one young child for 30 days or one older child or adult for 15 days.” [32] Based on the student’s field experience, the *Power of Milk* program lacked structure and was implemented without a strong program design. This led to poor program implementation and inadequate program data to assess program coverage and effectiveness. Through conversations and meetings with nutrition program staff and caregivers the student uncovered several findings which are noted in Appendix 2 at the end of this document. Notable findings include: lack of a qualified nutritionist to administer the program effectively, inadequate record-keeping system, lack of child

follow-up, very low child breastfeeding rate (Figure 8), and prevalence of stunting and severe wasting among enrolled children (Figure 8). The most common foods fed to children by their caregivers included: porridge (Ugi), Ugali, Sukuma wiki (local vegetable), milk (cow's milk), rice, and bananas.

Overall, the mothers and caregivers of children enrolled in the program were appreciative of the support that has been provided to them through the nutrition program. One caregiver remarked: “whatever we’ve been given has been so helpful to the child.” Caregivers emphasized a need for more information on nutrition for children. Lack of education means that mothers are unaware of the importance of breastfeeding, and lack information on the kinds of foods to eat in order to maintain good health. Lack of protein, HIV status, maternal undernutrition, poor sanitary conditions, and lack of adequate nutrition education were highlighted as causes of malnutrition in Kopanga. The head nurse commented “[t]hey are eating high carbohydrate foods. The problem is the [lack of] protein in the diet... with malnutrition you look at so many things, but the main problem- if we can correct the protein- [is the] lack of protein in the diet. They have the carbohydrate.” Lack of finances posed a barrier to the provision of adequate diet for children. During a group session, caregivers noted that “[we] know. But the way of getting income to feed the children [is lacking].” Caregivers also noted that the food supplements provided were not enough to last the child for one month.

Based on the student’s review of monthly growth measurements and anecdotal information from discussions with caregivers and the nutrition program staff, the nutrition program improved the nutritional status of most of the children enrolled in the program. Though, the extent to which micronutrient deficiencies have been addressed is unknown. Take L.A. for example. L.A. lost her twin sister to undernutrition during

infancy. But L.A. is now 3 years old and making good improvements in her nutritional status. Her mother attributes the health of her child to the nutrition program. The head nurse and the nutrition assistant shared other cases of critically malnourished children who improved significantly.

DISCUSSION

Kopanga is an impoverished community with many public health challenges including high rates of HIV infection, lack of sanitation and clean water, and low economic status. These factors amplify the effects of undernutrition in the community. As has been discussed throughout this paper, there are numerous factors that contribute to child undernutrition. All of these factors need to be taken into consideration when designing an intervention to address undernutrition. The Kopanga case study illustrates the challenges and constraints of implementing a nutrition program without adequate infrastructure and the importance of evidence-based knowledge in guiding public health interventions.

Despite some good project outcomes, several challenges were experienced and many lessons were learned. Findings suggest that the *Power of Milk* program had several organizational and implementation barriers that impacted the effectiveness of the program. The CRHD lacked the administrative capacity to implement an effective nutrition program, and this can be resolved by providing training to program staff, and engaging with local nutrition programs. Research suggests that in order to achieve optimal effectiveness nutrition programs should be integrated with antenatal/maternal care along with improvements in the underlying determinants of undernutrition, including poverty, poor education, disease burden, and lack of women's empowerment. [14, 24]

The *Power of Milk* nutrition program aims to address one immediate cause of undernutrition- diet. However, the disease burdens in Kopanga highlight the need to incorporate disease management and treatment into broader plans to improve nutrition. The HIV burden is high in Kopanga, and the status of many children remains unknown due to stigma and lack of testing. Diarrhea and stomach parasites are also common among Kopanga children due to poor sanitation in Kopanga. Many families utilize water from streams and rivers that have been polluted by garbage and human and animal waste which are often disposed in the bushes. Interventions such as providing access to clean water and education on good agricultural and child feeding practices are essential to reducing the undernutrition burden. Emphasis should be placed on the first 1000 days of life, and interventions should address the different stages in the life cycle that impact undernutrition (Figure 7).

Six low-cost interventions have been identified for alleviating undernutrition. These include: supplementation with iron, vitamin A and zinc, and the promotion of breastfeeding, appropriate complementary feeding and good hygiene. [18, 23] These activities require the engagement of multiple partners at different levels of society. As a result of the student's work on assessing the nutrition program, vital information were gathered and have resulted in a stronger program model that utilizes the expertise of the Kenyan ministry of health, community health workers, local health facilities, and community leaders. Ten children are now enrolled at a time, and formal entry and exit criteria have been established for enrollment and graduation from the program. The Kenya (Migori) Ministry of Health provides fortified food supplements (i.e. plumpy nut, food by prescription (FBP)) to the program which are delivered to caregivers during bi-weekly visits with the P4P project administrator at a local church. The project

administrator, in consultation with the Migori District Nutritionist supervises administration of the supplements. The Kopanga CHWs screen children in the community, refer them to the nutrition program, and work with the project administrator to implement the program according to Kenya government nutrition guidelines. The CHWs have been trained on assessing malnutrition, and conduct home visits and regular health education with caregivers using the Infant and Young Child Feeding (IYCF) and Integrated Management of Childhood Illnesses (IMCI) manuals. Topics discussed include: breastfeeding, complementary feeding, healthy food preparation using local produce, hygiene, and growth monitoring. A monitoring system is in place, and all child enrollment data are sent to the Migori District Nutritionist and P4P. [34]

Community engagement is central to malnutrition interventions. Community health workers play a critical role in addressing malnutrition in remote and low-resource communities. [18] These are people from the community with valuable insight on the culture and cultural practices of the people in the community and can influence caregivers and mothers to encourage best practices. When properly trained and equipped these frontline workers are able to deliver low-cost and highly effective interventions such as vitamins and micronutrients (iron folate, vitamin A, zinc), breastfeeding and complementary feeding, and hygiene. [18] Cultural beliefs and practices are important factors to keep in mind when addressing undernutrition, particularly in rural communities. [35]

Challenges & Limitations

A critical challenge with the Power of Milk program was its status as a privately administered program. The program started with a simple desire to address malnutrition

by providing infant formula to infants whose health were being compromised as a result of not being breastfed. As the program evolved, and the need for more sustainable and evidence-based interventions became evident, the relationship between the partner organization P4P and the head nurse at the CRHD became strained due to differing perspectives on how the nutrition program should be implemented. The student found it challenging to institute programmatic changes because changes had to be approved by the head nurse, and there was not always a consensus.

The lack of program structure and explicit program objectives/targets posed major challenges to the student's ability to evaluate the program. Without knowing what the program aimed to achieve, it was hard to fully assess the extent of the program's impact. Data constraints also posed a challenge as a result of lacking adequate data to assess changes in child nutritional status over time. As described by a P4P dietician, "Many times in Kenya the people who receive resources are not the ones with the most need. It is somewhat unusual for patients to be evaluated using objective data." [22] This was certainly the reality of the experience assessing the *Power of Milk* program. The lack of staff program management training was also a limitation to the effective implementation of the program.

