The effectiveness and challenges of Food by Prescription (FBP) - Firstfood® in the management of moderate malnutrition among under-five year old children in Karemo Division, Siaya County, Kenya.

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A research thesis submitted for the award of a degree of Master in Public Health in the School of Public Health of Kenyatta University.

March 2013
DECLARATION

This thesis is my original work and has not been presented for a degree in any other University or any award.

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DEDICATION

This project is dedicated to my siblings Betty, Vincent, Benter and my dear wife Bella for their moral support while doing this work.
ACKNOWLEDGEMENTS

For this study to be what it is now, I am most grateful to my supervisors Dr. Florence Okwara and Dr. George Orinda whose guidance and constructive critique were fundamental in developing and shaping up this study. I wish to also express my gratitude to James Orwa for his great support with data management. My acknowledgement also goes to my research assistants; Linnet, Margaret, Judy, Doreen, Patrick and Jane for their dedication and sacrifices while collecting data for the study. My appreciation also goes to the study participants who volunteered their time and useful information during data collection. I would also like to thank the management of Siaya District Hospital, Tingwangi, Ngiya, Kogelo and Bar- Olengo health facilities for their hospitality and support when undertaking this project.
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OPERATIONAL DEFINITIONS

a) **Effectiveness**: Is defined in this study as the ability of the nutritional supplement (FBP *Firstfood*) to improve the nutritional status of the under-five malnourished children from a moderate malnutrition to mild malnutrition or no malnutrition status.

b) **Nutrition**: Is the sum of all processes involved in taking in of nutrients and their assimilation and use for proper body functioning and maintenance of health. The successive stages include ingestion, digestion, absorption, assimilation and excretion.

c) **Malnutrition**: Any disorder of nutrition. It may result from an unbalanced, insufficient or excess diet or from impaired absorption, assimilation or use of food.

d) **Moderate malnutrition** (MM): Is defined as a weight for age or weight for length/height between -3 and -2 z-scores below the median of the WHO child growth standards. It can be due to a low weight-for height (wasting) or a low height-for-age (stunting) or to a combination of both.

e) **Nutritional therapy**: Refers to an administration of food and fluids to support metabolic processes of a patient who is malnourished or at risk of becoming malnourished.

f) **Food by Prescription** (FBP): This is a nutrient supplement in form of porridge flour administered to malnourished children and or adults as part of their therapy. It comes in three categories for children under five, adults and pregnant women.

g) **First Food** (FF): This is a nutritionally dense supplemental food with additional energy (450kca per 100g) prescribed for moderately malnourished under five children.

h) **Children under-five**: Children who have not completed five years of age since their birth.
i) **Z score:** A standard deviation score that has reference to WHO normalized values for height for weight for age. It is a tool used in nutritional assessment to compare age, height and weight.

j) **Weight for Age:** Measure for underweight

k) **Weight for Height:** Measure for wasting

l) **Height for Age:** Measure for stunting

m) **Anthropometric Measurements:** This refers to a set of noninvasive, quantitative techniques for determining an individual's body fat composition by measuring, recording, and analyzing specific dimensions of the body, such as height and weight; skin-fold thickness; and bodily circumference at the waist, hip, mid upper arm and chest.

n) **Ready to Use Food Therapy:** This refers to a nutritional supplement that comes in a pre cooked and ready to use form like peanut butter, nutritious biscuits, FBP among others.
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<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>ART</td>
<td>Antiretroviral Therapy</td>
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<tr>
<td>BMI</td>
<td>Body Mass Index</td>
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<tr>
<td>CBS</td>
<td>Central Bureau of Statistics</td>
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<td>CDC</td>
<td>Centers for Disease control and prevention</td>
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<td>CHWs</td>
<td>Community Health Workers</td>
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<td>FACES</td>
<td>Family Aids Care and Education Services</td>
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<td>FBP</td>
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<td>GAIN</td>
<td>Global Alliance for Improved Nutrition</td>
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<td>GoK</td>
<td>Government of Kenya</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>IDIs</td>
<td>In-depth Interviews</td>
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<td>IMC</td>
<td>International Medical Corps</td>
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<td>KDHS</td>
<td>Kenya Health Demographic Survey</td>
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<td>KEMRI</td>
<td>Kenya Medical Research Institute</td>
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<td>KII</td>
<td>Key Informant Interviews</td>
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<td>MDGs</td>
<td>Millennium Development Goals</td>
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<td>MM</td>
<td>Moderate Malnutrition</td>
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<td>MoH</td>
<td>Ministry of Health</td>
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<td>MCH</td>
<td>Maternal and Child Health</td>
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<td>MUAC</td>
<td>Mid Upper Arm Circumference.</td>
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<td>NASCOP</td>
<td>National Aids Control Programme</td>
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<td>Acronym</td>
<td>Full Form</td>
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<td>NGOs</td>
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<td>NNS</td>
<td>National Nutrition Survey</td>
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<td>NRUs</td>
<td>Nutritional Rehabilitation Units</td>
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<td>PLWAs</td>
<td>People Living with HIV and Aids</td>
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<td>PMTCT</td>
<td>Prevention of Mother to Child HIV Transmission</td>
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<td>PSC</td>
<td>Patients Support Center</td>
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<td>RUFT</td>
<td>Ready to Use Food Therapy</td>
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<td>SDA</td>
<td>Seventh Day Adventist</td>
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<td>SAM</td>
<td>Severe Acute Malnutrition</td>
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<td>SD</td>
<td>Standard Deviation</td>
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<td>SDH</td>
<td>Siaya District Hospital</td>
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<td>TB</td>
<td>Tuberculosis</td>
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<td>UN</td>
<td>United Nations</td>
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<td>UNAIDS</td>
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<td>UNICEF</td>
<td>United Nations International Children Education Fund</td>
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<td>USAID</td>
<td>United States Agency for International development</td>
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<td>WFP</td>
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ABSTRACT

Malnutrition in children remains as a significant global problem, accounting for up to 56% of the 10.6 million child deaths annually in developing countries. Kenya like many sub-Saharan African countries has had the highest case fatality of malnutrition, AIDS and tuberculosis (TB). Various interventions have been put in place to combat the under-five malnutrition in line with the realization of millennium development goal (MDG) number 4. Nationally, the Kenya’s Ministry of Health (MoH) in collaboration with international and local agencies has been rolling out a “ready to use food therapy” programme dubbed “Food by Prescription (FBP)” since the year 2006 targeting moderately malnourished children. This product is locally manufactured by Insta Products and comes in form of pre-cooked corn soy blend porridge flour. Despite the roll out of this programme, very little is known about its effectiveness in improving nutritional status of moderately malnourished children which was one of its core mandates. This study sought to assess the effectiveness of FBP (Firstfood) in the management of moderate malnutrition (MM) among under-five year old children in Karemo division of Siaya District. The study design was a prospective cohort to allow comparison of the anthropometric measurements at baseline and three months later at exit to test for any significant improvement. Three months was recommended by the product guideline to allow for any meaningful change in nutritional status and the children were exited regardless of the outcome. A total of 215 children with MM (Z score < -2) and their primary caretakers were recruited. Stratified sampling technique was employed to proportionately allocate facility sample sizes, and convenient sampling to recruit the participants from the five study sites. Mixed design of qualitative and quantitative techniques was used. Quantitatively questionnaires were administered alongside taking anthropometric measurements [weight, height and Mid Upper-Arm Circumference (MUAC)] of the children both at enrollment/baseline and exit. STATA10 was used to analyse data whereby a paired T test was used to compare means of Z scores, and of individual anthropometric measurements at baseline and exit. Association of exit Z score was also performed against individual categorical variables. The findings revealed a significant increase in weight and MUAC at exit with P value < 0.001. There was positive improvement in height though Z score was not statistically significant. On the socio-demographic variables, breastfeeding was significantly associated with improvement at P value < 0.001. Overall 43.5% of the participants recovered from moderate malnutrition to mild or no malnutrition excluding 8.5% who were enrolled with mild malnutrition. 45% did not improve while 3% developed severe malnutrition. Inadequate FBP staff, poor nutritional counseling and FBP education as well as FBP (Firstfood) sharing among members of the household emerged as main barriers to moderate malnutrition recovery. Other factors included stigma associated with FBP (Firstfood) seen as food for HIV positive thereby keeping others away from using the food or going for refill. Failure to thrive was also attributable to the short (3 months) follow up period. This study recommended the need for exit package information to be delivered through more counseling and education, regular home follow up visits to monitor the administration of FBP. Programmatically, there was need to increase the duration of FBP supply from 3 months to at-least 6 months to allow meaningful improvement before exit. More trained staff were needed to dispense FBP (Firstfood). There was need to avail FBP to other clinics like the Maternal and Child Health (MCH) to de-stigmatize its association to HIV infected patients. Further studies were recommended to enhance understanding on the FBP (Firstfood) needs for the HIV positive compared to the HIV negative under-five children in order to establish differences in calorie needs and recovery rates.
CHAPTER ONE
INTRODUCTION

Background of the Study

Malnutrition refers to poor nutrition because of an insufficient or poorly balanced diet or faulty digestion or utilization of foods (World Hunger and Poverty 2010). Malnutrition presents in various categories depending on severity, and is usually reflected in Z-score values (standard deviations from the mean) for children less than five years of age. This ranges from mild, moderate to severe malnutrition.

Malnutrition remains the world’s most serious problem and single biggest contributor to child mortality (Hirsch 2008, Fields 2008). The problem is particularly prevalent in developing countries, where it affects one out of every three pre-school age children (Selah, et.al 2006; UN 2004). UNICEF (2006) affirms that more than one quarter of all children under the age of five in developing countries are underweight and many to a life-threatening degree.

Child malnutrition accounts for up to 56% of 10.6 million child deaths annually in developing countries (Hirsch 2008). Severe Acute Malnutrition (SAM) is commonly associated with case fatality rates of up to 60% (Sadler, et.al 2008; Hirsch 2008). McClain (2008) adds that, malnourished children are prone to infections and diseases and many never achieve normal growth. This view was also echoed by Murray (1996), that malnutrition is an underlying factor in many diseases in both children and adults, and it contributes greatly to the disability-adjusted life years worldwide.
The Kenyan situation is no better, child mortality rates and malnutrition remain high, and this is in-spite of the government's commitment to create an enabling environment for the provision of quality health care and reduction of mortality and malnutrition levels (Mariara et.al, 2008). The Kenya Demographic Health Survey (KDHS) report of 2008 adds that the average Kenyan child falls behind the reference standards for linear growth by 12 to 24 months, leading to stunting rates of more than 30 percent. UNICEF (2009) affirms that under-five mortality rates remains relatively high in Kenya at 84 per 1,000 live births while infant mortality rates are well above 55 per 1,000 live births. This worrying state of malnutrition remains a serious health concern in most parts of Nyanza province, and it is particularly severe and worsening in Siaya district as revealed by the previous nutritional surveys. The situation is aggravated by the high HIV prevalence in the region according to the Kenya National Development Plan (KNPD) of 2008.

