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## Probiotic Yoghourt for Health, Nutrition and Women's Empowerment in Kenya: A Community-Based Approach

Ellena Andoniou, *The University of Western Ontario*

Supervisor: Dr. Isaac Luginaah, *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Geography

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## ABSTRACT

The dissertation aims to examine the impacts of probiotic yoghurt on health, nutrition and women's empowerment within the context of HIV/AIDS in Kenya. Mixed methods that combine quantitative and qualitative approaches are used to understand the effects of probiotic yoghurt on the health, nutrition and quality of life for men and women. Results of the quantitative analysis (n=227) demonstrated that the probiotic yoghurt confers a variety of health benefits – physiological (fewer urogenital conditions and digestive problems; reduced dependence on medical treatment), and psychological (perceived improvements with bodily appearance, felt an increased meaningfulness with life). Results of the qualitative analysis (n=26) revealed an overall improved quality of life based on the six domains of the WHOQOL assessment tool.

A supplemental qualitative study and analysis that examines the ways in which this health and development initiative promotes empowerment, social and economic development revealed that while there are substantial and important direct and indirect benefits, there are challenges with group dynamics, class, and power structures.

Theoretically, the study highlights the need to revisit the group approach of health and development projects. While this method undeniably empowers the women at the individual level within a number of domains, the group structure can be considered to counteract some of the gains and positive effects. Methodologically, the research shows the value of employing a mixed methods design. Usually, biomedical research using clinical study designs do not adopt mixed methods to describe the experiences of the participants. Building on the survey findings, deeper and richer insights into the impacts of the probiotic yoghurt on the health and quality of life of participants is gained. Lastly, the findings from this research provides a platform for policy

makers to re-examine the importance and need to incorporate nutritional support programmes that are holistic and multi-faceted, targeting marginalized groups.

*Keywords:* HIV/AIDS, probiotic yoghurt, community-food based programs, nutrition, health, economic empowerment, quality of life, Kenya, mixed-methods

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# CHAPTER I

## Introduction

### 1.1 Structure of this Dissertation

This dissertation is comprised of seven chapters. Chapter one introduces the purpose of the research and the objectives with a small snapshot of the broad contextual factors: 1) the HIV/AIDS epidemic in Sub-Saharan Africa and Kenya; 2) The need for community nutrition interventions; 3) Nutrition and HIV/AIDS; 4) a recognition of probiotics as a food supplement to improve nutrition in those infected with HIV; 5) socio-economic and gender inequalities in the context of HIV/AIDS 6) the project objectives and goals, and lastly, 7) the bearing of the topic to health geography. Chapter two provides a general overview of the country profile - the socio-political and economic environment, the effect of structural adjustment programs, a snapshot of the health care system, followed by a description of the community. Chapter three reviews the literature, presenting the theoretical context of the research. Chapter four describes the research methods and study design utilized to carry out the research, and chapter five presents the quantitative findings of the impact of probiotic yoghurt on adults and the associated qualitative findings establish how this constructs quality of life. Chapter six presents the discussion and the results of the socio-economic impacts of the project on the women and discusses the project's structure. Lastly, chapter seven provides an overview of the study limitations, the policy implications as well as future recommendations.

## **1.2 Setting the Scene: The HIV/AIDS Epidemic in Sub-Saharan Africa and Kenya**

HIV/AIDS is a global health problem that displays dynamic, growing and changing characteristics involving new and existing opportunities for transmission (NACC & NASCOP, 2012; UNAIDS, 2004). The unpredictable diffusion of the virus has affected entire societies and the severity of the epidemic has surpassed all expectations since it was first identified (NACC & NASCOP, 2012). Almost all the region's nations have generalized HIV epidemics - that is, their national HIV prevalence rate is greater than 1% (Kaiser Family Foundation [KFF], 2015). Since the pandemic's inception, forty-two million people around the world have been infected with the virus, and the brunt of the epidemic being felt primarily in Sub-Saharan Africa (SSA), where 70% of all reported cases are located, although the continent contains only 13% of the world's population (KFF, 2015; Population Reference Bureau, 2014). SSA also has the most number of children living with HIV – 88% (KFF, 2015) and the majority of the twenty million people worldwide who have already died from AIDS have also been African, and currently, there are an estimated 25.8 million HIV-positive citizens in the regions (UNAIDS, 2015).

Whole societies are affected by disruptions in schooling, work patterns, and human productivity, limiting their ability to develop or maintain previous progress (Mcintyre, Brown, and Sosler, 2001). The effects of AIDS related morbidity and mortality are being felt within all aspects of community life, with food crises, increased numbers of orphans, and depleted human capacity as thousands of people die of AIDS in the region every day (UNAIDS, 2004). The epidemic continues to diminish social

networks, leaving entire societies unable to cope with the crippling and debilitating health, social and economic effects of the disease (UNAIDS, 2004, NACC & NASCOP, 2012).

The epidemic is also distinctly characterized by its feminization – young women and adolescent girls face a disproportionately high risk of infection due to biological vulnerability, social inequality and exclusion as such there is a risk that infection rates can increase exponentially within women, children and youth (UNICEF, 2011a).

HIV/AIDS is strongly gender-based with critical links between the disease and gender oppression (Population Reference Bureau [PRB], 2011). Amongst critical groups are women of reproductive age, pregnant women, and those under 25 years of age.

Worldwide, an estimated 5 million young people in the 15-24 age group were living with HIV in 2009. Among the 10 to 19 year age group, new data shows, an estimated 2 million adolescents are living with HIV. Most of them live in SSA, most are women, and most do not know their status. Globally young women make up more than 60% of all young people living with HIV. In SSA that rate jumps to 72% (UNICEF, 2011b).

Particularly, young women aged 15–24 years are more vulnerable and approximately 8 times more likely than men to be infected (UNAIDS, 2010). Nowhere is the epidemic's 'feminization' more apparent than in Sub-Saharan Africa, where more than 61% of all people living with HIV are women and girls (PRB, 2011).

Although HIV has affected several countries, the levels vary geographically and even within specific communities. Kenya can be described as experiencing a mixed and geographically heterogeneous epidemic. Its characteristics are those of both a

generalized epidemic among the mainstream population and a concentrated epidemic among the most at risk populations (NACC, 2014; KNBS & ICF Macro, 2010; KAIS, 2007). The heterogeneity of the epidemic can be described by the large differences by region. Approximately 65% of new HIV infections in Kenya occurred in nine counties (Otieno, 2015). Three counties, containing most of Kenya's population have the majority of all HIV infections. The study area, Oyugis and the surrounding areas (now part of Homa Bay county and the former Nyanza Province) has an adult prevalence of 27.1%, the highest in all of the country. Kisumu, 18.7% and Siaya 17.8%. In other words, about one in four residents in the most affected areas is living with HIV/AIDS (Otieno, 2015), Nairobi county has 8.6% adult prevalence and Wajir 0.2% (National AIDS Control Council [NACC], 2014). It appears that higher educational level does not provide protective effects from HIV infection in Kenya.

The epidemic has managed to reverse gains on most measurements of quality of life. Life expectancies have the tendency to be much lower in the most affected areas (Nairobi, Nyanza, Rift Valley and Western regions) and expressing geographic variation within Kenya. For example, life expectancy in Nyanza province is much lower than other regions, and a person living in Nyanza can expect to live about 16 years less than someone living in Central province (Vyas, 2012) due to the prevalent social, economic and health conditions (Kenya Institute for Public Policy and Research [KIPPRA], 2014). The national average in Kenya is approximately 63.77 years (62.3 yrs for males and 65.26 yrs for females) (Central Intelligence Agency [CIA], 2015). While progress has been made to reverse the effects of dramatically reduced life expectancies, from 20



years ago (e.g. 48 yrs in 2000, 55.1 yrs in 1996, 59.1 yrs in 1990, 59.6 yrs in 1986) (IndexMundi, 2015) there remain geographic variations, and the most productive adults (aged 20-40 yrs) continue to be affected - leaving family members and orphaned children to deal with ostracism, stigma, and the inevitable cycle of poverty and disease.

Nationally, most new infections, approximately 44% occur in couples who engage in heterosexual activity within a union or regular partnership (NACC, 2009). It is estimated that men and women who engage in casual sex contribute to about 20% of new infections, while sex workers and their clients account for 14%. Men who have sex with men and prison populations contribute to 15% of new infections and injecting drug users account for 4%, while health facility-related infections contribute to 3% of new cases (KNBS & ICF Macro, 2010).

In Kenya, 5.6% of adults aged 15-49 are infected with HIV (NACC, 2014). HIV prevalence in women is higher than that for men, 6.9% and 4.2% respectively. As noted previously, young women are at higher risk of HIV infection compared to young men. For example, 3% of women (15-19) are HIV+, compared to less than 1% of their male cohort, while HIV prevalence in women age 20-24 is more than four times that of their male counterparts (6.4% vs. 1.5%) (KNBS & ICF Macro, 2010).

In terms of HIV prevalence and socio-economic characteristics, in general the 2008-2009 KDHS, indicates that urban respondents are more likely to be HIV+ than rural respondents (7% and 6% respectively). However, the pattern differs by sex (KNBS & ICF Macro, 2010). Women living in urban areas have a significantly higher risk of contracting HIV (10%) than rural women (7%), while men in rural areas have higher

levels of HIV infection than their urban counterparts (5% vs. 4%). The latter trend differs from previous years where patterns indicated that there were higher levels of HIV infection in urban men than among rural men (KNBS & ICF Macro, 2003; 2007, 2010).

Other important characteristics that define the epidemic in Kenya are education level, wealth and marital status. With regard to education, women with incomplete primary education (9%) have the highest levels of HIV infection, while men in this group exhibit the lowest levels. Interestingly, HIV infection shows a tendency to rise with wealth in Kenya – women and men with higher levels of wealth have the highest rates of HIV infection (KNBS & ICF Macro, 2010). This trend is also true for those who are employed. Working men and women have a higher prevalence of HIV than do those who are not currently employed (KNBS & ICF Macro, 2010). Lastly, marital status plays an important role in HIV prevalence. Rates are considerably high among widowed women (43%), and both men and women who are divorced (17%) or separated (10%) demonstrate have high levels of HIV infection. Those in polygynous unions also have increased infection rates (13%) as compared to those in non-polygynous unions or not in any union. Likewise, men in polygynous unions are three times more likely be HIV+ than are men who are married but not in polygynous unions (16% and 5%) (KNBS & ICF Macro, 2010).

There are numerous factors that favoured and that have contributed to the rapid spread of HIV in Kenya since the first AIDS case was diagnosed. A number of socio-cultural and behavioural factors help explain the HIV prevalence level. Early sexual debut for both men and women that, together with later marriage, gives rise to a long

gap between first sex and first marriage; a high number of sexual partners in and out of marriage; lack of knowledge and widespread misinformation worsened by low, inconsistent or incorrect use of protection during sexual intercourse; and the background prevalence of sexually transmitted infections (STIs) in the population (DHAPP, 2005). Specifically, significant risk factors have been identified to include: high-risk heterosexual contact (which includes contact with vulnerable populations such as commercial sex workers, fishermen, transportation workers, refugees, military personnel, and prisoners), high mobility, trafficking of young girls, and abuse of child domestic workers, multiple sexual partners, mother-to-child transmission, and denial of possible HIV-infection by the majority of Kenyans (DHAPP, 2005; UNAIDS, 2004). More recently, factors significantly contributing to the spread of HIV/AIDS include a lack of comprehensive knowledge about HIV prevention among young people (it is below 50%, with young men having more knowledge than young girls), young men starting sex before age 15, the percentage of women and men having multiple sexual partners has increased over the last 10 years, poor levels of condom use by men and women who have more than one sexual partner, improved HIV testing and counselling among men, and increased proportions of men having sex with men (NACC, 2014).

As the epidemic progresses and continues to destroy the social fabric of society, other circumstances that create increased vulnerability to HIV infection also become more prominent - poverty, inequality and migrations as a result of labour shifts, conflict and or civil strife feed into the cycle that further powers the epidemic (Haddad & Gillespie, 2001). Recognizing the negative social and economic effects of the epidemic and its impacts on other sectors such as agriculture, industry, education, transportation

and human resources, it is critical to substantially expand prevention programs, as well as heighten care and treatment efforts, otherwise the HIV crisis and AIDS death toll will continue to devastate SSA for years to come, beyond the 2030 projected date to end HIV/AIDS.

### **1.3 The Need for Community Food Based Programs to Improve Health and Nutrition in the Context of HIV/AIDS**

Antiretroviral Therapy (ART) services in Kenya are largely perceived as purely clinical interventions. Since the inception of ART programmes, the focus has been on increasing access to the drugs while other aspects of the epidemic (the social determinants of the epidemic), such as socio-economic needs, psychosocial, food and nutrition of PLWHAs on ART are perceived as secondary concerns (Thuita, 2005), and often neglected or not adequately addressed. Therefore, there is an unmet need for community based food programs.

Furthermore, attention to nutritional care is largely limited to the creation of awareness through nutrition education and some counselling (for example, the importance of a balanced and healthy diet by consuming fruits and vegetables, and how to properly prepare fortified porridge) usually in group settings and less often at the individual level (Thuita, 2005). Very few programs engage PLWHAs in comprehensive counselling that address the relationship between nutrition, ART, with a limited number of programs focusing on assistance services for ART clients, and even fewer programs, if any have comprehensive nutrition education services relating to key foods, portion sizes and proper preparation techniques to maximize nutrient content (Thuita, 2005).

To some extent, these challenges are due to the lack of guidelines to standardize actions and provide guidance, the lack of training service providers, and a shortage of human resources (World Bank, 2007; Thuita, 2005). Table 1, reviews some of the key challenges that service providers face in providing nutritional counselling and support to ART clients, which stresses the need for community based programs that can assist with meeting these needs. Additionally, “specific interventions or broader actions to improve livelihoods, safety net or social support programs can address the needs of PLWHAs and others affected by HIV and AIDS, such as orphans and vulnerable children (OVC)” (World Bank, 2007, pg. 40). Consequently, the World Bank called for action and investment to improve the nutrition of PLWHAs based on sound scientific evidence, local resources, and programmatic and clinical experience with the prevention, treatment, and management of the disease and related infections.

**Table 1:** Challenges facing different levels of service providers in providing nutritional counselling to ART clients.

Service Providers	Needs & Challenges
<b>Clinicians (Medical and Clinical Officers)</b>	Lack of guidelines for identification of PLWHAs and ART clients nutritionally at high risk
	No guidelines on nutritional therapy appropriate for rehabilitative care of severely malnourished ART clients
	Limited reference materials on food and nutrition issues of PLWHAs & ART clients
	Inadequate capacity (nutritionists) to provide specialized nutritional counselling to ART clients
<b>Nurse counsellors</b>	Lack of supportive tools for counselling
	Heavy workload

	Inadequate grasp of issues of nutrition for ART clients
<b>Nutritionists</b>	No training on Nutrition and HIV
	Lack of appropriate tools to support counselling
	Limited knowledge on content & role of various nutritional supplements and food therapies promoted
	Lack of supplies for conducting food preparation demonstrations
<b>Community Health Workers</b>	Inadequate guidelines on nutritional management of specific conditions of PLWHAs
	Inadequate food assistance for clients in home based care programs
	Minimal training on nutritional components
	No nutritional component in home based care kit

**Source:** Adapted from FANTA, 2005, retrieved from [http://pdf.usaid.gov/pdf\\_docs/Pnadj249.pdf](http://pdf.usaid.gov/pdf_docs/Pnadj249.pdf)

## 1.4 Nutrition and HIV/AIDS

Poor nutrition results from inadequate dietary intake and general protein, energy and micronutrient deficiencies that have strong associations with wasting, weight loss, low BMI, incomplete viral load suppression, lower CD4 counts and immunologic decline (Weiser, Bangsberg, Kegeles, Ragland, Kushel, Frongillo, 2009b; Weiser, Frongillo, Ragland, Hogg, Riley, Bangsberg, 2009) increased hospitalizations (Weiser, Tsai, Gupta, Frongillo, Kawuma, Senkugu, et al., 2012), a greater likelihood of diagnosed and self-reported opportunistic infections, declining physical health (Weiser et al., 2012) and shortened life expectancy for PLWHAs both in and out of ARV therapy programs.

In those infected with HIV, oxidative stress caused by micronutrient deficiencies may cause HIV viral loads to increase (Shreck, Rieber, Baeuerle, 1991). In turn, this increases the individual's infectiousness and likelihood of transmission of HIV to others (Royce, Sena, Cates, & Cohen, 1997). Further, those that are receiving ARVs, undernutrition and food insecurity have been associated with unsuppressed viral loads (Weiser, Frongillo, Raglan, Hogg, Riley & Bangsbers, 2009a), which are known to increase the risk of secondary HIV transmission through vertical and sexual routes including the use of injection drugs. With regard to macronutrient deficiencies and infectivity, wasting and low weight gain during pregnancy are associated with increased mother-to-child transmission (Mehta, Manji, Young, Brown, Chasela, Taha et al., 2008). Food insecurity and severe food insufficiency which can lead to undernutrition and inadequate breast milk production increase vertical transmission of HIV/AIDS by increasing the prevalence of mixed formula and breastfeeding, a practice that increases the risk of mother-to-child transmission 4-fold when compared with solely breastfeeding (Iloff, Piwoz, Tavengwa, Zungua, Marinda, Nathoo et al., 2005). Additionally, micronutrient deficiencies can impair the integrity of the gut and genital epithelial lining, the differentiation of target cells, and can work to cripple other host defense mechanisms, which results in increased susceptibility to infection in infants and adults in cases where the individual is uninfected and exposed to the virus (Friis, 2005).

Deficiencies in micronutrients such as zinc, selenium, thiamine and vitamins A, B3, B6, B12, C, D and E can lead to decreases in body mass and wasting in those with advanced HIV. Lacking these micronutrients triggers increased metabolic demands

(Drain, Kupka, Mgusi, Fawzi, 2007) and is associated with diarrhoea and gastrointestinal malabsorption of fats and carbohydrates further compounding the causal links between malnutrition and disease progression. Additionally, the risk of malnutrition among PLWHAs is further exaggerated by reduced energy intake as a result of anorexia early satiety; impaired swallowing due to oral and esophageal opportunistic infections such as thrush, progressive disability which ultimately results in the inability to work and difficulties in the procurement of food stuffs (Babameto, Kotler, 1997; Stack, Bell, Burke, Forse, 1996; Macallan, Noble, Baldwin, Foskett, McManus, & Griffin, 1993). Lastly, a lack of food has been linked to impeding the optimal absorption of certain types of ARVs which can lead to treatment failure. Certain types of protease inhibitors (e.g. nelfinavir and ritonavir) require food for the optimal absorption and the lack of food can negatively affect the pharmacokinetic mechanisms of these medications (Abbot Laboratories, 2013; Bardsley-Elliot & Plosker, 2000).

Numerous studies have shown that supplementing to boost depleted micronutrient stocks can reduce metabolic and cellular complications resulting in clinical benefits among individuals living with HIV/AIDS (Drain, Kupka, Mgusi, Fawzi, 2007; Nerad, Romeyn, Silverman, Allen-Reid, Dieterich, Merchant, et al., 2003). Proper nutrition is an integral component of the health and well-being of those infected with HIV. It is vitally important that more community health and development projects – providing nutritional support/targeted food aid are implemented in contexts where poverty, malnutrition, food insecurity, and food insufficiency coexist with high and rising HIV prevalence rates.



## **1.5 Probiotics to improve Nutrition for HIV/AIDS patients at the Community Level**

The importance of nutrition in the transmission, progression and treatment of HIV, has been widely recognized and has led to the recommendation that those infected with HIV/AIDS consume foods that are high in vitamins and micronutrients in order to support and boost the immune system (Haddad & Gillespie, 2001). In fact, research findings support the application of nutritional and microbial supplements as adjunct therapies for PLWHAs (Foster, 2007; Namulemia, Sparling & Foster, 2007). Some of the gaps discussed above may be filled by using probiotic yoghurt as a nutritional supplement or targeted food aid complementing ARV treatment.

Such a practice (targeted food aid program) would assist in counteracting the widespread ailments that are brought on by HIV, as well as the rampant food insecurity and food insufficiency in this high poverty area. The importance of nutrition in the transmission, progression and treatment of HIV, has been widely recognized and has led to the recommendation that those infected with HIV/AIDS consume foods that are high in vitamins and micronutrients in order to support and boost the immune system (Haddad & Gillespie, 2001). In fact, research findings support the application of nutritional and microbial supplements as adjunct therapies for PLWHAs (Foster, 2007; Namulemia, Sparling & Foster, 2007).

Probiotics have been advocated for their beneficial health effects and therapeutic value for a wide range of diseases, and there is strong evidence of their efficacy in clinical applications (Hekmat et al., 2009; Boyle et al., 2006; Isolauri, 2001; Ouwenhand, 1999; Perdigon et al., 1995). For instance, probiotic bacteria have been

shown to address a number of problems associated with HIV/AIDS and malnutrition, namely, but not limited to i) improving resistance to infection through immune modulation (Perdigon et al, 1995); ii) improving intestinal barrier function (Isolauri, 2001); iii) alleviating diarrhoea (Anukam et al., 2008); and improving nutrient bioavailability, including B vitamins, calcium, iron, zinc, copper, magnesium and phosphorus (Kopp-Hoolihan, 2001). Hence the need for community nutrition programs and probiotic products.

## **1.6 The Project: Framed within Socio-Economic and Gender Inequalities in the context of HIV/AIDS**

The HIV/AIDS epidemic in Sub-Saharan Africa (SSA) has impacted women and girls disproportionately. UNAIDS consistently reports growing infection rates among girls and women, their susceptibility exacerbated beyond biology, by the interplay of poverty and gender inequality. Women aged 15 to 49 years in SSA are roughly 1.6 to two times more likely to be infected than men of the same age, and in some of the hardest hit countries women are five to six times more likely to be infected (UNAIDS, 2006). Nowhere has the ‘feminization’ of the epidemic been more severe than in SSA, where 59% of infected adults are women, and 76% of infected young people are females (UNAIDS, 2008).

Societal and cultural norms and attitudes which rigidly prescribe what is considered appropriate behaviour, limits women’s power to negotiate safer sex or resist unwanted sex; and little or no control over contraception and their personal health,

putting them at greater risk of becoming infected (UNAIDS, 2008; Pettifor et al., 2004). Thus, gender-based inequalities within the epidemic are clearly marked by power imbalances between men and women. Combined, these factors make it difficult for women to opt out of abusive or violent relationships, and promote expectations of dependence on men, a dependence that is deepened and further anchored by poverty. Further, demands on women's care work has increased several fold as a result of the HIV/AIDS epidemic, hence, denying them access to education which has been shown to reduce risk of infection, to enhance self-esteem, and provide the knowledge and skills necessary to participate in livelihood alternatives (International Planned Parenthood Federation, 2007; International Institute for Educational Planning, 2003).

In the development context, there is general agreement that women's empowerment is essential to the reversal of the epidemic and women's vulnerability to infection, and therefore rates within the male population (IPPF, 2007; UNAIDS, 2008). Several accounts have called for the use of multi-faceted and comprehensive approaches in order to control the epidemic. According to the UNFPA (2008), development and reproductive health programs are more effective when they address educational and training opportunities as well as empowerment of women. When women are empowered, whole families benefit, and these benefits often have ripple effects to future generations (UNFPA, 2008). More specifically, economic empowerment through income-generating activities can be seen as entry points for channels of communication and vehicles by which women can meet their needs (Rogers & Youssef, 1988).

They provide effective ways to address inequalities in the areas of health, education and poverty alleviation. It has been recognized that improvements in health care (including reproductive/sexual health), nutrition, education, family-related decisions can only be sustained with an increase in household income and greater control by women over financial resources (Hashemi, 2004). Additionally, improved economic status translates into improved social status, whereby individuals begin to take an active role in defending their interests at various social and political levels.

In recognition of these crucial realities, in 2003, The University of Western Ontario (UWO) in partnership with the Kivulini Women's Rights Organization (KWRO), the Tanzanian National Institute for Medical Research (NIMR) and the Tukwamuane Women's Group (TWG) launched a probiotic food-based community development project in Mwanza, Tanzania. The 'Western Heads East' (WHE) project, whose foundation is centred around a strong group of stakeholders working together, combines elements of community-health, development, and research. The project aims to empower women by improving their socio-economic status while also improving health, nutrition, alleviate suffering from malnutrition, diarrhoeal diseases, and urogenital disorders in vulnerable social groups in the context of the HIV/AIDS epidemic. Resource poor women with little or no formal education are trained successfully to use local resources to produce a high quality, nutrient rich yoghurt for consumption, and sell the surplus-which generates an income for them.

The project uses a combination of technology from modern microbiology and the low tech, cost-effective, methods of food science to produce probiotic yoghurt at

the household level in resource-poor settings. Combining yoghurt production techniques with probiotics is a relatively simple and inexpensive method for improving quality of life. Studies have indicated that specific probiotic strains, including *Lactobacillus rhamnosus* GR-1 (the strain used by the project), can enhance host defences such as natural killer cells, thereby potentially boosting immunity in patients with AIDS helping alleviate complications and improve quality of life (Reid, et al., 2005; Reid, 2006). Other empirical evidence indicates that probiotics are effective at alleviating diarrhoea, urogenital infections, and other gastrointestinal side effects as a result of malnutrition, and can facilitate the uptake of highly active antiretroviral therapy (Anukam et al., 2008).

The overall goal was to set up a sustainable food-based community micro-enterprise for better health, which fosters leadership, empowerment and advocacy skills among women and knowledge transfer to future generations. More recently, the project has been replicated, in collaboration with the Kenya Medical Research Institute (KEMRI), the Ministry of Health, and the Orande and Baraka Women's Groups. Two probiotic yoghurt kitchens have been constructed in Oyugis and Kadongo, Rachuonyo District of Kenya, in Nyanza Province, with startup funds for the buildings and equipment provided by a World Bank Development Marketplace Grant.

The Orande and Baraka women were being trained by women (Yoghourt Mamas) from Mwanza, Tanzania on how to produce probiotic yoghurt. The Tanzanian Yoghourt Mamas played a vital role in helping transfer the required knowledge and skills and to provide training to the new groups for the successful operation of the community

kitchens. Women are provided by women with the necessary tools and resources through hands on training. The expectation is that hands on training from woman to woman, will allow for the transfer of necessary skills and expertise to produce high quality nutrient rich probiotic yoghurt, the knowledge needed to operate a successful revolving micro-credit scheme and microenterprise. The women will learn the technical skills as well as essential business skills (such as accounting and marketing) to manage this micro-enterprise.

The project then is a critical medium, providing an enabling environment for these groups of women. Whereby the skills and knowledge the women gain can be considered self-enhancing tools, provided in an encouraging setting with support systems, which in turn will aid them to make decisions and exert control over their lives. Women's empowerment must be considered a process, which embodies 'self' and cannot be attained through the direct interventions of outside agents. It must be self-selected and self-driven and is not susceptible to interventions of those wishing to 'empower' (IPPF, 2007).

This unique project has the ability to provide the foundation to establish empirical evidence in support of the value of community health and development projects, and the use of probiotics, a simple technology, to improve health, nutrition, assist with the management of HIV/AIDS, and the socio-economic conditions of marginalized women in Africa. This study examines the health, nutrition and well-being of PLWHAs taking the probiotic yoghurt, the socioeconomic effects it may confer, and

the degree of empowerment it may present the Yoghourt Mamas with the following objectives.

## **1.7 Research Objectives**

The research is designed to incorporate results from qualitative and quantitative data to enhance the understanding of factors which contribute to the better health, nutrition, social and economic status of women, and how to empower women living in resource-limited settings, with potential future applications to similar contexts.

### **1.7.1 Overarching Research Objectives:**

- Investigate the prevalence of malnutrition, diarrhoeal disease, urogenital infections in women within the study sample who are infected with HIV/AIDS and living in the Oyugis community and surrounding area;
- To examine perceived improvements in health, well-being, quality of life and the utility of probiotic yoghurt in improving quality of life of those consuming the yoghurt;
- To explore the cultural acceptability of the project within the Oyugis and Kadongo community and examine community perceptions and general use of fermented food products in the context of prevailing socioeconomic and cultural factors;
- To explore the economic, social and health impact of the project on the empowerment of women and their immediate families and improvements

in quality of life (if any) resulting from participating in this community base health and development project.

- To explore perceived barriers to project implementation and development in the context of power dynamics, gender roles, family and community relations.

## **1.8 Research Relevance to Health Geography**

The foundational concept behind this health and development project, can be considered to intersect at the nexus of health, equity and innovation as it attempts, in a multipronged approach, to redress inequality and inequities (concepts that have always concerned the discipline) and to improve health. According to Luginaah, Kerr, and Dixon (2015) “to date, conversations about geographies of health in development have been limited and do not reflect the importance of budding scholarship across the world on the subject” (p.1). It is under the auspices of this observation that the research aims to contribute to the geography of health.

“Geography offers a unique lens to the study of health by not only focusing on the distributive features of disease and disease services (traditionally conceptualized as space), but also broadening the discussion to more complex notions of place” (Luginaah, Kerr, Dixon, 2015 p. 1). Approaches in health geography are diverse, drawing on different ways of conceptualizing space, place and health. The research recognizes the importance of context, setting and spatial scale – from global to local – and the factors that have worked to determine health outcomes within the Kasipul community,



especially with regard to HIV/AIDS in this specific area. The issues are complex and integrative, needing a multipronged approach to ensure that potential policies are informed by appropriate research. Social and spatial polarization with regard to socio-economic inequalities, poverty and generally, vast inequities, have driven research that seeks to inform the determinants and consequences of health variations, including concerns related to poverty, health care access and public health. Identifying persistent inequities in health between communities is able to provide evidence that can support policies to address the underlying causes of health problems (Shaw, Dorling, Gordon, Smith, 2001; Marmot, 2005; Pampalon, Martinez, Hamel, 2006) and to improve health equity. “Partnerships among health specialists, geographers and others can help sustain innovative approaches to solving complex problems and ultimately reduce inequity” (Dummer, 2008, p. 1180). In the paragraphs that follow, the links between health geography and the ways in which this research, that is focused on health and development informs the discipline will be described.

The research, considers ‘health’, broadly defined as physical and mental health, well-being and health-related practices, and addresses a range of different substantive issues. These include spatial epidemiological interpretation of how and why health varies in the Kasipul district as compared to other areas in Kenya at the ecological (aggregated population) level. Further, it examines how individual health outcomes and health-related practices relate to one’s varying experiences of and exposure to the physical and social environment. More specifically, the research plays a key role in providing a spatial understanding of the community’s health, the distribution of HIV in

the area, and offers an understanding and insight into the influence of inequality, culture, and representation of place on health. Further, the research informs health geography by considering the significance for physical and mental health interactions between the people in this specific community and their environment and examines broadly, the variation of health in the population.