Lessons Learned

In Kenya, there is a common Swahili phrase "polé, polé." This phrase means "slowly, slowly" and was a constant reminder during this project that *change takes time*. The student learned to assess the context in which she was working, learned the cultural norms, and realized that when working in a rural and remote setting in a developing country, patience and clear communication are vital. Many programmatic issues in the *Power of Milk* intervention could have been avoided if everyone clearly understood the importance, goals, and expectations of the program. The student also learned the value of

having a strong program theory/design as this serves as the foundation for which any effective program evaluation can be done using program indicators, inputs, outputs, and outcomes. The notion of “seeing is believing” was made clear to the student as there were some misperceptions about the current status of the nutrition program from the point of view of the Spokane-based P4P organization prior to the student’s arrival in Kopanga.

An important lesson that was emphasized by the student’s field supervisor, Seth Okumu, is the African proverb that notes “[i]f you want to go fast go alone, if you want to go far go together.” P4P is doing good work in Kopanga- working to address the critical health needs of a marginalized population. However, the pace at which progress can be achieved might be slower than anticipated due to the complexities of global health work and navigating international cultural and social norms. The head nurse, Mrs. Alice Wasilwa also echoed this sentiment as she urged the student to “[w]alk, don’t run.”

RECOMMENDATIONS

The following recommendations are suggested based on the student’s assessment of the state of the *Power of Milk* nutrition program, and in compliance with evidence-based practices and insights from nutrition experts and health personnel.

The Nutrition Program

1. Partnering for Progress and the CRHD should develop a *program theory*⁵ or Standard Operating Procedures (SOPs) outlining their resources, program objectives, program goals, measurable indicators, chain of activities, and plan for monitoring and evaluation of the program.
2. Baseline data from the community should be ascertained pertaining to community awareness of malnutrition, rates of malnutrition, childcare and feeding practices, and the availability and kinds of food in the region.

⁵ Program Theory: logical description that addresses “how and why a program is supposed to work.” (http://www.evaluatod.org/resources/evaluation-guides/LogicModel_8-09.pdf. Accessed: 11/14/2012)

3. Caregivers of children enrolled in the program should take a pre- and post-enrollment survey to assess baseline and outcome knowledge of good childcare practices and malnutrition.
4. The focus of the *Power of Milk* nutrition program should shift from making and providing “flour” mixtures to mothers and caregivers for their children to encouraging and promoting breastfeeding and the production of breast milk, and providing health and nutrition education to new and current mothers/caregivers.
5. The program should provide culturally sensitive health and nutrition education to debunk myths about breastfeeding and proper child feeding practices. This can be done through use of Information, Education, and Communication (IEC) materials in the local language(s).
6. The program should incorporate behavioral change and communication activities into its interventions.
7. Based on the fact that the program sees and enrolls children who are lagging in their growth (according to recommended child growth standards), the program should promote child stimulation and growth monitoring.
8. The Comprehensive Rural Health Dispensary and Partnering for Progress should partner with the Kenya Ministry of Health via the Migori District Hospital and the District Nutrition Officer to ensure provision of good and adequate support to malnourished children.
9. Investment in increasing/improving access to clean water should be considered in order to ensure that caregivers are able to obtain clean water for their children.

Referral and Follow-Up

1. The Nutrition Program should develop clear and objective criteria for recruitment, enrollment, follow-up, and exiting of children and caregivers in the program.
2. Different treatments should be implemented depending on the nature and severity of malnutrition based on the Kenya “National Guideline for Integrated Management of Acute Malnutrition” and in collaboration with the District Nutrition Officer.
3. In establishing enrollment criteria, home location of the patient should be taken into consideration to aid in proper follow-up of the child.
4. Nutrition program staff should work with the Kopanga area community health workers (CHWs) to recruit and follow-up children in the program.
5. Clear lines of communication should be established between nutrition staff, caregivers, and community health workers to ensure understanding and adherence

of program protocols. The relationship between the head nurse and P4P was strained due to distance, communication, and cultural barriers and misunderstandings.

Nutrition Program Staff

The nutrition program staff should:

1. Be knowledgeable on the process of collecting anthropometric measurements.
2. Receive proper and adequate training on detecting malnutrition, assessing infants and children for malnutrition, and communicating with caregivers about their child's nutritional status.
3. Be able to provide culturally sensitive and relevant health education.
4. Be familiar with the WHO and Kenya Ministry of Health Guidelines for treatment of acute malnutrition.
5. Be fluent in/familiar with the local languages of Swahili and Luo to aid communication with the community.

Future Directions

- Conduct baseline assessment on the nutritional status of children around the dispensary's service area.
- Conduct baseline survey of attitudes, perceptions, and understanding of malnutrition among mothers, caregivers, and community members.
- Partner with the Migori District Hospital, UNICEF, community health workers, and local leaders to provide adequate support and rehabilitation to undernourished children.
- Hire a qualified nutritionist to implement nutrition program- someone with knowledge of how to detect, monitor, and address malnutrition.

CONCLUSION

Every year, twenty million babies are born with low birth weight due to being born too early or poor growth in utero due to maternal undernutrition. [18] The consequences of malnutrition extend throughout a person's life course impacting academic and economic productivity. Maternal and child nutrition go hand-in-hand and it is imperative to address undernutrition in adolescent girls and pregnant women in efforts

to address child undernutrition. Child malnutrition costs the global economy about \$20 to \$30 billion per year. [18] As noted by UNICEF, “[u]ndernutrition is not just about the lack of food. An individual’s nutritional status is influenced by three broad categories of factors – food, care and health – and adequate nutrition requires the presence of all three.” [4] Effective interventions to combat malnutrition require comprehensive, multi-sectoral approaches that include clear communication, involvement by various stakeholders, and commitment from community members, ministries of health, and country governments to ensure the highest level of impact and program sustainability. Investments in nutrition are not only cost-effective, but are critical for advancing development efforts globally.

The Kopanga experience underscores the need for programs to develop program theories that serve as road maps for the implementation of a program, and to develop appropriate “feedback systems that allow learning and ongoing improvement to occur.” [36] This project allowed the student to gather relevant information to inform and advance P4P’s work in Kopanga. The experience was a lesson in the challenges of implementation science in low-resource and remote settings.

ETHICAL CONSIDERATIONS & APPROVAL

This project was a case study, and is therefore, not generalizable. The project followed the guidelines regarding case study and program evaluation projects as outlined in the Department of Global Health (DGH) *Master of Public Health Thesis Manual*. All participants in this project were informed about the purpose and extent of the evaluation prior to their involvement. Caregivers were advised about the voluntary nature of their participation, and provided their consent for use of their information (i.e. pictures,

statements). Information gathered was shared only by the student and other appropriate personnel connected with the project such as the directors and board of P4P, the P4P project coordinator, CRHD nutrition program staff, and the student's thesis committee members. Because of the non-research purpose of this project, the researcher received confirmation that the project will not need to go through the University of Washington Institutional Review Board (IRB) process. The student received permission from the CRHD head nurse to evaluate the nutrition program, and to use program data.