Despite concerted efforts to address malnutrition in some countries, developing world averages for underweight children have dropped only five percentage points in the last 15 years (UNICEF 2006). In its efforts to ensure health for all Kenyans, the Ministry of Health's Strategic Plan (1999–2004) aimed among other targets, at reducing malnutrition among under-five year olds by 30% (Mariara 2008). Multi-pronged approaches had been put in place to address the worsening malnutrition situation. A Ready to Use Food Therapy (RUFT) programme, dubbed “Food by Prescription” (FBP) is one such intervention under PEPFAR with funding from USAID, which was piloted in January 2006. A year later it was rolled out to more facilities that covered most parts of Nyanza Province including Siaya district (Muyunda 2008). FBP come in three different brands, the Firstfood® brand meant for under-five year old children; Advantage® for pregnant mothers and Foundation plus® (F+) for children above 5 years. The product is locally made by
Insta-Products Kenya, dispensed in form of porridge flour and prescribed for three months then the beneficiaries are exited afterwards (See appendix1 for details and nutritional value). The scaling up of the programme has been steadily rising, however the effectiveness of FBP - *Firstfood* has not been determined (Mohammed 2008).

**Problem Statement**

FBP-*Firstfood* programme was introduced in Kenya in the year 2006, with a core mandate to prevent loss of weight and lean body mass and facets of malnutrition among under-five year old children. Despite the roll out of the programme, malnutrition remained a serious problem with a high rate of 33%. Informal interviews with FBP-*Firstfood* providers pointed out cases of children exiting the programme after attaining the recommended Z-score value, only to appear for re-enrollment after relapse to initial malnutrition status. The effectiveness of FBP-*Firstfood* in managing moderate malnutrition among under-five year old children, some of whom were HIV positive and living under varied social circumstances was not yet documented. The re-admission of failure to thrive and relapse cases into the programme had made the programme a vicious circle. This study sought to assess the effectiveness and challenges of FBP-*Firstfood* programme in managing moderate malnutrition among children under-five years of age in Karemo division of the greater Siaya District. The findings of this study would contribute towards informing similar nutritional intervention programmes locally and nationally at the policy level so as to improve service delivery and effectiveness of the programme.
**Research Questions**

This study sought to answer the following questions;

1. Is FBP-*Firstfood* effective in the management of moderate malnutrition among under-five year old children in Karemo division?

2. What factors influence the implementation and effectiveness of FBP-*Firstfood* among the moderately malnourished under-five year old children?

3. What is the rate and causes of relapse to malnutrition condition among under-five year old children exited from FBP- *Firstfood* programme?

4. What factors predispose children under the age of five to malnutrition in Karemo division?

**Study Objectives**

**General Objective**

The objective of this study was to assess the effectiveness and challenges of FBP-*Firstfood* programme’s product in the management of moderate malnutrition as well as the implementation challenges among children under-five children of age in Karemo division.

**Specific Objectives**

1. To assess the effectiveness of FBP-*Firstfood* among the moderately malnourished children aged under-five years in Karemo division.

2. To establish the factors affecting FBP-*Firstfood* implementation & effectiveness among the moderately malnourished children aged under-five years in Karemo division.

3. To establish causes and rate of relapse among children aged under-five years on FBP-*Firstfood*. 
4. To establish the predisposing factors to under-five malnutrition situation in Karemo division.

**Hypotheses**

**1.5.1 Null Hypotheses**

$H_1$ FBP-Firstfood has no significant effect in weight change among moderately malnourished under-five year old children in Karemo.

$H_2$ FBP-Firstfood has no significant effect in Mid Upper Arm Circumference (MUAC) change among moderately malnourished under-five year old children in Karemo.

$H_3$ FBP-Firstfood has no significant effect in height change among moderately malnourished under-five year old children in Karemo.

**Significance and Anticipated Outputs**

There had been increase in the roll-out and coverage of the FBP-Firstfood as an intervention specifically targeting the moderately malnourished children aged under five years. There was however limited information on the effectiveness of the product among the intended target. To inform the rapid expansion of the programme it was necessary to establish the effectiveness of the intervention as well as the challenges to intervention. Information generated from this study would shed more light towards understanding how effective the programme is, it would also highlight some of the challenges experienced in the implementation process. Such understanding would inform policies in the FBP-Firstfood roll out on appropriate strategies to put in place. This would go a long way to inform other similar nutritional interventions and policies to effectively combat malnutrition in Kenya and beyond.
Limitations

In assessing the effectiveness of FBP-Firstfood, the children enrolled in the study were re-evaluated three months post FBP initiation at the point of exit from the programme; hence any occurrences beyond the intervention were missed out by this study. The study was confined to healthcare facilities within Karemo division that were implementing the FBP-Firstfood programme. The facilities included; Siaya District Hospital (SDH), Ng’iya Mission Health Center, Tingwang’i Health Center alongside Kogelo and Bar-Olengo Dispensaries. These were high HIV burden areas hence the findings could be more relevant to similar settings. The study was also unable to control other feeds given to the children during their participation in the study, FBP-Firstfood was a supplement hence caretakers were urged to continue with their normal feeding programme.

Assumptions

The study was undertaken under the assumptions that the caretakers followed the right procedures in preparation and feeding the porridge (FBP-Firstfood). Another assumption was that the nutritional content of the FBP-Firstfood given to the children was the same.

Conceptual Framework

This study is premised on a frame-work that nutritional deficiencies originate from a complex set of factors. Malnutrition therefore cannot be combated by just providing or improving the access to a prescribed diet since infections, health care services, care of children, economic status, level of education and government policies are equally important causes of malnutrition. These factors work simultaneously to impact on the nutritional status of the malnourished children. The size of family members influence nutritional status of children as the prescribed food may be shared.
with other members of the household, denying the index child the quantity and quality of the prescribed food. Some parents may not prepare the food prescribed as per the instructions due to limited knowledge, thereby destroying the nutritional content of the food. Others may deny their children the prescribed food due to socio cultural factors, especially stigmatization. All these problems may arise from poor economic status, poor policies on prescribed food interventions and unequal distribution of resources nationally. Therefore different aspects need to improve concurrently in order to realize the effectiveness of an intervention like the prescribed foods. An assessment of a nutritional intervention should be broader than just a specific prescribed diet but also provide information on the total number of people affected and in particular vulnerable groups, general health, environmental conditions, public health risks, immunization status, dietary habits, local availability of foods, fuel and cooking facilities. Combined with other factors, this information provides a basis for food distribution, modification and continuation (Masinde; 2009). This is illustrated in Figure 1.
Figure 1: The vicious cycle of malnutrition in children. Adapted from UNICEF (1990)
2.1 Background Information

Malnutrition among under-five children is a common problem in the underdeveloped world (Hirsch 2008). It remains the world’s most serious problem and the single biggest contributor to child mortality (Hirsch 2008). Worldwide, half of all child deaths are caused by malnutrition, and nearly 20 million children under the age of 5 are severely malnourished (Hirsch 2008; Rayhan 2006). Antwi (2008) adds that, it is estimated that 9% of children below 5 years of age globally suffer from wasting. In developing countries, however, prevalence of malnutrition among the children under age five is estimated at 27%. In Kenya, the rate of under nutrition among children is estimated at 30%. UNICEF (2006) adds that malnutrition rates in most parts of Kenya are critical. KDHS (2008) puts the latest figure at 29.6% stunting (height for age) and the rate is highest among children within the age bracket of 12-23 months at 41.7%. More male children are stunted at 37% compared to females at 30%. Looking at wasting (weight for height) the overall figure for the country is at 5.8%. The rate for underweight is 20.3% overall (KDHS 2008).

2.2 Predisposing factors to child malnutrition

A study by Grobler (2006) showed that there was a direct connection between areas of high food insecurity and high rates of malnutrition in the areas studied in Kenya. However the available evidence and data on trends suggest that provision of food (or food as the predominant response) has not solved the problem, and will not solve it alone. He adds that, the reasons for persistently
high rates of malnutrition are always multi-faceted and multi-causal. The standard reference tool for understanding and analyzing the causes (direct, indirect and underlying) is the causal framework. The framework cites food intake and disease as the immediate causes of malnutrition, with three underlying and overlapping causes:

i) Inadequate household food security;

ii) Inadequate care and feeding practices; and

iii) Poor public health access and environment.

Available data also suggest that breastfeeding for up to twenty months is common, but that exclusive breastfeeding (for children <6 months of age) is extremely rare at about 0.4% in parts of Kenya. Infants are often fed water, tea and cow or goat milk within a few days of birth, and by 3 months most infants are given other foods. The effects of early mixed feeding have been well documented and include greater risk of infection, particularly diarrheal disease and acute respiratory infections according to Grobler (2006). According to the latest Kenya Demographic Health Surveillance (KDHS) report of 2008, 32% of all children under the age of 6 months are exclusively breastfed. This figure reduces to less that 1% by month 8. The average breastfeeding period is at 21 months (KDHS 2008).

Inadequate introduction of complementary foods (too early, too late, insufficient quantity and quality) was also pointed out. In Turkana for instance it affects over 80 percent of infants. Infant feeding practices (particularly the lack of exclusive breastfeeding) was found to be strongly associated with acute malnutrition in children in Turkana. An increased practice of exclusive breastfeeding could immediately reduce infant deaths by 20% adds Grobler (2006). Pregnant women believe that eating too much will result in a large baby and make delivery complicated.
They are frequently advised by women in their communities to reduce food intake, resulting in low birth weight (Grobler 2006). A study by Wanjiru and Whyte (1991) posit that cultural placing of women in form of gender imbalance is the major cause of malnourishment in Siaya. KNPD (2008) on the other hand, contend that poor agricultural conditions are the main causes of malnutrition in the region. Previous studies therefore tend to be inconclusive on the push factors towards under-five malnutrition in the region.

2.3 Responses to combat under-five malnutrition

A lot of efforts have been put in by various governments and Aid agencies to root out poverty and hunger as entrenched in the Millennium Development Goals (MDGs). Hirsch (2008 b) observed that, the mid-way point for the MDGs realization has been reached. This included among other, a call to reduce extreme poverty and hunger by half by the year 2015 as reflected in goal number one and goal number four calling for the world to reduce by two thirds the mortality rates among children under the age of five.

Even though significant progress has been made, close to 10 million children under five needlessly die each year (Manary 2006). Malnutrition contributes to around half of these deaths. In the backdrop of all these it’s no doubt that food insecurity and malnutrition need to be addressed as a matter of agency, Manary (2006) added that “We want a world where there is enough [for everyone] to eat, before then, we need to rescue [these kids].” This position was being shared by most interventions addressing food insecurity and malnutrition among under five children.