Increasingly important, is health geography's relevance for public health research. Embracing fields such as quality of life, well-being, disease accessibility and use of services and the ways in which users interact with services in different settings (Curtis, 2014). In addition to surveying the geographical factors as determinants of health, the research also explores quality of life, and how state of health (physical and mental health) affects the experiences of participants' physical and social environments. It takes into consideration the global, national and regional processes, the local contexts of places and peoples' everyday lives that are crucial and the evolving considerations for health policy development.

### **1.8.1 Importance of Defining Community**

Community, as a concept is one that holds a collection of positive connotations, and implies constructive and wholesome attributes such as inclusivity and belonging (Mowbray, 2005). Whereby, communities are valuable and dynamic units – changing and evolving, and often defined using different parameters. Usually, communities are defined based on the physical environment, identified by a geographical area, and considered to be a bound space or place (and can also be considered permeable)

(Paronen & Oja, 1998). While in other cases, community is defined as a psychological bond or connection that ties individuals with shared experiences (Rifkin, 1996; Fawcett, Andres, Francisco, Schultz, Richter, Lewis et al., 1995). Typically, communities are geographically bound and experiences are considered to be in some way interwoven with the physical aspects of 'place' (Edwards, Jumper-Thurman, Plested, Oetting, Swanson, 2000). Despite the constellation of positive attributes and extensive use, the literature (e.g., Mansuri and Rao, 2004) lacks a single definition to serve all situations, purposes and interests (Hampshire, Hills, Iqbal, 2005). As such, the literature and discourse around the definition of community is ambiguous.

There has been a lack of consensus around the definition of 'community' even as the term has been used a great deal in recent years, working to give it a vagueness and ambiguity that reduces its value as a concept (Thurston, 2014; Roberts, 2009). Therefore, failing to identify the intended meaning of community, can lead to the construction of incongruous assumptions about the context of the community. To circumvent the devaluation of the concept.

To emphasize the importance of understanding the community in which the work took place and to avoid mismatched assumptions, 'community' (for the objectives of this research), is defined as a geographic 'place' whereby those living within this particularly boundary share: a common heritage – culture, language, traditional practices and rituals; hold comparable values, beliefs and norms; have a shared sense of identify and belonging; shared need and resources; and collectively have analogous historical roots and political experiences (Edwards et al., 2000). This description of

community is further supported by concepts of 'space' and 'place' within health geography.

In considering the conceptualization of community, it is critical to bear in mind that communities are often thought of in terms of social relations, which also implies that the people who constitute these groups are likely to be part of several communities, reflecting the varied ways in which their identities and their sense of belonging is created and formed in relation to the diverse spheres of their lives. The dynamics and intensity of social and environmental barriers can affect community programs and the ability of the community to influence change (Fawcett, et al., 1995). Communities are dynamic and fluid, where people interchangeably move between identities in a variety of settings (Thurston, 2014). Additionally, defining communities in terms of identities and values predictably pushes into observation the significance of balance of power, its distribution in communities and control. Power can be used to exclude and or include people on the basis of certain characteristics, and can also be a source of friction and conflict (Pantazis, Gordon, Levitas, 2006). This is especially important within the study communities as these forces can have a profound effect on the quality of participation, project success or failure, and sustainability.

### **1.8.2 Conceptualizing 'space' and 'place' in Health Geography**

'Space' and 'place' can be viewed to be socially constructed and highly contingent on individual perceptions and experiences (Curtis, 2014). In conceptualizing 'space', the idea can be viewed as both a means and a product of social relations, suggesting that space has an element of social significance and can also be socially

constructed (Kearns & Joseph, 1993). Whereas 'place' can be thought of as being more well-defined and specific than that of 'space', it is a location with attributes – social and physical, where socio-economic activities and processes come together (Curtis & Jones, 1998). Distilling the concept to a more granular level, the physical and social construction of the human body can also be considered as a 'site' where social processes associated with health are expressed (Curtis, 2014).

In geographical terms, 'place' can be thought of as a segment of space with boundaries – both indiscrete or discrete, and can be defined as both an objective location that has unique characteristics or similarities with other places. Alternatively, it may be a subjective social construct that invokes symbolism and meanings (Eyles, 1993). According to Eyles (1989) human actions are structured into the places (communities) in which people live, giving meaning, making patterns and establishing reason. Therefore, 'place' can also be considered as the epicentre of value that is embodied in the experiences of people, and not simply a locale to carry out their daily lives which can have a strong influence on health behaviours, well-being and overall quality of life.

In practice, 'community' (place) and community health are intertwined with geographical location and social functioning, as such it is important to integrate the concepts of 'space' and 'place' and explore the inextricable and multidirectional relationship between these concepts. With these considerations, it is also essential to recognize that 'space' and 'place' may not be fixed or discretely identifiable, and may not be associated with one specific locale. 'Space' and 'place' can be experienced through the creation of spatial interactions, such as place linkages (Eyles, 1993).

Further, the material infrastructure of places and collective functioning of places are related to health, therefore health can be thought of as being expressed by the people who inhabit a particular area (composition) and by elements that reflect the broader nature of the environment in which people reside (context) (Macintyre, Ellaway & Cummins, 2002). Additionally, cultural meanings, traditions, values and norms infuse places and influence health concepts and practices (Kearns & Joseph, 1993). It is well known that the physical and social structures including the environment, for example, appropriate housing; accessibility to essential common resources such as clean drinking water and hygienic physical environment (clean – air, land, water); and the availability of other services (health care, education, transportation and emergency services) affect health (Macintyre, Ellaway & Cummins, 2002).

### **1.8.3 Contextual and Compositional Factors of ‘Place’ and Considerations for Health and Development Projects**

Contextual characteristics that can impact health are ‘physical’ aspects of place that can be measured directly (Veenstra, 2005). These types of factors are usually tangible elements and can include access to services such as education, social services and health care, housing, the composition of housing (mud floor, thatched roof etc.), access to water, the availability of electricity, and transportation, among others.

To a certain extent, the physical aspects of ‘place’ can be used to identify the spatial distribution of health and deprivation (Taylor, 2000), with the worst health and deprivation tending to occur together. From the example presented, it is evident that these basic needs are imperative to realizing health. Taking into consideration the

importance of contextual factors in health, it is important to first undertake community-based needs assessments when considering the implementation of any program. Undertaking local 'needs assessments' are crucial in identifying and deciding where, when and how to concentrate resources. As most governments, policy makers, benefactors, and donor organizations are mainly concerned with the distribution and allocation of these physical resources, identifying community needs and resource availability is essential prior to implementing any type of health and development project to ensure (to a certain extent) the program is sustainable after initial funding and capacity building (training, human resources) have ended. The predominant rationale for working in resource-limited communities has been an endeavour to improve resources, service provision (quantity and quality of resources and services), however the more deprived areas tend to be poorer, and more poorly resourced (Dorling, 2010). All too often, resources – financial, technical and human capital are used to implement health and development projects that unfortunately collapse because the feasibility for implementing a sustainable project within the community did not initially exist.

Compositional factors of place, otherwise community, considered to have an impact on health involve political, economic, and cultural factors of place including social function. More specifically, compositional aspects include socio-cultural and historical features, such as shared values, beliefs, norms and interests, traditions, rituals, religion, ethnicity as well as common economic and political histories. Other important aspects embrace social networks, community support and the concept of

empowerment (Macintyre, Ellaway & Cummins, 2002). Despite ample amounts of literature highlighting the importance of these factors on health, more often than not they are under studied determinants of health within public health research (Veenstra, 2005).

In designing the road map– strategic objectives, goals and initiatives for a health and development project, examining the existing contextual factors – socio-cultural dynamics, roles, and relationships are crucial in understanding the complexity of community forces and relating this to the path of least resistance towards project implementation. With any health and development project, efforts must be sensitive to the cultural relevance, appropriateness, historical context, and be accepted by the community as an enduring commitment to improving health (Edwards et al., 2000). For instance, socio-cultural and socio-economic factors that affect health and place can include (but are not limited to): general community wealth and degree of equality (i.e., distribution of incomes, norms, beliefs, values); social dynamics (i.e., power, control, trust, social networking and reciprocity); and political positionality (Veenstra, 2002). By exploring and understanding the contextual aspects of a community can lead to an improved sense of why and how individual actions are a part of socially conditioned, culturally entrenched, and economically constrained ways of living (Beeker, Guenther-Grey, Raj, 1998). It is held that ‘places make people’ as part of place-based processes (Subramanian, Lochnen, Kawachi, 2003). On this assumption factors such as low income, low educational levels, and poor accessibility to fundamental health and social



services are an output of the places where people live (Subramanian et al., 2003; Macintyre & Ellaway, 2000).

Another essential element to be considered when investigating the probable impact of a proposed health and development project are the community conditions under which the project is operating. Community leaders and the community (local residents) must support the project, its objectives and must be willing to co-operate towards the actualization of project initiatives. To be sustainable and effective, community health and development projects must involve multiple systems of local support (e.g. community leaders, community based-organizations, institutes, hospitals etc.) and should maximize the use of community resources and assets as much as possible and whenever possible. These multiple systems can also include human/social capital and co-operative efforts that support project initiatives that work towards achieving sustainability and effectiveness. Engaging the community as much as possible from the design of the project through to implementation with local capability and capacities in mind, works to guide the community in becoming responsible for their own health and development, not only so that the individual/community can manage their own well-being, but also so that they have a duty to participate in the well-being of their community (Crawshaw, Bunton, Gillen, 2003). In taking this approach, community members feel a sense of responsibility and commitment, applying their knowledge, using their resources, time and energy to improve quality of life within their communities and effecting community wide transformations in health. Active participation (engagement and mobilization) enables community members to increase

control over their own health by contributing to the development of more relevant health and development projects, policies, while also encouraging empowerment, and an increased sense of self-esteem as they are more able to identify their own health issues, needs, define the determinants of these problems and to be actively involved in solutions.

In taking stock of the contextual and compositional factors presented above, it is critical to understand that while the factors are presented independently, and discussions around these concepts are often examined separately, these two aspects of place are inter-related and should not be considered as mutually exclusive in developing health and development project objectives (Subramanian, Lochnen, Kawachi, 2003).

## **1.9 Chapter Summary**

The current chapter describes broadly, the background of this research as it is positioned within the context of HIV/AIDS and health care in Kenya. It highlights the need for community health and development projects, more specifically nutritional projects, and sets the stage by outlining the Western Heads East Project. The chapter also provides the study objectives that have led to the evaluation of the health, nutritional, and socio-economic impacts of the project on the women's groups as well as the community.

## **CHAPTER II**

### **Research Context - Country Profile**

#### **2.1 Introduction**

This chapter provides an overview of the study context. It presents information on Kenya, the province of Nyanza and moves to illustrate the district (Rachuonyo) and community settings (Oyugis and Kadongo). The first section gives an outline of the geography, historical and political shifts within Kenya and their impact on the population and the health care system. The second section presents a description of the current situation in Kenya as it pertains to poverty, HIV/AIDS, health care, education and employment in the study communities. Socio-economic data, health statistics as well as the current health care situation are presented throughout the chapter.

#### **2.2 Kenya: An Overview**

##### **2.2.1 Location and Geography**

The Republic of Kenya is situated on the eastern shores of the African continent and lies between 1° 00' N and 38° 00' E, almost bisected by the equator (Figure 1) (UN, 2004). Kenya shares borders with five other countries and several water bodies: Ethiopia (north), Tanzania (south), Somalia (northeast), Uganda and Lake Victoria (west), Sudan (northwest), and the Indian Ocean on the east.

The country falls into two regions – the lowlands, comprised of the coastal and Lake Basin lowlands, and the highlands, which extend on both sides of the Great Rift Valley,

and are considered to be one of the most successful agricultural production regions within Africa (UN, 2004). The climate within each of these regions is highly variable, with rainfall and temperatures dependent on altitude and proximity to water. The country also experiences four seasons in a year: a dry period from January to March, the long rainy season from March to May, followed by a long dry spell from May to October and the short rains between October and December. The major planting seasons take place during the long and short rains; however, several parts of the country are prone to poor agricultural yields and difficult livestock rearing conditions because of major, recurring droughts, and severe flooding when it does rain. Approximately 80% of the country's land area is arid or semi-arid, and only 20% of the total land area is arable.

Kenya has a population of 41,070,934, and has a very large youth cohort, with 42.2% of the country's population is between the ages of 0-14, while 2.7% are 65 years and over (Central Intelligence Agency [CIA], 2011). The country has a large dependency ratio that has increased since 2003 with over 45% of the population depending on 55% of the productive group between 15 and 64 years (Kenya National Bureau of Statistics [KNBS] and ICF Macro [ICF], 2010). The relatively high dependence ratio creates a great deal of pressure on social and economic development and more particularly on women who to a greater extent are the providers of basic needs for their families.

The country has various tribes that are distributed throughout Kenya, their populations comprise several different ethnic groups: the Kikuyu (22%), Luhya (14%), Luo (13%), Kalenjin (12%), Kamba (11%), Kisii (6%), Meru (6%), other African (15%) and non-African (Asian, European, and Arab) (1%) (CIA, 2011). The majority of these individuals

are Christian, but estimates for the percentage of the population that adheres to Islam or indigenous beliefs vary widely. Generally though, 45% of Kenyans are Protestant, Roman Catholic (33%), Muslim (10%), indigenous beliefs (10%), and other (2%) (CIA, 2011). In Kenya, English and Kiswahili are used as official languages, and Kiswahili is the national language. Although Kiswahili is the national language, local dialects are often preferred for daily interactions, as most people have difficulty comfortably conversing in Kiswahili.

**Figure 1: The Location of Kenya and Oyugis within the African Continent**



**Source:** United Nations. (2004). *Kenya*. United Nations from the Department of Peacekeeping Operations U.N. Map # 4187. Retrieved from <http://www.un.org/Depts/Cartographic/map/profile/kenya.pdf>

### **2.2.2 The Socio-Political and Economic Environment**

In 1950, the infamous Mau Mau rebellion paved the way for advancements within the Kenyan political arena and pushed for constitutional reform. In the years that followed, Jomo Kenyatta led Kenya towards independence through a liberation struggle against the British colonial rulers. The independence process was met with resistance and an armed struggle by Kenyans against the British ensued. The country eventually achieved self-rule in June 1963 and gained independence on December 12, 1963 (*Uhuru Day*).

The following year, Kenya became a republic, as a multi-party state under founding President Jomo Kenyatta. Although the country identified itself as a multi-party state, it was a de facto one-party state from 1969 until 1981, when relevant parts of the constitution were amended to create an official one-party state. President Daniel Toroitich Arap Moi took power in constitutional succession after Kenyatta's death in 1978, and the ruling Kenya African National Union (KANU) made itself the sole legal party in Kenya. In 1991, Moi finally acceded to internal and external pressure for political liberalization, and the country reverted to a multi-party state. From independence until December 2002, the country was ruled by KANU. In 1992 and 1997 the ethnically fractured opposition failed to remove KANU from power, and the elections were marred by fraud and violence, but were considered to reflect the general will of Kenyans. During the 2002 general elections, the National Alliance of Rainbow Coalition (NARC) – a multiethnic, united opposition group, under the leadership of Mwai Kibaki, defeated KANU candidate Uhuru Kenyatta following a campaign centred on an anticorruption

platform and ascended to power through a landslide victory. President Moi stepped down in December 2002 following fair and peaceful elections.

In 2005, Kibaki's NARC coalition splintered over the constitutional review process. Government defectors joined with KANU to form a new opposition coalition, the Orange Democratic Movement (ODM), which defeated the government's draft constitution in a popular referendum in November 2005. General elections in 2007 saw Kibaki's re-election, as allegations of vote rigging surfaced from ODM candidate Raila Odinga and brought about two months of violence in which an estimated 1,500 people died or went missing. UN sanctioned talks in late February 2007, produced a power-sharing accord bringing Odinga into the government in the restored position of Prime Minister. Currently, the country is run by a coalition government, bringing together the Party of National Unity (PNU) and the Orange Democratic Movement (ODM).

In August 2010, Kenya voted on and begun enacting a new constitution that marked the end of a twenty-year struggle for reforms. Over 67% of Kenyans approved the new constitution in a referendum held on August 4<sup>th</sup>, 2010 which eliminates the role of prime minister after the next presidential election, and is intended to bring much needed reform to the country, particularly under the new Bill of Rights. Some of the most progressive provisions of the Kenyan constitution were made under this section, guaranteeing fundamental rights such as the right to equal opportunities for men and women.

Kenya's development after independence was rapid – public investment, encouragement of smallholder agricultural production and incentives for private



industrial investment, often foreign, lead to an annual GDP average of 6.6% from 1963 until 1973 (Library of Congress [LoC], 2007). Agricultural production also grew 4.7% annually during this same period, stimulated by opening new areas to cultivation, redistributing estates, and diffusing new crop strains (LoC, 2007). Since 1974 however, growth has been slow and at times stagnant as a result of numerous factors (i.e., import substitution, fluctuating oil prices, uncompetitive manufacturing sector, and unattractive environment for investment) (LoC, 2007).

At independence, three priority sectors were identified as needing urgent attention in order to address the inequalities created by the colonial administration and development. One area was health, the other two being education and poverty (Central Bureau of Statistics [CBS], 2007). Health was chosen as a means to improve quality of life and positively impact socio-economic development through improved adult productivity, longevity and earnings. As part of this mandate, 'free' health services were introduced, and members of the public were encouraged to assist with increasing health sector capacity by providing the resources - financial, human, technical and infrastructure required to build adequate capacity in providing health care services (Rono, 2002).

In the years from 1991 to 1993, Kenya experienced its worst economic performance since independence. Agricultural production shrank at an annual rate of 3.9%, growth in GDP stagnated, inflation reached 100% in August of 1993, and the government's budget deficit was over 10% of the GDP (LoC, 2007). As a result bilateral and multilateral donors suspended program aid to Kenya in 1991.

In 1993, the Government of Kenya began major economic reforms and liberalization. With the assistance of the World Bank (WB) and the International Monetary Fund (IMF), the new Minister of Finance and Governor at the Central Bank of Kenya, undertook a series of economic measures (LoC, 2007). As part of this program, the government eliminated price control and import licensing, removed foreign exchange control, privatized a number of publicly owned companies, reduced the number of civil servants, and introduced conservative fiscal and monetary policies. From 1994-1996 Kenya's real GDP growth rate began to improve, averaging just over 4% a year (LoC, 2007)

However, in 1997, the economy entered a period of stagnant growth, due in part to unfavourable weather conditions and decreased economic activity prior to the general elections in 1997 (LoC, 2007). During this time, the Government of Kenya also refused to meet commitments made earlier to the IMF on governance reforms. As a result, the IMF suspended lending for three years, and the World Bank also put a \$90 million structural adjustment credit on hold. By 1999, the Government of Kenya took positive steps on reform, including the establishment of the Kenyan Anti-Corruption Authority, and measures to improve the transparency of government procurements and reduce the government payroll (LoC, 2007). In 2000, the IMF signed a \$150 million Poverty Reduction and Growth Facility, and the World Bank followed with a \$157 million Economic and Public Sector Reform credit (LoC, 2007). Currently, the main drivers of Kenya's economy are the various sectors in agriculture, manufacturing, telecommunications, and tourism.

### **2.2.3 Structural Adjustment Programs**

Beginning in 1988, the first of a series of economic and political reforms were initiated in Kenya by the International Monetary Fund and the World Bank (Rono, 2002). By 1991, when Kenya began to experience its worst economic performance since independence, there was a greater reliance on credit through Structural Adjustment Programs (SAPs), which worked to transform many aspects of Kenyan life – high rates of income inequality, unemployment, inflation, retrenchment which have lowered living standards, particularly those relating to the material resources in the family (Rono, 2002). Within the Kenyan context SAPs resulted in increased deviant behaviour, crime rates, ethnic hatred, discrimination and welfare problems, particularly in the areas of health and education (Rono, 2002).

Although SAPs were intended to improve the economy in the long run, the short term, and ‘immediate’ negative consequences of SAPs were largely ignored. One area that suffered under SAPs is the social aspect of human development due to the erosion of social services, especially among vulnerable groups, families and individuals (Structural Adjustment Participatory Review International Network [SAPRI], 2004; Rono, 2002). Generally, SAPs brought about profound declines in political, economic and social domains that precipitated tensions and conflicts.

As a result of significant gains in facilities in the health sector, improvements were made from independence until about 1993. The crude death rate dropped from 20 to 9 per 1000, while infant mortality declined from 120 to 60 per live births and life expectancy increased from 40 to 60 years. However, the gains made during the first 25 years of

independence eroded, dramatically since the implementation of SAPs. Increasing poverty proceeded alongside poor quality of health services and nutritional status (Rono, 2002). Overall, SAPs have been linked to increased food insecurity, undernutrition, rising ill-health, and decreasing access to health care especially for those who live below poverty levels (Rono, 2002; Loewenson, 1993). SAPs also affected the development of 'healthy' health policies, with a loss of proactive health policy frameworks, a widening gap between the affected communities and policy makers, and the replacement of the underlying principle of equity in and social responsibility for health care by a policy in which health became a marketed commodity with access to health care becomes an individual responsibility (Loewenson, 1993).

Overall, "the structural reforms in the social sector were aimed at achieving large-scale changes in the role of the state" (SAPRI, 2004, p. 177), however, their cost-sharing schemes and spending controls were implemented at a time when countries were experiencing economic decline and the needs of the poor were the greatest (SAPRI, 2004; Lensink, 1996). The negative effects of adjustment programs on education, health care and other social services have been tremendous and have adversely affected development.

According to the 2014 UNDP Human Development Report, Kenya has a Human Development Index of 0.535 (as of 2013) and is ranked in the low human development category. Currently, Kenya ranks 147<sup>th</sup> out of 187 countries (UNDP, 2014). Between the years 1980-2013, Kenya's HDI value increased by 20% or approximately 0.55% annually, from 0.446 – 0.535 during this time period (UNDP, 2014).

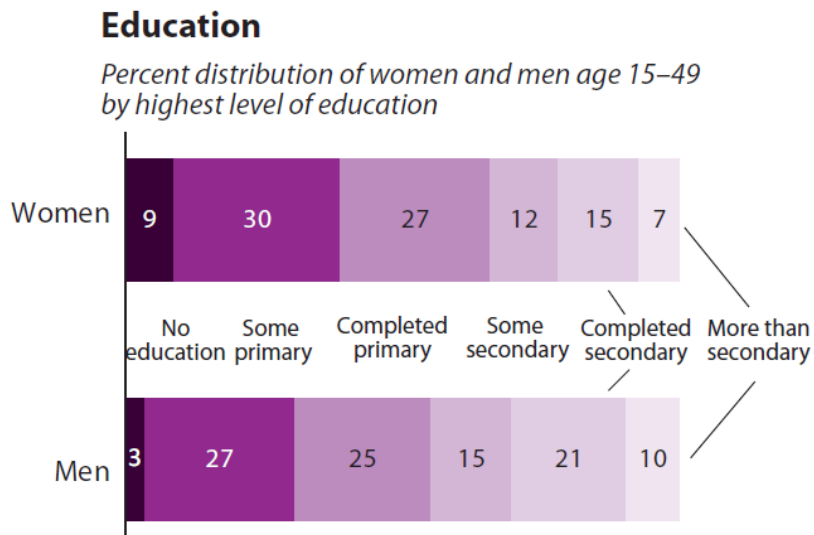
The economy grew steadily from a rate of 5.8 in 2002 to 7.0 in 2007, but declined to 4.5 in 2008 due to election related political instability and the global economic crisis (World Health Organization [WHO], 2009). As a result, Kenya's progress towards the attainment of the Millennium Development Goals is slow and uncertain, with only education registering significant progress, and mostly as a result of external donor assistance (WHO, 2009). Poor infrastructure, weak institutions, corruption, and poor regulatory enforcement are key development challenges facing Kenya. Currently, Kenya Vision 2030 is the development blueprint being followed to transform the country into a middle-income nation. To achieve this goal, the government, along with donors aim to maintain a stable macro-economic environment supported by structural reforms (WHO, 2009).

Despite being a regional hub and having the largest economy of the three countries within the East African community - by virtue of its population, it remains one of the poorest countries and has one of the lowest life expectancies in the world. The probability of dying between 15 and 60 years of age for men and women respectively is 432 and 404 per 1000 (WHO, 2012). With a 40% unemployment rate, Kenya has one of the lowest average gross national incomes in the world, \$840 USD per capita and is still only about half of Africa's average of 1,600 USD (EARC, 2014). Approximately, 50% of Kenya's population lives below the poverty line (i.e. half of the population lives on less than \$2 USD per day without the necessary resources to obtain minimum basic necessities such as food and health care) (Kenya Integrated Household Budget Survey [KIHBS], 2006). Within this 50% there are strong regional disparities in the distribution of poverty, and

income inequality with an estimated Gini coefficient of 42.5% in 2008 and increasing to 47.7% leading up to 2013 (CIA, 2011; UNDP, 2013). Indication, that absolute inequality has increased. Kenya's poverty levels are high when compared to neighbouring countries of Tanzania and Uganda with Gini coefficients of 36% and 31% respectively (World Bank, 2010a).

Education has been identified as one of the most effective tools for reducing inequality and poverty and is the basis for sustained economic growth (Hanushek and Woessmann, 2008, UN, 2009). Kenya has made great strides in terms of education. Net primary education enrollment increased from 80% in 2003, to approximately 90% in 2008, with an equal enrollment ratio between boys and girls. In 2004, only 60% of primary students completed their education compared with 80% in 2008. However, there remain regional disparities and inequalities, and although, 85% of women and 92% of men are literate, as can be seen from the figure below (Figure 2), only 7% of women and 10% of men have more than secondary level education (KNBS & ICF, 2010).

**Figure 2: Distribution of Adults by Highest Level of Education**



**Source:** KNBS and ICF, 2010

#### **2.2.4 The Kenyan Health Care System: Structure, Status and Challenges**

The health sector is currently governed through two ministries: 1) Ministry of Medical Services; and the 2) Ministry of Public Health and Sanitation. The Kenya Health Policy Framework (1994-2010) is the overarching health policy and the National Health Sector Strategic Plan (2004-2010) elaborates on plans for crucial and essential health services and activities for the sector (WHO, 2009). The health sector has also defined the Kenya Essential Package for Health (KEPH) based on a life-cycle approach to deliver a comprehensive health care package across six levels of care. Government is the main provider of health services while the private for-profit and the private not-for-profit also serve a significant proportion of the population.

As the policy framework and strategic plan have come up for renewal, it has been noted that the impact on health during a 16 year period was limited - all age cohorts showed worsening/stagnating health over the time period, there was an increased disease burden within the population, the communicable disease burden remained high, and the recurrence of measles and polio, which had previously been brought under control (Kandimaa, 2010; WHO, 2009). The high disease burden reflects the meagre expenditures on health at 4.6% of the GDP in 2007 and per capita (~\$38 USD, 2007) (Global Health Observatory [GHO], 2010). In 2013, the per capita expenditure increased to approximately \$45 USD (GHO, 2015). These figures are drastically lower than pre-structural adjustment program values. For instance, annual spending on health services per capita in Kenya declined from US \$982 in 1980/81 to about US \$6.20 in 1996, and since have only slightly improved to the recent value of US \$45 (GHO, 2015; WHO, 2015; Owino & Munga, 1997). The share of government spending allocated to health is low at 6% and government expenditure on health as a % of GDP is in the median range at 2% (WHO, 2015).

Health impact indicators suggest that wide disparities in health across the country persisted throughout the policy period, and are closely linked to underlying socio-economic, gender and geographical disparities (Kandimaa, 2010; WHO, 2009).

Additionally, the roll-out of the KEPH under the policy framework and strategic plan continues to be hampered by inadequate quantities and qualities of resources (human, infrastructure, and financial) as well as an ever evolving institutional capacity to



manage the available resources (WHO, 2009). Table 2, highlights some of the key opportunities and challenges the health system faces in Kenya.

**Table 2:** Health System Opportunities and Challenges

OPPORTUNITIES	CHALLENGES
<ul style="list-style-type: none"> <li>▪ Clearly articulated government vision and strategy; Government-led reform process.</li> </ul>	<ul style="list-style-type: none"> <li>▪ High burden of communicable diseases and a growing burden of non-communicable diseases (i.e., diabetes, cancer, heart disease).</li> </ul>
<ul style="list-style-type: none"> <li>▪ Global health partnerships provide resources for addressing health challenges.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Weak health systems; distribution inequalities and disparities; low health services utilization.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Robust private sector, robust economy and a strong civil society.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Inadequate health infrastructure, human resources and other health care inputs.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Regional and sub-regional integration provides opportunities for harmonization of cross-border health and economic activities.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Inadequate platforms for procurement, financial and information management to support health services and decentralization.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Lack of comprehensive approach to intervention in some key areas.</li> </ul>

**Source:** WHO. (2009). *Country Cooperation Strategy at A Glance*. Retrieved from [http://www.who.int/countryfocus/cooperation\\_strategy/ccsbrief\\_ken\\_en.pdf](http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_ken_en.pdf)

## Community Profile

### 2.3 Community Profile of the Study Areas: Oyugis and Kadongo

The towns of Oyugis and Kadongo in the Rachuonyo District of Kenya, are located in the southern region of Nyanza province in Western Kenya, approximately 80km south east from Kisumu, the 3<sup>rd</sup> largest city in Kenya. The district has a population of 307, 126 (Table 3) more specifically, the towns belong to the Kasipul - Kabondo Division (recently amalgamated), which is 1 of the 32 political constituencies comprising the province, and have a population of approximately 130,000, and 71,500 respectively (ConstitutionNet, 2002). The district is the 5<sup>th</sup> most populated in Nyanza province, and has a primary school enrolment rate of 72.8% (ranked 8<sup>th</sup> in the province and 32 nationally) and a secondary school enrolment rate of 17.4% (ranked 7<sup>th</sup> in the province and 39 nationally, however this number is bolstered by a large in-migration of students to highly reputable institutions and may not reflect the number of actual students from the area enrolled in secondary schools).

**Table 3:** Disaggregated District Population

District Population by Sex	Male	Female	Total
	145, 793	161, 333	307, 126
Total District Population Aged 18 years & Below	89, 966	87, 244	177, 210
Total District Population Aged Above 18 years	55, 827	74, 089	129, 916
Population Density (person/km <sup>2</sup> )	325		

**Source:** ConstitutionNet. (2002). *Karachuonyo District*. Retrieved from <http://www.constitutionnet.org/files/KARACHUONYO%201%20complete.pdf>

Oyugis is located 20km north of Kisii and Kadongo is located 45km north of Kisii. The distance between Oyugis and Kadongo is approximately 25km. Both towns are situated along the major A1 highway which links these communities and the province to the rest of Kenya, as well as the continent from South Africa northward to Egypt – making it a key transportation corridor.