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FIGURES AND TABLES

Figure 1: Google Map plot of Kopanga location



Figure 2: Location of 80% of the World's Stunted Children

80 per cent of the developing world's stunted children live in 24 countries

24 countries with the largest numbers of children under 5 years old who are moderately or severely stunted

| Ranking | Country | Stunting prevalence (%) | Number of children who are stunted (thousands, 2008) | Percentage of developing world total (195.1 million) |
|---------|----------------------------------|-------------------------|--|--|
| 1 | India | 48 | 60,788 | 31.2% |
| 2 | China | 15 | 12,685 | 6.5% |
| 3 | Nigeria | 41 | 10,158 | 5.2% |
| 4 | Pakistan | 42 | 9,868 | 5.1% |
| 5 | Indonesia | 37 | 7,688 | 3.9% |
| 6 | Bangladesh | 43 | 7,219 | 3.7% |
| 7 | Ethiopia | 51 | 6,768 | 3.5% |
| 8 | Democratic Republic of the Congo | 46 | 5,382 | 2.8% |
| 9 | Philippines | 34 | 3,617 | 1.9% |
| 10 | United Republic of Tanzania | 44 | 3,359 | 1.7% |
| 11 | Afghanistan | 59 | 2,910 | 1.5% |
| 12 | Egypt | 29 | 2,730 | 1.4% |
| 13 | Viet Nam | 36 | 2,619 | 1.3% |
| 14 | Uganda | 38 | 2,355 | 1.2% |
| 15 | Sudan | 40 | 2,305 | 1.2% |
| 16 | Kenya | 35 | 2,269 | 1.2% |
| 17 | Yemen | 58 | 2,154 | 1.1% |
| 18 | Myanmar | 41 | 1,880 | 1.0% |
| 19 | Nepal | 49 | 1,743 | <1% |
| 20 | Mozambique | 44 | 1,670 | <1% |
| 21 | Madagascar | 53 | 1,622 | <1% |
| 22 | Mexico | 16 | 1,594 | <1% |
| 23 | Niger | 47 | 1,473 | <1% |
| 24 | South Africa | 27 | 1,425 | <1% |

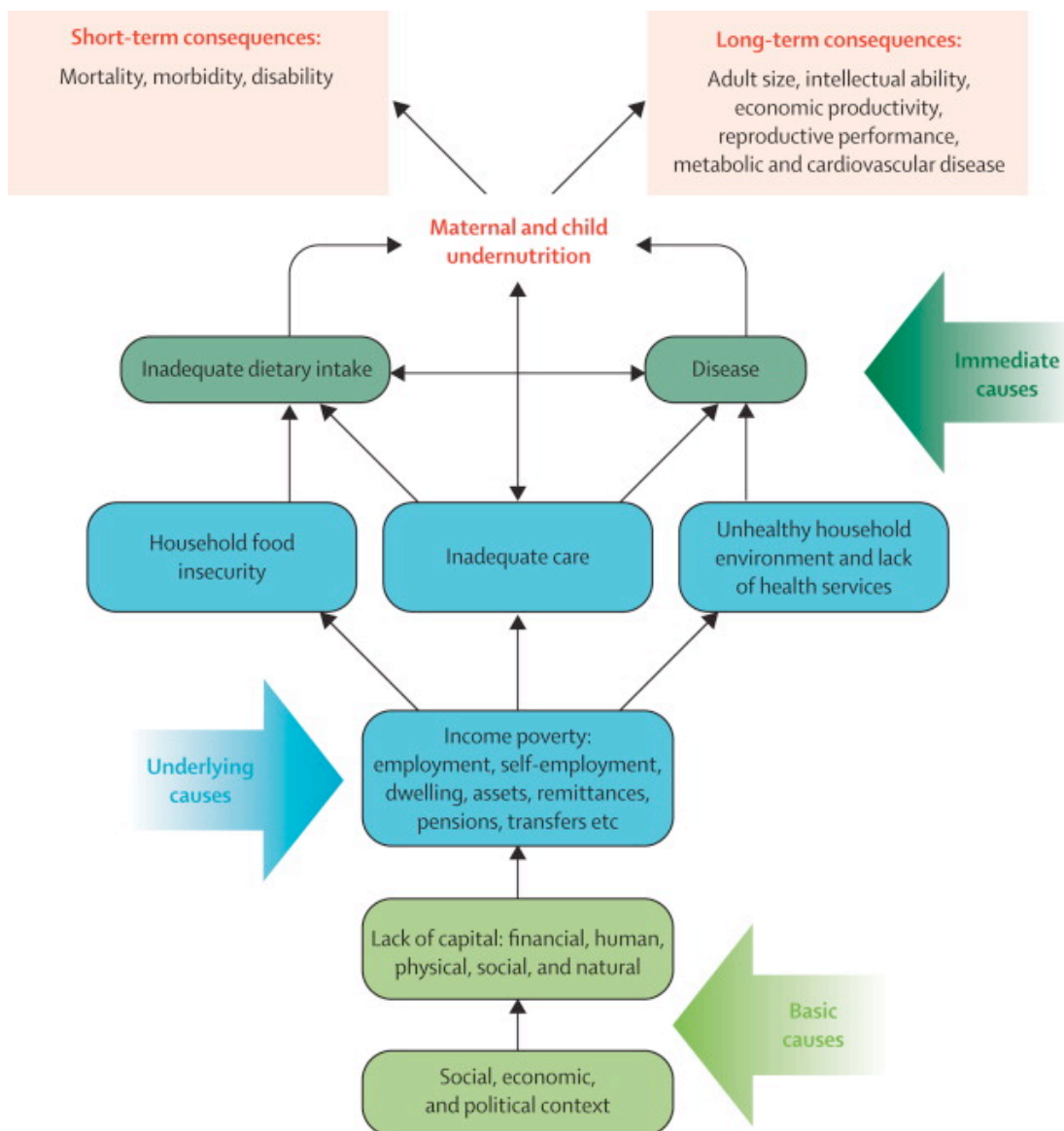
Total: 80%

Note: Estimates are based on the 2006 WHO Child Growth Standards, except for the following countries where estimates are available only according to the previous NCHS/WHO reference population: Kenya, Mozambique, South Africa and Viet Nam. All prevalence data based on surveys conducted in 2003 or later with the exception of Pakistan (2001–2002). For more information on the prevalence and number estimates, see the data notes on page 116.

Source: Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys (DHS) and other national surveys, 2003–2008.