World health organization (WHO) set guidelines on how to manage malnutrition in its various stages using nutritional supplements in form of ready to use food therapy (RUFT), according to
Jennifer (2007), the implementation through the guidelines has produced mixed results. In Malawi, Jennifer (2007) pointed out that, WHO standard of therapy looked promising on paper, but was less successful in practice. In the Kenyan case, Food by Prescription (FBP-Firstfood) programme which is a food therapy intervention was being implemented in Kenya among moderately malnourished HIV positive and HIV negative under five children alongside adults at various health care facilities. The main themes of FBP-Firstfood as outlined in the USAID manual (USAID 2007) include strategies to;

- Maximize the effectiveness of medical and pharmacological treatments
- Prevent the development of specific nutrient deficiencies
- Optimize nutrition status, immunity and overall wellbeing
- Prevent and manage medication side effects
- Prevent loss of weight and lean body mass and facets of malnutrition
- Minimize health costs.

2.4 Use of FBP in managing malnutrition

FBP feeds are manufactured locally by Insta Products, Ltd. The Products came in different brands tailored for undernourished adults, PMTCT clients and children. The fortified blended foods contain corn, soy, sorghum, millet, vegetable oil, sugar, salt with protein concentrate, with micronutrient fortified (Muyunda, et.al 2008). FBP comes in three brands namely; Advantage: This is developed for pregnant mothers and post-partum mothers. Foundation plus: A nutritionally dense supplemental food with additional energy, and should be consumed from age 11 years upwards and First food; This is formulated as a nutritionally dense complimentary
weaning food to ensure infants grow into strong healthy children; it should be consumed from 6 months up to 10 years.

The intention of the FBP-Firstfood program is to be a stop gap measure aid quicker recovery out of moderate malnutrition (MM). Once the children are out of MM they get exit ed from the programme. With the nutritional counseling the caretakers are given, they are expected to provide appropriate nutritional needs of their children outside the programme. As highlighted by Njoroge (2008), the components of the first food product are;

**Ingredients:** Precooked whole maize, millet (*wimbi*), sorghum (*mtama*), soybeans, cane sugar, iodized salt, vegetable oil; fortified with vitamins and minerals. The Nutrition per 100g: Energy 435 kcal Protein 12% Fat 12% Carbohydrate 64%

**Preparation Procedure:**

- Before preparing the food, the person preparing it is advised to wash his/her hands with clean water and soap.

- Scoop the floor and mix with clean and safe water in a *sufuria/pan* in the ration of 6 Table spoons (100g) flour to 1 cup of clean and safe water for infants/children between age 6-24 months. For children between 2-10 years; 12 Table spoons (200g). Flour to 2 cups of clean and safe water

- The mixture is to be stirred until the paste is even then put on fire of low heat, and then allowed to boil for between 5-10 minutes, while stirring continuously. As it cooks, water can be added if too thick.

The prepared food is not supposed to be warmed; therefore the primary caretaker is encouraged to prepare only enough food for the day.
2.4.1 FBP Protocol for malnourished children as spelt out by USAID (2007)

Table 1.1: FBP-Firstfood Protocol

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Entry Criteria</th>
<th>Food Prescribed</th>
<th>Exit Criteria</th>
</tr>
</thead>
</table>
| 6-24 Months    | • Child HIV +  
• Mother is HIV+ Orphan (One or both parents)  
• Underweight (Z-score between -2 and -3)  
• Other reason for ‘vulnerability’ | • First food  
• 100g per day  
• 12 sachets per month | Reaches 24 months of age. If only underweight, reached mid-range of desired weight/age |
| 2-4 Years      | • Z score below <- 1.5 for either weight or height: Do not have to be HIV + | • First food  
• 200g per day  
• 24 sachets per month | Z-score above-1.0 for both height and weight |
| 5-10 years     | • HIV+  
• BMI for Age between 3.0 and -1.0 z score | • First food  
• 200g per day  
• 24 sachets per month | Z-score above-1.0 for both height and weight |

Note: Meaningful growth is expected to occur within a period of three months, and therefore re-evaluation of patients is done after three months and only then can one make an informed choice based on the evidence (BMI,Z score), whether to keep them in the programme or discharge. Adapted from USAID (2007); Nutrition and HIV Toolkit for FBP in health facilities.

2.5 Uptake and impact of Ready to Use Food Therapy (RUFT) Interventions

FBP-Firstfood programme is currently being implemented in most Government of Kenya (GoK), non-governmental organizations (NGOs) and mission run healthcare facilities. Family Aids Care and Education Services (FACES) an HIV programme working in over 30 healthcare facilities in four districts of Nyanza province, Kenya has integrated FBP-Firstfood in their activities (Oyuga, et.al 2007).
Studies conducted by Manary et.al (2004) in Malawi points to the success of ‘ready to use food therapy’ (RUFT). He reported higher recovery rates in pilot studies of home-based therapy with RUTF.

In informal interviews conducted with FBP-Firstfood providers in Karemo division prior to this study, there were concerns among some of the providers that some caretakers could have not been bringing their malnourished children to the health facility due to lack of adequate information on the availability of the services. This thought was being justified by the fact that pediatric admissions in SDH which is the referral hospital showed that up to approximately 35% of the children were malnourished (KNDP 2008).

It is not clear the impact being created by FBP-Firstfood among under five in Karemo division as well as the constraints being encountered in its implementation. Informal interviews with the providers also raised concerns about the cases of children who are exited from the programme after attaining the recommended Z score value only to be re enrolled a few days later after relapse to the initial malnutrition status. There is however inadequate literature to quantify this observation. This study is likely to generate such information in order to inform other nutritional programs so as to enhance their impact.

2.5.1 Factors affecting the success of RUFT interventions

As reported by Jennifer (2007), in a similar study in Malawi, a low success was realized with the ‘enriched milk therapy’ intervention. The study pointed out that it wasn’t that the product used to treat the children was harmful for the kids, but that malnutrition treatments in hospitals exposed children to other infections and disease. The study explained further that, “In Malawi, where hospitals may have three kids to a bed, it was very difficult to avoid infection,” while the WHO standard of therapy looked promising on paper, it was less successful in practice.
In their preliminary observations with implementation of FBP-Firstfood in Kisumu, Oyuga et.al (2007) observed initial low uptake of FBP-Firstfood. This occurred as clinicians and nursing team were busy with other clinical duties which were considered priority. This was an experience which could potentially be realized in other health facilities implementing FBP-Firstfood which were most likely under staffed. Record keeping and collation was also cited to be difficult because multiple prescribers kept records (Oyuga, et.al 2007). Loss to follow-up was observed and attributed to poor access to facilities because of changes in client circumstances. Inadequate resources for transport as well as mortality, and stigma were also cited. In a study by Muyunda, et.al (2008), providers and clients reported the possibility of food being shared within the households.

Children with HIV infection have been noted to have higher energy requirements and frequent infections that will delay recovery. It is not known, however, if this has practical implication for the dietary management of moderate malnutrition (MM) beyond the recommendation to provide extra energy to cover the additional expenditure related to HIV infection. This could make the Kenyan situation more complex as it gets aggravated with high HIV/AIDS prevalence and incidence as evidenced elsewhere in the sub Saharan region. The same concern is echoed by Jennifer (2007) who reported that while the evidence showed “Project Peanut Butter” was helping to save starving children in poor communities, she was of the opinion that additional studies will be needed to know whether “enriched peanut butter” would yield similar positive results in regions where malnutrition was a product of war or HIV/AIDS.

Heikens (2008) pointed out that, in HIV-uninfected malnourished children, appetite was useful, to assess nutritional recovery. This however seem not to be the case in HIV-infected children, in
whom persistent anorexia was common. A suitable feeding regimen was needed for severe diarrhea, which was often associated with high case-fatality rates. Various implementing partners supported by PEPFAR to implement the FBP-Firstfood programme including; Catholic Relief Services (CRS), Family Aids Education Services (FACES) and Academic Model of HIV Prevention and Treatment of HIV (AMPATH) have been unable to do proper assessment of the FBP-Firstfood programme due to poor record keeping and inadequate staff among others. Little focus has been put towards under five year old children as more focus is shifted towards the adults (Masinde, 2009).

2.6 Summary of literature reviewed and identified gaps

The available literature from previous studies is inadequate in terms of addressing effectiveness of the prescribed Firstfood®. Fewer studies have targeted varied levels of malnutrition in children without taking attention of the HIV status of the children. Lessons learnt from the ongoing implementation that would be helpful in informing and shaping up the implementation process is yet to be documented. Implementation of the FBP Firstfood® programme get hampered if stock is not taken on its effectiveness and appropriate implementation approaches put in place. This study has addressed this gap by looking at the programmatic and socio cultural factors that could be associated with effectiveness of the programme.
CHAPTER THREE
METHODOLOGY

3.1 Research Design
This study was prospective cohort in design. A cohort of moderately malnourished 215 children under the age of five enrolling in the FBP-Firstfood programme was recruited from the five participating health facilities. The children were then followed up monthly for three consecutive months post the FBP-Firstfood initiation before being exited from the programme at the end of month three. Comparison was made on anthropometric measurements (weight, height, MUAC) at baseline and at exit to assess FBP-First food’s effectiveness in managing moderate malnutrition. This study was a mixed method with both quantitative and qualitative approaches in data collection and analysis.

3.2 Operational Definition of Variables

3.2.1 Independent Variables

1. **Age (respondent and child):** Refers to the number of completed calendar years for the primary caretaker since birth. For children it refers to the number of completed months since birth.

2. **Sex:** Refers to the gender of the participants i.e., being male or female

3. **Number of living children:** The primary guardian’s total number of living children including the one(s) involved in this study.

4. **Level of education:** The highest level of formal education attained by the primary caretaker.
5. **Economic activity of mother:** An income generating activity that the mother of a child in this study was engaged in.

6. **Income of mother:** Daily/Monthly income of the mother from her occupation (computed in Ksh)

7. **Income of father:** Daily/Monthly income of the father from his occupation (computed in Ksh.)

8. **Economic activity of father:** An income generating activity that the father of a child in this study engaged in. (Occupation)

9. **HIV status of child:** Referred to the HIV-1 sero status of the child, as either being HIV negative or positive.

10. **Socio cultural factors:** Referred to influence emanating from the societal structures including; family structures, religious affiliations, economic factors that surrounded the malnourished child.

11. **Programmatic factors:** Referred to the whole package of the FBP programme including the sensitization, implementation, monitoring and evaluation. It involved logistics and operation procedures and guidelines.

### 3.2.2 Dependent Variables

12. **Nutritional status:** This was evaluated based on the outcome of comparison between anthropometric measurements taken at baseline and those taken at exit.