Oyugis is the commercial capital of Rachuonyo District in Nyanza Province. It is a budding centre in a rural area and is an emerging town in the district, beginning to experience rapid growth and expansion, marked by the establishment of several bank branches by popular Kenyan financial institutions, and hotels. The town itself has an urban population of approximately 9,000 people. Oyugis also has a district hospital, a private health clinic, several VCT clinics and small-scale business owners provide numerous other services. It also has a small-medium sized western style supermarket, and a medium sized traditional (informal) market, both are quite active most of the week. On 'market days', merchants, wholesalers, retailers and vendors flock to Oyugis to sell a multitude of wares, and the town is transformed into a bustling commercial centre. Kadongo, on the other hand has a very small central business district, with extremely limited goods and services available to residents. The town does not have a hospital, health clinic, or bank and the informal market has not been diversified - even on market days, the selection of available food products and wares is severely limited, demanding that residents travel to neighbouring towns for basic foods, services and necessities, typically using their modest savings for transportation costs.

Transportation during heavy rains to and from the interior of both these towns is extremely difficult as the road and bridge infrastructure is very poor and can be considered non-

existent, resulting in washed out routes and mud laden roads that can become impassable by vehicle, motorcycle or on foot.

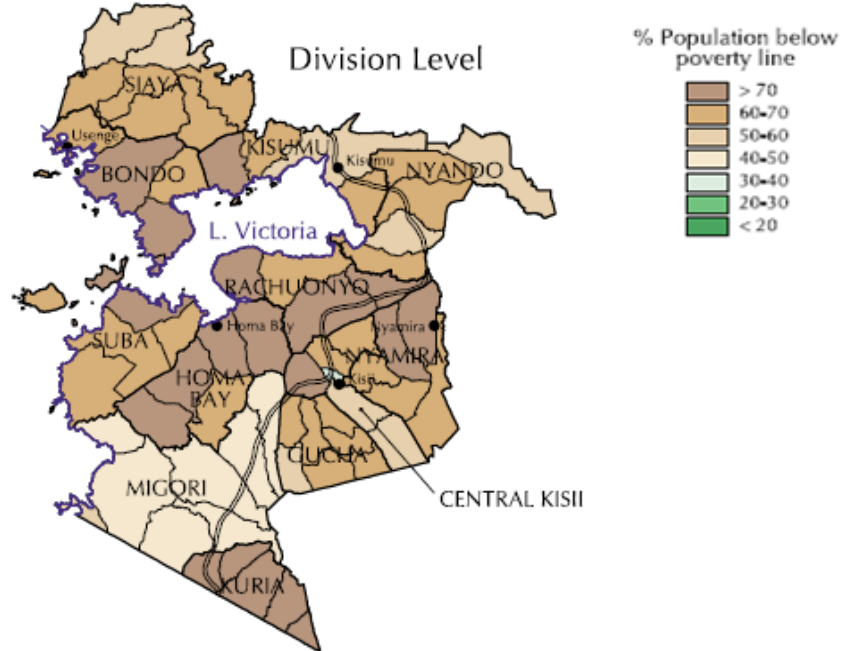
The area is ethnically homogenous, inhabited mainly by the Luo. There are however, people from other ethnic groups living among the Luo, and residing in Oyugis, especially along the district's borders with Kisii, where there are pockets of Gusii speaking people.

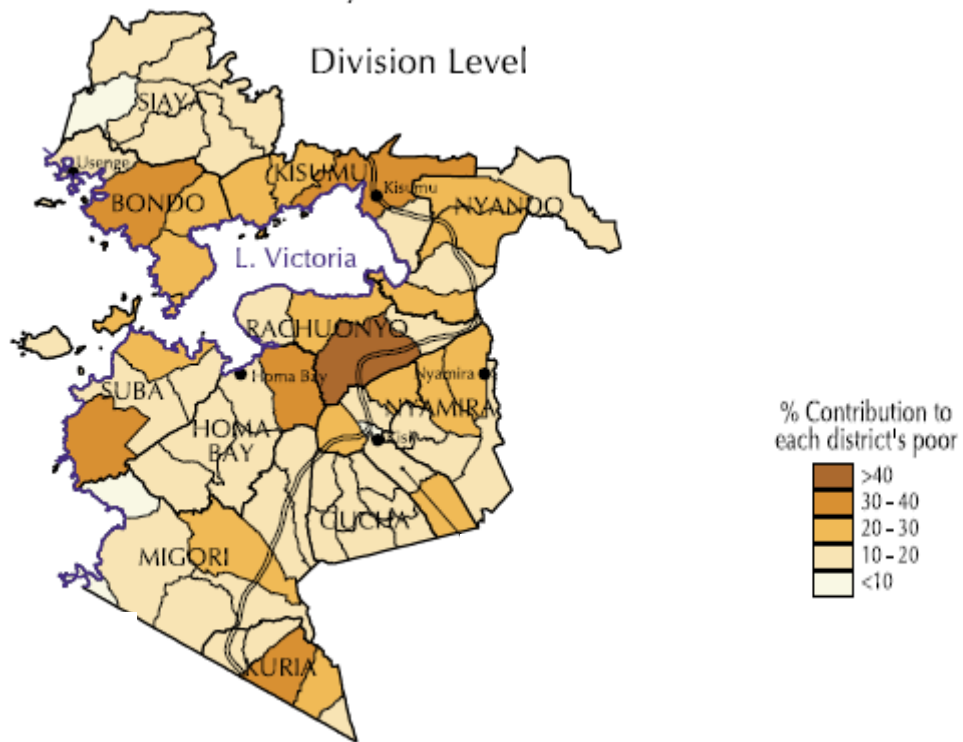
In terms of human capital, Oyugis has a pool of human resources from which educated and skilled workers can be pulled from. Additionally, due to its proximity to Kisii, and Kosele (the administrative capital of the district), there is also a large in-migration of professional and skilled workers. In comparison, Kadongo has a substantial amount of daily in-migration by professionals, more specifically teachers, completing their residency requirements.

Although these areas are characterized as budding centres, and exhibit potential for informal and formal commercial activities, the current socio-economic conditions of Oyugis and Kadongo are disheartening. Nyanza Province is comprised of 32 political Constituencies, which contribute 19% to total national poverty, with an estimated 273 million poor people, 43% of them are concentrated in 10 of the 32 divisions, and 18 of the 32 divisions have a poverty headcount index that is above the provincial mean of 65% (CBS, 2007). Namely the Kasipul-Kabondo Constituency has the second highest contribution to provincial poverty levels at 4.6%, and ranks 200<sup>th</sup> (out of 210) on a national poverty ranking (CBS, 2007). Overall, poverty incidence in the area is 77%, higher than the national average of 47% (CBS, 2007) (Figure 3). The majority of household heads are men, portraying the patriarchal nature of Kenyan societies. However, Nyanza province has the highest number of female headed

households at 36.2%. This presents a fundamental challenge on poverty levels among poor female headed households (CBS, 2007).

**Figure 3: Poverty Incidence Levels in Rachuonyo District**





**Source:** Central Bureau of Statistics. (2007). *Geographic Dimensions of Well-Being in Kenya*. Kenya Poverty Atlas. Retrieved from <http://www.knbs.or.ke/surveys/poverty/pdf/KenyaPovAtlasIfinal2cl.pdf>

Within the study areas, subsistence farming consists primarily of maize, 'irish' and sweet potatoes (both white and orange), tomatoes, beans, or bananas for household consumption. Those who are fortunate enough to have a larger plot of land and can diversify their crops typically grow and sell maize and sugar cane, which are relatively easy to keep with fewer inputs and have higher crop and financial yields. Some also keep a few animals such as poultry, non-dairy goats, and non-dairy cows; while others run small-scale informal businesses or operate small-scale formal businesses. For the most part, these activities generate very small yields and low income, which leaves individuals vulnerable to

economic shocks. The average person (subsistence farmer) in the area makes approximately 0.73 cents per day in income (Awange & On'gan'ga, 2006).

Generally, Kenya is a low-income food-deficit country, prone to drought and climatic phenomena resulting in high levels of malnutrition especially among vulnerable groups. Approximately 80% of Kenya's 41 million people (~32.8 million people) live in rural areas and subsist almost entirely on agricultural production as most are peasant farmers. More recently, climatic changes and weather phenomenon, such as La Niña, have negatively impacted agricultural outputs resulting in a decline in food security levels and pushing food poverty levels in the area to 58%, higher than the national average of 46% (World Food Program [WFP], 2011; Awange & On'gan'ga, 2006; KIHBS, 2006). Although maize prices in maize production areas are 50% below the 5-year average (despite a recent blight of Aflatoxin affecting maize yields, and deliberate government induced shortages), food prices typically rise to astonishing highs with impending climatic variations, and the imminent dry seasons which occur twice a year. Cereal prices are already between 20-40% above the normal average (WFP, 2011). As a result, nutrition is affected as household food security reaches harmful lows. Household nutrition suffers as budgets are cut to support other expenses such as medical costs, or school fees, and to purchase more common, but not necessarily healthy food staples such as sugar, chai (tea leaves), and maize flour which are not nutrient rich foods and provide little nutritional value. Based on the community profile, it is unsurprising that Oyugis and Kadongo are disproportionately affected by high levels of food insecurity exacerbated by rising food prices, low food production and poor nutritional standards despite being

agriculturally fertile regions, and considered to be in generally food secure areas (Kenya Food Security Steering Group [KFSSG], 2011).

## **2.4 Overview: Socio-Political and Economic Environment in the Nyanza Community**

During colonial rule, Nyanza Province and the Luo were highly favoured and trusted by the British and held many administrative positions. Even at independence the Luo were considered to be the elite tribe, highly educated and industrious, holding prominent white collar and blue collar positions (Awange & On'gan'ga, 2006). However, after independence, the province was adversely affected by the politics of the time, and intense tribalism within the government, leaving the province subdued and economically vulnerable for years to come (Awange & On'gan'ga, 2006).

The abject poverty in Nyanza can largely be attributed to political neglect and marginalization. Historically, Nyanza Province has been a politically marginalized area, neglected to the point of impoverishment. With the fall of Odinga Oginga and Tom Mboya in the 1960's, political archrivals, but both from the Luo community, Nyanza became antagonistic towards the Kenyatta regime, and more broadly a Kikuyu-dominated government (Parsons, 2003). Later, antagonism to Moi's regime and favouritism towards his Kalenjin Tribe lead to a further undermining of the province and the Luo. These events have since lead to the intense tribal schisms that are present to this day, and have worked to shape ethnic relations within Kenya.



To quell accusations of favouritism as a result of the centralized distribution of funds and to reduce levels of inequality and poverty, the government implemented the Constituency Development Fund (CDF) in 2003 – a way to distribute 5-9% of the annual national income to the constituencies meant to improve quality of life through various programs and activities by decentralizing the distribution of funds and shifting decision-making power to the district level. However, even under these circumstances, the resources allocated to operate the various programs under the CDF have been abused by the local Members of Parliament. Through the adoption of preferential distributions to other government officials and the community elite, Members of Parliament have denied funds to the most marginalized and have become deeply and actively involved in internal and external corruption schemes (CBS, 2007; Awange & On'gan'ga, 2006). Generally, corruption is Kenya's largest impediment to economic growth and stability.

Though there is a democratically-elected government, protracted neglect by previous governments, civil unrest, corruption, and coupled with the effects of HIV/AIDS, the repercussions on development – health, education, food security, and affluence, have been debilitating. Making it difficult for communities to fully explore and benefit from the resources they have available.

## **2.5 The Health Care Environment in Rachuonyo District as it relates to HIV**

The HIV pandemic has had a profound impact on all sectors of Kenyan society and economy, and its burden on the health sector is no exception. HIV/AIDS has increased the number of people seeking health services, raising the overall cost of

health care nationally. HIV/AIDS has also over-stretched hospital capacities. For instance, the average hospital bed occupancy rate for AIDS-related opportunistic diseases in adult wards in major urban hospitals was estimated at 30 per cent in 2003 (Odundo and Owino, 2004); while AIDS-related bed occupancy rates at district hospitals were 50-55 percent. These occupancy rates are reflective of the extent to which HIV/AIDS constrains health facilities and undermines their capacity to provide other services. Further, this vicious circle begins to spiral as many areas have insufficient health workers to deliver health services and treatment, and treatment options are not available.

Health care services of any kind as well as HIV-related services are unevenly distributed throughout Kenya. Access to hospitals, maternities, and health centres varies from province to province, and not surprisingly from community to community. Nyanza Province has the highest percentage of adults between the ages of 15-49 with HIV infections at 15%, yet the province has the fewest HIV-related health services in the country (National Coordinating Agency for Population and Development [NACPD] and ORC Macro [ORC], 2005). It has the second lowest percentage of health care facilities offering counselling and testing services at 19% (whereas North Eastern Province which has less than 1% of its adult population infected with HIV has 13% of the national total of health care facilities providing HIV care), and only 5% of the province's health care facilities offer anti-retroviral therapy (ART), and just over half (55%) provide care and support services for PLWHAs (NACPD & ORC, 2005).

More specifically, in the Kasipul–Kabondo Constituency, there are only three centres that are capable of offering HIV related health care services: Ober Health Centre and the Rachuonyo District Hospital which operate under the auspices of the MoH, and Matata Hospital, a private, pay-per-use facility. The Rachuonyo District Hospital HIV clinic opened its doors with the assistance of several international donors in 2004, and ARVs did not begin to become available until 2005, when there was a national roll out of HIV related health care services. Although, the development of the clinic has seen many people coming forward for treatment, many in the area delay seeking medical care until their health conditions have reached crisis levels, often citing restricted access such as cost, problems of distance to health facilities, as well as congestion and long queues once there, stigma, and poor quality of services.

The average distance to the hospital in the area is 5km, with only 60% of households having access to the health facilities (NACPD & ORC, 2005). In cases where services and treatments are available, there are a limited number of health workers to deliver treatment and supplies are often out of stock as government hospitals lack essential amenities and once machines such as flow cytometers break down they are either rarely repaired or it takes several months before they are serviced. For example, in the joint NACPD and ORC report (2005) in Nyanza Province, 44% of facilities experienced stock-outs of anti-retroviral medicines (ARVs) for a period of at least six months.

It was not until recently, that the government began a concerted effort to ensure that stocks did not run out at hospitals, requiring facilities to keep stocks that could last

for up to three months. In the event that supplies do run short, the dispensary is restocked almost immediately by the government, using courier services to deliver the needed ARVs to the hospital. These supplies are received from two sources, the government, and Kenya Pharma, an organization funded by USAID. Although relatively regular shipments and keeping supplies of ARVs is a tremendous achievement and improvement relative to other SSA countries, efforts on preventing the spread of and treating HIV remain weak. For example, keeping stock of condoms continues to present a challenge. Condoms which are provided free of charge at hospitals, health centres and VCTs are often in short supply with frequent stock-outs lasting longer than three months at a time. Stocks are limited country wide, and it is a national problem that most hospitals and health centres can not address unless the central government acts quickly. The end result – individuals are left to their own devices and often opt not to use condoms since the costs outweigh the benefits, or resort to recycling condoms by washing, drying and reusing them. Moreover, drugs and or nutritional supplements, such as fortified porridge intended for hospitals and clinics are often unavailable as a result of corruption. Corrupt medical personnel sell public hospital drugs to private clinics or stock their personal dispensaries with these items for sale.

Further to this, sexual health clinics are currently non-existent in Kenya. This field of medicine is not recognized by the Ministry of Health, as such, services pertaining to sexual health can only be accessed at VCT clinics with clinicians who treat such conditions or only at some reproductive health clinics. Compounded by the fact that there are very few clinics, individuals also face ostracism and stigma; many feel

ashamed to access the limited services available at these centres. Leaving their STI untreated and putting themselves at greater risk of HIV infection.

All of these problems have led to the search for alternative or adjunct therapies as people have lost faith in public health facilities.

## **2.6 An Unmet Need for Community Health and Development Programs**

Kenya is the largest recipient of U.S. foreign aid in Sub-Saharan Africa, with a requested allocation of 714 million for 2011 which is geared at HIV/AIDS and other health programs (Lawson, Epstein, Resler, 2011), yet the resources that trickle down to the community level are hardly adequate to assist the most marginalized.

Levels of malnutrition are intimately linked to poverty levels, and according to the 2008-2009 Kenya Demographic and Health Survey (KNBS & ICF Macro, 2010), it is estimated that 35% of children under five are moderately or severely stunted (too short for their age), indicating chronic malnutrition. The problem is more prevalent in rural areas (37%) than urban areas (26%), and least common among children of more educated mothers and those from wealthier families. This is important as nutritional status as a child is intimately linked to overall health, cognitive development and mental ability, physical development and health as an adult - these figures on nutritional status are indicative of future health status. Undernutrition is the single largest risk factor for the loss of health in low and middle-income countries (Ezzati et al., 2006). Nutritional status therefore has a profound effect on labour productivity and an individual's prospects for earning income.

Nutrition is also central to the achievement of the Millennium Development Goals (MDGs). Directly or indirectly, nutrition is related to almost all of these goals. In fact, there are no prospects for meeting the MDGs without substantial improvements in nutrition. The hunger goal is completely linked with nutrition, and nutrition deficits are intimately connected to poverty.

This nutritional gap is difficult to accept since there are a number of low cost, and highly effective nutrition interventions that can dramatically improve nutrition status, but are not being implemented.

Health indicators such as maternal and infant mortality demonstrate that despite Kenya being an economic hub, with political, social and economic achievements, there continue to be enormous development challenges, revealing socio-economic underdevelopment (World Bank, 2010b). It is in this social and economic context that is necessary to implement health and development projects that aim to improve the health, nutrition and socio-economic status of the most marginalized Kenyans.

## **2.7 Chapter Summary**

With these geographical and socio-economic barriers, individuals in the area experience difficulties in accessing comprehensive primary health care, HIV/AIDS prevention and treatment, and often skip or abandon treatment programs. These challenges compel us to seek health initiatives with wider impacts – linking the nutritional dimension of HIV/AIDS with approaches that strengthen local control of food

production, poverty alleviation and income generating benefit to the community, as important and far reaching determinants of health and improved quality of life.

## **CHAPTER III**

### **Literature Review**

#### **3.1 HIV/AIDS in Oyugis & Kadongo**

Since 1999, when AIDS was declared a national disaster and serious efforts were established to monitor infection rates, Nyanza province and now Homa Bay county has consistently had the highest number of infected adults for the past 12 years. It is ranked 1<sup>st</sup> among the counties with the highest HIV rates. With such large variations from one geographical location to another, and only marginal success recorded with, multi-sectoral responses, multi-disciplinary studies and the adoption of safer sexual practices by some, it is critical to examine the socio-cultural attributes in the Luo cultural framework, as well as important socio-economic factors to better understand and explain some of the reasons that the spread of the virus is so prolific in Nyanza, and more specifically within the district and the study area – Oyugis and Kadongo.

The Ministry of Health estimates that the two divisions - Oyugis and Kadongo, in Rachuonyo District have a 37% infection ratio, and the aggregate prevalence rate of HIV within the county is the highest in the country, at 27.1%, greater than the national average of 5.6%, by more than double (NACC, 2014; KAIS, 2012). The area is not only characterized by high levels of HIV, but it is also plagued by high levels of infant mortality (102/1000 live births), child mortality (87/1000 live births), and maternal mortality (488/100,000 births), and some of the most common cases of morbidity in Kasipul and Kabondo in order of prevalence are malaria, respiratory diseases, skin diseases, typhoid fever, diarrhoea and intestinal worms, and



pneumonia (KNBS & ICF Macro, 2010; Rachuonyo District Hospital, 2010). Life expectancy, not surprisingly, is also quite low, at 47 years, as compared to the national average of 63 years and internationally the country ranks 185<sup>th</sup> of 224 countries on life expectancy (CIA, 2015).

Overall, individuals and the community are inadequately prepared for the vulnerability and costs that food insecurity, and HIV related illnesses and mortality usually lead to, and life savings are often depleted very quickly. These factors all lead to high levels of malnutrition which exacerbate the effects of HIV by further weakening the immune system, reducing quality of life and life expectancy. Food insecurity and more specifically, malnutrition, accelerates the progression of HIV to AIDS, and the synergistic effect on the immune system can lead to premature death (Anabwani & Navario, 2005). Consequently, HIV infected individuals require above average nutritional intake in order to take anti-retroviral drugs (ARVs) to slow disease progression and slow the appearance of various types of opportunistic illnesses, which concurrently bring about inefficiencies in the body's absorption and utilization of needed nutrients (Semba & Tang, 1999).

### **3.2 Socio-cultural and socio-economic factors in the spread of HIV in the Nyanza Community**

Many groups within SSA have been studied in order to better understand the factors which spread HIV and to develop programs with the potential to curb rates within their communities. The spread of the virus is prolific among the Luo people, and also within the study area (UNAIDS, 2011). Within the Luo cultural framework, widow inheritance (levirate) and ceremonies associated with death (e.g. disco funerals, cleansing

rituals etc.), initiation ceremonies, agricultural rituals, weddings, religion, misconceptions regarding appearance and body size, denial of HIV/AIDS and sero-positivity, as well as fear and failure to expose HIV/AIDS status have all lead to the continued spread of the virus (Matoti-Mvalo & Puoane, 2011; Moyo & Müller, 2011; Njue, Voeten, Remes, 2009; Wringe, Roura, Urassa, Busza et al., 2009; Ayikukwei, Ngare, Sidle, Ayuku, et al., 2008; Rankin, Brennan, Schell, Laviwa et al., 2005). More specifically, sexual intercourse is perceived as a sacred rite when performed as a ritual, and within the cultural context is a ritual of social transition, associated with social cultural activities like planting, harvesting, weddings and burial ceremonies, the purpose of which is sanctification and cleansing of evil spirits. Widows who are not cleansed are ostracized and discriminated against (Luginaah, Elkins, Maticka-Tyndale, Landry, & Mathui, 2005). The continued practice of the ritual is perpetuated by a shared common belief system. Often, widows and cleansers are believed to be purveyors of the HIV virus. The ritual encourages unprotected sex with multiple partners. These are barriers to HIV prevention strategies that are aimed at changing sexual behaviours (Ayikukwei, Ngare, Sidle, Ayuku, Baliddawa and Greene, 2008).

While these cultural practices have begun to dissipate due to the realization that such traditions fuel the pandemic; they are being replaced by other detrimental socio-cultural practices and a resurgence in harmful beliefs and practices, a few of which are discussed below.

There are an increasing number of women who are not inherited by members of the deceased husband's family (Nyambedah, 2004), brought about by the breakdown of

traditional family structures as a result of HIV, despite widow inheritance being an extremely important tradition. Following this trend, men from neighbouring communities, particularly the Kisii are taking on second wives from the Luo area, despite not being traditionally polygamous, due to the financial benefits associated with taking on a widow. Additionally, younger Kisii men are carrying on a separate double-life in their community, looking for mature widows, who are supported by financially stable older children, thereby perpetuating opportunistic behaviours which increase HIV rates in communities where they have been relatively low and stable.

Despite AIDS being in existence for over two decades, the virus is still attributed by some to a curse or witchcraft at the individual or household level, and can be cured by: traditional healers, magicians, witchdoctors and religious leaders, and prefer to forego treatment at formal health facilities and ARV therapy (Wringe, Roura, Urassa, Busza et al., 2009; Zou, Yamanaka, John, Watt, Ostermann & Thielman, 2009; Wanyama et al., 2007; Bauni et al., 2003). Community awareness programs were considered successful in dispelling such myths, but a lack of faith in public health facilities and Western medicine and a loss of hope in biomedical therapies, has led to a resurgence in individuals joining religious groups which claim to cure HIV/AIDS (Zou et al., 2009). These beliefs and practices compound misconceptions and accelerate premature disease progression (Bangsberg et al., 2006; Harrigan et al., 2005; Bangsberg et al., 2001), as well as the appearance and recurrence of opportunistic diseases and infections, increased viral loads, virological failure (Martin et al., 2008; Shuter et al., 2007; Arnsten et al., 2007; Nachega et al., 2007; Lucas, Chaisson & Moore, 1999), emergence of drug resistance (Bangsberg

et al., 2006; Harrigan et al., 2005; Bangsberg et al., 2001) and of course premature death (Hogg et al., 2002; Nachega et al., 2006; Wood et al., 2006). Even more importantly, faithfulness internalize misguided beliefs and practices that are highly likely to perpetuate the spread of HIV as they engage in unsafe and risky sexual practices believing they have been cured (Zou et al., 2009). Regardless of affect, the effect is continued spread of the virus and early death due to a lack of proper medical care. The purpose of these religious groups is to attract many followers (who donate money) in the false hope that they will be cured. Arguably, such practices contradict most mainstream religious doctrines and mislead the followers (Zou et al., 2009). Religious organizations are influential social networks that have the power to support or stigmatize people living with HIV/AIDS, promote or impede HIV education, and endorse or reject medical treatment of HIV (Zou et al., 2009, Wanyama et al., 2007).

Another key factor in the spread of the virus in the area is the belief that 'HIV/AIDS is just like malaria'. Once you contract the virus, just as in cases with malaria, attend the hospital, receive treatment and life continues. This phenomenon is referred to as therapy optimism or behavioural disinhibition, whereby HIV/AIDS is viewed as a manageable chronic disease (Luchters et al., 2008; Crepaz et al., 2004). The availability of ARVs (which prolong life expectancy and improve quality of life as measured by disability-adjusted life years and quality-adjusted life years) has desensitized the severity of the virus. Due to the medical 'treatability' of HIV/AIDS, there has been a trivialization of risk, and is often viewed uncritically and too optimistically (Federal Ministry of Health, 2007). In summary, medical treatability, daily struggles of coping with life, extreme vulnerability to certain

socio-economic and cultural conditions, death-related realities and a fatalistic attitude towards life have trivialized the seriousness of HIV/AIDS leading, time and again to risky sexual behaviour (NACC & NASCOP, 2012; Erinosh, Isiugo-Abanihe, Joseph & Dike, 2012; Fapohunda & Rutenberg, 1999).

The socio-economic factors that lead to the spread of HIV in SSA have been well documented, and can be considered cross-cutting themes applicable to the region, individual countries and even specific areas. Within Rachuonyo District and the specific study areas, factors that have led to the proliferation of the virus include: inadequate information and misconceptions about HIV/AIDS, especially with regards to the mode of transmission; poverty, casual sex and promiscuity; commercial sex; beach culture; negative attitudes towards condom use; alcohol and drug abuse (NACC & NASCOP, 2011; FAO, 2010; KNBS & ICF, 2010;).

Poverty continues to be a leading pre-disposing factor to casual sexual relationships and promiscuity (Nyagero, Wangila, Kutai, Olango, 2010; Tekola, 2007). In most cases, marginalized females are lured into sex by males of higher economic status in exchange for favours and special treatment such as food, clothing, and money (Ogola, 2004). This has also become a fashionable trend in the area more recently with wealthy and mature females luring young males into sexual relationships with promises of gifts, favours and special treatment (Nairobi Chronicle, 2008). Similar practices are also linked to the large number of boda boda operators (bicycle taxis), who usually trade their services for sexual favours in lieu of payment when their clients are unable to pay (Gitau, Wandia, Marum, 2002).

Typically, males are more promiscuous due to the cultural acceptance of polygamy and they take advantage of this practice to engage in different types of extra-marital affairs without regard for the risks involved (FAO, 2010). Kenyan men have been found to be practicing complex forms of polygamy, where men keep multiple informal heterosexual partners, typically involving married men who carry on extra-marital affairs and also engage in the solicitation of sexual services with female sex workers (Voeten, Egesah, Ondiege, Varkevisser et al., 2002; Ocholla-Ayayo, 1996). Besides poverty, prolonged separation due to rural - urban migration in search of employment provides an opportunity to engage in illicit sexual activities.

Commercial sex is a common trade for many women within the study areas, especially in Oyugis. Typically, girls from rural areas travel to these more urbanized areas seeking employment and are lured by other females into the trade with promises of protection, shelter, food and clothing until they begin to work and contribute to household expenses. Even as bar maids or attendants at lodges, women are responsible for ensuring clients are pleased in any way that is requested. Sex workers have to provide services according to the wishes of their clients, even if some clients prefer not to use condoms as a method of safe sex (Machera, 2009; Odundo & Owino, 2004). Transmission is accelerated by frequent solicitation of sex services (once or twice a week) and the use of different female sex workers (FSWs), approximately 3-5 different FSWs in a year (Voeten et al., 2002). Clients typically develop at least two steady FSW relationships, unlike typical sex work where there are rapidly changing one-time contacts. In these multiple steady relationships, clients do not use condoms citing that

they trust their steady FSW (Voeten et al., 2002).

Sex for fish – fish for sex, also leads to the spread of the virus. Although Kadongo and Oyugis are not situated on the lake, many women in these areas are fish mongers travelling to nearby lakeside towns to purchase fish at wholesale. Women must have a ‘husband’ at any one time to be assured of fish supplies and other favours (Ogola, 2004). Again condom use is low. The consequences of these practices are felt within the immediate community, but also in their respective home towns as the virus is carried by the fishermen and the women when they visit spouses and relatives.

Other reasons for the spread of the virus include alcohol abuse (both mainstream alcohol and the local illicit brew), and low levels of condom use due to negative perceptions, supply shortages at Community Based Organizations (CBOs) and hospitals, which inhibit the acceptability and use of condoms (IRIN, 2011; FAO, 2010). Female condoms are also very difficult to access since they are not carried at CBOs, hospitals, health centres or sold at dispensaries often as a result of poor acceptance and lack of popularity among women and men in the area (Population Council, Liverpool VCT, Care & Treatment, 2009; Feldblum, 2001).

### **3.3 Impact of HIV/AIDS on the Community**

HIV/AIDS has become the leading challenge to socio-economic well-being, because more than half of all reported HIV/AIDS cases occur among the economically active and productive segment of the population which is between 16-55 years (Odundo & Owino, 2004; Drimie, 2002). This is considered the age at which investments in

education and training begin to provide a return, and families are established and taken care of.