Source: http://www.unicef.org/publications/files/Tracking_Progress_on_Child_and_Maternal_Nutrition_EN_110309.pdf

Figure 3: UNICEF Conceptual Framework for Causes of Child Undernutrition



Source: <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2807%2961690-0/fulltext>

Figure 4: Conceptual Model for Power of Milk Nutrition Program Evaluation

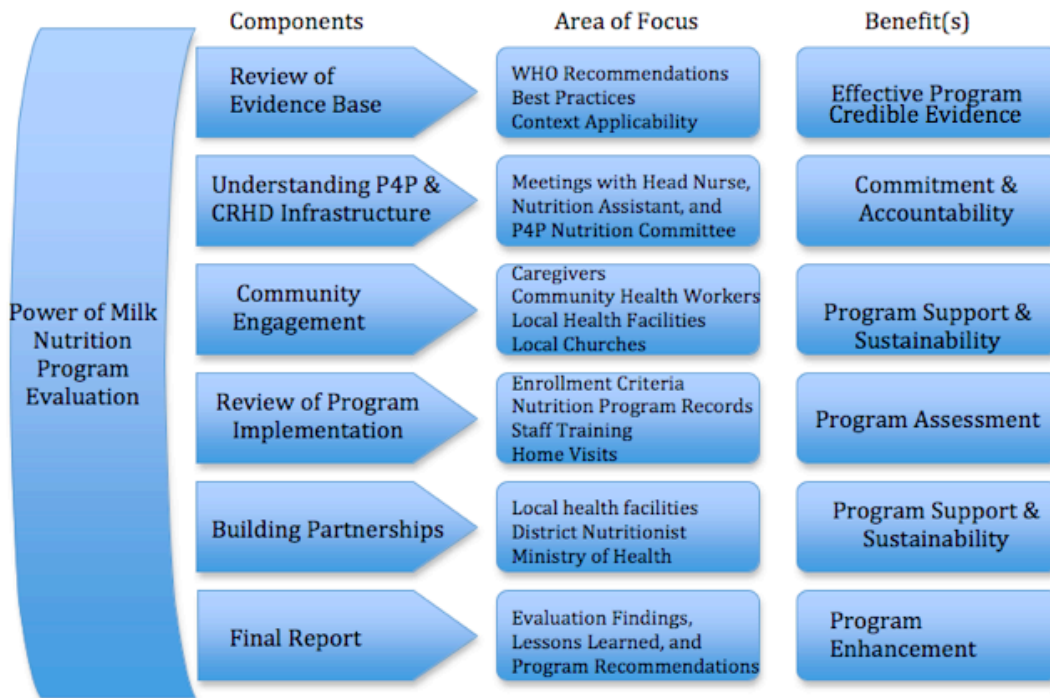
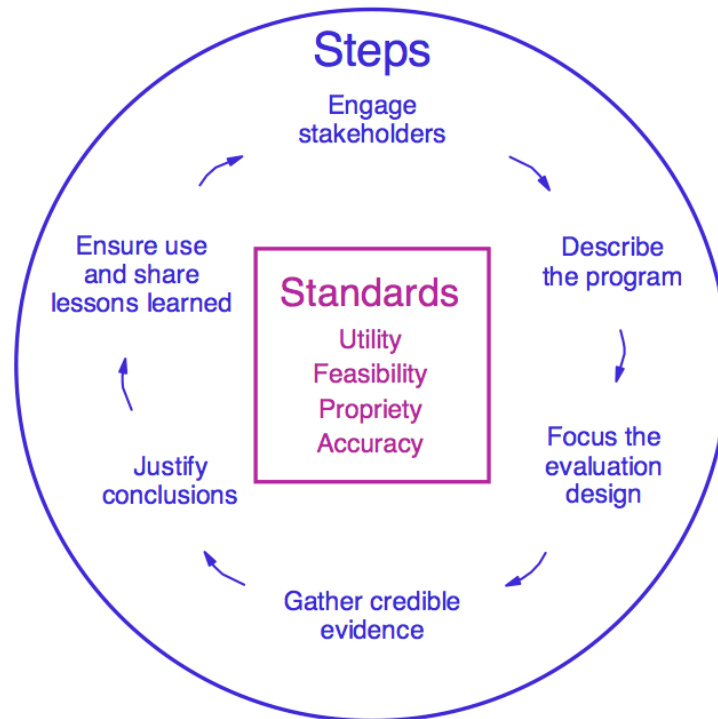


Figure 5: CDC Recommended Framework for Program Evaluation

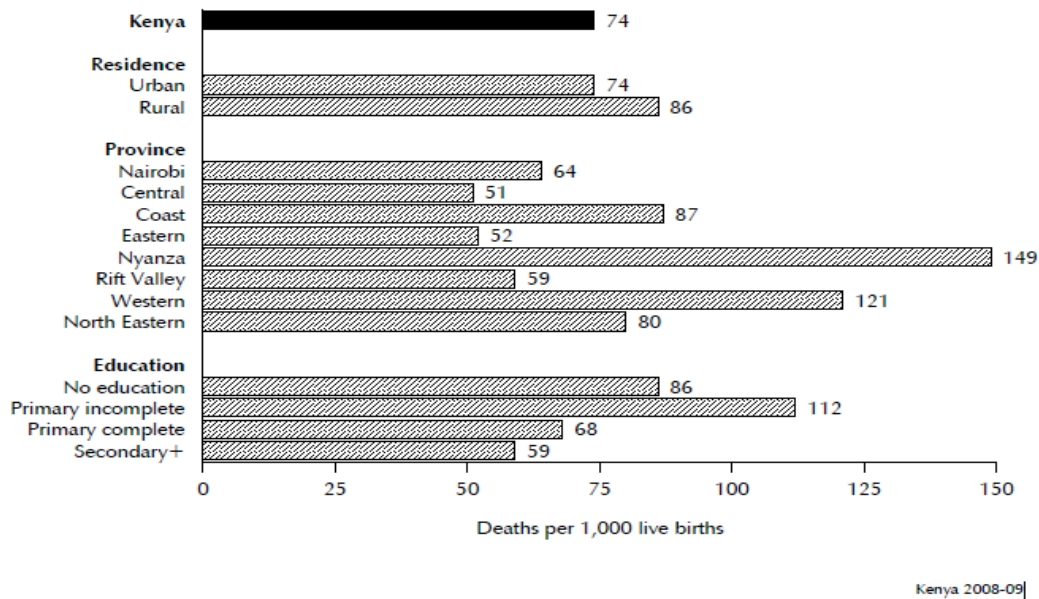
FIGURE 1. Recommended framework for program evaluation