### 3.3 Study Site description

The study was conducted in Karemo Division one of the 7 divisions of the greater Siaya District. It had 4 locations and 17 sub-locations. Karemo had an area of 235.1km², with a population
density of 336 persons (KNPD; 2008). The child mortality rate is 102/1000 live births. This is much higher than the national figure of 74/1000 (KDHS 2008). Karemo division falls within the pockets of Siaya district with high poverty levels characterized by low rainfall and poor soils. The HIV prevalence in Karemo was 17% (NASCOP/MOH; 2008, KNPD; 2008). Malnutrition rates among under five year old children attending outpatient clinics was approximately 30% underweight (KNPD 2008). As shown in the study map (Appendix 10) Karemo had 7 GoK, 1 mission and approximately five private healthcare facilities. The average distance between the GoK health facilities was approximately 10 km (KNPD 2008).

3.4 Target Population

The study targeted;

- Under-five year old moderately malnourished children enrolling in the FBP-Firstfood programme in Karemo division. A total of 215 malnourished children were recruited.
- The Primary caretakers of the 215 moderately malnourished children.
- FBP service providers: Total of 5 (2 from Siaya District Hospital (SDH) – 1 from the maternal and Child health clinic (MCH) and the other from the Patients Support Center (PSC) and 1 each from Ng’iya, Kogelo and Tingwangi health facilities).

3.4.1 Inclusion Criteria

The inclusion eligibility criteria for participants (children and their caretakers) were;

- Age bracket of 6 -56 months.
- Moderately malnourished with Z score value range between -3 ≤ SD-score >- 2 (weight for length/height). See WHO normalized chart for Z scores (Appendix 2).
• Enrolling in the FBP programme at the targeted study facilities.
• Should not be participating in another nutritional intervention programme or study at the time of enrollment and for three months while in this study.
• Residents of Karemo division and not intending to relocate for the next three months post FBP enrollment.
• Giving consent voluntarily for their participation and assent for the participation of their malnourished children.

3.4.2 Exclusion Criteria

This study excluded children who;

• Had severe acute malnutrition (Z score < -3.0 for weight for height/length)
• Presented with concomitant severe diseases or congenital abnormalities in the child e.g.; TB, meningitis and cerebral palsy at enrollment.
• Required admission during the three months period of participation in the study-meaning all children who got admitted during their participation in the study were excluded from analysis.

3.5 Sample Size Determination

3.5.1 Sampling Techniques

For the quantitative category, the study employed stratified sampling technique to proportionately determine the sample sizes for each of the five health facilities that were implementing FBP-Firstfood in Karemo division. Convenient sampling technique was later used
to recruit participants as they presented at the FBP clinics. Since the variable of interest (moderate malnutrition was not) evenly distributed in the population, convenient sampling allowed eligible clients to participate in the study as they got enrolled in the FBP -Firstfood programme.

For the qualitative category of the study, participants were chosen through simple random selection from the FBP-Firstfood registers to participate in FGDs. This was after purposively picking two sites (one larger site-Siaya DH and a smaller site –Tingwangi health center) for focus group discussions (FGDs). For the in depth Interviews (IDIs), all the FBP -Firstfood programme heads from the five participating sites were interviewed.

3.5.2 Sample Size Calculation

As determined below, a total of 215 participants were enrolled in the quantitative category of this study. This was above the calculated sample size of 203 participants to cushion for possible transfer outs or loss to follow up. The sample size for the survey was calculated using a formula by Fisher et al (1998). The formula: \( n = \frac{z^2pq}{d^2} \), which is recommended for \( N > 10,000 \) where:

\[ n = \text{desired sample size} \]
\[ z = \text{standard normal deviate at the required confidence level} \]
\[ p = \text{the proportion of the target population or the estimated characteristics being measured (The proportion of malnutrition recovery due to nutritional food supplement interventions is 54% (Masinde; 2009) } \Rightarrow p = 0.54 \) implying \( q = 1 - p = 1 - 0.54 = 0.46 \]
\[ d = \text{the marginal error allowed or degree of accuracy desired (in our case 95%} \]
confidence limit, thus marginal error allowed, d=0.05).

A total of 2000 children under the age of five had been enrolled in the FBP programme across the five study sites. According to Fisher et al (1998), for a target population below 10,000 the sample size is derived by the following formula: \( nf = \frac{n}{1 + \frac{n}{N}} \), where;

- \( nf \) = the desired sample size when the population is less than 10,000
- \( n \) = the desired sample size when the population is more than 10,000
- \( N \) = the estimate of the actual target population

\[
n = (1.96)^2 \times (0.54) \times (0.46) = 381.7 \text{ (Since } N < 10,000) \]

\[
(0.05)^2
\]

\[
nf = \frac{n}{1 + \frac{n}{N}} = \frac{381.7}{1 + \frac{381.7}{N}} \text{ But } N=2000
\]

Hence \( nf = \frac{381.7}{1 + (381.7/2000)} = 203 \)

The sample size was calculated as 203. This formula was adopted since it had been used in other previous nutritional assessment studies as in Masinde (2009).

For the qualitative category, the study had 2 FGDs (12 participants per FGD) with primary caretakers of the enrolled children and 5 In-depth interviews with FBP-Firstfood providers. The number of FGDs was pegged to the level of saturation whereby no new information or theme was coming up from the discussions. The study had initially planned for 3 FGDs but ended up conducting two when saturation point was reached.
Table 3.1: Breakdown on the number of participants

<table>
<thead>
<tr>
<th>Participant category at enrollment</th>
<th>Number of participants</th>
<th>Method of data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under five years old children</td>
<td>215</td>
<td>Taking of anthropometric measurements</td>
</tr>
<tr>
<td>Primary Caretakers</td>
<td>24</td>
<td>2 FGDs of 12 participants each</td>
</tr>
<tr>
<td>Key Informants (FBP-Firstfood providers)</td>
<td>5</td>
<td>In-depth Interviews with Key informants</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>244</strong></td>
<td></td>
</tr>
</tbody>
</table>

3.6 Research Instruments

Approved and standardized anthropometric measurement instruments were used at the targeted health facilities to take the measurements. The instruments included MUAC tape, weighing scale and height/length board which were routinely being used at the targeted facilities. The other tools included: consent forms; baseline and exit questionnaires, FGD and IDI guides. The instruments were developed to be able to address the study objectives, bearing in mind the local language (Dholuo) and the recommended readability scale of 8 was ensured to ease understanding. Where necessary, the study used the translated Dholuo version of questionnaires and interview guide to enhance comprehension by the participants. Consent forms were also developed to help obtain the participants approval. The consent forms were translated in Dholuo and back translated to English by a professional translator (See appendix 3).

3.7 Pre-testing Study Tools
The study tools were pre-tested in Boro health center within Boro division. This was conducted with a sample of 20 participants enrolled in FBP-Firstfood programme at the facility. The sample size of 20 was chosen to represent approximately 10% of the main study sample size. Boro was chosen because of its proximity and similarities with Karemo division. They shared various health indicators like child and infant mortality rates, malnutrition rates, HIV prevalence and incidence among others. Based on the performance of the study tools necessary adjustments were made to improve their suitability.

3.7.1 Validity

Validity of the study tools was enforced by putting in place a number of factors. Some of the study forms were translated to the native languages, Swahili and Dholuo and then back translated by independent professional translators to ease understanding. Other tools like weighing scales (Salter), height/length boards and MUAC tapes were calibrated to the recommended standard to enhance accuracy.

Accompanied interviews whereby the research assistant conducted the interviews in the presence of the investigator were employed. Anthropometric measurements were also taken alongside the research assistants and the health facility staff/ FBP-Firstfood provider during the pilot to help improve accuracy in reading the measurements. This was followed by debriefing sessions to share the experiences/challenges and to identify which parts of the study tools needed to be adjusted or harmonised appropriately to better the accuracy of the tools.

3.7.2 Reliability
To ensure reliability, the measurements taken by the research assistants were compared among themselves, and also with the measurements being recorded by the FBP-*Firstfood* providers in the FBP-*Firstfood* registers. Re-interviews were conducted to 10% of the respondents picked randomly to compare the consistency of the responses.

### 3.8 Data Collection Tools and Techniques

#### 3.8.1 Anthropometric Measurement Tools

These included:

- **Height/Length board:** Was used to take heights of participants both at baseline during enrollment in to the FBP-*Firstfood* programme, at month two and at the third month post enrollment during exit. To take height/length measurements, children who were unable to stand were laid down straight on a calibrated board, whereas those able to stand were made to stand straight next to a height boards and the readings recorded in centimeters.

- **Weighing Scale:** (Calibrated Salter Scales) were used to take participant’s weight both at baseline and at exit. The weights were taken in kg.

- **MUAC tapes:** Were used to take the measurements for the Mid Upper Arm Circumference on the children.

#### 3.8.2 Questionnaires: The study had both baseline and exit questionnaires. Research assistants administered the questionnaires to the respondents who were primary guardians. The baseline questionnaires were administered at enrollment while the exit questionnaires were administered
three months post enrollment at the point of exit from the FPB programme. (See appendices 7&8)

3.8.3 In-depth Interviews (IDIs)

These were interviews conducted on a one on one basis with the FBP-Firstfood providers at the targeted facilities. The FB-Firstfood P providers were considered more knowledgeable and experienced on the topic of inquiry. In-depth interview focused on nutritional counseling, FBP-Firstfood dispensation as well as programmatic and socio-cultural factors that would influence use and efficacy of FBP-Firstfood. The gathered information helped to enrich the study. An in-depth interview guide was used to gather the data (See attached guide; appendix 5).

3.8.4 Focus Group Discussions (FGDs)

This refers to discussions conducted by the investigator with small groups of 12 who are homogeneous in characteristics of interest to the inquiry. Sampled caretakers to the participating children were consented individually then asked to converge in a private place to discuss issues of interest to the study and give a group perspective. The issues under discussion included, predisposing factors to malnutrition in the community, experiences and challenges with FBP-Firstfood use as well as socio cultural factors affecting FBP-Firstfood use and performance. This tool was used to help the study understand the group norms, attributes and perceptions on general <5 malnutrition and FBP-Firstfood use in the region.

3.9 Data Management and Analysis

This study employed the use of both qualitative and quantitative data analysis methods.
3.9.1 Quantitative Data Analysis

For the quantitative category, the study used scannable “TELLE” forms/questionnaires to collect data. The completed questionnaires were scanned, verified and put in an access database. *STATA 10 software* was used to clean and analyze the data set. Univariate and bivariate analysis was done on socio-demographic and other variables of interest presented in the Tables 4.1 and 4.5. Odds Ratio and Paired t-test was used to calculate and show any differences in anthropometric measurements at baseline and at exit/post intervention. This was alongside other multivariate analysis whereby cross tabulations were done on various variables to test the study hypotheses.