As a result, the pandemic leaves behind a large pool of destitute orphans, sometimes under the care of ill relatives, or elderly and less productive grandparents (Drimie, 2002). The consequences are heightened poverty levels, low school completion rates, rising cases of child labour, depression, high levels of morbidity and mortality, and increasing crime rates, among other problems. HIV is also associated with low rates of investment due to a high dependency ratio. The number of dependents overwhelms the few active individuals often leading to very low or zero savings for the purpose of investment for continued productivity (Odundo & Owino, 2004, Drimie, 2002). For example, poverty is perpetuated by the high cost of taking care of the medical and nutritional needs of the infected, funeral expenses, and the reduced number of hours spent in economic activities to take care of the ill, lack of will, and hopelessness. Further, poverty and orphanhood work to reduce the rates of school enrolment and completion, many children resort to child labour in order to support their families. These orphans are then deprived of the opportunity for development - moral, intellectual, physical and spiritual as they are mistreated, often lured into sexual activities at an early age, or enslaved by their adopters and exploited for financial gains (PREPFAR, 2006; USAID, 2004; UNICEF, 2004; Drimie, 2002).

The over-burdened health sector is increasingly affected with rising numbers of people seeking health services, which results in increased costs of health care. Additionally, HIV/AIDS constrains the over-stretched facilities and undermines their



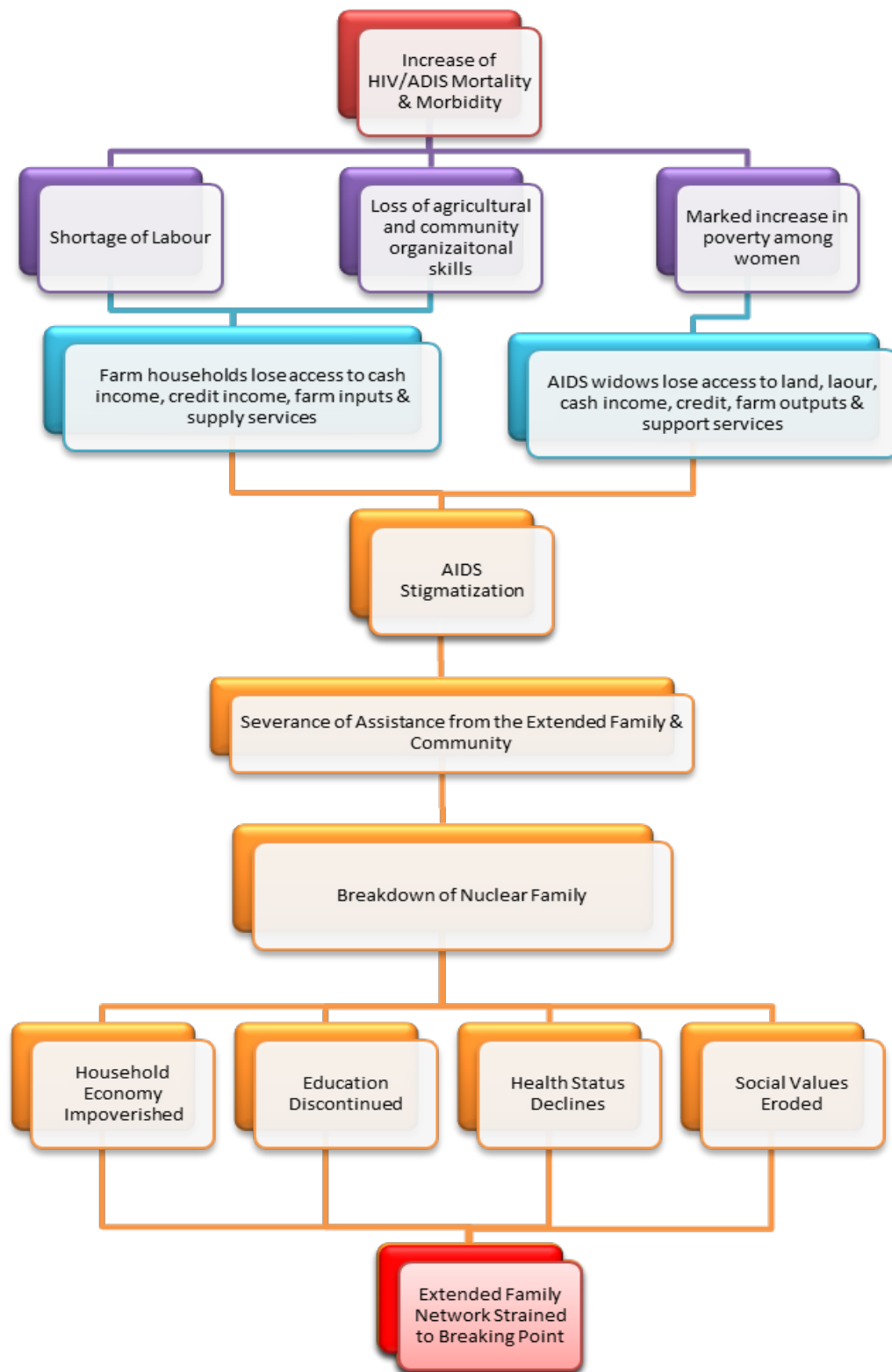
capacity to provide other services or better care (MoH, 2006; Odundo & Owino, 2004).

Also affected are, government and donor funds intended for investment in income generating activities and other social welfare programs which are necessarily channeled to care for the infected and orphans.

Moreover, the pandemic has reduced the workforce, especially those who are educated. For instance, teachers are one group being decimated at an alarming rate, affecting the quality of education among other professionals (Odundo & Owino, 2004).

Lastly, with the feminization of the pandemic, women in the community, the ones who contribute the most to their families, society and the next generation, are the most affected by the epidemic and are also the ones who suffer the most under these socio-economic conditions (NACC & NASCOP, 2011). Women, often widows, are left standing alone without a support network or a source of income, caring for orphans and vulnerable children (OVCs) and people living with HIV/AIDS (PLWHAs), incur a multitude of stresses while struggling to survive and make ends meet on a daily basis. Figure 4 highlights the impact of HIV/AIDS on traditional coping mechanisms in rural economies.

**Figure 4:** The impact of HIV/AIDS on Traditional Coping Mechanisms in Rural Economies



Source: FAO, SDRE & SDWP

### **3.4 Food Security and HIV/AIDS**

Food insecurity is both an outcome of and a contributor to the HIV/AIDS pandemic. Households living with at least one HIV infected family member are more likely to be poor and food insecure (World Bank, 2007). HIV infection limits productivity, leading, in turn, to loss of income while increasing health care costs. Additionally, individuals who are food insecure are more likely to engage in transactional sex or become more mobile to find employment. Both activities are associated with a higher risk of contracting HIV (Weiser et al., 2011; Gillespie, 2008; World Bank, 2007). Improving food security in poor communities and reducing the number of food insecure households can help decrease risky behaviours and prevent further infections (Weiser et al., 2011; Gillespie, 2008).

“PLWHAs often identify their highest priority need as food, and HIV affects all three components of food security: availability, accessibility, and utilization” (World Bank, 2007, pg. 40). For instance, decreased income or declines in a family’s food production affect accessibility and the ability of PLWHAs to follow dietary recommendations.

Unique and effective strategies to increase food security and improve daily livelihoods can thus be an important part of prevention, mitigation, and treatment of the disease (World Bank, 2007).

### **3.4.1 Food Security and Nutrition in Kenya within the Context of HIV/AIDS**

It is estimated that 47% of the Kenyan population is food insecure and does not have sure access to food resources to adequately meet their daily nutritional needs (MoH, 2006). In Kenya, as in many other countries in SSA, food insecurity is associated with high levels of poverty and reduced agricultural production (Weiser et al., 2011; MoH, 2006). HIV/AIDS reduces a household's ability to produce and buy food (Weiser et al., 2011, Gillespie, 2008). Those infected with HIV are less able to work on their land or earn income from other activities. In addition, increases in illness episodes lead to increased health costs diverting household money that is needed for food (Weiser et al., 2011).

Malnutrition works to exacerbate the effects of the disease and HIV compromises the immune system resulting in increased susceptibility to severe illnesses (WHO, 2004). The effects of HIV are intensified as it further weakens the immune system, reducing quality of life and life expectancy (WHO, 2004). HIV feeds into this vicious cycle by increasing the risk of malnutrition - it increases nutrient needs, reduces food intake and nutrient absorption (WHO, 2005; 2004). Nutritional care and support must become an integral component of the HIV/AIDS comprehensive care package. Nutritional interventions are required by all infected persons, irrespective of whether they are on ART or not, and at all stages of the disease (WHO, 2004).

### **3.5 Anti-retrovirals (ARVs)**

Anti-retroviral therapies (ARTs) on their own improve immunity, slow disease progression and increase the life expectancy of those living with HIV/AIDS (Tomkins, 2005; Hogg et al., 1998). Yet to date, only a fraction of people infected with HIV receive anti-retroviral therapy. In rural communities the figure is significantly lower, and this figure is further reduced when there is a lack of adequate nutrition for ARV intake. Globally, about 8 million people living with HIV in low- and middle-income countries were accessing ART at the end of 2011. At the same time, an estimated 15 million people needed ART for their own health in low- and middle income countries, based on WHO's 2010 treatment guidelines. This amounted to treatment coverage of 54% (UNAIDS, 2012).

#### **3.5.1 The Link between HIV, Nutrition and ARVs**

The success of ART services and uptake in resource limited settings is in very large part determined by nutrition. Food insecurity can pose significant challenges to proper management of food and nutrition implications of ART. Poor access to food can prevent ART clients from obtaining sufficient quantities of the foods needed to maintain healthy dietary intake and manage side effects and interactions between drugs and food. Given national AIDS control strategy targets for ART coverage in Kenya and the prevalence of food insecurity, addressing food and nutrition issues related to ART is an important part of ensuring successful ART (World Bank, 2007; FANTA 2004a,b). Managing nutritional implications of antiretroviral therapy is an important component

in assisting people with HIV and caregivers to make dietary choices that manage drug side effects, support drug efficacy and promote adherence.

Often, medications used by PLWHAs may adversely alter food intake, metabolism rates, nutrient absorption, distribution and excretion. They can cause loss of appetite, changes in taste and diarrhoea (World Bank, 2007; FANTA, 2004b; WHO, 2004). Counteracting these effects is food and nutrient intake which can positively alter drug absorption, metabolism, distribution and excretion. This synergistic relationship between the drugs and nutrition is critical to the effectiveness and adherence of ARVs and other medications used to treat HIV/AIDS (FANTA, 2004a,b). Food and drug interactions are so crucial, that undernourished PLWHAs require therapeutic nutrition or food aid before and during the early stages of ART (FANTA, 2004b). An improved understanding nutrition/drug interactions is needed to inform HIV/AIDS treatment programmes, and should also consider interactions with traditional herbal remedies (FANTA, 2005; WHO, 2004).

Poor nutrition can also be linked to the prevalence, length and severity of opportunistic infections - for instance, HIV-related infections, such as tuberculosis and diarrhoea, not only have nutritional status as a significant determinant of their incidence and severity, but they also have severe nutritional consequences that commonly precipitate appetite loss, weight loss and wasting (WHO, 2004).

Adequate nutrition is required to maximize the benefits of ARVs in prolonging the lives of PLWHAs, but also for preventing transmission of the virus from mother to child during birth (Tomkins, 2005). There is now evidence that, when combined with a

well-nourished diet, ARVs have an even greater impact on the health of PLWHAs, giving them an added advantage of a better quality of life as compared to malnourished individuals (Paton, Sangeetha, Earnest, & Bellamy, 2006; Tomkins, 2005; Hogg et al., 1998). Recently, probiotic yoghurt has also been shown to improve to the gut health of PLWHAs, thus aiding in nutrient and mineral absorption (Hekmat et al., 2004). Probiotic yoghurt also improves protein status, thereby preventing progressive muscle wasting, and probiotics have been shown to reduce the severity of diarrhoeal episodes, which often leads to the poor absorption of nutrients (Elfstrand, & Florén, 2010; Alam & Ashraf, 2003). This underlines the importance that nutrition must become an essential and complementary intervention to anti-retroviral treatment in order to enhance adherence, rehabilitation and immunity to opportunistic infections. In recognition of the health benefits conferred on the host by probiotics the FAO/WHO suggested that efforts should be made to make these nutritional products more widely available to people living with HIV/AIDS (PLWHAs) and populations at high risk (FAO/WHO, 2001).

The effective use of ARVs prolongs life and improves the quality of life too. Nutrition should be considered an essential complementary intervention to ART which will work to enhance rehabilitation, immunity, and adherence to ART. “Although nutritional interventions cannot replace ART, just as ART cannot replace adequate nutrition, interventions to improve micronutrient intake and status could contribute to a reduction in the magnitude and impact of the global HIV epidemic” (Friis, 2005, pg. 1857).

### **3.5.2 The Importance of Macro and Micro - nutrients within the context of HIV**

The HIV/AIDS epidemic is occurring in populations where malnutrition is already endemic (WHO, 2004). Loss of appetite and poor dietary intake are important causes of weight loss associated with HIV infection. As such, there is an urgent priority, for improving dietary quality and increasing dietary intake to recommended levels (WHO, 2004). The development and full function of the immune system requires a range of essential micronutrients and adequate macronutrients achievable through good nutrition. When the immune system is functioning optimally, it helps slow the progression of HIV into AIDS, reduces the number of illness episodes as a result of opportunistic infections, and increases survival. Generally, immune suppression responds rapidly to nutrition interventions, it is also a way in part to ensure that those who are taking ARVs continue treatment. A lack of food (poor food security) is most often cited as one of the reasons in the discontinuation of ARV treatment (World Bank, 2007, FANTA 2005, 2004b; WHO, 2004).

In order to fight infection, prevent weight loss, and build and or maintain muscle mass, it is important to have sufficient nutrient intake at all times. PLWHAs need to have a balanced diet that offers all the essential nutrients to meet increased nutritional needs, maintain the immune system, sustain physical activity, and to achieve optimal levels of quality of life (World Bank, 2007). PLWHAs have additional energy needs due the virus, opportunistic infections, nutrient malabsorption, and an altered metabolism. These increased energy needs depend on whether the PLWHA is symptomatic (e.g.



wasting, fever, weight loss, diarrhoea) or asymptomatic. Energy needs are estimated to increase by 10% in asymptomatic HIV+ adults and children, while adults in more advanced stages of the disease require 20% to 30% more energy (World Bank, 2007; FANTA, 2004, WHO, 2004).

### **3.5.2.1 *Micronutrients***

Micronutrients (vitamins and minerals) are essential in the production and function of proteins, enzymes, hormones and the immune system (MoH, 2006). Vitamins, A, C, E, folate and the B-group vitamins along with zinc, selenium, iron, iodine, magnesium and calcium are most critical in these and other functions (MoH, 2006). Micronutrient deficiencies are common in areas where HIV is prevalent and PLWHAs often suffer from micronutrient deficiencies which act to compromise their immune functions and, in turn, their ability to fight infection (FANTA, 2004b).

Consuming a variety of protective foods daily, consisting of fruits and vegetables along with animal sources, will provide adequate micronutrients and a significant amount of the daily fibre requirement (15-25 g) (FANTA, 2004b). A diverse diet, fortified foods and multiple micronutrient supplementation will assist in meeting Recommended Daily Allowances (RDA) (World Bank, 2007; WHO, 2004). WHO (2005; 2004) recommends one RDA of all micronutrients for people infected with HIV and those not infected. Increasing micronutrient intake should only be considered for those with vitamin or mineral deficiency or those who are vulnerable to a micronutrient deficiency (FANTA, 2004b). However, for PLWHAs with multiple nutrient deficiencies diet alone

may not be sufficient to correct nutritional deficiencies and may require more than one RDA per day, as previously suggested, to reverse these deficiencies (WHO, 2004). In addition, HIV-infected lactating women have increased needs for vitamin A and iodine, as such it is recommended that they take the necessary supplements, while HIV-infected pregnant women are encouraged take iron-folate during the prenatal period (MoH, 2006).

While most studies suggest that micronutrients are crucial to immune function and the prevention of infection, there is still conflicting evidence regarding the relationship between high-dose micronutrient supplements and disease progression and mortality for PLWHAs (WHO, 2007). Research currently underway should be able to provide further guidance on therapeutic and preventive use of multivitamins and micronutrient supplementation.

Given the importance of nutrition on HIV management, this study examines the perceived (since we will be relying on self-reporting) impact of probiotics among people in Oyugis, Kenya.

### **3.6 Probiotics**

It has long been thought that the primary function of the human gastrointestinal tract is to digest and absorb nutrients and excrete waste-end products (McNaught & MacFie, 2001). More recently though, it has become widely accepted that the gastrointestinal tract is responsible for many other functions that are fundamental to our overall well-being, as such the balance of gastrointestinal microflora is essential in

maintaining health and longevity (McNaught & MacFie, 2001). “The intestinal microbiota is the largest source of microbial stimulation that exerts both harmful and beneficial effects on human health” (Delcenserie, Martel, Lamoureux, Amiot, et al., 2008, p. 37).

This of course is not a new theory, at the turn of the century Elie Metchnikoff put forward that the overall health and well-being of individuals in ethnic populations was in part due to the composition of their intestinal flora (Metchnikoff, 1907). Therefore, with the expansion of knowledge in the field of microbiology and fermentation processes, there has been increased interest in techniques to manipulate the enteric microflora in a beneficial way, in the hope of achieving health benefits in the host. The concept then of treatment with probiotics comes from a belief that modern human behaviour - our current lifestyle, eating habits and certain health conditions, do not allow for the adequate consumption and replenishment of beneficial microbes and this can be remedied by taking probiotics leading to improved health and well-being (Vasiljevic & Shah, 2008; Reid & Hammond, 2005).

### **3.6.1 What are Probiotics?**

Probiotics can be defined as “live microorganisms, which when consumed in adequate amounts confer a benefit to the host” (FAO/WHO, 2001, p.5). In other words, they are a live microbial food supplement that beneficially affects the host by improving microbial balance (Fuller, 1989). There are a large number of probiotics and probiotic products currently in use and available over-the-counter in the form of capsules as well as in fermented foods and yoghurt. The majority of products contain species

belonging to *Lactobacillus* and *Bifidobacteria*, and less commonly species of *Streptococcus*. Collectively, this group of species are classified as Lactic Acid Bacteria (LAB) since they primarily produce lactic acid as a by-product (Lahtinen, Owehand, Salminen, Von Wright, 2012). Lactobacilli are gram-positive, non-spore forming rods or coccobacilli and Bifidobacteria are gram-positive rods, non-motile and non-sporulating with varying appearance (Lahtinen, Owehand, Salminen, Von Wright, 2012).

For organisms to achieve probiotic status, they must also fulfill a number of key criteria: a) be isolated from the same species as its intended host; b) have a demonstrable beneficial effect on the host; c) be non-pathogenic; d) be able to survive transit through the gastrointestinal tract, and e) a large number of viable bacteria must be able to survive prolonged periods of storage (McNaught & MacFie, 2001; Collins & Gibson, 1999; Fuller, 1989). Table 4 briefly lists the qualities of an effective probiotic dietary supplement.

**Table 4:** Key Criteria for a Product to be Considered Probiotic

1) Isolated from the same species as its intended host (e.g. must be of human origin)
2) Exert a beneficial effect on the host
3) Be non-pathogenic and non-toxic
4) Contain a large number of viable cells
5) Be capable of surviving and metabolizing in the gut
6) Remain viable during storage and use

7) Be antagonistic to pathogens

Source: Adapted from Jordan, 2013

### **3.6.2 How do Probiotics Work?**

The idea to improve health & well-being with probiotics comes from the evidence that existing dietary patterns prevent us from consuming and replenishing the beneficial bacteria that keep us healthy (Reid & Hammond, 2005). If the gastrointestinal tract, that provides fuel for energy, immune response, nutrient delivery, encourages digestive movements and waste disposal falls out of balance with an excess of pathogenic bacteria, some forms of yeast such as candida that are initially harmless can adapt to become pathogenic and harmful candida albicans (Jordan, 2013). The importance of maintaining a beneficial microfloral balance is important if good health is to be maintained or regained (Jordan, 2013).

The majority of probiotic products are foods containing lactobacilli or bifidobacteria with no known virulence and are usually present in the gut and vagina of a healthy person. They have complex nutritional requirements and can be found in a variety of habitats where rich, carbohydrate – containing substrates are available; they are fermentative, anaerobic, and acidophilic in nature (Bronozian, 2016). Probiotics transform sugar and other carbohydrates through fermentation into lactic acid which acts as a digestive antiseptic while normalizing the gut microflora (Jordan, 2012). As probiotics travel through the intestinal tract, the number multiply many times the ingested amount in a short period before populating the intestine wall.

The bacteria also produce enzymes which identify, digest and deliver nutrients to the body and are responsible for all metabolic processes in the body (Jordan, 2012). A deficit of probiotic bacteria in the gastrointestinal tract can result in a lack of adequate enzymes and without these vital enzymes, nutrients and food (chyme) in the intestines are not digested properly hindering the proper utilization of nutrients and leading to disorders in the body (Jordan, 2013). Probiotics through enzyme production also help to restore peristalsis, enhance regularity in waste disposal and control the number of harmful toxin-producing fungi that can suppress immune cells and response. Some strains are also known to improve the body's allergic response, can promote healthy liver and kidney function by assisting with detoxification, among other benefits (Jordan, 2013).

Early research on probiotics established that ingested probiotic strains adhere to the gut wall, can block pathogen growth and adhesion (Reid & Hammond, 2005; Perdigon, Alvarez, Rachid, Agüero & Gobbato, 1995) and strengthen immunity (Reid & Hammond, 2005; Reid, Cook, & Bruce, 1987). More recent research suggests that probiotics have other functions as well, such as producing anti-infectives (e.g. hydrogen peroxide and bacteriocins) (Reid & Hammond, 2005; Ocana & Nader-Macias, 2004), cell signals that boost host-cell mucous barriers against pathogen invasion (Reid & Hammond, 2005; Mack, Ahrne, Hyde, Wei & Hollingsworth, 2003), and other signals that prevent disease causing agents, such as toxins from being released into the body (Reid & Hammond, 2005).

### 3.6.3 Probiotics and Mechanisms of Action

The use of probiotics to alleviate symptoms from many health conditions and improve health and well-being have been well documented (Reid, Jass, Sebulsky, McCormick, 2003). Fermented milk products, such as yoghurt which can contain probiotics, have been shown to play a role in alleviating gastrointestinal maladies, particularly diarrhoea, modulating the immune system, and have the potential to prevent HIV and sexually transmitted diseases/infections especially in women, among other benefits (Anukam, Osazuwa, Osadolor, Bruce, et al., 2008; Bolton, van der Straten, Cohen, 2008; Walker, Goulet, Morelli, & Antoine, 2006; Halpern, Vruwink, Van der Water, Keen & Gerswhin, 1991). Table 5, provides a summary of the action mechanisms of probiotics.

**Table 5:** Summary - Mechanisms of Action of Probiotics

<b>Antimicrobial Effects of Probiotics</b>	
<b>A</b>	Modify the microflora of an environment to suppress pathogens
<b>B</b>	Secrete antimicrobial substances
<b>C</b>	Compete with pathogens to prevent their adhesion to the intestine
<b>D</b>	Compete for nutrients necessary for pathogen survival
<b>E</b>	Antitoxin effect
<b>Effects of Probiotics on the Intestinal Epithelium</b>	
<b>A</b>	Promote tight contact between epithelial cells forming a functional barrier
<b>B</b>	Reduce the secretory and inflammatory consequences of bacterial infection
<b>C</b>	Enhance the production of defensive molecules such as mucins
<b>Immune Effects of Probiotics</b>	
<b>A</b>	Probiotics as vehicles to deliver anti-inflammatory molecules to the intestine

<b>B</b>	Enhance signalling in host cells to reduce inflammatory response
<b>C</b>	Switch in immune response to reduce allergy
<b>D</b>	Reduce the production of inflammatory substances

Adapted from: [http://www.customprobiotics.com/about\\_probiotics.htm](http://www.customprobiotics.com/about_probiotics.htm)

### 3.6.4 Mechanisms of Action and Health Benefits Specific to GR-1 & RC-14

Since the original isolation of these specific strains in 1980 and 1985, *Lactobacillus rhamnosus*, GR-1 (from the urethra of a healthy woman) and *Lactobacillus reuteri*, RC-14 (from the vagina of a healthy woman) respectively (Chr. Hansen web site), the use of probiotics to alleviate symptoms from many health conditions and improve health and well-being have been well documented (Reid, Jass, Sebulsky, McCormick, 2003). These two strains have been used widely as a food supplement since 2004, and are the world's most documented probiotic strains (Reid & Bruce, 2009). Specifically, *Lactobacillus* strains GR-1 and RC-14 can function in the gut, survive passage and be excreted in feces (Gardiner, Heinemann, Baroja, Bruce, et al., 2002; Morelli, Zonenenschain, Del Piano, Cognein, 2004). By doing so, *Lactobacillus* GR-1 and RC-14 have been shown in clinical studies to displace pathogens, improve treatment efficacy of antibiotics, reduce the risk of infection as well as repopulate the vagina to maintain a healthy vaginal microbiota by increasing the number of beneficial Lactobacilli which in turn can lower the risk of bacterial vaginosis (Reid & Bruce, 2009). A healthy vaginal environment can potentially help prevent HIV and sexually transmitted diseases/infections especially in women, among other benefits (Anukam et al., 2008; Bolton, Van der Straten, Cohen, 2008; Walker, Goulet, Morelli, et al., 2006; Halpem,



Vruwink, Van der Water, 1991). The strains *Lactobacillus rhamnosus* GR-1 and *Lactobacillus reuteri* RC-14 have a proven efficacy to treat and protect against many gastrointestinal and urogenital infections (Hekmat & Reid, 2007). Moreover, treating and preventing opportunistic infections can reduce the decline of CD4 T-lymphocytes in patients with HIV (Meydani & Ha, 2000). People with HIV often have diarrhoeal episodes and consequently experience malabsorption of certain nutrients (McGhee et al., 1992).

Specific mechanisms of action continue to be uncovered but include modulating host immunity, dislodging pathogens, altering the micro-environment to be less receptive to pathogens by producing acid, hydrogen peroxide, signalling compounds and biosurfactants (Reid & Bruce, 2009).

Importantly, GR-1 and RC-14 possess unique properties rendering them an ideal application to help alleviate the symptoms of a number of health conditions and improve immunity. During initial testing phases, GR-1 was found to have antagonistic properties against uropathogens and the ability to adhere to the epithelial cells in the urethra providing a protective barrier between pathogens and the host (Reid & Bruce, 2009; Reid et al., 1987; Chan, Bruce & Reid, 1984). Additionally, the strain's ability to coaggregate with uropathogens has been found to be useful in blocking pathogens from moving through the urinary tract up into the bladder and other areas of the vagina (Reid & Bruce, 2009; Reid et al., 1988). Further studies have also shown that *Lactobacillus* GR-1 can modulate host immunity in a way that enhances antimicrobial activity but also down-regulate the strong inflammatory processes associated with the signs, symptoms and discharge of infection (Reid & Bruce, 2009; Kirjavainen et al., 2008; Baroja et al.,

2007; Kim et al., 2006). Subsequent studies have shown that the strain produces by-products, most likely acid, that kill bacteria and viruses rapidly including HIV (Reid & Bruce, 2009), quantities of lactic acid that stress pathogens in the urinary tract such as *E. coli* cell surfaces (Cadieux et al., 2009; Cadieux et al., 2008) and quorum sensing molecules that partake in activities that interfere with the production and development of disease (Reid & Bruce, 2009). More recently, the strain was re-examined for its ability to produce hydrogen peroxide as a by-product, and it has been shown in fact, to be a producer of H<sub>2</sub>O<sub>2</sub> (Reid & Bruce, 2009; Schellenberg, J. unpublished) which is naturally beneficial in controlling candidiasis (vaginal and oral yeast growth) (Jordan, 2013). In brief, the organism has several properties which are suitable to improving immunity, distal urethral activity and vaginal health.

Although, the properties of GR-1 are robust, a second strain RC-14 is often used in conjunction with GR-1 in probiotic formulations to primarily enhance activity against gram-positive pathogens and inhibit their growth (Reid & Bruce, 2009). While GR-1 has been shown to have bacteriocin-like properties against *E. coli* and appears to stress this pathogen (McGroarty & Reid, 1988), it does not actually displace the enterococci (Reid & Bruce, 2009; Bruce & Reid, 1988) which are increasingly recognized in uropathogenesis, as well as being part of a disrupted flora associated with bacterial vaginosis in women and infection (Jahic et al., 2006; Kelly et al., 2003). As such, a clinically compatible and potent formulation able to improve vaginal health was found to be a combination of GR-1 and RC-14. Further, studies performed on RC-14 have shown that various proteins and peptides play a role in the strains anti-gram positive

coccal activity (Laughton et al., 2006; Reid et al.2002; Heinemann et al., 2000; Howard et al., 2000) and its ability to reduce the pathogenicity of E. coli (Medellin-Pena et al., 2007). Previously, it was thought that the primary mode of action of RC-14 was reuterin (Reid & Bruce, 2009; Dobrogosz, 1998), however, recently it has been discovered that the antibiotic described as being a key mechanism of action for L. reuteri is not actually a critical component of its probiotic activity (Reid & Bruce, 2009; Cadieux et al., 2008).

Overall, the properties of Lactobacillus GR-1 and RC-14 are conducive to preserving, enhancing and replenishing good bacteria and restoring a healthy balance. The strains' unique properties also allow them to be propagated into a form that can delivered to humans relatively easily either in a milk product (Reid & Bruce, 2009; Gardiner et al., 2002; Reid et al., 2001b) or in dried capsule form (Reid & Bruce, 2009; Reid et al., 2001a) are viable after prolonged periods of time, survive passage through the intestinal tract, are not overly sensitive to errors during milk production phases. These properties are the robust characteristics which make these strains optimal for production, use and delivery in resource poor environments that can be challenging.

### **3.7 Conceptualizing Health Related Quality of Life**

Quality of Life (QOL) has become an integral variable of outcome measures in clinical health research and is ever more being integrated into individual patient assessments. Health professionals, health care providers, and policymakers have recognized the significance of measuring health related quality of life (HRQOL) to make educated evaluations of patient assessments for case management, and policy decisions

(Guyatt, Feeney, & Patrick, 1993). Growing dramatically since the mid-1980's - during a time when a paradigm shift from epidemiological methods to a focus on the individual was underway, Quality of Life has "grown from a cottage industry to a large academic enterprise" (Gill & Feinstein, 1994). The shift duly highlighted the need to recognize and understand the impact of healthcare interventions on patients' lives rather than just objective disabilities and mortality. Since then, recognizing and understanding the impact of healthcare interventions has become particularly important especially among patients suffering from chronic, disabling and or life threatening diseases who live without the expectation of a cure and have conditions that are likely to have an impact on their psychological, physical and social well-being (Addington-Hall & Kalra, 2001).