Source: <http://www.cdc.gov/eval/framework/index.htm>

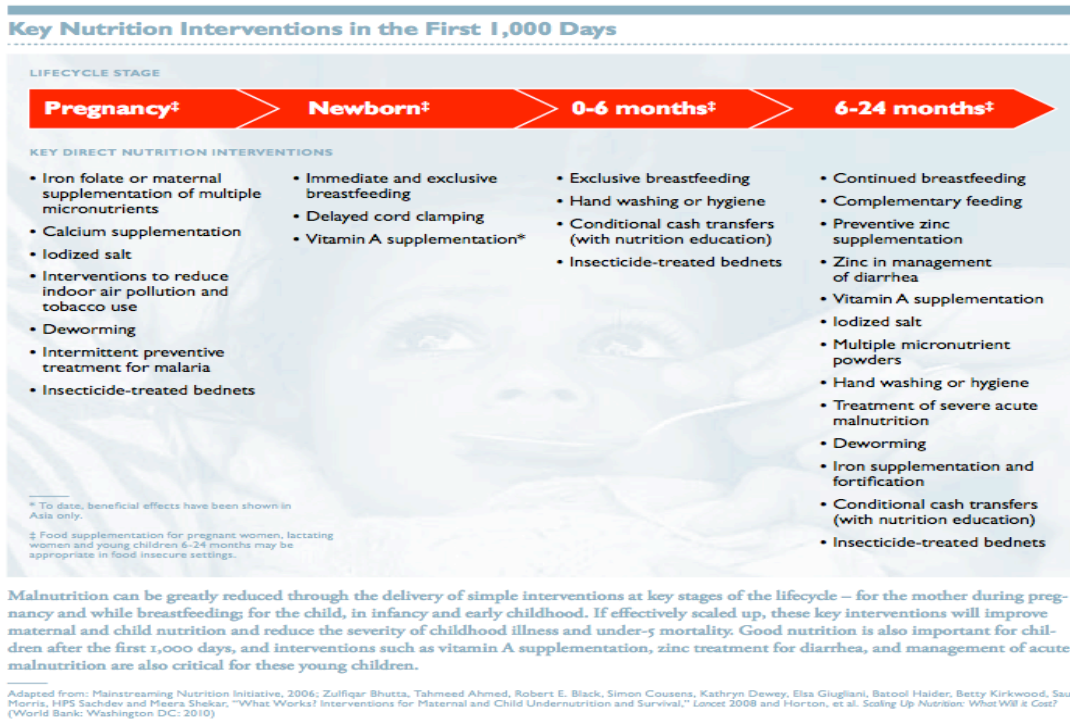
Figure 6: Rates of Under-Five Mortality in Kenya By Population Characteristics

Figure 8.2 Under-Five Mortality by Background Characteristics



Source: <http://www.measuredhs.com/pubs/pdf/FR229/FR229.pdf>

Figure 7: Key Nutrition Interventions in the First 1,000 Days



Source: http://www.savethechildrenweb.org/SOWM2012Interactive/SOWM2012_2/index.html#/29/zoomed

Figure 8: Change in Growth among Children receiving Food Supplements in P4P Program

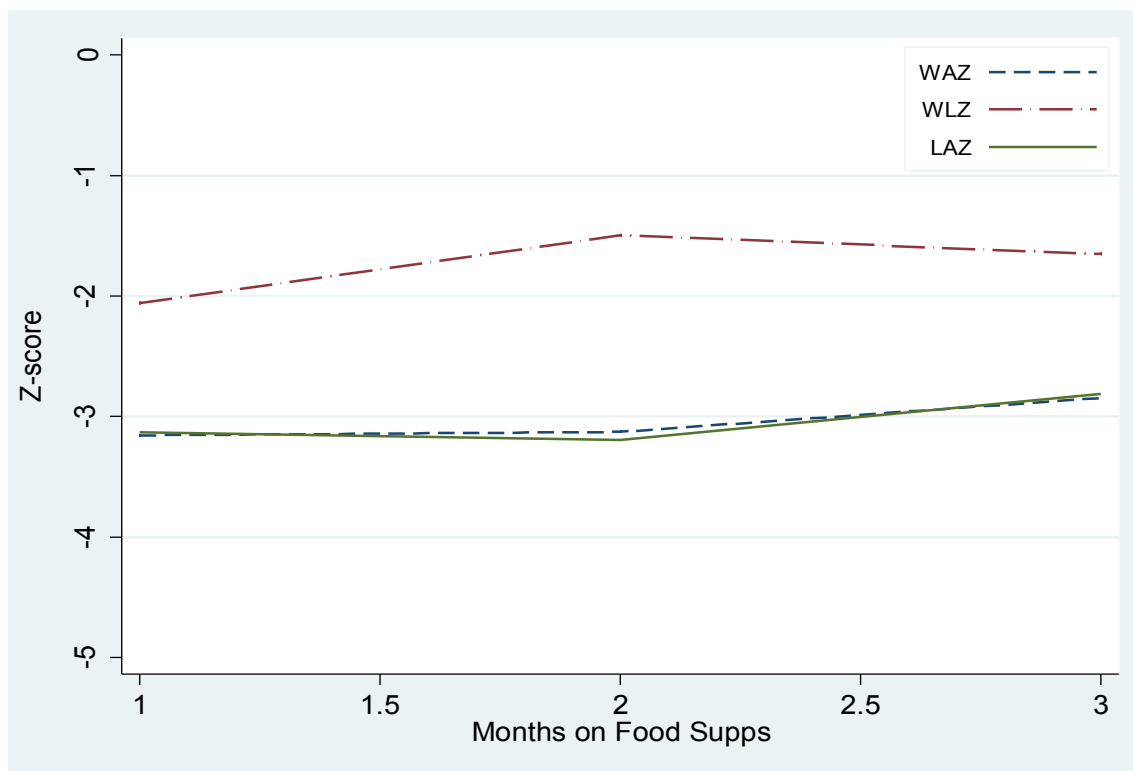


Table 1: Infant and Maternal Characteristics at Enrollment

| Baseline Characteristics | < 6mnths (n =5) | 6-12mnths (n=6) | 12-24mnths (n=3) | 24-36 mnths (n=4) |
|-------------------------------|--|-----------------------------------|-----------------------------------|--------------------------|
| Female | 2 (40%) | 3 (50%) | 1 (33%) | 2 (50%) |
| #Breastfed | 1 (20%) | 4 (67%) | 0 (0%) | 1 (25%) |
| #Exclusively Breastfed | 1 (20%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Food Fed | Porridge, Breastmilk, Cow's milk | Porridge, Rice, Ugali, Milk | Porridge, Cow's milk, Ugali | Porridge, Ugali, Milk |
| Mother Deceased | 2 (40%) | 1 (17%) | 1 (33%) | 0 (0%) |

Table 2: Baseline Growth by Age at Enrollment

| N = 18 | < 6mnths (n = 5) | 6-12mnths (n = 6) | 12-24mnths (n = 3) | 24-36 mnths (n = 4) |
|---------------------------------------|---------------------|----------------------|-----------------------|------------------------|
| | Median (range) | Median (range) | Median (range) | Median (range) |
| WAZ | -2.37 (-3.23, 0.39) | -3.57 (-5.9, -0.5) | -1.83 (-6.11, -1.6) | -4.55 (-5.47, -0.94) |
| WLZ | -0.96 (-4.04, 1.06) | -2.3 (-3.53, -0.22) | -3.7 (-4.08, -1.26) | -2.62 (-3.35, -0.16) |
| LAZ | -2.85 (-5.22, 0.38) | -2.58 (-5.96, 0.22) | -1.43 (-6.3, 1.64) | -4.32 (-6.54, -1.52) |
| MUAC | 10.3 (7.5, 13.5) | 10.7 (10, 13) | 13.5 (9.5, 14) | 12.2 (10.5, 14.5) |
| # (%) Stunting (LAZ <-2) | 3 (60%) | 3 (50%) | 1 (33%) | 3 (75%) |
| # (%) Wasting (WLZ <-2) | 1 (20%) | 3 (50%) | 2 (67%) | 3 (75%) |
| # (%) Underweight (WAZ <-2) | 4 (80%) | 4 (67%) | 1 (33%) | 3 (75%) |

APPENDICES

Appendix 1:

Interview Guide for Nutrition Program Staff with transcript of responses from Head Nurse

1. When did the *Power of Milk* nutrition program begin?

“I can’t remember because... I didn’t have any records. I was doing it not for funding. I was doing it to help the community.”