3.9.2 Qualitative Data Analysis

For the qualitative data, in-depth interviews were conducted with FBP-Firstfood providers and also FGDs with the care providers in two health facilities. The data was organized and analyzed thematically using the *Nvivo 8 software*. Emerging themes were picked alongside matching quotes to present the findings.

3.10 Logistical and Ethical Consideration

The study was approved by the Kenyatta University Graduate School. Ethical clearance was granted by the Ministry of Education Science and Technology. Approval and support was also sought from the Siaya district medical superintendent’s office and from the heads of the targeted health facilities.

Participants were taken through a consenting process before they voluntarily accepted to participate in the study.
CHAPTER FOUR

RESULTS, DISCUSSION AND HYPOTHESES TESTING

4.1 RESULTS

4.1.1 Introduction

This chapter presents the results based on the data collected on variables of interest from the study participants. This includes the socio-demographic profile of the study respondents and the general findings of the study based on the univariate and multivariate analyses. In this study, a total of 215 participants were recruited which was above the required sample size of 203 participants. A total of 200 were retained until the end of the study duration, representing 99% retention. This was within the acceptable range for cohort studies. The analysis is therefore based on a sample size of 200 who completed the study duration. Deaths, hospitalization and relocations outside study areas accounted for the loss to follow up.
4.1.2 Socio-demographic Profile of the Study Respondents

This study involved various categories of participants. These included the moderately malnourished children under the age of five and their primary caretakers (parents/guardians) who brought them to the health facility. The frequencies of the univariate analyses of the socio demographic characteristics are presented in Table 4.1.

Table 4.1: Socio-demographic profile of the study respondents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex of the children participants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>93</td>
<td>46.5</td>
</tr>
<tr>
<td>Female</td>
<td>107</td>
<td>53.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td><strong>Age of the Children (Months)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-12</td>
<td>67</td>
<td>33.5</td>
</tr>
<tr>
<td>13-24</td>
<td>65</td>
<td>32.5</td>
</tr>
<tr>
<td>25-56</td>
<td>68</td>
<td>34.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td><strong>Age of Primary Caretakers (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-30</td>
<td>98</td>
<td>59</td>
</tr>
<tr>
<td>31-40</td>
<td>79</td>
<td>39.5</td>
</tr>
<tr>
<td>&gt;41</td>
<td>23</td>
<td>11.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td><strong>Relationship with care taker</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>160</td>
<td>80.0</td>
</tr>
<tr>
<td>Father</td>
<td>27</td>
<td>13.5</td>
</tr>
<tr>
<td>Grandmother</td>
<td>11</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td><strong>House help</strong></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td><strong>Caretaker’s average Daily Income of (Ksh)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;100</td>
<td>123</td>
<td>61.5</td>
</tr>
<tr>
<td>100-200</td>
<td>43</td>
<td>21.5</td>
</tr>
<tr>
<td>200-500</td>
<td>23</td>
<td>11.5</td>
</tr>
<tr>
<td>&gt;500</td>
<td>11</td>
<td>5.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td><strong>Caretakers total number of living children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>72</td>
<td>36.0</td>
</tr>
<tr>
<td>3-4</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>&gt;5</td>
<td>28</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

As reflected in the Table 4.1 of the 200 moderately malnourished children who completed the study, 46.5% were males while 53.5% were females. This showed a slightly higher enrollment for females compared to the female gender.

The ages of the children were taken at baseline, the minimum age was 6 months and the maximum age was 56 months, whereas the median age was 17 months.

Out of the 200 primary care takers at baseline, 98 (59%) were aged between 18-30 years, 79 (39.5%) aged between 31-40 years, 79 (39.5%) were aged between 31-40 years, while 23 (11.5%) were aged above 41 years. It was also established that 160 (80.0%) of the caretakers were biological mothers to the child, 27 (13.5%) were fathers, 11 (5.5%) were grandmothers while only 2 (1.0%) were house helps.

On the caretakers’ level of education, 14 (7%) had no education at all, majority 128 (64%) had primary level education, 50 (25%) had secondary level education, while 8 (4%) had college level education. The Figure 2 shows the distribution of primary caretakers in terms of level of highest education attained.
The study also sought to know from the caretakers the total number of children they had, including the one(s) enrolled in the study. The response as reflected in the Table 4.1 showed that of the 200 respondents, 72 (36.0%) had 1-2 children, half the participants 100 (50.0%) had 3-4 children while 28 (14%) had 5 children and above. This was not different from the recent Kenya national census figures of about 4 children per household (Habitat 2011).

The primary caretakers were also asked about their occupation to establish time of contact with their children. 5% were in formal employment, 30.5% were unemployed whereas 64.5% reported self-employment. This is reflected in Figure 3.
The daily average income of the caretakers were, 123 (61.5%) earned > Ksh. 100, 43 (21.5%) had an income between Ksh. 100-200, 23 (11.5%) earned between Ksh. 200-500, while 11 (5.5%) earned above Ksh. 500.
On the marital status, 14 (7.0 %) were single mothers, 16 (8.0%) were separated with their partners, 40 (20.0 %) were widowed while 130 (65.0%) were married as illustrated in Figure 4.

Table 4.2: Nutritional practices of primary caretakers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breastfeeding practices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breastfed</td>
<td>42</td>
<td>31.8</td>
</tr>
<tr>
<td>Not breastfed</td>
<td>90</td>
<td>68.18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>132</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Reasons for no Breastfeeding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate milk</td>
<td>7</td>
<td>7.8</td>
</tr>
<tr>
<td>Child Sick</td>
<td>33</td>
<td>36.7</td>
</tr>
<tr>
<td>Mother sick</td>
<td>37</td>
<td>41.1</td>
</tr>
<tr>
<td>Others</td>
<td>13</td>
<td>14.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Additional feeds to FBP-Firstfood</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow milk</td>
<td>27</td>
<td>13.5</td>
</tr>
<tr>
<td>Other fluids</td>
<td>118</td>
<td>59.0</td>
</tr>
<tr>
<td>Other solids</td>
<td>51</td>
<td>25.5</td>
</tr>
<tr>
<td>None</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Source of Nutritional Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td>13</td>
<td>6.5</td>
</tr>
<tr>
<td>Community Health workers</td>
<td>56</td>
<td>28.0</td>
</tr>
<tr>
<td>Health talks at the clinic</td>
<td>96</td>
<td>48.0</td>
</tr>
<tr>
<td>None</td>
<td>31</td>
<td>15.5</td>
</tr>
<tr>
<td>Friends</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Caretakers perception whether malnutrition is a problem or not</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>141</td>
<td>70.5</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>9.5</td>
</tr>
<tr>
<td>Not sure</td>
<td>40</td>
<td>20.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Chemical water treatment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>177</td>
<td>88</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Unknown</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
The primary caretakers were also asked about breast feeding practices and it was established that 132 (66.0%) of the children enrolled in the study were within the breastfeeding bracket (≤ 24 months). Of this number, 42 (31.8%) were being breastfed while 90 (68.2%) were not. The reasons for not breastfeeding were, 7 (7.8%) had inadequate milk, 13 (14.4%) had other reasons, 33 (36.7%) reported child being sick while in 37 (41.10%) of the cases the mother was sick hence couldn’t breastfeed.

The study also sought to know if the caretakers gave other feeds apart from FBP-Firstfood, 4 (2%) gave none, 27 (13.5%) gave cow milk, and 51 (25%) gave other solids while 118 (59.0%) gave other fluids. This therefore means that nearly all participants maintained their normal feeding practices in addition to the FBP-Firstfood.

In establishing the sources of nutritional information the study established that, 4 (2.0%) got from friends, 13 (6.5%) radio, 31 (15.5%) did not get information at all, 56 (28.0%) got from community health workers (CHWs) while 96 (48.0%) from health talks at the clinics. The study also sought to assess if caretakers perceived malnutrition as a problem in their community; 141 (70.5%) were affirmative, 19 (9.5%) said no, while 40 (20%) were not sure.
The participants were also asked about the sources of water used in FBP-Firstfood preparation and the responses were as shown in Figure 5.

At exit the respondents were asked if they had noticed any changes/improvement in their children since the FBP-Firstfood initiation. 8 (4%) reported developmental achievements, 16 (8%) reported improved appetite, 20 (10%) reduced morbidity, 30 (15%) healthy and 37 (17%) active / playful while 92 (46%) reported growth in terms of weight and height increase as reflected in Figure 6. The study also found out that 22 (11.0%) of all the participants were re-enrollment cases due to relapse while 178 (89.0%) were new cases.
Figure 6: Caretakers perception on FBP-Firstfood effect on their children

Figure 7: Baseline and exit measurements of mean weight, height and MUAC

As reflected in Figure 7, there were significant positive changes in the anthropometric measurements at baseline compared to exit. The mean weight at baseline was 7.8 kg, while at exit it was 9.8 kg. The test of means showed a significant increase in mean weight with a p-value < 0.001. On the other hand, the mean MUAC at enrollment was 11.5 cm and at exit 12.8 cm, this
also showed a significant increase in the mean MUAC with a P-value < 0.001. Looking at height, there was a positive increase in the mean though was not significant.

Table 4.3: Baseline and exit Z score values (Weight for length/height)

<table>
<thead>
<tr>
<th>Z score values</th>
<th>Baseline Z score</th>
<th>Baseline Z score %</th>
<th>Exit Z score</th>
<th>Exit Z score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;-1 (No malnutrition)</td>
<td>0</td>
<td>0</td>
<td>49</td>
<td>24.5</td>
</tr>
<tr>
<td>-1 SD&lt;-2 (Mild malnutrition)</td>
<td>17</td>
<td>8.5</td>
<td>55</td>
<td>27.5</td>
</tr>
<tr>
<td>-2 SD&lt;-3 (Moderate malnutrition)</td>
<td>183</td>
<td>91.5</td>
<td>90</td>
<td>45.0</td>
</tr>
<tr>
<td>SD &lt;-3 (Severe malnutrition)</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Looking at the Z score values on weight for length/height (Table 4.3), majority of the participants 183 (91.5%) were recruited with a Z score value between -2 and -3 at baseline (moderate malnutrition), with only 17 (8.5%) recruited with Z score value between -1 and < -2 (mild malnutrition). At exit the Z score values showed that 90 (45%) participants still had moderate malnutrition, 55 (27.5%) had mild malnutrition with only 49 (24.5%) fully recovering to no malnutrition, whereas 6 (3%) had deteriorated to severe malnutrition as reflected in the Table 4.4.