Several basic approaches to quality-of-life measurement are available: those that provide a summary of HRQOL, known as generic instruments; and instruments that focus on specific areas of function, patient groups, or problems associated with single disease states (Guyatt, Feeney, & Patrick, 1993; O'Connor, 2004). Generic instruments include health profiles and instruments that generate information on the severity of symptoms, and a patient's personal outlook and values toward the illness or symptom – commonly known as a health utility (Ku et al., 2009). The approaches are not mutually exclusive. Each approach has its strengths and weaknesses, suitable under different circumstances. Additionally, HRQOL instruments can be used to measure cross-sectional differences in quality of life between patients at specific time points (discriminative instruments) or longitudinal changes in HRQOL within patients during a period of time (evaluative instruments) (Guyatt, Feeney, & Patrick, 1993). Given the

significant importance of measuring HRQOL, instruments have been developed suitable for detecting minimally important effects in clinical trials, for measuring the health of populations, and for providing information for policy decisions.

Quality of Life has developed into a concept that is a semantic representation that symbolizes ideas and meanings and expresses an abstraction (Rogers & Knafelz, 2000). As such, quality of life is not considered to be an empirical entity, but rather is a concept whose definition is based on consensus. Within the context of chronic illnesses and HIV, there has been a focus on the far less existential concepts of health related quality of life (Robinson, 2004). Researchers and clinicians have come to define health related quality of life as the “value assigned to the duration of life as modified by the impairments, functional states, perceptions and social opportunities that are influenced by disease, treatment and health care delivery” (Robinson, 2004, p.14). There is consensus among researchers that there are at least two key areas that researchers have found agreement: 1) measurement of HRQOL must account for its multidimensionality and that, 2) HRQOL is defined in terms of an individual’s subjective experiences. Multiple representations exist in the literature portraying the elements of HRQOL, but in general they tend to include a) degree of pain and discomfort b) physical function and mobility; c) sensory function; d) emotional function; e) cognitive function and e) self-care ability regarding activities of daily living (Vanheem, Toma, & Pineault, 1996). Secondly, HRQOL is defined in terms of an individual’s subjective experiences, measurement, therefore is focused on self-rated strategies as opposed to clinician

assessment, and is an occurrence which may not be observable to the clinician (Pearlman & Jonsen, 1985; Varricchio, 1990).

Generally, health related quality of life evaluations in HIV are used to compare treatment options in clinical trials, to measure outcomes of health services, to help with cost-utility analyses, and to monitor and evaluate individual patient care (O'Keefe & Wood, 1996). Evaluation can also extend beyond the dimensions of health and often include satisfaction with other life variables and can include measures related to sexual functioning, self-disclosure, stigma, and body image (Shumaker, Ellis, & Naughton, 1997).

More specific to HIV, two separate approaches to the measurement of HIV health related quality of life have emerged - generic versus HIV specific survey instruments (Robinson, 2004). Generic instruments are those used to determine HRQOL across different patient groups, diseases, and treatments. An advantage of this approach is the ability to compare data across different groups or populations. Examples of generic measures of HRQOL validated for use within the HIV-infected population include the: Quality of Well-Being Scale (Kaplan, Patterson, Kerner, Hampton-Atkinson, & Heaton, 1997), as well as the Quality of Life Index (Rabkin, Remien, Katoff, & Williams, 1993). Over the past ten to fifteen years several HIV-specific HRQOL instruments have appeared in recognition of the unique challenges facing those who are infected with HIV. Specifically, these survey instruments include a facet for evaluating the impact of symptoms related to HIV and its related therapies (Tsasis, 2000). According to Robinson (2004) these instruments provide the practitioner,

clinician and researcher a “conceptually more valid assessment of HRQOL in HIV disease” (p.15).

In the pages that follow, the methodological and interpretive challenges of quality of life evaluations are identified, the challenges to measuring the impact of nutritional support, and a discussion about quality of life as a measure of the effect of nutritional support on PLWHAs.

### **3.7.1 Conceptual Problems with Measuring Quality of Life**

The concept “quality of life” was first developed in the social sciences and was initially applied in the medical sciences in order to determine if available cancer treatments were capable of increasing the survival time of patients and to more importantly improve their sense of well-being (Hasanah, 2003; Spitzer, Dobson, & Hall, 1981). The plethora of new and long-standing assessment tools reflects the fact that even to date there is no single definition of quality of life that is universally accepted. Additionally, there is criticism that even amongst these instruments; there are those which claim to assess quality of life when in actuality they truly look into the assessment of disability or impairment (Hasanah, 2003).

Based on clinical practice and research there is enough evidence to suggest that quality of life is at least, in part independent of health status (Guyatt, Feeny, & Paoick, 1993), and “is a reflection of the way that patients perceive and react to their health status and to other non-medical aspects of their lives” (Gill & Feinstein, 1994, p. 625). Researchers are often at odds with one another because quality of life is inherently

subjective, a uniquely personal perception, that only perceived well-being, not functional assessment should be used to determine quality of life (Gill & Feinstein, 1994). The instrument should focus on appraising how health affects an individual's quality of life rather than their functional status.

The theoretical criticism against the use of any of the indexes in measuring the quality of life is that the researchers cannot know what it is that they measure and indicate. According to Veenhoven (2007), most attempts to quantify quality of life by computing values across quadrants are unsuccessful. The primary reason for this is that it involves adding 'apples to oranges' - there is no sense to be adding 'chances' and 'outcomes'.

With regard to the WHOQOL and the abbreviated version (WHOQOL-Bref) as well as the various illness specific modules, these highly structured instruments are supported by extensive psychometric testing. Focus groups comprised of professionals with vast experience, scientific knowledge and from varying backgrounds participated in defining 25 key facets of six domains (physical, psychological, level of independence, social relationships, environment, and spirituality). The measures for overall quality of life and general health perceptions were developed and included in a multi-domains approach to measuring quality of life. By dividing the assessment into the six domains further structure is considered to be provided for understanding the effects of health status on quality of life (Hasanah, 2003). Additionally, the multi-domains approach offers precision and clarity while also providing information surrounding various aspects of quality of life which may be utilized for different studies (Hasanah, 2003). WHO's



quality of life scale takes on a unique approach in that it is a multi-centred and cross-cultural instrument which has undergone a rigorous iterative process and encourages respondents to answer using a five-point scale. The result is an instrument which conforms to a subjective assessment (Hasanah, 2003).

Further, all indexes, including the WHOQOL, WHOQOL-Bref and all subsequent modules, are incomplete, as each instrument gives equal weight to all items, while it is evident that the importance of some facets will vary and have an increasingly substantial influence in determining quality of life. “None of the indexes acknowledges that weights vary with satiation and that they are contingent on situations and personal capabilities” (Veenhoven, 2007, p. 229).

Quality of life scales which give equal weight to all items of the index are open to being accused of unrealism (Häyry, 1999). On the other hand, although scales can be constructed by putting more emphasis on facets which are considered important, there are no agreed upon interpersonal criteria that could be employed in doing so (Häyry, 1999). Some researchers argue that scores from the different domains should be recorded independently, while others in the field advocate incorporating it into a single indicator, implying either an equivalence of importance across the different domains or a weighting between them. Even if the domains are considered separately, however, the data are rendered comparable across context, and open to complex statistical analysis.

Therefore, the field stands at an impasse, at either horn of the dilemma the survey instruments fail to provide a foundation for universally measuring quality of life

accurately and adequately. The best that can be done is an inference into the quality of life.

### **3.7.2 Methodological Issues**

One of the most important features of any instrument is their ability to measure the outcome of interest accurately and consistently. However, determining this with quality of life measures can be very difficult since a standardized definition does not exist. Therefore, instruments for measuring HRQOL should be evaluated based on their psychometric properties such as validity and reliability. “Validity involves content/face validity, concurrent (sensitivity) validity, discriminate (specificity) validity, and positive and negative predictive value. Features of reliability include internal consistency and test-retest consistency” (Robinson, 2004, p. 15). Additionally, with the constantly changing nature of HIV, it is imperative that the HRQOL instrument be useful across the spectrum of disease progression so that it can be used from the stages of asymptomatic infection to symptomatic infection, and AIDS. Therefore, validity and reliability must be capable of transcending disease stages, gender, ethnicity/race, and language (Robinson, 2004; Shumaker et al., 1997). Further, HRQOL tools must be responsive to change (Robinson, 2004; Franchi & Wenzel, 1998; Shumaker et al., 1997). Since these instruments are utilized to evaluate the impact of an intervention, it is important that they are sensitive to changes. Some interventions result in a small effect size, and although there may be a clinically relevant effect, the effect may be too small to be detected by an insensitive measurement tool (Robinson, 2004; Badia & Baro, 1999; Brechtel, Breitbart, Galietta, Krivo, & Rosenfeld, 2001). HRQOL tools must be able to

detect small changes. Further, it is imperative to bear in mind that a “statistically significant change in a score on an HRQOL instrument may or may not translate into a clinically significant change in HRQOL” (Robinson, 2004, p. 15).

### **3.7.3 Measuring Change in Quality of Life Over Time ~ Interpreting the Results**

Most applications of health related quality of life measures quantitatively assess the degree of improvement or deterioration in quality of life as a result of the intervention. This is usually obtained by measuring quality of life scores in patients before and after the treatment of concern, and usually with similar measures obtained from a placebo or control group. However, numerous problems have been documented with the detection and interpretation of such changes over time, many of which focus on the question of what will count as a significant improvement or deterioration. “The quantitative expression of the size of change scores in terms of units of a quality of life instrument do not provide intuitively accessible evidence of the importance of the change” (Fitzpatrick, 1996, p. 152). Similarly, conventional tests of statistical significance may not provide a clear indication of the personal or clinical significance of change.

There has been much debate surrounding methods of how to best measure and determine a significant change over time in quality of life (Fitzpatrick, 1996) and although there is not one specific method or gold standard, several methods can be employed to determine changes in quality of life. One such method to estimate significance is to compare quality of life changes to health professionals’ judgement of

change (Fitzpatrick, 1996). However, evaluating changes in quality of life based on a health professionals' judgement is partial and to a degree is inadequate in demonstrating individual and small variations in health and quality of life. A second approach is to examine change scores in patients receiving treatments which have already been established to be effective (Bombardier, Raboud, & Aurano-fin Cooperating Group, 1991). This can be a useful technique but requires in-depth knowledge of a treatments' efficacy, and the uncertainty surrounding the effect of the treatment is that which usually motivates the research. Therefore, one of the most effective techniques of establishing a significant improvement or deterioration is by asking the patient to judge the efficacy of the intervention, and then examining the variation in quality of life change scores.

While in relative terms a great deal is known about how various states of health are valued either by the patient or the imagined values of others, much less is known about how change in health related quality of life should be measured. There are two issues 1) how to measure changes in health related quality of life, and 2) how such changes are valued. "As with static measures, in relation to the second question there is an important question as to whether direct judgements (via experiential methods) produce similar results to those obtained by normative values" (Fitzpatrick, 1996, p. 153).

The outcomes of the research are generally intended for various audiences – health care practitioners, clinical and academic researchers, policy makers and patients. For patients, the changes in their QOL with the intervention "communicates to their

care giver how aspects of their life that were perceived cognitively or subjectively have been translated objectively, and how progress has been shown by changes in each domain or by a composite score” (Hasanah, 2003, p. 60). Usually though for a patient, whatever the improvement in the score is, it is considered to be a significant improvement. This is especially important since physicians’ perceptions and decisions regarding the patient’s needs frequently differ from the patient’s own self-report (Wilson & Cleary, 1995; Meyerowitz, 1993). Additionally, patients may perceive significant and important changes in health-related quality of life that are not detected by even the most established of health status measures (Fitzpatrick, 1996). Therefore, without a structured approach to interpreting these data, the patient’s perceived quality of life, needs and goals for treatment are misinterpreted and often disregarded by researchers and health professionals (Hasanah, 2003).

For researchers, practitioners and policy makers, the focus also often lays on group differences, and they present their results by highlighting the level of statistical difference, reported as a P value. A smaller P value is interpreted as a larger difference in quality of life, thus the greater the change or impact the intervention has had on quality of life. Therefore, the more likely the practitioner is to take notice. However, “all it means is whether the results of the study are found purely by chance or otherwise” (Hasanah, 2003. p. 63). Statistical methods utilized to measure a quality of life questionnaire’s responsiveness to change are: paired *t* statistic (Liang, Larson, Cullen, & Schwartz, 1985), relative change (Deyo & Centor, 1986), effect size (Jaeschke, Guyatt, Keller, & Singer, 1991), relative efficiency (Bombardier et al., 1991),

standardized response mean (Katz, Larson, Phillips, Fossel, & Liang, 1992), responsiveness statistic (Guyatt, Kirshner, & Jaeschke, 1992), and standard error of measurement (Wyrwich, Tierney, & Wolinsky, 1999). However, “these statistical measures, by themselves, do not provide an evaluation of the significance of the change, i.e., whether the change is minimally important to the decision-maker. Each measure is a quantitative descriptor of change” (Hasanah, 2003, p. 63). Therefore, it is important when reporting results to include guidelines on the clinical importance of the observed changes in quality of life and the extent of the clinical and empirical importance (Hasanah, 2003). Additionally, estimates of clinically significant change can be separated into those that are study specific and instrument specific. Instrument-specific estimates can be obtained from the defined sample validation data, whereas study specific estimates can be obtained from clinical trials (Cella, Bullinger, Scott, & Barofsky, 2002). For example, an instrument specific estimate, demonstrates that a 9-point difference on a survey instrument in physical functioning is equivalent to having back problems, a clinically meaningful difference (Hasanah, 2003). For policy makers and administrators, cost-effective analyses are increasingly applicable, and are derived from quality-adjusted life-years (QALY) and the associated cost. This measure captures gains resulting from decreased morbidity and reduced mortality which is then incorporated into a single measure.

### **3.7.4 Challenges to Evaluating Impact of Nutritional Support on Quality of Life**

Establishing a framework to measure the impact of nutritional aid on PLWHAs is not considered to be a simple task. There are many constraints which need to be considered and include data collection capacity, complexity of study design and analysis, and most importantly understanding the interaction between HIV and micro – and macronutrients (Strasser, Egge, Huddle, & Greenaway, 2005). Further, it is impossible to control for intra-household distribution, food sharing and sales, these are all considered to be uncontrollable variables (Egge & Strasser, 2006). “Proving causal attribution of an impact to food aid is difficult because of HIV disease complexity and numerous factors influencing beneficiaries’ experiences” (Egge & Strasser, 2006, p. 320). Only extensive and rigorous evaluation design is capable of disentangling whether an impact was related to nutritional support as opposed to other issues. According to Egge and Strasser (2006) potential confounders must be identified and collected at baseline – research is needed in order to gain better understanding of the independent variables relevant to collect in order to show a causal attribution of nutritional support. For instance, an identified confounding variable is continued wasting even for those nutritional support beneficiaries who are receiving ART (Egge & Strasser, 2006; Miller, 2003). Other confounding variables include the side effects of ART such as nausea, vomiting, metabolic complications of treatment such as imbalances of glucose and lipid metabolism (Egge & Strasser, 2006; Shevitz & Knox, 2001), and prolonged recovery times (Egge & Strasser, 2006; Sandige, Ndekha, Briend, Ashorn, & Manary, 2004).

According to Egge & Strasser (2006) there are also key control variables which include, and are not limited to:

demographic information (e.g. gender, age, ethnicity, location, household size), program inputs (e.g., quantity of food and commodities received and for what duration), treatment received (e.g., ARVs, breastfeeding counseling, cotrimoxazole), stage of disease and CD4 count at onset and completion of research period, and signs and symptoms experienced by PLWHA during research period, access to medical care, symptoms/disease outbreaks, micronutrient status, home and community support and stigma. If these variables are not controlled for, it will not be possible to determine what impact came from nutritional support and what came from other sources (p. 320).

The relationship between HIV and nutrition is a complex network of social, behavioural and biologic factors. Understanding this complex interaction is crucial to developing a valid and reliable study design, and it is critical to bear in mind that inadequate nutritional status may continue despite nutritional support as a result of frequent infections, loss of appetite and disease progression, rendering even the most robust evaluation methods and successful programs to be inadequate tools.

### **3.7.5 Quality of Life as a Multi-Faceted Concept**

Quality of life is a multi-faceted concept which considers the impact of impairment, function (mental and physical) perceptions and social opportunities as such the current literature is bursting with studies on the quality of life of people living with HIV/AIDS (PLWHAs). An abundance of studies have been conducted using QOL measures with PLWHAs and many tools exist to measure QOL for those living with HIV. A comprehensive summary of common HIV-specific health related quality of life



instruments can be found in the article 'Measurement of Quality of Life in HIV Disease' (Robinson, 2004). Despite the fact that the literature abounds with studies on the QOL of PLWHAs, and an understanding of the importance of nutrition on HIV exists, there has not been an extensive examination of the effects of nutritional support on the quality of life of PLWHAs. Based on an extensive database search of the literature using the key word combinations, nutrition, HIV/AIDS, QOL, functional foods, nutritional support, and targeted food assistance there were only a handful of published studies found. Very few studies have been published which explore quality of life as a measure of the effect of nutritional support on PLWHAs. Despite evidence that QOL measures offer a rich assessment of the effect of nutritional support including physical, social and psychological components (Egge & Strasser, 2006).

At an International Conference on HIV/AIDS and Food and Nutrition Security (2005) in Durban, South Africa it became clearly evident that there is a "serious lack of empirical evidence on how best to monitor and evaluate the effect of [food assistance] programs on participants who are HIV positive or living with AIDS" (Strasser et al., 2005, p. 4). There is extensive consensus both from the literature and experiences from the field, which point to a shortage of effective and appropriate indicators for measuring the effect of nutritional support on chronically ill beneficiaries especially within the context of development and HIV/AIDS (Canahuati, 2004; FANTA 2004a,b; FAO, 2003; USAID 2003; IFAD, 2001). According to a comprehensive literature review conducted by Strasser et al. (2005) of academic, relief and development agency databases on nutritional status and the impact of nutritional support in the context of HIV/AIDS -

there are a limited number of studies focused on measuring the impact of nutritional support and the practical assessment tools to measure targeted food assistance on nutritional outcomes for PLWHAs are not easily accessible.

Although a plethora of knowledge exists with regard to the multidimensional importance of proper nutrition for those who are HIV positive, little is known about the effect of nutritional support on PLWHAs and their quality of life. The paucity of studies which have used specific measures to assess the impact of nutritional support on PLWHAs at the individual level are completely lacking (Strasser et al., 2005, Egge & Strasser, 2006). Often, researchers with a specific interest in a particular illness or the efficacy of a specific treatment discover that generic measures are typically insensitive to the types of changes resulting from the intervention or that the instrument used does not include questions which are important to a particular area. Therefore, researchers struggle to find effective and appropriate indicators for measuring the effects of the intervention (in this instance nutritional support) on chronically ill beneficiaries. 'Success', then, more often than not becomes associated to program adherence, rather than 'success' measured by changes in health status. Ultimately, health and nutritional outcomes of PLWHAs receiving nutritional support are not widely available.

To date there is no specific instrument which measures the effects of nutritional support on the quality of life of PLWHAs. Therefore, to examine the objective effects of nutritional support on HIV/AIDS, and the consequent deterioration in quality of life, both quantitative and qualitative methods need to be employed, in order to capture the effects of health status on personal well-being, which is subjective. By employing the

WHOQOL-HIV Bref, a clearer picture of quality of life can be gained, however, based on the project at hand the instrument itself may not be sensitive to the types of changes resulting from the intervention since it is focused on assessing QOL in HIV and not the effects of nutritional support on HIV and the improvements gained.

Despite the challenges – a lack of practical assessment tools in evaluating the impact of nutritional support on HIV/AIDS participants, evaluation methods (often used in combination) do exist, and can be used as a starting point for determining the impact of nutritional support interventions. As stated above-at the moment the most robust method of examining the effects of nutritional support at the individual level is by combining quantitative methods to measure the objective parameters (immunological and biochemical outcomes; e.g. morbidity, CD4 levels, viral load, disease progression and body composition) with a QOL instrument which will most closely capture and establish changes in the health related quality of life among the participants, using a Likert Scale.

As the project moves forward, it is important to build an evidence based understanding of the contribution of nutritional supplements, specifically probiotics to the quality of life and physical status of the targeted beneficiaries. This is essential not only to better justify the provision of such support, but also to improve the design and implementation of nutritional support programs to marginalized beneficiaries, and to influence policy initiatives to include nutritional supplements as part of a total care HIV package.

### **3.7.6 Probiotic Yoghourt as a Nutritional Supplement to Improve Health, Nutrition and Quality of Life**

Across cultures, humans have been using microbial cultures – probiotics, for thousands of years in food and alcoholic fermentations. Fermented foods have gradually fallen away in contemporary diet, in both developed and developing countries, which may be contributing to the increased prevalence of some diseases. Probiotics are live microbial cultures added, usually to dairy products that beneficially affect an individual by improving their intestinal microbial balance. As the recognition of the link between diet, a strong gut and health has never been clearer, probiotics have come under scientific scrutiny for their ability to prevent and cure a variety of diseases. The research conducted over the last decade indicates that probiotics can improve immunological, digestive, and respiratory function and may alleviate infectious disease. The identified health benefits of probiotics resulted in the FAO/WHO (2001) declaring the need to make probiotics available to populations at high risk of infectious diseases, malnutrition and mortality. Probiotics are now being implemented in numerous ways to: boost immunity and prevent infections (Reid, Jass, Sebulsky et al., 2003; Ouwehand, Salminen, Isolauri, 2002), aid in the prevention and treatment of acute diarrhoea and antibiotic associated diarrhoea (Sazawal, Hiremath, Dhingra et al., 2006), and in decreasing the severity and duration of diarrhoeal episodes caused by rotavirus infections (Reid, Jass, Sebulsky et al., 2003; Ouwehand, Salminen, Isolauri, 2002) , decrease the incidence of dental caries (Näse, Hatakka, Savilahti et al., 2001), manage urogenital health (such as urinary tract infections and bacterial vaginosis) (Reid, 2001; Famularo, Perluigi, Coccia et al., 2001), managing lactose intolerance (Sanders, 2000),

preventing certain types of cancer (Wollowski, Rechkemmer, & Pool-Zobel, 2001), reducing inflammation resulting in allergies (Reid, Jass, Sebulsy et al., 2003), improving mineral absorption (Famularo, De Simone, Pandey, Sahu, & Minisola, 2005), reducing candida or yeast infections caused by antibiotics and preventing harmful bacterial growth under stress (Hitti, 2006), among other potential benefits.

By using probiotics, the underlying notion is that health, nutrition and quality of life can be improved. With funding from the World Bank Development Marketplace Grant, the implementation this community based health and nutrition program using probiotics to improve community health, particularly within the context of HIV/AIDS, has been made possible in Oyugis and Kadongo, Kenya. The implementation of this community health and nutrition program has provided the foundation to collect data and evaluate the health and nutritional benefits of probiotic yoghurt. The study focuses on the impact of probiotic yoghurt on men, women and its potential for reducing malnutrition, and other ailments and improving the quality of life within this vulnerable group.

### **3.8 Philosophical Underpinnings of Gender and Development**

Gender and development theory, just like many theories, has had a turbulent beginning, and as it further develops it continuously metamorphoses and challenges contemporary ideologies and theory. Key shifts in its development required a re-conception of the notions 'women' and 'gender'.

Taking the lead from a liberal feminist paradigm, early gender and development work focused on 'women' as a social category and the types of relationships they had with the economy and development processes (Reeves & Baden, 2000). Taking notice of women's exclusion from male dominated arenas, initial initiatives stressed the importance of compensatory measures and the need to include women in development activities (March, Smyth and Mukhopadhyay, 1999). This revisionism came to be known as the women-in-development movement. The WID approach "endorsed the enhancement of women's consciousness and abilities, with a view to enabling women to examine their situations and to act to correct their disadvantaged positions" (Alba, 2000, p. v). Additionally, the movement supported the notion that a greater provision of and access to resources for women would result in an increasingly efficient and equitable development process (Alba, 2000; Reeves & Baden, 2000). However, despite its purposeful intentions, the WID approach has heavily been criticized even though there is continued use and implementation of some of its key components among certain development institutions' tactics regardless of rhetorical shifts (March, Smyth & Mukhopadhyay, 1999). Following the WID movement, the end of the 1970's was marked with expressed concern about inequalities in numerous spheres of life and across different scales between men and women which mediate development processes. Gender relations were being pushed to the fore in the 1980's and 1990's. Especially since studies began to demonstrate that there were (and continue to be): unequal roles, unequal access to resources, women have been inundated with a disproportionate amount of responsibilities, a persistence of unbalanced authority,

power and control, and inequitable decision-making patterns exist between men and women, and within other socially constructed categories which affect one's position and daily activities (Kabeer, 1997).

For instance, an examination of structural adjustment policies indicated that gender inequalities bear a tremendous influence on the realization of macroeconomic objectives (Alba, 2000; Busingye, 2002; Elson, 1995). Additionally, micro-level studies have illustrated vast differences in social expectations, perceived capabilities, and entitlements of men and women, as well as boys and girls (Busingye, 2002; DHS, 2005; Sweetman, 2002).

Contrary to the unified-household model, the household has been considered an arena of bargaining, cooperation, or conflict. Reflecting the norms, laws, and social values of society, the differences in the status of men and women have profound implications for how they participate in market or non-market work and in community life as a whole. These differences embody social and power relations that constitute the setting for the implementation of development programs, and these differences therefore influence program outcomes (Alba, 2000, p.v). Since the mid-1990's, there have been continued debates surrounding gender and development theory, the power of development discourse, the concepts of difference and voice, and more recently mainstreaming as well as men-streaming in gender and development.

One of the main concerns in development has been and continues to be gender equality. Historical accounts of this theme recount an evolution in development planning and policy from a welfare approach, to one which prioritised equity,

subsequently efficiency, and lastly one which adopted and advocated for women's empowerment as its goal (Moser, 1993). These themes also surfaced as individual policies of governments and agencies, or were combined in organizations with the expectation of forming consistent and achievable movements toward gender equality. With the assertion that equality in the status of women and men is essential to every society, concerns shifted towards gender relations in development (Reeves & Baden, 2000). The realization that development was more than the creation of equal opportunities, lead to an understanding that women and men need to have equal voices in decision-making across all levels, opportunities for good governance, and equality in policy planning and implementation. It also became evident that within patriarchal societies, organizations, society, culture, rules and outcomes were and in some cases continue to be modelled on male values and attitudes. Thus, efforts often lead to unfavourable results, fail to recognize and reward women's contributions, and ultimately recreate and reproduce the gender hierarchies, inequalities, and perpetuate dominant cultures of power and control in all domains where women and men intersect throughout their daily lives.

The sections that follow examine the theoretical underpinnings of gender and development and works towards contextualizing the challenges faced by Kenyan women, girls and those who are marginalized, even in the wake of the new Constitution which promises unprecedented rights for women.



### 3.8.1 Women in Development

The 1960's ushered in the first United Nation's Development Decade. The doctrine of the time placed large emphasis on economic growth and the "trickle-down" approach as crucial strategies to reduce poverty (Alba, 2000). Since that time however, the development debate progressed significantly, with one of the most important shifts in thought being the decision to consider gender equality as part of development initiatives. As such, women's concerns began to be integrated into development agendas in the 1970's, and gender equality has since become a fundamental underpinning of development (Alba, 2000). In response to pressure from a number of women's movements, various United Nations mandates, national and international development agencies along with governments and non-governmental organizations have adopted a variety of guidelines, strategies and policies in order to promote women's rights, equality and advancement (Visvanathan, Duggan, Nisonoff, & Wiegersma, 2011; Momsen, 2004; Razavi & Miller, 1995).

While improvements to development strategies continued to be made in the 1970's, considerable dissatisfaction with the effects of the *trickle-down approach* lead to the adoption of the "basic-needs strategy" (Alba, 2000). The *basic-needs strategy* was an approach which concentrated on encouraging and intensifying development for marginalized individuals. The strategy "focused on increasing the participation in and benefits of the development process for the poor, as well as recognizing women's needs and contributions to society" (Alba, 2000, p. v). This realization lay the groundwork for a paradigm shift toward more fully integrating women in the development process, and

was further bolstered by activism surrounding women's issues which continued keenly both in national and international forums, bringing about the 'women-in-development movement' (WID) (Antrobus, 2004, Razavi & Miller, 1995; Reeves & Baden, 2000). As a theoretical approach WID began to take root in the feminist development field and proponents worked toward integrating policies and guidelines that were more inclusive of women in the development process. The WID framework challenged the existing *trickle down* strategies of development as it openly acknowledged that modernization and economic liberalization affect men and women differently (Cornwall, Harrison & Whitehead, 2004; Chant & Gutmann, 2002; Harrison, 1997). Advocates of the movement affirmed that providing women with increased access to resources would assist with achieving an equitable and efficient development process (Alba, 2000; Razavi & Miller, 1995).

WID emerged as a framework championing social justice and equity for women through the process of development, and its tenets were based on an acknowledgement of the importance of the status women and the recognition of women as significant participants in the development process who deserve equal opportunities. The goal of integrating women into national economies through a focus on women's access to education, training and resources was put into place in order to improved women's status; assist in creating equal socio-economic and political opportunities. Emphasizing women's institutional and legal rights, WID supporters pursued the need to improve educational and employment opportunities; equality in political, social and economic participation, as well as increased access to health and

other social welfare services (Momsen, 2004; Razavi & Miller, 1995; Tinker, 1990). WID played a role in working towards emphasizing women's productive roles, as well as processes to overcome subordination within existing economic frameworks, and offered a rationale for directing limited development resources to include women (Kevane, 2004; Razavi & Miller, 1995).

Within the 'Decade for Women' (1975-1985), global data was demonstrating that gender inequalities in access to and control over productive resources (e.g. capital, land, information, education, training, technology etc.) still placed women at a socio-economic disadvantage (Visvanathan et al., 2011; Momsen, 2004; Jahan, 1995; Momsen, 1991). Several studies of the Third World in the 1990s indicated that in general women were becoming more impoverished, their work burdens growing substantially, and their status, relative to men, declining (Koczberski, 1998). The failure to acknowledge and develop women's productive roles within and beyond the household was leading to the inefficient use of resources which was hampering development (Tinker, 1990). Thus, the anti-poverty objectives and approaches associated with the WID approach, especially within developing countries, fell short in achieving the overreaching goals of equality as most income-generating projects were only marginally successful.