2. What are the intake criteria for enrollment in the program? (Asked as do you currently have any criteria for who you enroll/take in [into the program] or decide to sponsor?)

“Yeah. Children with protein calorie malnutrition.”

3. What is/are the exit requirement?

“Until the child walks. That is what I’m looking at... my context is very different... It’s not possible for me to phase these children after 6 months... If the child is already walking, then we can enroll the child for six months and then exit the child from the program.”

4. What kinds of interventions are provided? (i.e. formula, locally-made flour, vitamins, etc)

1) provision of 300 Kenya shillings (\$US..) to mothers and caregivers for the purchase cow's milk, 2) provision of 2 kgs of flour mixture made with green grams, maize, and finger millet, and 3) provision of Vita Meal rice supplement (for the mother's nourishment to help her produce nutritious breast milk).

5. How many children do you have enrolled in the program?

“Nineteen.”

6. How many do you desire to have enrolled?

“The first time I wanted 40 children. We agreed. We talked with Stacey. We talked with Sandy... We talked, talked, talked. [Stacey] told me it is ok. After like three weeks, [Stacey] called me... told me we can only enroll 20...”

7. For how long should a child be enrolled in the program?

However long it takes for a child to walk. “I don’t know when the child will start [walking]... that [6 month] program will not help... you know the essence is for [the child] to get the iron so that the bones become strong and [the child] walks. But if the child is not walking what have you done to that child, sincerely? What have you done?”

8. What is the age range for the children who are currently enrolled?

Under 3 years.

9. Do you categorize acutely malnourished and chronically malnourished?

“I don’t do that... I’m not a nutritionist, anyway.”

10. How do you treat a child who is acutely malnourished? Chronically malnourished?

N/A

11. How do you determine malnutrition?

“You know [these parents] always give you an impression that her child is getting what he’s supposed to get to eat... maybe that Omena is never there... with this community around, how many can afford [to buy a dish of Omena for 50 shillings and maize for 100 shillings]? ...There are those ones who say ‘oh he likes just mandazi and porridge.’ You will just know the child is feeding on pure carbohydrate. Because mandazi is just pure carbohydrate. Porridge, with here, it is cassava porridge. It’s pure carbohydrate.”

12. What kinds of nutrition information are given to new mothers at the clinic?

“We don’t [give nutrition information]. We’re supposed actually, to be holding a health education every month, but we don’t have man power.”

13. Do you/clinic staff involve men/fathers and grandmothers in nutrition advising? (Why/Why not?)

“Actually, we are supposed to involve the men because they are the bread winners. Men involvement is very essential. But, this is something that, we’ve not, actually taken any initiative of doing it.”

14. In your opinion, what are the causes of undernutrition among children in the Kopanga sub-location? (Asked as: What do you think is the reason why children are malnourished in Kopanga?)

“They are eating high carbohydrate foods. The problem is the [lack of] protein in the diet... with malnutrition you look at so many things, but the main problem- if we can correct the protein- [is the] lack of protein in the diet. They have the carbohydrate.”

15. What are the challenges to proper nutrition in the Kopanga community?

“It’s because well, ideally, Luos have not been farmers. Maybe from other regions, I don’t know. Before we [moved to Kopanga] –when I was at the market- people were not growing maize. So the problem is they have the land, but ideally they’re not farmers. They just only grow cassava. And when you ask them they tell you it is drought-resistant that is why they’re growing it. So, the main problem is if people around can change their notion and know that most of these food stuff can just come from their garden. Yeah, that one will help. From last year is when I started growing beans here. [When I suggested growing maize and beans, they] told me it will not grow. I’m surprised now they’re planting maize and beans and it is growing. I told them even to plant bananas, [my mother-in-law] told me this area is very dry. It is their culture... they’re not farmers. So, vigorous health education- that is the only thing that will help. That

is why it is very hard to phase out these children. When you phase them out, what will they eat?”

16. What are the challenges to treating malnutrition at the clinic?

“Donor fatigue- because they say they don’t have money... it’s like they’re bored with the program. That’s our major challenge. And, also, another challenge is what I usually know is if you want to run a program effectively, you always get the right person to run the program...[we need a nutritionist].”

17. What is your vision for this nutrition program?

“[Provide children] with everything if I had the money, but the problem is for me to correct the protein part of the diet so the child does not get Kwashiorkor.”

Appendix 2:

Final report presented to Partnering for Progress

**Assessment of the “Power of Milk” Nutrition Program
June – September 2012**

**Onyinye Edeh
University of Washington
Department of Global Health MPH Candidate**

**Submitted:
March 22, 2013**

Background

Ms. Onyinye Edeh, a Department of Global Health MPH student at the University of Washington, Seattle, Washington was tasked by “Partnering for Progress (P4P)”, a Spokane-based non-government organization (NGO) to assess the Comprehensive Rural Health Dispensary’s “Power of Milk” nutrition program which received support from P4P.

The aims of the project were to:

1. Evaluate the current nutrition program in the context of evidence-based Practices
2. Gather feedback from clinic staff about nutrition services provided and identify barriers to effective tracking of child growth and management of child undernutrition
3. Provide recommendations (based on nutrition program *best practices*) to improve the quality of services at the Comprehensive Rural Health Dispensary (CRHD)
4. Fulfill the University of Washington’s Department of Global Health MPH *Practice* Thesis requirement.

The “Power of Milk” Nutrition Program

The “Power of Milk” nutrition program (hereafter referred to as “the nutrition program” or “program”) was initiated in April 2012 with an agreement by members of Partnering for Progress and the Comprehensive Rural Health Dispensary’s Head Nurse, Alice Wasilwa. The program was to be a pilot project to provide dietary supplements to undernourished children and nutrition education to mothers and caregivers around Kopanga. The program objective was to reduce the number of malnourished children in the dispensary’s service area. The program was to be evaluated at the end of six months to determine impact and further investment. At the time of the student’s arrival the program had been in place for only two months.

Below are findings from the student’s time in Kopanga, and recommendations based on the student’s review of existing literature, input from faculty mentors, feedback from health and nutrition personnel, and research on evidence-based practices. This assessment took the form of a combination of *case study and process* and *participatory* evaluations⁶ by looking at the implementation process of the CRHD nutrition program and gathering feedback from program staff and participants. It is hoped that this evaluation will be used to inform future P4P and CRHD program designs, to improve the quality of nutrition services offered at the Comprehensive Rural Health Dispensary, and to determine critical areas of needs and guide investment decisions.