Table 4.4: Baseline and Exit Z score values (Weight for Age)

<table>
<thead>
<tr>
<th>Z score values</th>
<th>Baseline Z score</th>
<th>Baseline Z score %</th>
<th>Exit Z score</th>
<th>Exit Z score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(&lt;-1) and -1 SD&lt; -2 (Mild + No malnutrition)</td>
<td>0</td>
<td>0</td>
<td>74</td>
<td>37</td>
</tr>
<tr>
<td>-2 SD&lt;-3 (Moderate malnutrition)</td>
<td>145</td>
<td>72.5</td>
<td>111</td>
<td>55</td>
</tr>
<tr>
<td>SD &lt;-3 (Severe malnutrition)</td>
<td>55</td>
<td>27.5</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
To show improvement in nutritional status, baseline and exit Z scores were compared. Children who attained an exit Z score \( >-2 \) were considered improved (No malnutrition + new cases of mild malnutrition). A total of 87 (43.5\%) improved while 96 (48\%) had not improved. This excluded 17 cases enrolled with mild malnutrition. Weight for height/length Z score being a more sensitive measure was preferred for short term nutritional evaluations. Looking at Z scores for Weight for Age, only 37\% showed improvement to mild or no malnutrition (See Table 4.4). This was not unusual since Weight for age was considered to be a less sensitive indicator.

To establish the effect of various variables on the FBP-Firstfood outcome (exit Z scores), a multivariate analysis was performed by cross tabulating various socio-cultural variables as depicted in Table 4.5.

### Table 4.5: Cross tabulations of social cultural variables with outcome variable

<table>
<thead>
<tr>
<th>Factors</th>
<th>Outcome variable</th>
<th>Odds Ratio (95% CI)</th>
<th>P- Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Exit Z Score- weight/length/height)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number Improved N (%)</td>
<td>Number Not Improved N (%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( &gt;-2 )</td>
<td>( &lt;-2 )</td>
<td></td>
</tr>
<tr>
<td>Caretakers level of Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary level and above</td>
<td>15 (24.19)</td>
<td>44 (31.88)</td>
<td>0.68(0.34-1.35)</td>
</tr>
<tr>
<td>No education and primary level</td>
<td>47 (75.81)</td>
<td>94 (68.12)</td>
<td></td>
</tr>
<tr>
<td>Caretakers marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>43 (69.35)</td>
<td>88 (63.77)</td>
<td>1.28(0.68-2.44)</td>
</tr>
<tr>
<td>Unmarried</td>
<td>19 (30.65)</td>
<td>50 (36.23)</td>
<td></td>
</tr>
<tr>
<td>Breastfeeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21 (33.87)</td>
<td>23 (16.79)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(66.13)</td>
<td>(83.21)</td>
<td>2.5(1.27-5.07)</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------</td>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td><strong>Child gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33 (53.23)</td>
<td>74 (53.62)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>29 (46.77)</td>
<td>64 (46.38)</td>
<td>0.98 (0.54-1.79)</td>
</tr>
<tr>
<td><strong>Caretakers occupation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>41 (66.13)</td>
<td>98 (71.01)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>21 (33.87)</td>
<td>40 (28.99)</td>
<td>0.79(0.42-1.51)</td>
</tr>
<tr>
<td><strong>HIV status of the child</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>20 (54.35)</td>
<td>30 (52.63)</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>15 (42.86)</td>
<td>27 (47.37)</td>
<td>1.2(0.51-2.80)</td>
</tr>
</tbody>
</table>

### 4.2 DISCUSSION OF THE FINDINGS

#### 4.2.1 Effectiveness of FBP-Firstfood

Objective one sought to assess the effectiveness of FBP-*Firstfood* in the management of moderate malnutrition among children under the age of five. To be able to measure the effectiveness of the intervention, anthropometric measurements were taken and compared at baseline and at month 3 when the participants were exiting the programme. The Figure 7 shows significant improvements in the mean weight and MUAC taken at baseline and at the end of the study. There was improvement in mean height over the study period though not significant. This could be attributed to the fact that not much difference in height would be experienced within three months. The findings of this study were in agreement with a study by FANTA/AED (2009) which noted improvements in the anthropometric measurements in a similar nutritional intervention. The FANTA assessment was conducted in selected ART sites in Kenya.
Looking at the caretakers’ level of education against the outcome variable, (Table 4.5.) it was established that there was no significant association with a P-value of 0.271. This finding was contrary to that of a previous study by Glewwe (1999) in Morocco where he established that, mother’s education was positively correlated with child health and nutrition. The same findings were reported in the KDHS (2008) that the mothers’ level of education had an inverse relationship with stunting levels, whereby those with secondary level education experienced 26% stunting in their children compared to 40% among mothers who had no education or incomplete primary education. However looking at the odds ratio (OR) it was shown that children whose caretakers had secondary level education and above were 1.5 times more likely to improve. This could be attributed to an understanding that caretakers with higher education level had a better understanding of the nutritional requirements of their children and were more likely to follow the given instructions.

The caretakers’ marital status was also cross tabulated against the outcome variable as shown in Table 4.5. The study established that there was no significant association between the marital status and exit Z score at a P-value of 0.443, however looking at the OR, it was established that children whose parents were married were 1.3 times more likely to improve compared to those whose caretakers were unmarried. This could have been attributed to the fact that married couples could pool their resources and efforts towards taking care of their children compared to their single counterparts. A study in Botswana by Salah, et al, (2006) had similar finding that children in single-parent households suffered from underweight to a significantly (p <0.01) higher level than children brought up by both parents. Another study by Emina (2005) in
Cameroon however only established a slight improvement on the nutritional status of children that had both parents as opposed to single parents. This was however attributable to the fact that part of the urban population he studied had economically empowered single mothers who could appropriately meet the nutritional needs of their children.

Looking at breastfeeding which was only applicable to the children within the breastfeeding age bracket (≤ 24 months), it was established that there was a significant relationship between breastfeeding and the outcome variable. It emerged that children who were breastfed were more likely to improve, with a P value < 0.05 as reflected in Table 4.5. This view was also shared in the findings of a study by Grobler (2006). In another study, Lewis (2003) adds that, science has proved that breast-fed babies have a healthier start in life. Human milk contains a balance of nutrients that closely matches infant requirements for brain development; growth and a healthy immune system hence were more likely to improve nutritionally.

On the gender of the children, the study further established that male children were more likely to come out of the moderate malnutrition bracket compared to their female counterparts by OR, however the P value didn’t confirm any significant difference.

From the qualitative category of the study, it was reported that there were cases of FBP-Firstfood sharing among the siblings of the enrolled children. This was occasioned by many other factors like; stigma so that FBP-Firstfood was not perceived by the other members of the family as a special food to anyone, a view that was also brought out by Greenway (2009). It was also attributed to lack of proper counseling and FBP-Firstfood education as most of the providers
were inadequately prepared to offer proper counseling. Some care givers also reported poverty and food insecurity as the push factor towards sharing the food. This was also captured in one of the FGDs when a participant said (Female aged 23 at SDH) said;

“When this [FBP-Firstfood] is the only flour you have in the house, you can’t only feed one child as the others watch. You just give all of them...”

There were even cases whereby it was shared by the whole household. Another participant (Female aged 27 at Tingwangi) added;

“there are also times when you only have a little flour that is not enough for the whole family, so you can take a little of this (FBP-Firstfood) and mix with the little you have to prepare porridge for the whole family.”

This practice therefore meant that the targeted children did not get the prescribed amount of the flour thus leading to delay in recovery from the malnutrition condition.

This further shows that under-five malnutrition needs to be tackled in a broader scale alongside food insecurity by reaching out to all children both HIV positive and negative. This view however attracts divergent opinions as highlighted by Greenway (2009), with some programmes insisting that separating out children for food ration causes friction and perpetuates stigma, and that it can be assumed that if one child is malnourished, other children in the household will be as well. In contrast other programmes hold that as with adult programming- the “food is medicine” and should be provided only to the index patient on the basis of a clinical assessment and classification, with household food insecurity tackled through a separate mechanism. The study found out that there were no existing food taboos that could hinder the use of food supplements like FBP-Firstfood and affect their effectiveness. 97% of the participants reported
knowing no food taboos related to food supplements. This then was not a major influencing factor.

4.2.2 Factors Affecting FBP-Firstfood Implementation and Effectiveness

This looks at the findings on the second objective of this study that sought to establish the factors affecting FBP-Firstfood implementation and effectiveness among under-five year old children. Effective implementation of the programme was vital for its success. The factors affecting implementation were categorized into two namely; programmatic and socio-cultural factors.

Programmatically, it was established that there were no qualified nutrition officers at all the five health facilities to effectively offer nutritional counseling and dispense the FBP-Firstfood products. This resulted to inadequate nutritional counseling and education on FBP-Firstfood preparation and use. In all the facilities FBP-Firstfood was being dispensed by volunteer lay health care workers some of whom were on a small stipend by partner organisations supporting HIV care and treatment services in those facilities.

This finding echoed the experiences of FACES FBP-Firstfood programme review, which pointed out inadequate number of staff as a major challenge to the programme’s success (Oyuga et.al. 2008). It also emerged that the volunteers dispensing FBP-Firstfood were also involved in other activities within the clinic, for example tracing HIV/ Aids patients who defaulted to come for their scheduled clinic appointments or lost to follow up. This made them unavailable at times to see FBP-Firstfood clients. Some clinics had scheduled FBP-Firstfood clinic days which coincided with the days when the service providers were available; this led to many clients turning up on a given day, thereby resulting in delays in the queue, consequently discouraging
some clients. In the words of one client during a FGD (Female aged 26 at Tingwangi Health center);

..“*At times you come for unga [(flour)] and you don’t find sister [(provider)], you are
told to come back tomorrow and tomorrow you don’t find her again, next time when you
come, you stay for hours to be served...It is discouraging”*...

From in-depth interviews with FBP-*Firstfood* providers it was evident that nearly all the
providers had no adequate understanding of the FBP-*Firstfood*. This resulted from the providers’
high turnover ratio as some were students on attachment while others were volunteers who had
not received proper training on the same.

It was also revealed that there were no adequate counseling rooms for the clients. This coupled
with inadequate FBP-*Firstfood* knowledge by some providers as well as lack of dedicated FBP-
*Firstfood* providers in some facilities most likely led to inadequate nutritional counseling and
FBP-*Firstfood* education to the clients.

In some instances the FBP-*Firstfood* porridge was dispensed over the pharmacy counter as the
recipients were hurriedly explained to how to use the product. There was not enough counseling
to understand the conditions of the client that would interfere with the effectiveness of FBP-
*Firstfood*.

The placement of FBP-*Firstfood* initially at the Patients Support Centers (PSC) targeting mainly
the HIV positive clients was also reported as a challenge during In-depth Interviews (IDIs) with
providers. It was seen as a barrier to some caretakers from picking FBP-*Firstfood* or coming
back for refill. This was a major issue to HIV infected caretakers who due to stigma had not
disclosed their HIV status. There were also cases of HIV negative caregivers who never wanted
to associate with the food for the HIV positive children. This probably could have affected their use of the product.