While the WID campaign brought about substantial change, and provided economic opportunities that may not have been offered in the past, the framework is often criticized for being problematic. Following the WID movement, there was expressed concern about inequalities in numerous spheres of life and across different

scales between men and women which mediated development processes. WID tended to marginalize women's concerns by focusing on individual rights and ignoring the structural inequalities that they face each day. In response to women's subordinate status, the tenets of WID were based on an integrationist approach, which is a belief or practice that women could be brought into existing models of development without a major restructuring of social, economic and political systems, however this was flawed. The anticipated improvements in the development process under WID began to appear as being minimal, and inequality between men and women in some contexts continued to grow, with more and more women joining the world's poor (Visvanathan et al., 2011; Momsen, 1991; Momsen, 2004). Attention has been aptly drawn to examples where women's greater participation in the formal market sector in developing countries has led to increased gender and class oppression. As Casale (2004) points out, the feminization of the labour market in South Africa has not relieved women of oppressive circumstances or benefited them in any particular way. This is a result of women's continued disadvantaged position in the labour market relative to that of men, which has not been deeply challenged (Casale, 2004).

The women-in-development approach, continued to be criticized for problematic development paradigms which support efficiency (March, Smyth & Mukhopadhyay, 1999). In essence, the approach has been critiqued for being established on development paradigms that "interpret Africa from the perspective of its economic 'inefficiency'" and often prescribe that "women of Africa should be concertedly 'captured' by the global market and the economic initiatives of the state" (Lewis, n.d.,

p.1). As a result, opponents contend that by placing women into Eurocentric, androcentric and unequal development processes while avoiding to question the development agenda as a whole, and other structural processes can lead to increasingly entrenched gendered and class oppression instead of reducing women's subordinate position (March, Smyth & Mukhopadhyay, 1999). For instance, the WID approach tends to ignore the impact of embedded structural inequalities on individual, household and community relations and interactions. For example, in Kenya, and many other low to middle income countries, men often control household resources including income generated by their wives so that even when women are integrated 'in development' gendered imbalances still persist (Creighton & Omari, 2000; Hanne, 2015).

Additionally, feminist critiques and debates of the WID approach surfaced concerning the idea that 'women' were being considered as a homogenous social group. The narrow focus of WID on the sexual equality of women as a homogenous group dismisses the contextual differences of women's lives and the interconnections between class, age, marital status, sexuality, race, ethnicity and dis(ability) and other formed identities. The critique also debated the focus on women's productive roles and advocated for acknowledgement of the inter-linkages between production and reproduction (Razavi & Miller, 1995; Momsen, 1991). The WID approach failed to acknowledge the importance of women's reproductive roles alongside their position within the productive labour force consistently ignoring the extra burden of placing 'women in development' or within the productive labour force as it overlooked commitments by women to carry out reproductive tasks and care for a family at home.

Furthermore, although an increasing number of women were entering into the paid work force, they continued to be low paying, unskilled or lesser skilled work in both the formal and the informal sectors of the money economy (Razavi & Miller, 1995). The subordination of women and prevailing processes of male domination (patriarchy) continued to persist within the development field since the WID approach has frequently been reduced to 'adding women on' or referring only to women rather than addressing deeper issues relating to mainstream conceptions and constructions of gender and the related operational processes and relationships that are associated with these culturally and institutionally entrenched norms (Kevane, 2004; Awumbila & Momsen, 1995; Kardam, 1997).

Eventually, critics suggested that better frameworks were necessary to take into consideration the processes and relations which reconstruct, reinforce and intensify inequalities among men and women, but also between women. As a result, fundamental institutional shifts took place in order to circumvent continued gender inequalities through and within institutions and the frameworks they utilized to evaluate development processes. The recognition of these shortfalls within the WID framework signaled a need for change. The debates surrounding these critiques emphasized the necessity to review and evaluate development paradigms coming out of the patriarchal context, instead of holding the presumption that women were being included in development processes and that analyses will result in empowerment and equality. The dismissal of the structural and socio-cultural factors within which gender inequalities are entrenched, produced and reproduced within the WID framework was a major driving

force behind the creation of new theories of development that included a gendered view rather than a focus on women alone (Visvanathan et al., 2011; Momsen, 2004; Razavi & Miller, 1995).

### **3.8.2 Gender and Development: From WID to GAD**

The resultant debates and a realization of the shortfalls of the WID approach, eventually led to the Gender and Development Movement (GAD), which would build on the WID approach by furthering the relational aspects of WID and other elements of the approach (Reeves & Baden, 2000). Mainstreaming essentially offers a pluralistic approach that values the diversity among both women and men (Booth & Bennet, 2002). Feminist scholars and advocates began to develop and transform the concepts of WID to address gender and development (GAD) in a more holistic fashion, whereby historical, political as well as socio-economic influences on gender are recognized (Agarwal, 1997; Baden & Gotex, 1997; Connell, 1987). For instance, GAD emphasizes more adequately and comprehensively the manifestations of gender within inequitable relationships between men and women, as well as procedures, structures, and institutions, while also challenging existing modes of thought.

GAD also encouraged an examination of long-standing masculinities and their function in culture and society, thus highlighting the concept of gendered organizational culture (Flood, 2004). Upon an assessment of entrenched masculinities, GAD came to acknowledge the importance of gender relations (the socially acquired pattern of relations between women and men) in the formation of the development process at

various levels of society (household, community, institutional/organizational), as well as how development influences, shapes and reshapes these power relations. GAD's method to development evolved to recognize the importance of restructuring and redistributing power relations to enable women to take part in the development process more equally (Momsen, 2004; Goetz, 1997).

Furthermore, criticisms of WID paved the way for GAD to draw attention to an array of variables which intricately intersect to dispute the notion that 'women' as a social group were homogeneous (Reeves & Baden, 2000). Thus, the GAD movement advocated the need for a multifaceted and relational analysis of gender, whereby women are not considered to be a homogenous group, but rather as diverse in their status and gender identities particularly over time, space and place (Reeves & Baden, 2000). The GAD approach then focuses more on gender as a multifaceted set of relations and characteristics that include social meanings, positions and relationship to others, which are constructed and interpreted through social interactions and vary across time, space and culture rather than the simple biological sex of a group.

The GAD approach, stressed the idea that gender identity and status are greatly influenced by social factors such as age, race, ethnicity, class, and culture (Parpart, Connelly, & Barriteau, 2000; Razavi & Miller, 1995; Reeves & Baden, 2000), and is concerned with examining: the social classification of masculinity and femininity; analyzing, explaining, and challenging unequal gendered power relations (the subordination of women in particular); and relating these unequal power relations to



the broader structure of patriarchal societies which includes social, cultural, political, historical and economic dimensions (Moser, 1993; Momsen & Kinnaird, 1993).

As such, feminist development theory has observed a shift in approaches from WID to GAD. Although in some instances there has not been an absolute shift, GAD nonetheless has critically assessed the WID approach and strives to tackle the tendency of simply putting women into gender-based development processes which overlook effective integration, equality and empowerment (Reeves & Baden, 2000). The Gender and Development approach is also focused on the idea that it is necessary to concentrate on gender relations in development processes (Reeves & Baden, 2000). Society and institutions are organized around gendered norms and identities, which collectively establish people's roles, views, attitudes priorities and statuses (Reeves & Baden, 2000). In order to break free from patriarchal ideologies the GAD approach promotes the empowerment of women, while attempting to make essential transformations of entrenched ideologies, structures, procedures and institutions in order to achieve gender equality. GAD serves to encourage women's participation, as well as to provoke change within organizational cultures. It pushes the boundaries of development to move beyond contemporary ways of thinking and practice which constrain women's meaningful participation and to deal with gender-biased benefits accruing from previously flawed development projects (Miller & Razavi, 1995).

As the above sections critically trace the contours of WID and GAD, it can be discerned that there has been a gradual shift in orientation of these policy approaches towards women from 'welfare', to 'equity', to 'anti-poverty' to 'efficiency' and finally to

'empowerment' (Vijayamohan, Asalatha, Ponnuswamy, 2009). Institutions, organizations and civil society have also slowly begun experiencing political and theoretical shifts toward an understanding of gender as relational, comprised of numerous variables, including ethnicity, race, class, and displayed across different social, institutional, political and economic levels (Reeves & Baden, 2000).

As GAD theories continued to be developed and scrutinized, dissatisfaction grew with the idea of solely integrating women in development, and led institutions to incorporate *gender mainstreaming* into their activities. Considerations surrounding gender sensitivity and accountability began to become incorporated in development initiatives (Momsen, 2004; Jahan, 1997). In the conceptualization of GAD, gender began to be viewed differently which was a critical shift in thought. Gender mainstreaming led to systematic procedures and mechanisms within organizations, especially government and public institutions, for openly taking into account gender issues at all stages of policy development and programme design and implementation (Baden & Gotez, 1997). Gender mainstreaming focuses on intra-household gender relations, women's multiple roles, and gendered violence as part of gender sensitive programs. However, this is not to say that men are ignored in the process. It is a strategy from making women's as well as men's concerns and experiences an integral dimension in the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equality and inequality is not perpetuated (UNIFEM, 1998). The overarching goal then of GAD is to bring awareness to the effects and implications of these socially constructed divisions and

differences for program development and project design (Gotez, 1997). This approach allows policy makers, planners and researchers to understand and draw attention to the motivations and constraints under which men and women work in order to tailor projects so that they will maximize productivity (Kevane, 2004). Bypassing the effects of such dynamic factors on gendered burdens and constraints can compromise methodologies and political agendas expected to affect change (Carver, 1996). Therefore, it can be decided that gendering does not take place in a vacuum, so challenging power relations and gendered inequalities cannot be accomplished by solely focusing on women.

For instance, gender mainstreaming recognizes the need for development initiatives, objectives and goals to always take into account existing gender norms, relationships and roles that exist at the household and community levels. In Kenya, and other countries in E. Africa, patriarchy and age seniority influence social relations at the household, community and national levels and points to the fact that households are not homogeneous social units (Creighton & Omari, 2000; 1995). Rather, they are constituted of individual social beings with different interests and roles that are related to socially constructed notions of gender, and with varying levels of control and access to household resources (Cornwall et al., 2007; Creighton & Omari, 2000; Dwyer & Bruce, 1988; Beneria & Sen, 1981). Households are not unitary entities that can be considered as unified economically rational units, but a space in which internal conflicts, imbalances in power relations, and inequities take place, and there is often one principal decision maker (Dwyer & Bruce, 1993). Typically, women and children are excluded or

marginalized from decision-making processes, especially those relating to the allocation of resources (Creighton & Omari, 2000; Sender & Smith, 1990). Additionally, households host varying divisions of labour, with men and women undertaking different activities that form complex and changing systems of cooperation and exchange (Razavi & Miller, 1995). While there is a division of labour, women are more likely to work an average of 13 hours a day as compared to men (8 hours) and are responsible for the vast majority of household duties, caring for the family and other economic activities outside the home that generate additional income. Women in Kenya can be considered as being “time-poor” because of their dual roles in the household economy and the labor market, yet they earn less because more of these hours are not remunerated (Saito, Mekonnen, & Spurling 1994). Women constitute 60.8% of unpaid family workers (Ellis et al., 2007). As a result, women take on the bulk of household duties but have much less control over household decisions making and assets (Dwyer & Bruce, 1993; Kevane, 2004; Turshen, 1984). These factors in conjunction with the way, in which other roles and responsibilities are assigned within a household unit, as well as the process and outcomes of the distribution of resources accumulated from the labour of family members are key factors that influence relations between members of the household (Momsen, 2004). Of course, these roles and responsibilities are influenced by the broader socio-cultural and socio-political context of interactions that affect the local context within the community and the household unit (Creighton & Omari, 2000).

It should be noted that women’s increasing involvement in the formal sector has not ended their subordination, but has been accompanied by the transfer of patriarchal

attitudes from the home and community to the formal sector with an ever-increasing workload (Ellis et al., 2007; Momsen, 2004).

In many countries, including Kenya, gender relations are influenced by structural forces and increasing women's burden of work. Kenya's political-economic shifts have had deleterious effects on gender relations and the status of women (Kariuki, 2010). For example, the penetration and diffusion of capitalism under British colonial rule from 1890-1963, decreased women's standard of living by exploiting them within the capitalist market; imposed notions of women's inferiority and further intensified domestic patriarchy reinforced by colonial social institutions; and decreased their access to training and education; and diminished the value and importance of women's work and their vital role in food production by emphasizing the more lucrative male-controlled cash crop cultivation (Kariuki, 2010; Turshen, 1984)

An additional political shift that has greatly affected women's work and positionality in society is the implementation of Structural Adjustment Policies (SAPs). SAPs have exacerbated gender-based inequalities by reducing or stopping social sector spending across various sectors, such as education health and other social welfare sectors leading to a downshift of responsibilities from the state onto the household which has worked to further subjugate women as the primary providers within households (Baylies & Bujra, 2000; Creighton & Omari, 1995).

For development processes, it is important to examine the local household and community dynamics that exist between men and women, and cast these against the backdrop of economic strain, political instability and disease (McCloskey et al., 2005;

Turshen, 1984). Women's burden of productive and reproductive work acts as a constraint on their ability to engage in productive activities and therefore affects the development process (Momsen, 1991; Beneria & Sen, 1981).

More recently, scholars argue for the need to have an increasingly male-inclusive approach to gender and development (GAD), with an emphasis on men as gendered beings (Chant & Gutmann, 2000; Flood, 2004). Most GAD initiatives have been concerned with women's inequities, and men have always been involved in GAD either directly or indirectly (Chant & Gutmann, 2000). Recently attention and consideration has been given to how male-inclusion in GAD analysis, policy and practice might improve work for, by and with women to produce increased gender equality in development interventions (Chant & Gutmann, 2000; Flood, 2004). Scholars are optimistic about the possibility of engaging men in policy-making and planning with respect to gender issues, as well as indicating the importance of engaging men in the transition to mainstream gender.

Chant and Gutmann (2000) suggest that this increased attention to men and masculinities is in part the result of global changes in gender relations especially with respect to education, employment, and family life. Recent trends indicate that a disproportionate number of men, particularly the poor and young are subject to growing marginalization and vulnerability. As such, they are beginning to lag behind their female counterparts in educational attainment and are less likely to gain employment, both in the South and the North (Chant & Gutmann, 2000; Hearn, 1998; Chant & McIlwaine, 1995;). This is not to say that women are not disproportionately

disadvantaged, in most countries they continue to tolerate civil, social and material difficulties. However, the declining probability of men to assume economic responsibility attached to an idealized male role as breadwinner has destabilized their identities and status, and is often associated to weakened familial integration as fathers and spouses (Chant & Gutmann, 2000). Additionally, the increased emphasis of social policy on female headed households, and the consequent neglect of young and poor men has resulted in the intensification of social problems such as crime and violence (Chant & Gutmann, 2000; Sweetman, 1997). “Since many of the changes that feed these constructions have important implications for women, particularly those on low incomes, it is no surprise that curiosity and concern have stirred in various segments of the gender and development community” (Chant & Gutmann, 2000, p.1).

### **3.8.3 Development and Gender in Kenya**

Within Kenya, the government and many development agencies have made women’s equality and empowerment a key policy issue and have undertaken efforts to restructure and reform discriminatory legislation (Creighton & Omari, 1995). This is also evident in the reforms presented in the new Kenyan Constitution. Nevertheless, women continue to experience disadvantages relative to men in terms of economic, political and social power that significantly impacts their socio-economic progress (Gonzalez-Brenes, 2003; Creighton & Omari, 2000; Razavi & Miller, 1995). Due to limiting socio-cultural norms, values, customs, discriminatory laws, impoverished circumstances and structural influences, women and girls are constrained in their

opportunities to access basic necessities and reach their potential. For instance, they often have limited access to education and health care, have difficulty obtaining credit; are unable to enter certain professions, inherit property, achieve positions of political power; avoid abuse and violence, or participate as equal partners to their full potential in society (Kevane, 2004; Razavi & Miller, 1995; Momsen, 1991).

Gender inequality is an important underlying cause of women's under nutrition and is further exacerbated by a lack of access to resources and poverty (UNICEF, 2009). In many cultural settings in the region, men and boys traditionally eat first, and women and girls eat the leftovers, and when food is in short supply this often means females have very little, or nothing to eat at all (UNICEF, 2009). Due to gender norms, women often also have limited access to and control over resources and may be excluded from household decision making (UNICEF, 2009). Therefore, more often than not, the health and nutritional status of women, and their children is considerably lower than that of men as their access to health and nutritional resources is limited. For example, barriers in access to health care are most acutely felt by women. In Kenya, 43% of women say that their husbands alone make decisions regarding their healthcare (UNICEF, 2008). These barriers include obtaining money for treatment; distance to health facility; transportation and not wanting to attend the clinic alone (RAWG, 2005). These barriers also adversely affect access to ARV treatments (RAWG, 2005).

Women in Kenya, also have fewer educational opportunities, and are, in general less educated than men. While there have been gains in literacy rates and school enrolment for girls, gaps remain and tend to be larger among older age groups (Lucas &



Mbiti, 2012; KNBS & ICF, 2010). Recent data indicates that women are more likely to have never attended school (19%) as compared to their male counterparts (13%) (KNBS & ICF, 2010). More men have also either completed a secondary school education (12%) or attained more than a secondary level education (6%) as compared with 9 and 5 percent of women, respectively (KNBS & ICF, 2010). The 2007-2008 post-election crisis also resulted in major internal displacement and loss of income, deepening the gaps in educational attainment as children were pulled from school (Glennester, Kremer, Mbiti, Takavarasha, 2011). Girls' schooling is particularly sensitive to fees, and boys are more likely to attend secondary school as compared to girls (Glennester et al., 2011; Alderman & King, 1998).

Furthermore, women in Kenya have limited opportunities to engage in and hold political and economic positions of power, such as managerial or leadership positions and their wages are often significantly less. In Kenya and Africa as a whole, partly because of cultural beliefs that have socially divided gender roles certain professions are still classified as masculine or feminine (Wanjala, 2011). Despite the upsurge of women's social movements in the 1970s and 1980s, many of which arose after the Third Conference on Women that the United Nations held in Nairobi in 1985, aimed at promoting gender equity in all paradigms of life, including occupations, many stigmas still surround certain professions. Although Kenya often touts itself as the most advanced country in Eastern Africa, and much rhetoric about gender equity, the role of women in Kenyan electoral politics remains very low – even by regional standards. The percentage of female members in the national Parliament serves as one of the most

direct indicators: Parliaments in all neighbouring countries in the East African Community comprise a female membership much greater than Kenya's. Rwanda has 48.8%, nearly achieving parliamentary gender parity and Tanzania has 16% participation by female members (Okumu, Adhiambo-Oduol, Ombati, Kamau Okoiti, 2008). In 2002, Kenya, by contrast, Only had 7.3% female participation and has only marginally improved to 10.4% in the (2007-2012) parliament (Kariuki, 2010), and only ten of Kenya's sixteen female Members of Parliament (MPs) had actually been elected, the others were among those member's of parliament that were nominated by political parties after the 2002 elections (Okumu et al., 2008). "In many respects, Kenya likes to see itself as the most advanced country in East Africa. With regard to gender equality in politics it surely is not; instead, it trails behind all others" (Okumu et al., pg. vi).

Although women are major actors in Kenya's economy, particularly in agriculture and the informal business sector, men dominate the formal sector (Ellis et al., 2007). Most women in Kenya are concentrated in low paying, low status occupations with poor benefits and carried out under poor working conditions and therefore hold very little prospect for poverty reduction and upward mobility. On the other hand, the majority of the women in the rural areas spend a great deal of time on low productivity work which has created major income disparities between men and women (Suda, 2002). In Kenya, women contribute up to 80% of the agriculture workforce yet only hold 1% of registered land titles in their names and around 5-6% of registered titles held in joint names (Kenya Land Alliance, 2002). Development projects also have the tendency to focus on promoting businesses or roles for women that have the tendency to reproduce

stereotypical gender roles, whereby women often partake in the production and sale of clothing, food products and handicrafts in already saturated markets (Suda, 2002; Creighton & Omari, 2000).

Unfortunately, those who work in the agricultural sector are usually engaged as casuals. Women's overall lower level of education, limited skills, and access to productive resources, heavy domestic workload, cultural attitudes and segregation of the labour market are some of the factors associated with their limited participation in the modern sector (Kamau, 2010; Ellis et al., 2007; Suda, 2002).

Women are also disadvantaged when it comes to owning land and obtaining land rights despite changes to the constitution legally allowing them permissions to land ownership. It was established in Kenyan court in 1971 that the U.K. Married Women's Property Act of 1882 applies in Kenya as a statute of general application. The principle is thus established in Kenyan law that spouses have equal rights in ownership of property. The principle appears to be clear under Kenyan law: even women in customary marriages have equal property rights in the matrimonial property; however the application of this principle in practice is less clear.

In Kenya, customary laws and policies as well as earlier laws restricted women from access to land, and failed to recognize the complexity of women's relationship with the land and excluded them from right to ownership and access (Ellis et al., 2007). Kenya's formal tenure system, introduced by the colonialists, is based on statutory registration and ownership of individually demarcated plots. But only a minority of land has been adjudicated and individual titles issued, mainly in urban areas (Ellis et al.,

2007). In other areas of the country, the lands are typically held under various systems of group tenure (including customary law tenure and group ranching systems), or is owned by the state (e.g. trust land, reserves, conservation area, government land). The formal laws previously regulating the land market did not prevent women from owning land, but in reality they own very little of it. It is also noted that when women do own land or have rights to the land, their plots are often less than half of the size of men's (World Bank, 2007). There are several reasons contributing to this predicament. Under customary law, there is a general principle that a husband should manage his wife's property, whether acquired before or during the marriage. As such, a married woman can use matrimonial property, but is not permitted to sell or manage it anyway she likes without her husband's consent (Ellis et al., 2007). Overall, culturally-sanctioned and structurally-reinforced gender roles tend to foster power imbalances that inhibit women's ability to participate actively in public and economic life in Kenya (Ellis et al, 2007; Creighton & Omari, 2000).

#### **3.8.4 The New Constitution and What it Could Mean for Kenyan Women and Development**

On August 4, 2010, Kenyans voted overwhelmingly in a national referendum to adopt a new constitution to replace its problematic 1963 independence-era Constitution. The referendum drew about 70% of the country's twelve-million registered voters (Kramon & Posner, 2011). The process was a culmination of efforts that began two and a half years earlier when UN secretary-general Kofi Annan negotiated a resolution to the violent conflict that followed the disputed December

2007 general election. The new constitution aims to reduce the power of the executive, devolve authority to subnational units and formally guarantee a host of economic and social rights to women, minorities and marginalized communities, and try to diminish the role that ethnicity plays in the country's affairs (Kramon & Posner, 2011; Akceh, 2010). The new Constitution, 'guarantees' women unprecedented rights and protections, which they previously were not afforded. For example, the new Constitution tackles gender inequalities by improving marriage, inheritance, and land-ownership rights for women and by mandating certain minimal levels of female representation in national and county assemblies. It also explicitly extends special economic and social rights to other vulnerable groups including seniors, young people, persons with disabilities and members of certain traditionally marginalized ethnic, religious, or cultural communities. It is anticipated that the devolution of power to the counties will make a tangible difference as well by providing for greater equality in the allocation of resources across localities (Kramon & Posner, 2011; Akech, 2010). Table 6, highlights changes to the Constitution which afford Kenyan women basic rights over land tenure, their children's citizenship, education, and health among other 'gains'.

While these advancements are to be commended, 80% of the Kenyan population lives in rural areas where details of the new constitutional rights have not yet been publicized. Across much of Kenya, neither women nor traditional village elders, who mete out justice in their communities, are aware of these historic changes (Espinosa, 2012; Maingi, 2011).

Instead, the majority of Kenya’s people continue to live their lives under laws – both formal and customary, that operate untouched by the ideals enshrined in the new Constitution. This system, dramatically disadvantages girls and women, especially with regard to property rights (Espinosa, 2012; Maingi, 2011). For example, under the customary law of most ethnic groups, women very rarely inherit land from their fathers, or are permitted to be the sole administrator of her husband’s estate, and she usually can only continue to live on the land as a guest of male relatives (Espinosa, 2012; Ellis et al., 2007). Likewise, rural Kenyan girls are routinely pulled out of school and married off at an early age with their bride price sometimes paying for their brother’s school fees (Espinosa, 2012). Women, almost universally have less education than men, and they spend their days working the land. According to the FAO (2011), Kenyan women perform 49% of the agricultural labour, but women rarely hold secure rights to the land they till. The impact of this gap between the new Constitution and entrenched practices are prevalent across villages and towns in Kenya today. The rights for Kenya’s women and girls enshrined in Kenya’s new Constitution are in danger of becoming mere banal statements, exercised only by a meager few.

**Table 6:** Gains for Kenyan Women in the Constitution

Women will be able to pass on citizenship to their children regardless of whether or not they are married to Kenyans. Article 14 (1).
Parties to a marriage will be entitled to equal rights at the time of marriage, during the marriage and at its dissolution. Article 45 (3).
Parental responsibility shall be shared between parents regardless of marital status. Article 53 (1) (e).

Eliminate gender discrimination in relation to land and property and gives everyone including women the right to inheritance and unbiased access to land. Article 60 (1) (f).

The New Kenyan Constitution provides for the enactment of legislation for the protection of matrimonial property with special interest on the matrimonial home during, and upon the termination of the marriage. Article 68 (c) (iii).

To maintain a one third requirement for either gender in elective bodies giving women of Kenya at least 1/3 minimum in elective public bodies. Article 81 (b).

Gender equality is maintained in political parties providing a basic requirement for political parties as amongst other to respect and promote gender equality. Article 91 (f).

Parliament shall formulate law to promote the representation of women, persons of disabilities, ethnic and other minorities and marginalized communities in Parliament. Article 100.

Women and men will have the right to equal treatment and opportunities in political, economic, cultural and social spheres without discrimination. Article 27 (3).

The right to health including reproductive health to all. Article 43 (1) (a).

Adequate and equal opportunities for appointment, training and advancement for women and men at all levels within the Public Service Commission. Article 232 (i).

**Source:** FIDA Kenya, 2011.

<http://fidakenya.org/2010/10/gains-for-kenyan-women-in-the-constitution/>

### **3.9 The Conceptual Frameworks**

Taking into consideration the complex context, and the different aspects of the project, it is critical to examine the interplaying factors using multiple theoretical approaches which complement one another. The theoretical approaches which will inform the research include the Vulnerability Theory, the Society and Health Perspective, and are complemented by the conceptual framework for empowerment developed by Wallerstein (1992).

#### **3.9.1 Vulnerability Theory**

Vulnerability theory can be described with a tripartite explanation whereby entitlement, empowerment and political economy intersect to lay the necessary

foundation for well-being (Watts & Bohle, 1993). The “tripartite causal structure defines the space of vulnerability through the intersection of these three causal powers: command over food (entitlement), state-civil relations seen in political and institutional terms (enfranchisement/empowerment), and the structural-historical form of class relations within a specific political economy” (Watts & Bohle, 1993, p. 44). Chambers (1989) describes vulnerability as the exposure to exigencies and stress and difficulty coping with them. Vulnerability, therefore has two parts: “an external side of risks, shocks and stress to which an individual or household is subject; and an internal side which is defencelessness, meaning a lack of means to cope without damaging loss” (1989, p. 1). More granularly, Chambers (1989) defines the three basic aspects of vulnerability as: 1) the risk of exposure to crises, shock and stress, 2) the risk of inadequate capacities to cope with shocks, crises and stress, and 3) the risk of severe consequences and the risk of slow or limited recovery (resiliency) from shocks, crises and risk.

Therefore, the most vulnerable people, groups, classes and regions are those most exposed to distressing incidents, have limited coping capability, and suffer the most from crisis impact and are constrained in the capacity to recover. Vulnerability then can broadly be described in terms of exposure, capacity and potentiality (Watts & Bohle, 1993). As such, the normative and prescriptive response to vulnerability is “to reduce exposure, enhance coping capacity, strengthen recovery potential and bolster damage control (i.e., minimize destructive consequences) via private and public means” (Watts & Bohle, 1993, p. 118).



Within the context of HIV/AIDS, issues of differential access to resources, can be applied to local-regional-global processes such as health, including HIV/AIDS, without ignoring the strong social, political, and economic forces, and not simply culturally determined patterns of behavior across time (Packard & Epstein, 1991). The vulnerability perspective also explains the general ineffectiveness of AIDS prevention programs as the result of an unwillingness to move beyond simplistic approaches which concentrate on individual sexual behaviour rather than economic, social and political contingencies which make certain social groups more vulnerable than others. The reality is that risky behaviour is much more intricate and complicated. “In fact, behavioural interventions based solely on information and reasoned on persuasion are insufficient to produce risk reducing behaviour change among vulnerable social groups” (Oppong, 1998, p. 438). Conventional prevention programs including education are ill-focused because they do not concentrate on issues of vulnerability and poverty (Kalipeni, 1997). Expecting individuals to abandon behaviours which are pleasurable, and provide immediate gratification is unreasonable, especially when it provides them with income or power, even when these behaviours pose unacceptable personal, family and community health risks (Kalipeni, 2000; Oppong, 1997).

Poverty and gender play vital roles in limiting the number of resources available, leaving certain social groups increasingly vulnerable. Kalipeni et al. (2004) argue that women in particular are more affected - jobs are scarce, resources such as government training projects or agricultural extension services are either non-existent or directed toward men, and local income-earning opportunities are unavailable. Further, scarce

job opportunities for men means that migrancy is high among many SSA countries leaving their wives and families increasingly vulnerable to risky behaviours in order to survive. “In short, vulnerability, whether it be that of an individual or a country has a lot to do with the well-being of members of society. Individuals in certain social groups are more vulnerable than others. Poorer countries can ill afford the provision of employment and health care facilities” (Kalipeni, et al., 2004, p. 308).

Vulnerability theory also has it that adverse life circumstances such as hunger and disease do not affect social groups homogeneously, which also means that gradients of risk are present within groups (Graham & Der, 1999). For instance, while all individuals are biologically susceptible to health risks, particular social and economic determinants place certain individuals and groups at increased vulnerability (Parker, 1996). Hence, in order to prevent the spread of disease, particularly HIV/AIDS in SSA, it is imperative to attempt to improve living conditions for as many individuals as possible. Providing opportunities for women to prevent them from turning to risky behaviour for economic survival may be as important as any education measure in the fight against HIV/AIDS (Kalipeni, 2000; Opong, 1997).