Methodology

This assessment utilized mixed-methods through:

⁶ Case Study: “a detailed review of a unique or important program that captures the background, process, outcomes, successes, failures, and

lessons learned.” (University of Washington- Department of Global Health Master’s Thesis Handbook. Accessed: 09/21/2012)

Process Evaluation: a type of evaluation used to “assess whether a project is being implemented according to its design.”

(http://www.healingclassrooms.com/downloads/IRC_Evaluation_Guidelines.pdf. Accessed: 10/18/2012)

Participatory Evaluation: a type of evaluation that “involves stakeholders and beneficiaries in a collective examination and assessment of a

project.” (http://www.healingclassrooms.com/downloads/IRC_Evaluation_Guidelines.pdf. Accessed: 10/18/2012)

- Development of a spreadsheet and forms to systematically capture clinic data on anthropometric information and child feeding (exclusive breastfeeding, complementary foods, formula, etc.)
- Exploratory interviews with clinic staff regarding barriers that addressed adequate record keeping, child anthropometric measurements, clinic efficiency and nutritional supplementation. The interviews were conducted using a list of pre-developed questions that served as a “start list,” and allowed for other questions as they arose. (See appendix A)
- Interviews with personnel at neighboring health facilities and organizations who address malnutrition, NGOs, the Kenyan Ministry of Health, and University of Nairobi regarding potential resources and to gain further advice on approaches to the nutritional program.

Findings

Below is a condensed list of main findings based on conversations with the nutrition program staff and caregivers of children enrolled in the program. It includes some direct quotations. For more detailed findings, see attached weekly reports from the field.

“Power of Milk” Approach and Status in June 2012 Evaluation:

- The number of children enrolled in the nutrition program was difficult to ascertain due to a lack of an adequate record-keeping system. No record was available for the number of children who had been enrolled in and exited from the program. Program forms for 49 children were available at the time of the assessment, but only 20 of those children had been back for monthly follow-ups as of June 2012. The 49 children captured on the forms ranged in age from 2 weeks to 3 years old.
- Participants in the program live around the Kopanga sub-location and as far as Tanzania (approximately 30 minutes to an hour away on a motorbike).
- Most common foods fed to children by their caregivers included: porridge (Ugi), Ugali, Sukuma wiki (local vegetable), milk (breast & cow’s milk), bananas
- The nutrition program utilized the following interventions: 1) provision of 300 Kenya shillings- Ksh (~ \$3.75 US) to mothers and caregivers for the purchase of cow's milk, 2) provision of 2 kgs of flour mixture composed of green grams, maize, and finger millet, and 3) provision of Vita Meal rice supplement. Vita Meal was engineered for malnourished children, and is composed of rice, lentils and 25 essential vitamins and minerals. Each package feeds “one young child for 30 days or one older child or adult for 15 days.”⁷ Due to miscommunication Vita Meal supplements were being given to lactating mothers (rather than to children) to help in the production of nutritious breast milk and for general maternal

⁷ <http://www.examiner.com/article/vitameal-vegan-and-gluten-free-way-to-feed-starving-children-around-the-world>

nourishment. Flour supplements were prepared by the head nurse and packaged by the nutrition assistant for distribution to caregivers.

- Food supplements and money (300 Ksh) were not always available during scheduled monthly follow-up visits. Caregivers were often asked to come back at a later time to pick up supplements.
- No formal criteria were being used for enrollment into the nutrition program. Referral/recruitment was at the clinic and community level; children were enrolled based on referral from clinic nurses following physical examination during a clinic visit, report of severe illness, and informal assessments of the parent(s)' economic status. No specific weight-for-age (WAZ)/ height-for-age (HAZ)/ weight-for-height (WHZ) thresholds were required for enrollment. Children enrolled in the program were mostly infants. Enrollment in the program was up to the head nurse's discretion.
- A Nutrition Assistant was hired in April 2012 to assist the head nurse with the implementation of the nutrition program. However, no formal training on nutritional interventions and serial assessment (except for training on collecting anthropometric measurements) had been offered to the Nutrition Assistant.
- The technical design of the program was lacking. No baseline information was available, and no entry or exit criteria had been established for the program.
- Anthropometric and demographic documentation of children was haphazard, and record keeping was deficient.
- The provider's assessment was that undernutrition in program participants was caused by lack of protein and HIV status.
- Upon the student's arrival, no child home visits had been conducted. Follow-up had only been done during child's monthly clinic visits.

Feedback from Nutrition Staff:

- The nutrition program was developed by Mrs. Alice Wasilwa, the head nurse at the CRHD. Communications between Mrs. Wasilwa and P4P have been complicated due to different visions and implementation strategies for the program. When asked about the program, Mrs. Wasilwa responds: "What I want is, if this is my dream, I want [P4P and staff] to follow what I think is right. Because I'm talking as a nurse. I think I know what is right for a child. I want to tell P4P what to do, not P4P to tell me what to do. They're in Washington State and we are in Kopanga, Magongo. I have to give them the guidelines... You know the problem with the donors, they always want you to do what they want, and that is why we don't agree with P4P... we don't speak the same language. I

cannot [and] don't have the money, but I have the knowledge. I don't want the program *if* they know they cannot support it well."

- The Nutrition Assistant did not understand her job description and expectations. She remarked, "I'm not a qualified nutritionist." "I'm not from this place [Kopanga]." "This program needs a qualified nutritionist." "Alice is busy, and she does not have time to mentor me."
- Unavailability of a computer created challenges for communication and delivery of reports between the nutrition assistant and P4P. The nutrition assistant remarked: "The reason I can't communicate with [P4P] the way they want is because I don't have a laptop... because I depend on Sospeter's [clinic manager] laptop. It's him who has a laptop [and] modem."
- General constraints voiced by staff and caregivers: "The money [for nutrition program implementation] is not enough."

Feedback from Caregivers:

- Overall, the mothers and caregivers were appreciative of the support that has been provided to them through the nutrition program. One caregiver remarked: "whatever we've been given has been so helpful to the child."
- Caregivers emphasized a need for more information on nutrition for children- they want to know how to keep their children healthy.
- Lack of education means that mothers do not know what kinds of foods to eat for more nutritious breastmilk. Caregivers noted that "we can breastfeed them, but due to lack of teachings..."
- Caregivers lack funds to support healthy child growth. "They know. But the way of getting income to feed the children [is lacking]."
- "Lack of finance" is the stated cause for child undernutrition.
- The food supplements are not enough to last the child for one month.

Findings from Home Visits:

- Limited access to clean water- a majority of the mothers/caregivers gets their household water from nearby rivers and uncovered boreholes.
- Most families owned latrines, but some reported that the latrines had "fallen in." Some families reported using nearby bushes, and covering up excrements.