By design the FBP -Firstfood also targeted orphans and vulnerable children (OVCs) regardless of their HIV status; it was evident that children were given the same food rations. This approach was seen as insensitive to the HIV status of the children and their unique nutritional requirements. This could have been another contributor towards deterioration to severe malnutrition by 4 out of the 6 cases of severe malnutrition at exit. This view is also held by Heikens (2008) who pointed out that, in HIV-uninfected malnourished children, appetite is useful, to assess nutritional recovery. This however seem not to be the case in HIV-infected children, in whom persistent anorexia is common.

### 4.2.3: The Rate and Cause of Failure to Thrive among FBP-Firstfood Clients

This third objective sought to find out the reasons behind the cases of failure to thrive and relapse to malnutrition status among children exited from the study. Of all the children enrolled, 11% were re-enrollment cases due to relapse.

Looking at the exit Z score values of weight for length/height at exit as shown in table 4.3, it was evident that up to 45% had failed to thrive, while 3% relapsed to severe malnutrition with Z score <3. This meant that up to 48% of the study participants qualified for re enrollment in to the FBP -Firstfood programme at exit.

The high rates of failure to thrive could be linked to both the socio cultural and programmatic factors highlighted earlier. It was also noted that of the 6 participants that deteriorated, 5 of them were not being breastfed though were within the breastfeeding age.
From the FGDs with the primary caretakers, it was evident that majority of the respondents were ill equipped at exit on the appropriate feeding practices leading to cases of relapse after exit. This was also attributable to inadequate training of the FBP-Firstfood providers who in turn were unable to adequately offer an adequate exit package to the children.

4.2.4 Predisposing Factors to Under-five Malnutrition

The study sought to understand the predisposing factors to under-five malnutrition in Karemo division. Previous nutritional surveys in parts of Siaya County had shown high rates of malnutrition among under-five (CBS 1994). It was established in the study that up to 50% of the participants couldn’t afford the food prices. This could have resulted from rampant poverty as depicted in very low incomes. As reflected in Table 4.1, up to 62% of the caretakers either had no steady income or had a daily income less than Ksh.100 this consequently limited their ability to support the nutritional requirements of their children. This finding is key as it shares in the findings of previous studies that have established that high poverty levels and under five malnutrition are directly related (Hunt 2005). These findings therefore back up the urgent need to fight against extreme poverty in a bid to reduce under-five mortality majority of which are malnutrition related. This is in line with the realization of MDGs # 1 and # 4.

It also emerged during the FGDs that food insecurity in Karemo was another major contributing factor to under-five malnutrition. This was occasioned by poor harvests in the region leading to high food prices. This finding affirmed the reports in the Siaya District Development Plan that under-five malnutrition was still a major problem in Karemo division (KNDP; 2008).

Looking at the sources of nutritional information to the caretakers, it was reported that about 50% got information from health facilities, meaning those who for one reason or another
couldn’t make it to the health facility had minimal chances of accessing appropriate nutritional information.

Even though breastfeeding was not a key factor under investigation, it was established that it was positively associated with improvement in nutritional status (P-value of 0.008). The low breastfeeding practices in the region at 32% could have partly contributed to the existing under-five malnutrition. This finding concurs with the findings of a similar study by Grobler (2006).

The low breastfeeding practices among the HIV positive mothers could have partly resulted from the advice from the PMTCT clinic that they either exclusively breastfeed for six months or not breastfeed at all.

4.3 HYPOTHESES TESTING

This study had three null hypotheses that were tested to establish if there were any significant associations between the variables of interest. The first null hypothesis stated that; FBP-Firstfood had no significant effect in weight change among moderately malnourished under-five year old children enrolled in the programme. To measure significance in association, this study looked at the difference in means of weight at baseline and at exit. The results established that there was a significance increase in weight with a P-value <0.001. The study therefore rejected the first null hypothesis. The second hypotheses stated that FBP-Firstfood had no significant effect in MUAC change among moderately malnourished under-five year old children enrolled in the programme. The mean MUAC difference at baseline and exit showed a significant increase with a P-value
<0.001. The study also rejected the second null hypothesis. The third hypothesis focused on height change and was stated as; FBP-Firstfood had no significant effect in height change among moderately malnourished under-five year old children enrolled in the programme. Looking at the mean difference in height at both baseline and exit, it was notable that increase in height was towards positive, however statistically it was not significant. This study therefore fails to reject the third null hypothesis.

The failure to register significant increase in mean heights could be attributed partly to the shorter follow up duration of the FBP-Firstfood programme (3months) and possibly due to the smaller sample size of the study. Overall the low improvement rates evidenced could partly be attributed to the fact that the use of height in the model to calculate the Z scores might have inhibited the difference since there was no significant change in height at baseline and exit. These findings were slightly different from the findings of a similar study by Masinde, (2009) in Mukuru slums in Nairobi, which realized above 50% recovery rates. This could partly be attributable to the regular follow up of caretakers since they were all receiving care from the same facility and living just in the surrounding neighborhood.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions and recommendations. It focuses on the key findings of this study in relation to the objectives as well as the findings of similar studies.

5.2 Summary of findings

As per the first objective on FBP Firstfood effectiveness, there was a significant improvement in the anthropometric measurements (Weight and MUAC) at exit with a P-value < 0.001. There was also an increase in mean height of the children enrolled in FBP-Firstfood, however not
statistically significant. FBP-Firstfood therefore contributed in improving the nutritional status. Looking at Z-scores (weight for height/length), 87 participants (44%) improved from moderate malnutrition condition to mild or no malnutrition.

The second objective focused on factors that affected the FBP-Firstfood implementation and effectiveness. Breastfeeding was significantly associated with improvement in nutritional status with a P-value < 0.05. Children whose caretakers had higher level of education (secondary and above) were 1.5 more likely to improve. The study also found out that children from married parents were 1.2 times more likely to improve by Odds Ratio. The study further found out that nutritional counseling, both FBP-Firstfood specific and general was either lacking or inadequate. There were no adequate counseling rooms, most of the volunteers/interns dispensing FBP-Firstfood had no in-depth knowledge of the product and were engaged in other activities. Consequently their nutritional counseling content and time were limited. Stigma resulting from associating FBP-Firstfood with HIV patients was a concern as some HIV negative caretakers were hesitant to use FBP-Firstfood. It also emerged that FBP-Firstfood was being shared with other household members depriving the target children the required nutrients that would aid their recovery process.

The third objective of the study sought to establish the causes and rate of failure to thrive and relapse among under-five year old children on FBP-Firstfood. The findings revealed that of the total enrollment, 11% were re-enrollments. This was even more vivid at exit when it was evidenced that up to 59% of all the enrollments did not get out of the malnutrition bracket
prompting re-enrollment at FBP-Firstfood exit. It emerged strongly that the children lacked an adequate FBP-Firstfood exit package that would inform the care takers on better feeding practices post FBP-Firstfood exit. This led to relapse to malnutrition shortly after FBP-Firstfood exit.

The fourth objective sought to understand the predisposing factors to under-five malnutrition in Karemo. From the findings, the unavailability of food, high costs of food as well as the general food insecurity in the area occasioned by crop failures and rampant poverty in the region were the major push factors to under-five malnutrition. Breastfeeding practices were reportedly low at 32% which was also a possible contributor.

### 5.3 Conclusions

In conclusion, the study established a significant improvement in anthropometric measurements weight and MUAC with $P$ values $>0.001$ for both MUAC and weight. This was most likely attributable to FBP-Firstfood intervention. Mean difference in baseline and exit Z-scores (Weight/Height and Weight for Age) showed positive improvement signifying improvement in nutritional status though failed to show a statistical significance. This could have been occasioned by shorter programme duration (3 months) and a smaller sample size.

Breastfeeding practices were low at 32% yet was a significant factor to nutritional recovery with a P-value $>0.001$. Children with both parents and those, whose care providers had secondary
education level, were 1.5 and 1.2 times respectively more likely to improve from moderate malnutrition.

There was no significant difference in performance in-terms of gender of the children participants.

FBP-Firstfood sharing among household members emerged as a key challenge alongside inadequate nutritional counseling to caretakers. Food insecurity due to poverty and poor climatic conditions for agriculture were the main push factors to malnutrition in the region. It was further evident that relapse to malnutrition was necessitated by inadequate exit package and lack of follow up to assess progress.

Despite all the challenges to the programme, it was a good learning ground and the revelations of this study would inform the FBP-Firstfood programme appropriately in order to better the outcomes.

5.4 Recommendations

Reflecting on the findings of this study, the following recommendations were made;

To make the programme more effective, there is need to review the FBP-Firstfood exit criteria to allow more time preferably 6 months to one year to allow adequate time for recovery. Qualified nutritional officers need to be engaged in offering nutritional counseling to programme participants. A clear nutritional counseling guideline to be developed or availed and its use enforced across all the facilities. This would enhance consistency in information given out.

Counseling rooms/spaces need to be availed to enhance privacy and for discussion of personal
issues that affect use and performance of FBP-Firstfood. Thus would address issues like sharing of FBP-Firstfood and stigma issues associated with FBP-Firstfood use.

There is need to develop a weaning package, detailing the appropriate nutritional counseling and information to give the caretakers so as to gradually prepare them and their children for exit by progressively reducing the dependence on the FBP-Firstfood product. A follow-up mechanism need to be put in place to regularly monitor the use of FBP-Firstfood and progress of the children at home pre and post exit.

Breastfeeding as a practice needs to be promoted in the region as it was positively associated with nutritional recovery. Looking at the family sizes of 3-4 children in more than half the households in the study, sensitization on family planning to increase uptake is recommended. Smaller families would be easier to provider for bearing in mind the high rates of poverty and food insecurity.

Multipronged approaches need to be put in place to combat food insecurity. Ministries of agriculture and non-governmental organizations working in agriculture need to put in place sustainable strategies like irrigation and incentives to food crop farming in order to increase food production.

To address the rampant poverty in the region, strategies that address job creation and economic engagement of the residents need to be addressed by proposed county government. Addressing these issues would go a long way in informing nutritional programmes on strategies that yield better outcomes as well as informing policies that would address long-term solutions to food insecurity in the region.
5.6 Further Research

The study recommends that further research needs to be conducted to establish the performance of FBP-*Firstfood* on HIV negative versus HIV positive under five years old children. This would establish differences in calorie needs and recovery rates and would help inform policies on the most appropriate entry and exit criteria for HIV positive and negative clients. There is also need to conduct studies on appropriate technology that would make it possible to locally manufacture FBP-*Firstfood* and making them more accessible and affordable to the locals. This would address the problem of occasional stock outs at the facilities.