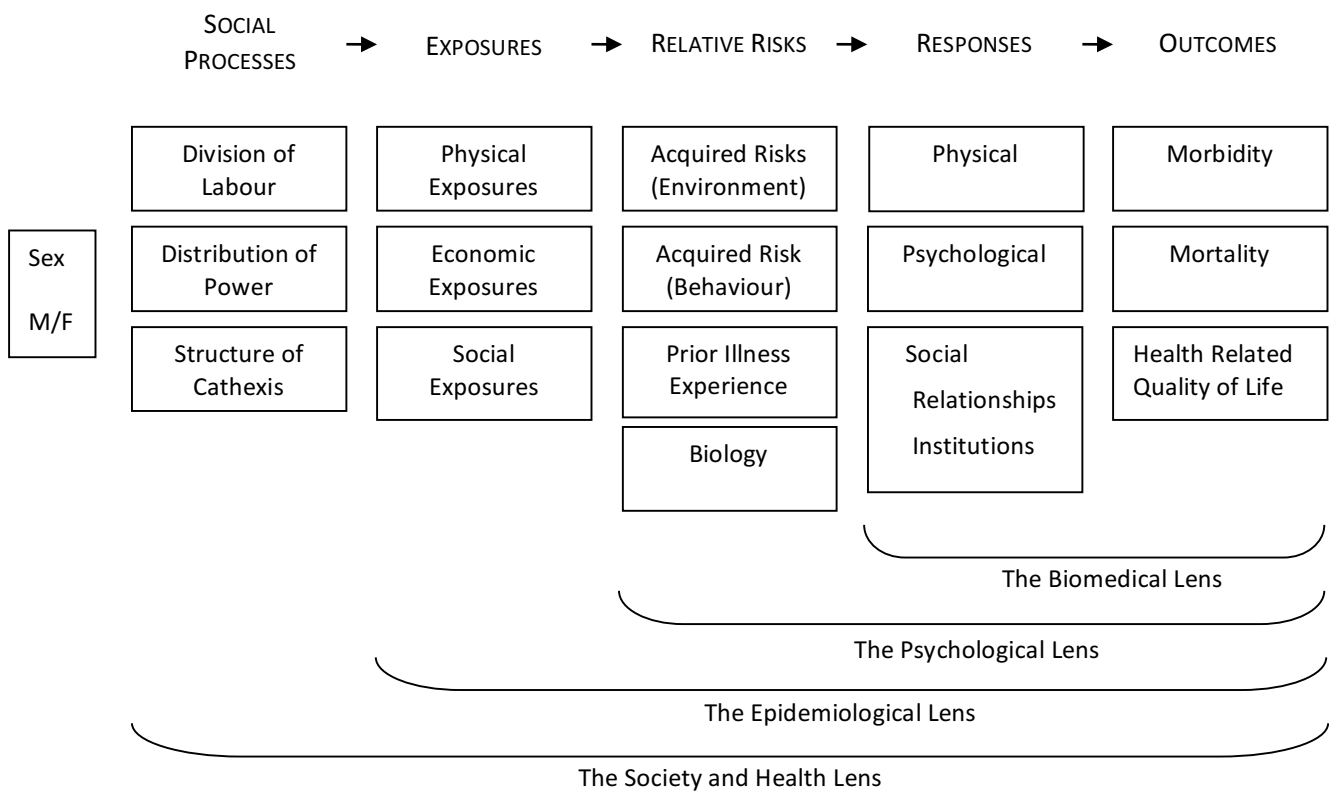
It is anticipated then by implementing a community health and development project such as this which has a concentrated focus on addressing issues of vulnerability and poverty may potentially have a long-term impact on decreasing health risks determined by the tripartite factors and work toward reducing risk and incidence to exigent exposures, while improving the capacity to cope and increase the potential for resilience.

The project provides an opportunity to not only curb rates of disease and reduce vulnerability in the current adult generation, but also can impact future generations. Many cultural practices and traditions have fallen away due to broken economic, social, and educational processes in SSA, the introduction of Western practices, and the urbanization of communities, particularly as a result of the HIV/AIDS pandemic. Consequently, many children have been left orphaned and families are trapped in the enduring cycle of poverty as a result of losses in knowledge transfer between generations. The women, now capable of transferring acquired knowledge and skills to future generations, will enable the most vulnerable to improve their quality of life, and potentially their health. For this reason, it is also imperative to incorporate a community perspective to health.

### **3.9.2 Society and Health Perspective**

While the society and health perspective was originally proposed as a theory for macro-level analysis, it will be utilized at the micro-level (community level) to investigate and uncover complex processes which determine health outcomes in subordinate groups (e.g. Horne, Donner & Thurston, 1999; Dedobbeleer et al., 2004; Chen et al., 2005). Complementing the vulnerability theory is the construct put forth by Walsh. Proposing a 'society and health lens', Walsh (1995) attempts to analyze cultural, social, economic and political processes in society that produce differential health risks in women and men (Figure 5). A distinctive feature of this perspective is its emphasis on how health concerns, responses to risk factors, signs and symptoms as well as the social

construction of knowledge about health are predetermined and constrained by mechanisms of social control and distribution of resources and power (Walsh, 1995). The argument is that epidemiological research on gender and health overlook the systems of social stratification which “allocate resources and power on the basis of gender-determined social roles and leaves the underlying social processes unidentified, unquestioned and unexplored” (Walsh, 1995, p.149). Adopting various aspects of a society and health perspective means raising questions about how social structure may affect personal choice and health.



**Figure 5:** Alternative disciplinary lenses for analyses of relationships between gender and health

Source: Walsh, 1995.

### **3.9.3 Empowerment as a Means for Improved Health**

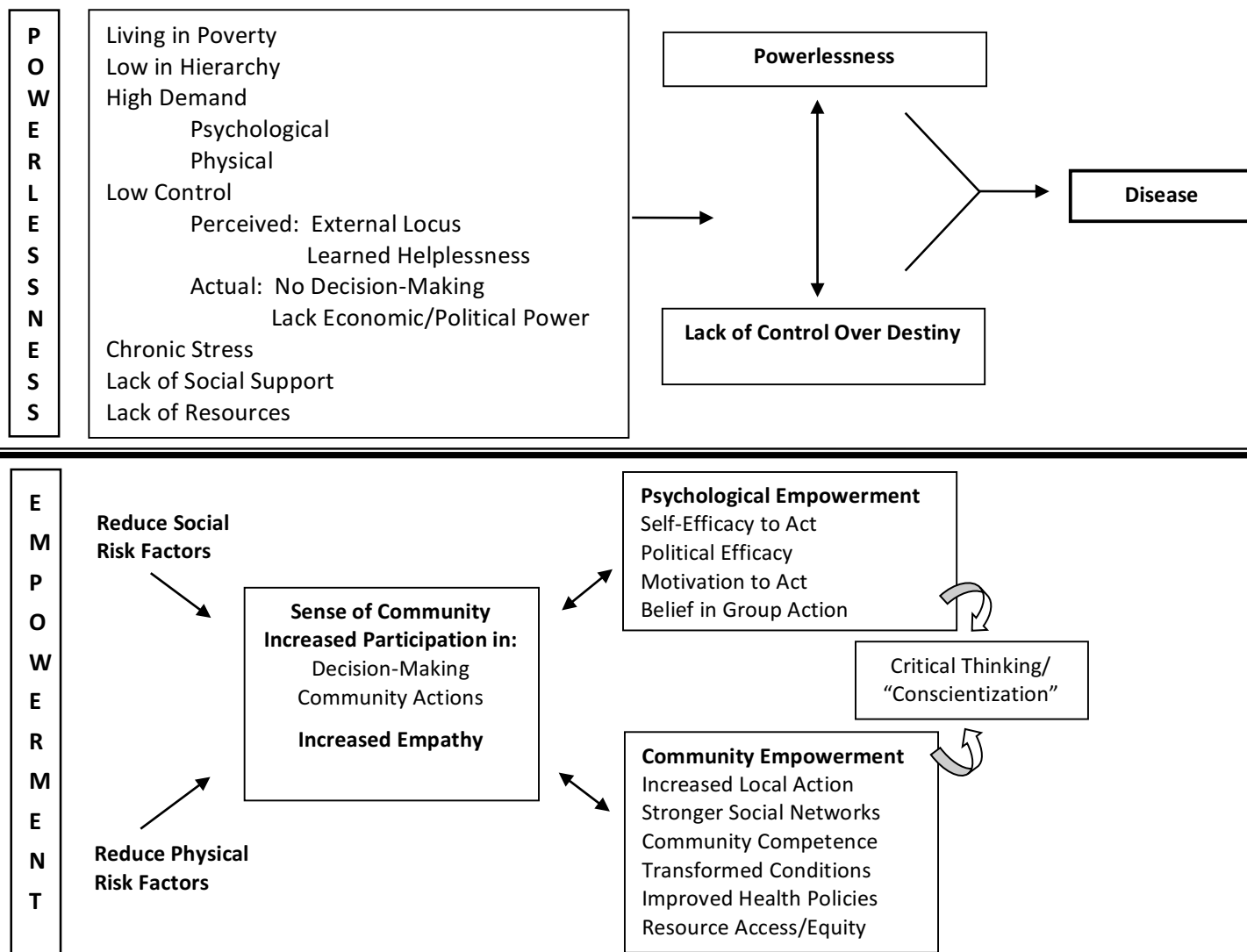
The Delphi panel of experts have identified 'empowerment' and 'community participation' as significant societal level 'process indicators' of health promotion, and over the course of the last two decades numerous international organizations have published documents focusing on empowerment as a central theme of health and human development. Some of these documents include, the Alma Ata Declaration (1978), the CEDAW/UN, Beijing Platform of 1995, Beijing+5 Review in 2000, and the Calcutta Declaration on Public Health (2000).

In order to create more gender equality, alleviate poverty, and improve health among women in both urban and rural settings, women's empowerment is a critical component. As a process, empowerment is a change in power relations that is both multi-dimensional and interlinked (Mayoux, 2000). The process required for such empowerment includes several elements in different spheres of life, each one a step to the next: a) acquiring power within - enabling women to articulate their own aspirations and strategies for change by developing self-worth a belief in one's ability to secure desired changes and the right to control one's life; b) developing power to - enabling women to develop the necessary skills and access the necessary resources to achieve their aspirations; c) developing power with - enabling women to examine and articulate their collective interests, to organize to achieve them and to link with other women's and men's organizations to influence social change in order to create a more just social and economic order; d) gaining power over - changing the underlying inequalities in power and resources that constrain women's aspirations and ability to

generate choices and exercising bargaining power in order to achieve them (Mayoux, 2000; UNFPA, 2008).

Furthermore, it is argued that initiatives seeking gender equity, including women's health development, ought to focus on empowerment of women through leadership development, equity education, and mobilization of resources in order to promote health and quality of life. Women's empowerment, which leads to community empowerment, should be a focal point towards achieving effective health (Figure 6). There are at least four pragmatic rationalizations for empowering women to achieve better health for all: 1) despite a longer life span, women experience a greater burden of disease, health risk and abuses; 2) women are the primary care givers in all families particularly in the developing world where they are also the only care givers to children and the elderly; 3) women spend their discretionary money and time on means to improve health and quality of life for their children and family; 4) targeting women for education and training results in enhanced health benefits for their families. Hence, empowering women has a positive effect on the health of women, but also results in improved health status of their families and communities. Therefore, the goal of empowerment (women's empowerment and community participation) is to enable the powerless to take proactive actions to improve their quality of life.

**Figure 6:** Schematic Representing 'Powerlessness' as a broad based risk factor for disease; and 'Empowerment' as an important promoter of health.



Source: Wallerstein. 1992

### **3.10 Chapter Summary**

This chapter makes a strong effort to provide a comprehensive narrative of the HIV/AIDS epidemic in Sub-Saharan Africa, Kenya and Nyanza province and to situate the need for a community based health intervention. The chapter outlines the the link between food insecurity and HIV/AIDS, the importance of micro and macro nutrients, defines probiotics and their mechanisms of action and then moves on to discuss gender and development and the theoretical underpinnings to be used to conduct the research.



## CHAPTER IV

### Materials & Methods

#### 4.1 Introduction

The previous chapters describe the research objectives and outline the theoretical frameworks that will be used to inform the research. The complexity of the epidemiologic and socio-cultural processes involved in this research warrants the use of mixed-methods, making use of both qualitative and quantitative data collection techniques and analysis.

In relatively recent history, there has been a push towards pragmatic research – combining quantitative and qualitative research, as a new guiding paradigm (Morgan, 2007, Onwuegbuzie & Leech, 2005) whereby there is an emphasis on '*shared meanings and joint action*' (Morgan, 2007). A greater methodological diversity is needed to uncover the multiple meanings of events (McKendrick, 1999). This turn in approach has arrived just as those involved with health research have begun to realize that the dominant orthodoxy of the 20<sup>th</sup> century has been unable to satisfactorily provide findings explaining the lived 'realities' of their research subjects or to inform and influence important healthy policy decisions. Alone, the cause and effect theory (epidemiological/positivistic approaches to health) outside the single agent theory has largely failed. The expectations of the positivist model are as narrow as the findings produced by that model, therefore leaving the rest to alternative methods.

The refocusing of health geography and public health on the importance of place, culture, and more generally social factors and the current trend towards combined research philosophies synergistically lend themselves to one another.

## **4.2 Methodological Approaches and Methods**

Selecting appropriate research methods depends greatly on the questions being asked (Elliott, 1999). As such, the research objectives played a major role in determining the chosen methodological approaches. Broadly, the key purpose of the research was to document if the probiotic yoghurt does indeed increase CD4 cell counts, improve health and quality of life, while also examining the health, social and economic impacts the project conferred to the 'Yoghurt Mamas'. Examining the first objective, there was a need for a baseline epidemiological study to determine and evaluate the health and nutritional benefits of the probiotic yoghurt with a specific focus on increasing the levels of CD4 cell counts, malnutrition, diarrhoeal episodes and bacterial vaginosis, as well as improving quality of life. It was also important to document the presence/absence of other common ailments, previously identified in this population, which can potentially be alleviated by the probiotic yoghurt. Although this area is greatly afflicted by HIV/AIDS, malnutrition, and poverty, there is a limited amount of literature specifically focusing on this area. National studies commissioned by para-statal government bodies in collaboration with international organizations (e.g. WHO, Measure DHS, etc.) typically provide an overview of national conditions, but do not explore specific circumstances or establish context specific actions to improve

conditions. A mixed methods study design best suited to collect some of this information given that there is little on the area.

Therefore, a combined methods approach, comprised of an epidemiological study (questionnaire survey) and in-depth interviews were used to collect the necessary data for the first and second phase of the epidemiological study. Using an explanatory sequential design, the qualitative results assist in interpreting, explaining and contextualizing the findings from the quantitative study that would otherwise be quite narrow (Creswell, 2014). A primary disadvantage of using interviews after the survey is the time required to design and conduct separate tailored instruments. An additional complicating factor with this design is the lack of overt linkages between the structured and unstructured responses (Driscoll, Appiah-Yeboah, Salib, Rupert, 2007). However, with this design the survey provided information on basic demographic data, nutritional information, anthropometric, biochemical and immunological measures, as well as prevalence of certain conditions within our sample population which could then be used to probe further. The in-depth interviews provided more detailed information on the factors which would have influenced the data (as collected in the survey), and the success of the project as a tool for development and a means of empowerment and improved health.

In summary, a questionnaire survey, interviews, and focus group discussions were the methods used to collect the necessary data for this dissertation.

### **4.3 Quantitative Study Design**

The epidemiologic study was developed by a team of professors at Western University, each from various relevant disciplines including Geography, Nutrition Sciences, Epidemiology and Biostatistics. The study was designed to draw participants from the Rachuonyo District Hospital (RDH) which has a catchment area of 300,000 people and it offers a Patient Support Centre for those afflicted with HIV/AIDS. Physicians working with these patients at RDH were asked to refer eligible participants for enrolment in the study. Within the context of the HIV/AIDS epidemic in Rachuonyo District, the baseline study was designed to obtain general participant information and data on three main issues. An equal number of subjects of each gender were registered, and the sample was ethnically diverse despite being in a primarily Luo region. Patients who met the eligibility criteria were referred to the residing clinic staff responsible for coordinating the enrolment process, where they were registered in the participant assignment log and randomly assigned to one of the study arms. Data collection for each of the groups began in October 2009 and continued until May 2010. Ethical clearance was obtained from The University of Western Ontario and the Kenya Medical Research Institute.

#### **4.3.1 Setting & Participants**

The structured interviews were conducted at three time points, and the survey captured information on socio-demographic data including gender, age, income, and family structure. Data were also collected pertaining to dietary intake through a food

frequency questionnaire, medication, and disease history. The survey obtained information on two main issues: 1) the magnitude of malnutrition, diarrheal disease, and urogenital infections in women and people living with HIV/AIDS in the sample; 2) perceived improvements in health and well-being and the utility of probiotic yoghurt in improving quality of life for those consuming it on a regular basis. The data collected evaluated the health and nutritional benefits of probiotic yoghurt with a specific focus on: increasing CD4 cell counts, reducing malnutrition diarrhoeal episodes and bacterial vaginosis, as well as improving quality of life. It was also important to document the presence/absence of other common ailments, previously identified in this population, which can potentially be alleviated by the probiotic yoghurt such as candidiasis, and abdominal pain among others (see Appendix B).

The study was originally designed to involve 400 participants from Kasipul district. The intervention group would be comprised of 200 participants – 100 men, 100 women and a control group (n=200), similarly divided. To be enrolled, the adults had to be HIV+ (as verified by their hospital issued Clinical Care Card) and between the ages of 18-65. Adult participants were enrolled in the program from three primary locations, Rachuonyo District Hospital (Voluntary Counselling & Testing Centre and Patient Support Centre), Ober Health Centre and the Community Kitchen, which also acted as yoghurt distribution points. All participants were served with portions of 200 mL of probiotic yoghurt daily, containing  $10^9$  cfu/ml of viable *L. Rhamnosus* Fiti.

The experimental design was constructed as an open-label randomized control trial, with n=200 randomized to an intervention group and n=200 randomized to a

control group. The open-label randomized study, is one in which both the researcher and the participants know which treatment is being administered. Fixed allocation randomization was achieved by using a simple or complete randomization design which demonstrates robustness against selection and accidental bias, and is conducive to achieving balance as the procedure generates similar sized-groups. Each block followed a 1:1 treatment allocation. Implementing this idea in practice, a random digit table on which equally likely digits 0-9 are arranged by rows and columns which were used to accomplish simple randomization. By randomly selecting a certain row (column) and observing the sequence of digits in that row (column) *A* can be assigned, for example, to those participants for whom the next digit is even and *B* to those for whom the next digit was odd. This technique produces a sequence of assignments that is random in order, and each participant has an equal chance of being assigned to *A* or *B*. This method is also relatively easy to follow and does not require a computer or software to generate the allocation.

To promote subject retention among the no-treatment control group, it was promised that probiotic yoghurt would be provided after the three month data collection period was completed. Additionally, since a placebo treatment or an alternative treatment was not possible, it was anticipated that the physiological markers which would be measured will diminish the placebo effect within the intervention group. In essence then, the potentially strong psychosomatic implications of the placebo effect would be better controlled for.

Baseline data collection started with all 400 participants a month before yoghurt consumption began. Training on how to complete the survey was provided to a group of research assistants who were proficient in both Luo and English and I was onsite to assist with the data collection processes and questions. Data was then collected at two subsequent time points for the women, giving a total of three time point measurements (baseline (1 month prior to yoghurt consumption - pre-intervention), intermediate (3 months after the beginning of yoghurt consumption - during intervention) and final (6 months after the beginning of yoghurt consumption - post-intervention)), while data on the male participants was only collected twice (pre and post intervention). The 3-month data wave spacing was based on the anticipated amount of time the probiotics would potentially need to begin taking effect, typically this can take a few weeks. Additionally, this timing coincided with participants' follow-up visits at the Patient Support Centre which would be convenient, reducing the financial and physical pressures of making additional visits to the hospital.

#### **4.3.2 Quantitative Data Collection**

The survey instrument contained questions on demographics, socio-economic status, dietary intake through a 24-hour recall, weight and disease history. Participants were also interviewed about the number of days they experienced diarrhoea, cough, flu/colds, and symptoms of fever. They were also asked to rate the severity of certain conditions due to gastrointestinal ailments (such as, abdominal pain, nausea, and diarrhoea). Other significant markers included measures of CD4 levels. Counts were

determined from blood samples drawn at each of the interview time points and were measured using conventional flow-cytometry in collaboration with the hospital's laboratory staff and medical lab. Samples were drawn as part of the participants' regular Voluntary Counselling & Testing Centre/Patient Support Centre visits and they were aware that CD4/CD3 counts were to be incorporated as part of the results. Participants had the option to refuse the use of their results in the study.

For all participants, the incentive for returning for follow-up visits was the probiotic yoghurt (which was served to the control group at the end of data collection). There was no monetary remuneration. All measurements were taken at the clinic.

#### ***4.3.2.1 Adults***

For this component of the quantitative phase, four hundred men and women (from a total of 400 recruited participants – 200 men and 200 women) from Rachuonyo District who are HIV+, and aged between 18-65 years were recruited for the study. The male and female groups were further divided equally into intervention and control. Two hundred men and women were allocated to the intervention and 200 were allocated to the control group. To be enrolled, research participants had to be attending the Patient Support Centre at the Rachuonyo District Hospital and taking their anti-retrovirals (ARVs). Participants also had to be on a regular ARV schedule during the three months preceding the study. There were no additional participant requirements.

For the duration of the study (six months), only participants allocated to the intervention group would receive probiotic yoghurt. Data was, however, collected on



both groups simultaneously and pre-intervention data collection began one month prior to probiotic yoghurt consumption. The men and women in the control group would begin yoghurt consumption after the six-month period of initial data collection. If a participant was hospitalized or failed to take their ARVs, the information was recorded to be factored into the subsequent analysis. The data that was collected on both men and women included (Table 7):

**Table 7: Data Collected on Men and Women**

	Men	Women
<b>Height and Weight:</b> Measured at each time point, and used to compute BMI. Patient Generated Subjective Global Assessment Tool, used to provide scores for the degree of emaciation.	•	•
<b>Frequency, Consistency, &amp; Presence of:</b> Blood/pus in diarrhoea, and other infectious illnesses at the different time points. Stool frequency was determined during the scheduled data collection periods, and was based on a 2 week recall.	•	•
<b>Presence of other illnesses:</b> Data collected on presence of illnesses, such as cough, TB, common colds, respiratory illness and length of any protracted illness.	•	•
<b>CD4 count:</b> Absolute CD4 T-lymphocyte counts, expressed as absolute concentrations (cells per cubic millimeter), were collected, one month before the beginning of the research and up to one month after its end, with 3-month intervals between them.	•	•
<b>24-Hour Dietary Recall:</b> Participants were asked for a 24-hour dietary recall (including a validated food frequency questionnaire) to determine food consumption patterns, and routine dietary intake of carbohydrates, fat and protein (macronutrients) and various micronutrients if applicable or known (in particular, vitamins A, E, C, zinc and selenium – all of which have been shown to be low in people living with HIV/AIDS).	•	•
<b>Quality of Life:</b> The quality of life was assessed using the WHOQOL - BREF instrument (WHOQOL, 1998). The instrument captures many dimension of quality of life.	•	•

<p><b>Urogenital Infections:</b> The women were asked about any history, and current symptoms and signs of vaginitis, bacterial vaginosis, yeast infections, and other urogenital infections (pain upon voiding or intercourse, frequency of urination, urgency, local itchiness, odour and redness, discharge, fever, blood in urine). The frequency of occurrence will also be assessed. Pap tests, and vaginal swabs were collected for laboratory analysis at each of the time points.</p>		•
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**4.3.3 Quantitative Data Analysis**

The analysis on the male and female adult data presents the results of the overall impact of the probiotic yoghurt on the intervention group as compared to the control group across the different time periods. In the estimation of treatment-specific rates, Kaplan-Meier analysis was applied to adjust for loss to follow-up. In extreme cases where two time point measurements were missing, censored cases (point censoring due to loss to follow-up) were removed from the analysis.

Bivariate analyses were used to determine the relative contribution of probiotic yoghurt for various measures of interest on health, nutritional status, and well-being. Additionally, chi-square was used to explore significant differences between the intervention and control group for characteristics of interest such as demographics and socioeconomic status. Numerous parametric tests, such as independent samples t-tests and several ANOVA techniques were used to determine the relative contribution of probiotic yoghurt to measures of weight gain, BMI, frequency of illness episodes, the prevalence of chronic symptoms, CD4/CD3 counts and to determine if there were any between and within consumer differences among the groups.

For CD4/CD3 counts, based on their skewed distribution, the natural logarithmic transformation ( $\log_{10}$ ) was used for the CD4 count, adjusted for age and CD4 initial values and analyzed by analysis of covariance (ANCOVA). All the analyses were run separately for each of the groups – men and women and the results are presented within their respective sections within chapter 5. IBM SPSS – Grad Pack Premium version 21 was used to conduct the quantitative analyses.

Confounders and effect-modifiers were controlled for as best as possible in the analyses. Participants were asked if they were consuming other products such as plumpy-nut, multi-vitamins, fortified porridge or participating in other projects which offer alternative supplements, medications or food supplements etc., which could have had an effect on the outcome of the study. With regard to effect modifiers, it is recognized that healthier patients were more likely to adhere to the daily requirement of consuming yoghurt on site at the distribution centers than less healthy patients. In these cases family members or friends were allowed to pick up and deliver the yoghurt to the participant. Of course, there were concerns surrounding this method of delivery as well (other individuals potentially consuming the yoghurt), however it was the most feasible alternative if a participant was unable to attend daily. Further, co-morbidities such as pre-existing conditions (TB, hypertension, and other chronic conditions) which can have an effect on the results were controlled for. Access to patient histories would permit designated and authorized clinic staff to record crucial information into the database on each participant. The results are expected to serve as an important starting point for reducing distress, improving health and nutrition as well as stimulating discussion around

implementing such nutritional programs for vulnerable populations through policy support.

#### **4.4 Qualitative Study Design**

Even though the questionnaire survey was useful in yielding essential data and capturing some of the physiological effects of the probiotic yoghurt, it was limited for understanding the issues that quite often lead to the conditions revealed in the survey – surveys lack the ability to highlight the complicated and interplaying factors that can impact one’s health, social and economic conditions, such as the context within which one might decide to stop taking ARVs or fail to attend a scheduled appointment. One of the most important aspects of this approach to inquiry is that the research, has the ability to add a richness and a depth to the quantitative data that is necessary to understand the contextual factors which contribute to the participants’ current and lived situations, and what strategies can be realistically employed to address them. The developed interview guides examined more effectively, by probing into the participants’ health experiences, the factors which govern their health, nutrition, and health management regimen within the context of HIV/AIDS and how the probiotic yoghurt may or may not work towards these factors which in turn impacts their quality of life.

The objective of this qualitative study is to build on the results from the epidemiological study using an in-depth analysis to examine the factors impacting the quality of life for those living with HIV/AIDS within the Kenyan context, and more specifically within the Rachuonyo District, which has one of the highest prevalence rates

in Kenya. It was anticipated that the findings may help to inform the development of increasingly comprehensive care models for PLWHAs that involve targeted food aid or nutritional supplements such as probiotic yoghurt.

#### **4.4.1 Research Methodology**

The second phase of the research consisted of semi-structured one-on-one in-depth interviews. Participants were recruited from the epidemiological study; a random selection of participants (n = 8) were asked if interested to participate in the in-depth interviews. Random selection for the qualitative study was important to avoid as much as possible a bias towards overselecting participants with a tendency to be more talkative and expressive, underselecting others or missing some in unknown subgroups altogether. While talkativeness and expressiveness are beneficial qualities and essential for interviews, it was key to also listen to those who may be less expressive under certain circumstances and potentially uncover new information. By randomly selecting participants (maximum variation sampling) a wider range of variation in the dimensions of interest would be represented in the responses (Hardon, Hodgkin, Fresle, 2004).

Those who agreed to participate were scheduled for an interview. Once the interview was completed, they were asked to provide the name of at least one other individual enrolled in the epidemiological that they thought would like to participate. Their referral was then contacted, asked whether they were willing to participate and scheduled for individual interviews at their convenience.

The study took place in Oyugis within the Rachuonyo District, with data collected using individual in-depth interviews (n=26) with participants drawn using the snowball sampling technique from the epidemiological study. The interview questions aimed at collecting participants' perspectives on the impacts and the effects of the probiotic yoghurt on their quality of life. Since the WHOQOL-HIV Bref is based on a scale/rating system, it does not allow for an in-depth understanding of the respondents' unique circumstances. Drawing from questions within the WHOQOL-HIV Bref and supplementing them with questions that probe into self-reported health and quality of life serves to establish a deeper understanding of the impacts of probiotic yoghurt. One of the advantages of the WHOQOL-HIV Bref generic instrument, is its ability to be used across different settings (it has strong transferability), and a clearer picture of quality of life can be gained. However, the instrument itself may not be sensitive to the types of changes resulting from the intervention since it is focused on assessing QOL in HIV and not the effects of nutritional support on HIV and the improvements gained nor does it take into consideration the contextual factors that would affect overall experience. Thus, while the WHOQOL-Bref provides an adequate snapshot of quality of life, with questions that "have been shown to display good discriminant validity, content validity and test-retest reliability" (WHOQOL, n.d., p.4), it is not context specific. As such, ecologically validated questions were developed using stable methods such as triangulation and respondent validation (e.g. Sarantakos, 2013) to assess the participants' perceptions of their circumstances and self-reported health as it pertains

to their quality of life. While the questions were tailored for the context, they were also designed to suit the six domains and facets of the WHOQOL-HIV Bref.

It was not very difficult to recruit willing participants to share their experiences. Ideally a sample of n=30 participants - both men (n=15) and women (n=15) were to be drawn from the treatment arm of the epidemiological study. Often, it is tricky to determine an exact sample size, however, consistent with Creswell (2007), “[t]his number should provide ample opportunity to identify themes of the cases as well as conduct cross-case theme analysis” (p.128). Additionally, Baxter & Eyles (1997) suggest that thematic saturation occurs when no new ideas arise in the collected data. Strauss and Corbin (1998) also suggest that theoretical saturation typically occurs between 10 and 30 interviews and when: 1) no new or relevant data emerge regarding a category; 2) the category is well developed in terms of its properties and dimensions demonstrating variation; and lastly, 3) the relationships among categories are well established and validated. Although saturation was reached at approximately 20 interviews, I felt that it was important to press on and conduct as many interviews as possible in the event that a new theme should arise, however efforts to interview additional participants were halted once it became evident that the point of saturation was reached.

The in-depth interviews were approximately 1 hour in length and were conducted off hospital premises in a private hotel conference/board room. The respondents might have felt uneasy about the anonymity of their responses in a private face-to-face setting, which also brings into question the validity of responses obtained from sensitive questions, however, it was expected that the participants’ responses

would be more open. The private setting would allow for direct and unguarded responses in an environment where they would feel at ease to discuss openly their experiences with the targeted food aid, their lives and experiences in the absence of others (peers). The atmosphere was relaxed and encouraged candid conversations. All interviews (n=26) were conducted personally with the same translator to ensure that all concepts were articulated the same way and that all ideas would be translated the same way. While the objective of face-to-face interviews is to generate conversation, from which insights are developed, it was critical that ideas, concepts and responses were explained unvaryingly to maintain quality control. The interviews were digitally audio recorded, and were conducted in locations that were quiet and convenient for the participants such as the office of the closest health clinic, and community based conference facility.