Program Impact:

- Based on the student's review of monthly growth measurements and anecdotal information from discussions with caregivers and the nutrition program staff, the nutrition program seems to have helped improve the nutritional status of most of the children enrolled in the program. Though, the extent to which micronutrient deficiencies have been addressed is unknown. Take L.A. for example. L.A. lost her twin sister to undernutrition during infancy. But L.A. is now 3 years old and making good improvements in her nutritional status. Her mother attributes the health of her child to the nutrition program. Other cases of critically malnourished children who improved significantly were shared by the head nurse and other nutrition program staff.

Project Outcomes

During her time in Kopanga the student:

- Re-initiated the nutrition program based on results of the program assessment, contact and feedback from local nutrition programs, District Nutrition Officer, UNICEF representative, nutritionists, dietitians, and by utilizing the WHO Child Growth training documents and the Kenya Ministry of Health guidelines on child nutrition.
- Assisted the nutrition staff with the implementation of the nutrition program by creating forms and a database for storing child visit and demographic information, providing health education to mothers and caregivers (aged 20-66), and conducting home visits.
- Evaluated enrollment and follow-up data on moderately and severely undernourished children under the age of two for 2 months during the assessment visit.
- Facilitated contact with community health workers, local health personnel and facilities, and local nutrition programs to promote sensitization on malnutrition, training, and sharing of ideas and resources.
- Provided evidence-based program recommendations to the Comprehensive Rural Health Dispensary's nutrition staff and Partnering for Progress.

Challenges/Limitations

- Lack of program structure and explicit objectives/targets
- Data constraints; lack of adequate data to assess changes in child nutritional status
- Nutrition program was privately administered which affected program implementation and hindered programmatic changes
- Lack of staff program management training posed challenges to the effective implementation of the program

Lessons Learned

- Polé, Polé (Swahili for ‘slowly, slowly’). Change takes time. When working in a rural and remote setting in a developing country, patience and clear communication are vital.
- A Program Theory is critical for the success of a program.
- Theory is very different in reality (aka “seeing is believing”).
- Don’t make assumptions.
- “If you want to go fast go alone, if you want to go far go together.” – Statement by Seth Okumu, field supervisor
- “Walk, don’t run.” – Advice from Alice Wasilwa, CRHD head nurse

Recommendations

The following recommendations are suggested based on the student’s assessment of the state of the *Power of Milk* nutrition program, and in compliance with evidence-based practices and insights from nutrition experts and health personnel.

The Nutrition Program

- Partnering for Progress and the CRHD should develop a *program theory*⁸ or a Standard Operating Procedure (SOP) outlining their resources, program objectives, program goals, measurable indicators, chain of activities, and plan for monitoring and evaluation of the program.
- The Nutrition Program should be halted until 1) a written agreement (in the form of a program theory) and protocols (including entry and exit criteria) are put in place to be implemented, 2) staff involved with the program are adequately trained on nutrition and required duties.
- Baseline data from the community should be ascertained pertaining to community awareness of malnutrition, rates of malnutrition, childcare and feeding practices, and the availability and kinds of food in the region.
- Caregivers of children enrolled in the program should take a pre and post-enrollment survey to assess baseline and outcome knowledge of good childcare practices and malnutrition.
- The focus of the *Power of Milk* nutrition program should shift from making and providing “flour” mixtures to mothers and caregivers for their child(ren) to encouraging and promoting breastfeeding and the production of breastmilk, and providing health and nutrition education to new and current mothers/caregivers.
- The program should provide culturally sensitive health and nutrition education to debunk myths about breastfeeding and proper child feeding practices. This can be

⁸ Program Theory: logical description that addresses “how and why a program is supposed to work.” (http://www.evaluatod.org/resources/evaluation-guides/LogicModel_8-09.pdf. Accessed: 11/14/2012)

done through use of Information, Education, and Communication (IEC) materials in the local language(s).

- The program should incorporate behavioral change and communication activities into its interventions.
- Based on the fact that the program sees and enrolls children who are lagging in their growth (according to recommended child growth standards), the program should promote child stimulation and growth monitoring.
- The Comprehensive Rural Health Dispensary and Partnering for Progress should partner with the Kenya Ministry of Health via the Migori District Hospital and the District Nutrition Officer to ensure provision of good and adequate support to malnourished children.
- Investment in increasing/improving access to clean water should be considered in order to ensure that caregivers are able to obtain clean water for their children.

Referral and Follow-up

- The Nutrition Program should develop clear and objective criteria for recruitment, enrollment, and follow-up of children and caregivers in the program.
- Different treatments should be implemented depending on the nature and severity of malnutrition based on the Kenya “National Guideline for Integrated Management of Acute Malnutrition” and in collaboration with the District Nutrition Officer.
- In establishing enrollment criteria, home location of the patient should be taken into consideration to aid in proper follow-up of the child.
- Nutrition program staff should work with the Kopanga area community health workers (CHWs) to recruit and follow-up children in the program.
- Clear lines of communication should be established between nutrition staff, caregivers, and community health workers to ensure understanding and adherence of program protocols.

Nutrition Program Staff

The nutrition program staff should:

1. Be knowledgeable on the process of collecting anthropometric measurements.
2. Receive proper and adequate training on detecting malnutrition, assessing infants and children for malnutrition, and communicating with caregivers about their child’s nutritional status.
3. Be able to provide culturally sensitive and relevant health education.

4. Be familiar with the WHO and Kenya Ministry of Health Guidelines for treatment of acute malnutrition.
5. Be fluent in/familiar with the local languages of Swahili and Luo to aid communication with the community.

Future Directions

- Conduct baseline assessment on the nutritional status of children around the dispensary's service area.
- Conduct baseline survey of attitudes, perceptions, and understanding of malnutrition among mothers, caregivers, and community members.
- Partner with the Migori District Hospital, UNICEF, community health workers, and local leaders to provide adequate support and rehabilitation to undernourished children
- Hire qualified nutritionist to implement nutrition program- someone with knowledge of how to detect, monitor, and address malnutrition

Final Thoughts & Acknowledgements

Prior to my departure from Kenya, I was asked to reflect on this question: “Do you feel that you had the right skill mix to support the *Power of Milk* program?” My response is “not fully.” While I acknowledge my strengths and talents in diplomacy and cultural sensitivity, and the knowledge I was able to share about child nutrition, I feel that the Nutrition Program needed a lot more than I could offer as a graduate student- in regards to expertise and technical support. I hope that this final report (in addition to the weekly reports from the field) provides some valuable information to enable P4P and CRHD move forward with their objective of improving child and maternal health in and around Kopanga. My sincere gratitude goes to the entire P4P and CRHD team for allowing me to take part in this project. It was an eye-opening and truly remarkable global health experience. I am grateful to my former faculty and staff advisors (Stephen Gloyd and Krishna Richardson) and my MPH committee members (Grace John-Stewart, Jonathan Gorstein, and Christine McGrath) for their academic and professional support and encouragement throughout this project. To the Kopanga community, thank you for welcoming me and for allowing me to learn through and from you. To my Field Supervisor, Mr. Seth Okumu, asanté sana for your tireless efforts, great spirit, and insights.