REFERENCES


USAID. (n.d.). Nutrition and HIV; A toolkit for food by prescription for service providers in health facilities.


**APPENDICES**

**APPENDIX 1: DETAILS AND NUTRITIONAL VALUE OF FBP-FIRSTFOOD**
APPENDIX 2: NCHS/WHO NORMALISED REFERENCE CHARTS
APPENDIX 3: INFORMED CONSENT FORM

Food by Prescription (FBP-Firstfood): Assessing its Effectiveness in the Management of Moderate Malnutrition among under-five malnourished children in Karemo division, Siaya District.

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ochuka Bernard O.</td>
<td>Investigator (Student)</td>
<td>Kenyatta University</td>
</tr>
<tr>
<td>Dr. G. Orinda</td>
<td>Supervisor</td>
<td>Kenyatta University</td>
</tr>
<tr>
<td>Dr. F. Okwara</td>
<td>Supervisor</td>
<td>Kenyatta University</td>
</tr>
</tbody>
</table>

Introduction
You are being asked to volunteer for a research study. This study is about malnourished under five children enrolled in the FBP-Firstfood programme in Karemo division. Before you decide whether to take part in this study or not, I would like to explain to you the purpose of the study, the risks and benefits and what would be expected of you if you decide to join the study.

If you accept to participate in this study, you will be asked to sign this consent form or make your mark in front of a witness. A signed copy of this consent form will be given to you and another copy retained by the study staff obtaining consent.

Purpose of the study
This study is about Food by Prescription (FBP-Firstfood), a ready to use food therapy given to malnourished children at healthcare facilities. The purpose of this study is to Assess the Effectiveness of FBP programme in managing malnutrition in Karemo division. This study therefore seeks your opinion on the effectiveness of the FBP-Firstfood programme in Karemo division. If you accept to participate, you will be part of the approximately 244 volunteers who are planned to participate in this study within Karemo division.

Your participation is voluntary
Once you have understood the study, remember;

- You do not have to be in this study if you do not want to give your opinion and or have the anthropometric measurements of your child taken.
- You may decide not to take part in this study without loosing the benefit of getting FBP-Firstfood supplies or any health service from your respective healthcare facility.

Study procedures
If you decide to take part in this study, you will be asked to participate in a; *(Choose Appropriate category: 1 Individual Interview 2. Indepth interview, 3. Focus Group Discussion (FGD))*

1. **Individual Interview** You will be asked to sit in a private room/place. A study staff will then ask you questions about yourself and or your child from a questionnaire or an interview guide. The following measurements will also be taken on your child during enrollment in the FBP-Firstfood programme; Weight, Height and MUAC. The same measurements and a brief interview will also be conducted at the end of three months during exit from the programme.

2. **In-depth Interviews**; You will be asked to sit in a private room/place. A study staff will then ask you questions from an interview guide. The interview will be voice recorded if you allow us. This will take approximately 30-45mins.

3. **Focus group Discussion**; You will be asked to be part of a group of between 6-12 people who are like you, you will then be asked to participate in a discussion on FBP-Firstfood and under five malnutrition in Karemo. The discussion will be voice recorded if the group gives consent to do so. The discussion shall last approximately one hour.

**Risks and or discomforts**
There are no major risks associated with your participation in this study. However, you may feel uncomfortable talking about personal issues like the HIV status of your child among others. There could be other risks that we may not anticipate, however we shall ensure that everything you say remains confidential and anonymous.

**Benefits**
There is no direct benefit for you if you decide to participate in this study. You and others may benefit in future from information learned in this study. You may also get personal satisfaction from being part of a research on malnutrition.

**Confidentiality**
Efforts will be made to keep your information confidential. We will also ask you to observe shared confidentiality particularly for those who participate in FGDs. Your personal information may only be disclosed if required by law. Your study forms may be reviewed by study staff and representatives from Kenyatta University Board of post graduate studies.

**Concerns/Questions:** Incase of any concerns about this study, contact Bernard Ochuka; Tel: +254 720618463 or 0737522256

**Statement of consent and Signature**
I have read this form or had it read to me. I have discussed it with study staff and all my questions have been answered satisfactorily. I understand the voluntary nature of my participation.

<table>
<thead>
<tr>
<th>Participant Name</th>
<th>Participant Signature/thumb print</th>
<th>Date (DD/MM/YY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study staff consenting</td>
<td>Study staff signature</td>
<td>Date (DD/MM/YY)</td>
</tr>
</tbody>
</table>
APPENDIX 4: DEMOGRAPHIC INFORMATION FORM FOR IDIS/FGDS

Date of Interview: ____/____/____ (DD/MM/YY)

Interviewer’s code: ____ ____ ____

Place/Location of interview………………………………………………

1 Sex of respondent  □ Male  □ Female

2 Age of respondent (In completed years) ____ (Years)

3 Marital status:
 □ Single  □ Engaged  □ Separated/Divorced
 □ Widowed  □ Married (monogamy/polygamy)

4 How many living children do you have? ____

5 Highest level of formal education/schooling
 □ None  □ Secondary
 □ Primary  □ College

6 What do you do for a living/Main source of income?
 □ None  □ Small business  □ Un-skilled labour
 □ Skilled labour  □ Business owner
 □ Others (Specify)…………………………………………………………

7 What is your average daily income from your economic undertaking? (Pick appropriate income bracket)
 □ None  □ Below ksh.100/=  □ Ksh.100/= to 200/=  □ Ksh.200/= to 500/=  □ Above Ksh.500/=

8 If married/living as married, what does your partner do for a living/Main source of income?
 □ None  □ Small business  □ Un-skilled labour
 □ Skilled labour  □ Business owner
 □ Others (Specify)…………………………………………………………

9 Area of residence………………………………………………………………

10 What is your religion?
APPENDIX 5: FGD/IDI GUIDE

Instructions to Research Assistants: Before using this guide, the interviewer to make sure that the participant(s) have/ has signed the consent forms and the Demographic Information Form.

FGDs Introduction Script
Hi everyone, my name is.............................. I am going to lead the discussion, next to me is .........................S/he is going to be our observer and note taker during the discussion. I would like to remind you again that in this discussion we shall have shared confidentiality. Meaning you shall not disclose to anybody outside this group what we have discussed here. We shall also refer to each other by the false names on our name tags. We shall record the discussion to help us capture everything you tell us. We urge you to fell free and talk. If you have any question you can ask before we start or at the end of the discussion.

IDIs Introduction script
Hi, my name is Bernard, as I had told you earlier; I am going to ask you some questions generally on nutrition and also on FBP-Firstfood. Once again I want to assure you that we shall treat every information you give us as confidential and we shall not attach your names to the anything you say.

Section A: General Nutrition
1. In this community which food stuffs/ fluids are given to under five children?
2. Where are those food stuffs/fluids sourced from?
3. Who feeds the under five children?
4. What comprises proper nutrition requirements for under-five children?
5. Where do parents get information on the appropriate nutritional needs of their children?
6. Is malnutrition among under-five a problem in this community?
7. If Yes, what has contributed to it/and what perpetuates it?
8. Are there cultural beliefs/practices or food taboos that affect/influence feeding of under-five children?
9. Are there religious beliefs/practices that affect feeding practices/patterns of under-five feeding?
10. What need to be done to remedy the malnutrition situation in this community?

Section B: Food by Prescription:
There is a food therapy programme (Food by Prescription-FBP) being given to malnourished under five children in healthcare facilities within Karemo division. The questions in this section are about the FBP programme in this community.
1. What does the FBP-Firstfood programme entail?
2. How widespread is the FBP programme coverage within this community/facility’s catchment area?
3. How has FBP-Firstfood been received in this community? What do people think about it?
4. How has FBP-Firstfood benefitted the under-five malnourished children in this community?
5. What factors do affect the implementation and Impact/Effectiveness of FBP-Firstfood in managing malnutrition?
   a. Programmatic factors
   b. Socio-cultural factors
6. In what ways has FBP-Firstfood impacted negatively among under-five malnourished children?
7. What may motivate mothers/guardians with malnourished children to join the FBP-Firstfood programme?
8. What may discourage/hinder mothers with malnourished under-five children from getting in the FPB programme?
9. In your view what needs to be done differently to better the outcome of the FBP-Firstfood programme in this community?

This is the end of our questions, unless there is anything else that you have not said about our discussion topic that is relevant for me to know. You can say it.

Thank you all.
APPENDIX 6: PARTICIPANTS’ LOCATOR INFORMATION FORM

Client’s code ___ ___ ___
Enrollment Date (DD/MM/YY) ___/__/___/___
Name of compound head.................................................................

Any changes to be noted at clinic or follow up visits

A: Physical Location/Home/Residence
Name of Mother and Nickname and Tel. contact.............................................
Name of Father and Nickname and Tel. contact.............................................
Name of Child...........................................................................................
Sex.............................................................................................................
Sub-location..............................................................................................
Village........................................................................................................
Clan............................................................................................................
Nearest school..........................................................................................
Nearest church........................................................................................
Nearest Shop/Kiosk/Bar............................................................................
Other contact person’s name and Tel. contact.............................................

B: Physical Location of Parents’ work places
Mother’s occupation.................................................................................
Physical address for work place............................................................... 
Nearest landmark....................................................................................
Mother’s work place Tel. contact............................................................... 
Father’s occupation...................................................................................
Physical address for work place............................................................... 
Nearest landmark....................................................................................
Father’s work place Tel. contact............................................................... 

C: Other Information
Do you have a child in one of the local schools?
If yes, name of the child (real and nickname).............................................
School......................................................................................................
Class:.................................................. Stream:.................................
*Draw a sketch map on the back of this form showing direction to the client’s home/residential place and a brief description on how to get there.

Initials of interviewer taking locator information ___ ___
Date (DD/MM/YY) ___/___/___

END

APPENDIX 7: BASELINE QUESTIONNAIRE
APPENDIX 8: EXIT QUESTIONNAIRE
## APPENDIX 9: LIST OF STUDY FACILITIES

<table>
<thead>
<tr>
<th>Health facility</th>
<th>Facility level</th>
<th>Location/Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Siaya District Hospital</td>
<td>4</td>
<td>Peri-urban/Public</td>
</tr>
<tr>
<td>2. Ng’iya Mission Health Center</td>
<td>3</td>
<td>Rural/Mission</td>
</tr>
<tr>
<td>3. Ting’wangi Health Center</td>
<td>3</td>
<td>Rural/Public</td>
</tr>
<tr>
<td>4. Kogelo Dispensary</td>
<td>2</td>
<td>Rural/Public</td>
</tr>
<tr>
<td>5. Bar-Olengo Dispensary</td>
<td>2</td>
<td>Rural/Public</td>
</tr>
</tbody>
</table>
APPENDIX 10: STUDY SITE MAP