Of the 26 participants interviewed, all were enrolled in the larger epidemiological study and taking ARVs. The age, gender and other socio-demographic distributions of the participants are summarized in Table 25. These interviews expanded on issues identified in the WHOQOL-BREF (Quality of Life) portion of the questionnaire (see Appendix B and C).

The last segment of the dissertation explores the last two objectives using in-depth interviews and focus group discussions to examine the economic, social and health impact of the project on the empowerment of women and their immediate families and improvements in quality of life (if any) resulting from participating in this community based health and development project; as well as the perceived barriers to project



implementation and development in the context of power dynamics, gender roles, family and community relations. The research methodology and the data collection techniques used are described below.

#### ***4.4.1.1 Exploring Economic Empowerment and Health: Research Methodology and Data Collection***

The women operating the project from the Orande (n=15), Baraka (n=17) and Besigre (n=13) Women's Groups participated in this component of the research (n=20) and had taken on the initiative since the summer of 2009. In addition to interviewing the yoghurt mamas, some of their husbands (n=5) from each group, and informants in key positions (n=3): the project manager, the public health officer (PHO) (a local partner who had worked extensively with the women's groups prior to their group participation and was involved in the selection of these women's groups for the project), and the community development officer (CDO) were interviewed. The project manager and public health officer had been part of the project since its inception in 2007-2008 and were interviewed in order to probe their perceptions of the project within the community and to explore some of the other inter-related themes that could affect women's empowerment and barriers to improving health and developing their social and economic capacities. All participants, with the exception of the project manager, PHO and CDO were interviewed on the basis of parameters such as age, education, marital status, health, social status and household income. This last element (household income) was assessed on the basis of the average financial resources available at the household level.

Many of the themes which surfaced within the in-depth interviews warranted further investigation, as such the in-depth interviews were further augmented by two focus group discussions (n=34) aiming to more deeply explore some of the challenges the groups were facing. Direct quotations from the transcribed interviews are used to illustrate the emergent themes, and serve to frame and categorize the responses thematically.

#### **4.4.2 Qualitative Data Analysis**

The ensuing one-on-one interviews and focus group discussions were manually recorded through note making in real time, and were also digitally audio taped. The audio taped data was transcribed by both the translator and myself, and subsequently compared to the transcribed field notes to ensure that the information from the interviews was complete and there are no gaps in the data. The information was analyzed in NVivo, which will allow for theme identification as well as cross-case theme analysis (Creswell, 2007). Each participant was entered as a separate case, and their characteristics were entered as attributes. Data was coded into themes using a mix of *a priori* and emerging codes. An attribute summary was generated in order to create a description of participants. Various simple and matrix queries were run to investigate any relationships which may exist between themes and attributes related to the participants. Direct, anonymous quotations were also used to demonstrate the themes presented by the participants. Through data reduction, interpretation, and synthesizing the findings,

gaps and connections will be uncovered. The analysis will facilitate the observation of themes, any existing relationships between themes, and identify potential concepts.

## **4.5 The Fieldwork: Practical Considerations**

This section describes some of the practical considerations taken into account prior to conducting the fieldwork and *in situ*, especially the factors which could have potential impacts on the outcome of the research and how they could be overcome. The issues explored here relate to the positionality and reflexivity as well as the insider/outsider status of the researcher and how these factors can influence study finding and outcomes.

### **4.5.1 Positionality & Reflexivity in the Research**

Researchers have often been called on to recognise and understand their 'own positionality' (Jackson, 1993, p. 211), to delve into the 'politics of position' (Smith, 1993, p. 305), and consider these aspects of qualitative inquiry reflexively (Rose, 1997). The work of feminist scholars and other critical geographers emerges as the crucial body of work highlighting the importance of reflecting critically on the multiple positionalities of the researcher (Anderson, 1998, Kobayashi, 2003, Mohammad, 2001, Vanderbeck, 2005) and the need to think through how various identities may influence and shape research encounters, processes and outcomes (Hopkins, 2007). For example, Valnetine (2002) and Vanderbeck (2005) reflect on the ways in which constructions of gender and sexuality influence and shape research encounters. Archer (2003) and Mohammed

(2001) also discuss the complexity of ways in which the race and ethnicity of the researcher determine the structure of everyday interactions and when doing research. By the very nature of the project structure (the North-South relationship, funding arrangements, my role as the researcher and 'project representative' from the West) and the combined methods approach of this research calls for an increased awareness and self-reflexivity about - my relative influence, the politics of positionality, power dynamics and relations. Therefore, in enabling research *for* women and with women instead of *on* women, and research with men within this specific context, greater self-reflexivity in the social construction of knowledge, and increased self-consciousness about power relations embedded within such social constructs is warranted. It is also important that the portrayal of their lived realities and experiences are not reduced to being average or disempowered and universalized (Mohanty, Russo & Torres, 1991) so as not to pronounce the social distances of location, class, nationality and language which separate myself (researcher) and researched (Mohanty, Russon & Torres 1991) which is a problem often encountered within the development field.

Further to this point, women and men as groups are not homogenous with one unified voice (Henwood & Pidgeon, 1995). Even within what would appear to be a similar group of women, there can be significant differences (e.g. one can be a woman and of Luo descent, and have grown up in an affluent neighbourhood, whereas her counterpart who is also of Luo descent, and belongs to the same 'group' grew up in a poor neighbourhood), these realities then threaten the idea of a single or universal experience (Narayan, 1987). There are many differences that divide women and men

(Narayan, 1987) even within the same identity group, often having different experiences and simultaneously belonging to multiple identity groups.

These arguments also suggest an opposition to the traditional positivist ideologies of reliability, neutrality and objectivity in research which need to be considered even when undertaking the quantitative research. Positivism depicts the researcher as an impartial scientist who maintains a distance from their subjects, which leads to neutrality and unbiased processes, results and outcomes (Mohammad, 2001). However, such a disembodied vision of the research can be considered a shortfall in understanding how the interaction of the researcher and the researched work to shape the results and outcomes. For example, it could be very easy for a research participant to overstate the benefits of the probiotic yoghurt and embellish on self-reported health improvements even within the quantitative component of the study. Within highly regarded randomized control trials also (the gold standard in 'objective' health research) testing the effects of different interventions depends to some extent on the value judgement of the investigators on the most suitable approach to test the impacts (Ozonoff, 1994). Therefore, all research is inherently influenced by value judgements, and one of the best ways of promoting objectivity, transparency, good policy and public trust is by declaring interests and values (Pelley, 2014). For example, by disclosing presumptions, conflicts of interest and clarifying the advantages and limitations of multiple interpretations of science, biases in research can be minimized, potentially also guiding a clearer separation between and science and policy.

In conducting research, while some of these issues can be reduced, others are exacerbated even when taking action on the above considerations; questioning the implicit ideal that research is free of power relations (Henwood & Pidgeon, 1995), and that the researcher can engage in the process completely subjectively or objectively (Morgan, 2007). As such, throughout the research process I tried to be greatly reflexive and conscious of the problems stated above in order to minimize issues surrounding ethical and cultural concerns. Also, in trying to provide an objective assessment and representation of one's lived experiences it is important to consider the perceptions of the researcher as an insider/outsider and how that can work to shape the study findings.

#### **4.5.2 Insider or Outsider?**

In trying to assess and represent the lived experiences of the research participants, the researcher's insider/outsider status is another important factor to consider. In conducting qualitative research, the success of the engagement depends greatly on the insider/outsider status of the researcher (Mohammad, 2001). The insider/outsider boundary defines group belonging and determines criteria for inclusion and exclusion (Mohammad, 2001). For instance, class, race, age and gender are important variables in determining group belonging.

A researcher can either be considered an insider or outsider, and each position holds with its advantages and disadvantages. This position or status presents opportunities and obstacles during the data collection phase. Unable to shed my outsider status, and with a particular naivety to local issues, it was critical to improve my

positionality and develop improved rapport and trust. A significant amount of time in the field was spent interacting, daily, with the yoghurt mamas, research participants and locals. This allowed for a fuller and more complete picture of their realities and a greater appreciation of their experiences to be gained. This increased understanding and enriched the findings. However, there were times that my outsider status led to me becoming an insider in some respects. It was often, that I found myself straddling this fine line, and what it meant in the field – adapting. The dynamics of this insider/outsider status are explored:

a) **Past experiences** as a researcher and intern with WHE in Mwanza, Tanzania with similar research, institutions and groups was an essential asset in the field. From my experiences - working with women's groups, the National Institute of Medical Research, government officials, conducting a small randomized trial and several qualitative studies on project sustainability, focus groups and economic empowerment and health, I was able to draw on these past experiences to establish my credibility, but also my sincerity about the project, was able to network more effectively, and avoid some of the pitfalls encountered with earlier research (e.g. knowing which concepts were easily understood/part of the culture). By mentioning my previous experiences with the project when introducing myself to research assistants and interviewees this helped to establish my credibility as a researcher. Additionally, my continued involvement with the project since 2006 established my sincerity and seriousness for the work which was critical in gaining trust and acceptance in the

revolving door environment of development work. Furthermore, having prior experience in the field meant that I had a well-developed sense of how things operate on the ground, with business, but especially within institutions and government. This was an essential asset in the field to manoeuvre through the bureaucratic policies and develop a network of contacts that could assist with project and research activities.

b) ***The politics of skin colour and being female*** often worked against my insider status, but being a white female also carried advantages that others may not have had – the exoticness of ‘the other’ and the prestige it held to be seen with a ‘young’ white foreign female (particularly among male professional circles) gave me a chance to become an insider in many cases which afforded me opportunities that I otherwise would not have had. Preferential treatment was typically the norm in government offices, private institutions, and professional circles where I was able to gain a rare glimpse into behind closed door issues, discussions and activities. These experiences benefited my understanding of general protocol amongst certain groups, the bureaucratic processes - either official or non-official, and socio-cultural practices which enabled me to operate more effectively in the field and collecting data based on these observations. As a female I was able to bond with the yoghurt mamas and develop a good rapport with them which was crucial for collecting sensitive data about their personal lives.

c) ***Affiliation with the World Bank Development Marketplace Grant*** and the Kenyan branch of the project in general gave me an insider’s perspective of why some things



were the way that they were on the ground, why certain problems existed and the challenges that the yoghurt mamas faced. This allowed me to engage the mamas in discussions about existing conditions, which fostered a sense of inclusion in the decision-making processes which they respected. In turn, stronger ties were developed, bolstering my insider status. It was also easier for me to put their experiences into the proper context because of my knowledge of the project since the beginning of the project.

Being an insider afforded me several advantages; however, there were also drawbacks. There were times that my previous experiences and knowledge from Tanzania would make me want to guide the interview in a certain direction. For example, when the interviewee could not identify a specific ailment, they would proceed to describe it and I would make suggestions as to what it might be based on the common terminology used in Tanzania. Often, the research participant would concede and simply agree to my 'diagnosis'. I did not give them room to describe in detail, in their own words, the circumstances of their ailment. Despite both countries being located in East Africa, ethnic and cultural differences do exist. As such, physical ailments/conditions are described and self-reported differently. Fortunately, I became aware of this suggestive practice which was flawed and was able to corrective action for the majority of the interviews.

Furthermore, although I tried very hard to engage and immerse myself as an insider as completely as possible, it of course was impossible to maintain this status at all

times – inevitably, there were instances where the obvious differences – language, race, age, and socio-economic status, would make me feel like an outsider both in the field, but more importantly while conducting the research.

a) While the *politics of skin colour* were usually not evident during periods of data collection and interviews, my outsider status often became obvious during the course of other conversations when many individuals would use the phrase ‘you people’ – meaning westerner/foreigner. It was difficult to ignore this perception and I often wondered if this sentiment was coming out of malice and resentment or a lack of better language. Whether this is how most felt but were too polite to reveal this general sentiment is unknown, perhaps it was a common feeling expressed during the interviews but not being translated. Nonetheless, this phrase solidified my outsider status.

b) *My inability to speak the same language* was definitely a draw back. Using a translator and switching from question – translation – back translation felt impersonal and emphasized my outsider status. Sharing a common language would have helped to reduce the challenges associated with communicating in a second language and increased the understanding of nuances in the linguistics which most likely were lost in the translation even though field notes describing body language and vocal intonations were made. Communicating back and forth from English to Luo and vice

versa was a limiting factor when describing certain experiences even when the translator was proficient in both languages and had an extensive vocabulary.

c) Being a foreigner also meant that my lack of understanding of certain ***cultural concepts*** emphasized my outsider status. During several interactions a research participant would use a native Luo description to describe a particular life event, and even though the translator would interpret this accurately, my lack of knowledge about certain traditions created a gap between us. The translator and research participant would pause to discuss the details of the event, and then it would be explained to me. This worked very effectively at solidifying my outsider status.

d) Throughout the research process – both quantitative and qualitative, the project leader, the research assistants and I constantly assured participants that no matter how they responded to the questions there would be no negative impacts/effects on the project. It was hoped that with these assurances we would help to garner genuine responses. The ***affiliation (project and personal) with the World Bank Development Marketplace Grant*** cultivated a sense of fear among participants which on many occasions made me feel like an outsider. Some of the research participants were of the mind that if they did not respond positively about the effects of the probiotic yoghurt or the impacts of the project on the community they would lose the grant, the women's group producing the yoghurt would be changed, or the project would be pulled from the community.

Lastly, age did not seem to be a defining factor in the interviews that I conducted. Regardless of age, we (the translator and I) were able to develop a good rapport with all interviewees.

While the factors listed above made the fieldwork more challenging, the experience was very enlightening and enriching. This uneven research field compelled me to take a number of simple steps, to improve the research environment:

- I visited the hospital, more specifically the Voluntary Counselling and Testing Centre where most of our participants were recruited often introducing myself, engaging in conversations and answering their questions about the yoghurt and the project. Time was spent with the yoghurt mamas in the kitchen and the market, I visited their homes in the community, and held community events to generate awareness about the project. This helped to establish community relations and build trust and rapport with the community and participants.
- Whenever possible, either prior to beginning the interview process or during visits at the hospital and community kitchen, I assured participants that the project belonged to the yoghurt mamas and the community – it was there to stay as long as the mamas could keep the kitchen operational. The interview questions were a means to assess the impacts of the probiotic yoghurt which could lead to financial support to develop more projects around East Africa.

- Lastly, to improve my understanding of cultural concepts, for a fee, I visited a community elder who was willing to share with me his insights on Luo traditions. Typically, Luo traditions are very well guarded for fear that these practices will be exposed to the outside world. However, I was fortunate enough to have had this opportunity. From this experience I was able to learn some of the key words for these traditions which are prevalent within the community, what they signified and their importance. These words then acted as trigger words during the interviews and I could immediately identify and make associations between the word and the cultural concept being discussed.

#### **4.6 Methodological Reflections**

The research design employed different techniques in order to capture the participants' lived realities, and as will be shown in the proceeding chapters, it was a sound approach to follow. This is not to say that there were no limitations to the research design, but the approach taken was conducive. Further, the fieldwork exposed me to the need to recognize and re-examine my positionality throughout the research process, even when present for the quantitative phase of the research. Although supposedly objective, quantitative research is still influenced by power dynamics and other factors especially within this specific research context. It also became clear that insider/outsider status is not static, but fluctuates depending the day, activity at hand, and even during the interview. The research process, specifically the interview process

forces the interviewer to adjust constantly and acclimatize to the changing conditions. Being flexible and adaptive is critical to ensuring the success of the interview process.

## **4.7 Chapter Summary**

From the outset, the research methods used to collect the data were informed by the overarching objectives of the project. The objectives required the methods chosen to be receptive to describing each individual case as thoroughly as possible, as well as sensitive enough to capture their personal experiences. The chapters that follow will present the participant profiles, results of each of the studies, as well as the challenges and limitations of the study design, recruitment and retention process. Each study addresses the main objectives of the thesis. The next chapter will present the study findings from the epidemiological study.

## **CHAPTER V**

### **Results: Health, Nutrition and Quality of Life**

#### **5.1 Introduction**

This chapter presents the results from the quantitative study on women and men and the associated qualitative study assessing quality of life. The findings and themes that emerge from the quantitative and qualitative findings provide insights into a deeper understanding of how to improve quality of life within a resource-poor context with nutritional support. More broadly, the objectives of this chapter are to contribute to the current literature on the importance of nutritional support for PLWHAs and the broad impact this has on their overall well-being – physical, psychological and social.

#### **5.2 Quantitative Findings**

##### **5.2.1 Results: Adult Women**

The results presented in this section are based on a comparison of the adult female group who completed the questionnaire at all three time points, T1 - a month prior to yoghurt consumption beginning, T2 – the intermediary assessment, three months after commencement of the study and daily yoghurt consumption; and T3 – the terminal study which took place 6 months since participants began consuming yoghurt.

Based on an analysis of the sample, the mean number of people per household was 5.67 (SD=2.507), with the means for the intervention and control group being 5.47 (SD=2.497) and 5.97 (2.500) respectively. On average the participants were 40 years of

age (SD=9.522), with little difference between the two groups – the mean age of the respondent's in the intervention group was 39 (SD=9.409) and for the control 41 (9.610). The difference between the groups was also not statistically significant.

The proportion of females in the intervention and control groups as measured on the characteristics of income, marital status, education and employment were not found to be significantly different (Table 1). However, there are notable characteristics worth noting – a large proportion of women reported being widowed (55% of the total number of women). Additionally, there was no significant difference in the number of employed participants versus unemployed participants between the groups, although a greater number of women in the intervention group reported completing high school. Further to this, those in the intervention group were more likely to report not knowing their household income (Table 8). The most common occupation was farming, as 47% of the respondents reported being involved in subsistence farming, followed by those who reported being green grocer/cereal vendors (20%). Although, there was no significant difference between the groups in terms of vocation, there were a larger proportion of professionals (e.g. nurses, teachers, social workers) in the intervention group as compared to the control group.



**Table 8:** Characteristics of Women in the Intervention and Control Group

Characteristic	Yoghourt n (%)† N=88	Control n (%)† N=59	Test of Sig.
<b>Income*</b>			
Less than 10,000 Ksh	25 (28.4)	27 (46.6)	$\chi^2=.161$
Between 10,000 – 20,000 Ksh	19 (21.6)	9 (15.5)	
Between 20,000 – 50,000 Ksh	19 (21.6)	6 (10.3)	
50,000 Ksh +	13 (14.8)	9 (15.5)	
Don't Know/Refused	12 (13.6)	7 (12.1)	
<b>Marital Status*</b>			
Married or Living with a Husband	35 (39.8)	24 (41.4)	ns
Widowed	49 (55.7)	30 (51.7)	$\chi^2=.644$
Divorced/Separated/ Never Married	3 (2.5)	4 (6.9)	
<b>Employment*</b>			
Full-time	42 (47.7)	27 (40.2)	ns
Part-time	45 (51.1)	27 (46.6)	$\chi^2=.629$
Unemployed	1 (1.1)	4 (6.9)	
<b>Education*</b>			
No Schooling	7 (8.0)	4 (6.9)	$\chi^2=.447$
Some Elementary	33 (37.5)	23 (39.7)	
Completed Elementary	16 (18.2)	13 (22.4)	
Some High School	13 (14.8)	12 (20.7)	
Completed High School/College (Higher Education)	19 (21.6)	6 (10.3)	

\* Numbers do not add up due to missing values.

† Percentage within Treatment Group

### 5.2.2 Weight Gain & Body Mass Index (BMI)

A mixed between-within groups comparison was conducted to determine if there was a significant change on the participant's weight gain and body mass index (BMI), with the ability to monitor any significant changes across time. The analysis revealed that there was no statistically significant difference in weight [Wilks' Lambda=.897,  $F(1, 144)=1.011$ ,  $p=.316$ ], or BMI [Wilks' Lambda=.940,  $F(1, 137)=3.581$ ,

p=.016] between the control and intervention group for the women. Despite a lack of statistical significance, the mean values between the two groups reveal that there was a steady upward increase in weight for the intervention group for both weight and BMI. In comparison, the control group displayed fluctuations in weight gain and BMI – with a dip in values from T1 to T2 and then an increase again at T3. This suggests that the probiotic yoghurt may potentially be effective in increasing and maintaining weight and consequently BMI, and further research is warranted.

Examining the interaction effect between time and treatment group to assess the possibility of a change in scores over time for the intervention and control group, the statistics indicate that there was a statistically significant change in measures across time for weight gain [Wilks' Lambda=.911,  $F(1, 144)=6.961$ ,  $p=.001$ , partial  $\eta^2=.089$ ] and BMI [Wilks' Lambda=.939,  $F(1, 137)=4.417$ ,  $p=.014$ , partial  $\eta^2=.061$ ]. Additionally, the effect size obtained from the partial eta squared values indicate that yoghurt consumption over a period of time is quite strongly associated with weight gain and moderately associated with an increase in BMI. Table 9 presents a comparison of weight and BMI for the intervention and control group.

**Table 9:** Comparison of Weight and Body Mass Index (BMI) between the Intervention and Control Group across Time.

Characteristic	Time	Intervention vs. Control	N* (n=147)	Mean	SD	Wilks' Lambda	Partial $\eta^2$	Sig.
Weight (kg)	T1	Control	58	57.73	9.50	.897	.007	ns p =.316
		Intervention	88	58.05	9.92			
	T2	Control	58	56.67	9.72			
		Intervention	88	58.50	10.50			
	T3	Control	58	57.06	9.58			
		Intervention	88	59.88	10.27			
BMI (kg/m <sup>2</sup> )	T1	Control	57	21.48	3.17	.940	.025	ns p =.061
		Intervention	82	21.90	3.26			
	T2	Control	57	20.92	3.30			
		Intervention	82	21.98	3.56			
	T3	Control	57	21.07	3.26			
		Intervention	82	22.88	4.63			

\*Only cases with complete measurements across the three time periods were included in the analysis.

### 5.2.3 Nutrition

Most participants reported having two or more meals a day, 22% of respondents consumed at least two meals per day and 64% reported having three meals a day.

When asked about their personal perception of food and appetite the control group was more likely to report having poor or average perceptions of food and appetite while the intervention group reported having good and very good perceptions of food and appetite. The difference was also statistically significant ( $\chi^2=16.065$ ,  $p<.001$ ). This coincides with reported satiation, 48% of respondents in the intervention group stated

feeling full after eating most of their meal, whereas 51% of participants in the control group responded that they feel full only after a few mouthfuls – the difference was not statistically significant though.

Generally, there is a lack of variety in the participant's daily diet; however, respondents in the intervention group reported better dietary habits in the food frequency section. The intervention group was significantly more likely to eat a variety of fruits such as mango, pineapple, papaya, citrus fruits and watermelon, and to also consume okra and sweet potato leaves (a good source of Vitamin A) more often than the control group. Further, the intervention group was significantly more likely to consume more proteins through foods such as eggs, beef and chicken. The difference seen here may be due to altered behaviours as a result of being part of the intervention group and an improved understanding of the role of nutrition on health, or reporting bias.

More importantly, the majority of all respondents reported never consuming a serving of any dairy product over a period of two weeks unless they were part of the intervention group, leaving most, vulnerable to a multitude of micronutrient deficiencies and at risk for other ailments since there is a lack of variety in the diet, and the foods consumed are energy-dense rather than nutrient dense. Additionally, those in the intervention group were significantly more likely to report consuming other dairy products such as kefir and pasteurized milk in addition to the yoghurt ( $\chi^2=14.304$ ,  $p<.05$  and  $\chi^2=14.771$ ,  $p<.05$ , respectively).

#### 5.2.4 General Health, Well-Being & Quality of Life

To bring health, well-being and quality of life, into context, respondents were asked a series of questions from the WHOQOL- Bref questionnaire access to health care, and other health related questions. This international cross-culturally comparable quality of life assessment instrument measures the broad domains of physical health, psychological health, social relationships and environment. It assesses the respondent's perceptions in the context of their culture and value systems, personal goals, standards and concerns. The results from some of the comparisons between the control and intervention group will be presented.

Generally, at baseline, a larger number of respondents regardless of treatment group were more likely to report poor quality of life. However, by the completion of the study participants who were part of the intervention group were significantly more likely to report good quality of life ( $\chi^2=12.722$ ,  $p<.005$ ). Further, the amount of medical treatment required to function in daily life improved across the three time periods and between the two groups. At baseline, there was no significant difference between the groups in terms of the amount of medical treatment required to function on a daily basis. However, by the intermediary study, all participants in the control group reported the need for medical treatment – a significant difference between the two groups ( $\chi^2=9.947$ ,  $p<.05$ ). For those in the intervention group, the number of participants who required very much medical treatment to function in daily life decreased. By time 3, although there was no significant difference between the two groups in terms of the amount of medical treatment required, a one samples t-test determined that the

intervention (yoghourt) group required significantly less medical treatment by the terminal study (Mean=2.70, SD=1.116,  $t(87)=22.783$ ,  $p<.000$ ). Further, from time 1 to time 2 there was a noticeable difference between respondents in the intervention and control group with respect to the extent which respondents felt their life to be meaningful ( $\chi^2=7.642$ ,  $p<.05$ ).

There was also an improvement in perceptions of bodily appearance. The intervention group was significantly more likely to report being mostly or completely satisfied with their bodily appearance, at the intermediary point ( $\chi^2=11.630$ ,  $p<.005$ ) as compared to the control group. There was also an improvement from time 1 to time 3 within the intervention group although it was not statistically significant – 35% of the intervention group was mostly or completely satisfied with their bodily appearance one month before they began consuming yoghurt as compared to 48% by the end of the study. Additionally, there was a significant difference between the intervention and control groups at time 1 and time 2 when asked to respond to their satisfaction with their ability to perform their daily living activities – T1 ( $\chi^2=6.006$ ,  $p<.05$ ) and T2 ( $\chi^2=8.991$ ,  $p<.05$ ). A larger proportion of participants in the intervention group (40%) responded to being satisfied or very satisfied with their ability to perform daily living activities as compared to the control group (21%) once beginning in the program. The intervention group was also significantly more likely to report at baseline and the intermediary stage of the study that they were satisfied with their means of transport and perform their daily activities ( $\chi^2=9.694$ ,  $p<.05$  and  $\chi^2=7.317$ ,  $p<.05$ , respectively).

When asked about the satisfaction with support received from friends, approximately 43% of those in the control group and 35% of those in the intervention group felt either dissatisfied or very dissatisfied with support received from friends at baseline. However, the intervention group was significantly more likely to report being satisfied with the support received at the intermediary ( $\chi^2=11.971$ ,  $p<.05$ ) and terminal phase of the study ( $\chi^2=9.758$ ,  $p<.05$ ).

Lastly, there was no significant difference between participant's self-reported satisfaction with sex life at baseline. The participant's perception of this change over time though as the intervention group was significantly more likely to report being satisfied with their sex life at time 2 ( $\chi^2=11.971$ ,  $p<.05$ ) and time 3 ( $\chi^2=9.758$ ,  $p<.05$ ) as compared to the control group.

#### **5.2.5 HIV Serostatus, CD<sub>3</sub> and CD<sub>4</sub>**

Serostatus of the women indicated that among the intervention and control groups 42% and 64% were HIV+ and asymptomatic, while 58% and 36% were symptomatic respectively. Interestingly 50% of these women, both in the intervention and control groups were AIDS converted. There was no statistically significant difference between the intervention and the control group.

One of the key objectives of this study was to determine if probiotic yoghurt had a positive effect on absolute CD3 cell counts and consequently CD4 in the participants. An independent-samples t-test was conducted to compare cell counts for the intervention and control group. There was no significant difference in CD4 and CD3

counts between the two groups (Table 10) at the 95% level of confidence, time did not have an effect on the sample either.

**Table 10:** A Between – Within ANOVA Comparison for the Intervention vs. Control Group across Time for CD4 and CD3 in HIV+ participants.

Cluster of Differentiation Count	Time	Intervention vs. Control	N*	Mean	SD	Wilks' Lambda	$\eta^2$	Sig.
CD4	T1	Control	40	513.53	205.31	.975	.025	ns p = .292
		Intervention	59	472.31	235.05			
	T2	Control	40	514.80	225.84			
		Intervention	59	525.20	273.36			
	T3	Control	40	505.55	237.21			
		Intervention	59	530.98	247.27			
CD3	T1	Control	28	2128.79	997.73	.989	.011	ns p = .654
		Intervention	55	1684.04	662.62			
	T2	Control	28	1981.54	899.39			
		Intervention	55	1711.20	746.18			
	T3	Control	28	1914.04	747.00			
		Intervention	55	1742.76	628.42			

\*Only cases with complete measurements across the three time periods were included in the analysis.

Although there were no significant differences between the two groups for CD4 and CD3, there was an increase in the mean CD4 count between the groups, demonstrating a gradual increase in CD4 cell counts for the intervention group over time, whereas the mean for the control group did decline slightly. The same pattern can be seen for absolute CD3 cell counts, the control group began with higher overall cell counts,



however over time CD3 cell counts decreased. At the same time the intervention group showed a modest increase in the mean number of CD3 cells.

### 5.2.6 Infections, Chronic Conditions and Symptom Reporting

A comparison of the intervention and control group for vaginitis, bacterial vaginosis and yeast infections demonstrated that women who were in the intervention group were significantly less likely to report bacterial vaginosis ( $\chi^2=7.118$ ,  $p<.005$ ) and yeast infections ( $\chi^2=4.440$ ,  $p<.05$ ). Overall, women consuming the probiotic yoghurt daily (intervention), were less likely to be diagnosed with bacterial vaginosis and yeast infections. When taking *time* into consideration, a comparison across the three time periods indicates that women in the intervention group were less likely to be diagnosed with bacterial vaginosis at time 2 as compared to pre and post-intervention (Table 11). These data support findings from other studies where probiotics have been found to be beneficial in preventing bacterial vaginosis (Reid et al., 2008), while also reiterating the importance of taking probiotic yoghurt on a daily basis in order to continue experiencing the benefits conferred by the bacteria.

**Table 11:** Comparison of Vaginitis, Bacterial Vaginosis and Yeast Infection for the Control and Intervention Groups across the three Time points.

Urogenital Infections	Time	Control n (%) N=59		Intervention n (%) N=88		Test of Significance
		Presence of Condition				
		No	Yes	No	Yes	$\chi^2$
Vaginitis	1*	47 (33.1)	9 (6.3)	66 (46.5)	20 (14.1)	ns
	2*	55 (39.0)	2 (1.4)	77 (54.6)	7 (5.0)	ns
	3	51 (34.7)	8 (5.4)	82 (55.8)	6 (4.1)	ns

Bacterial	1*	41 (28.7)	15 (10.5)	71 (49.7)	16 (11.2)	ns
Vaginosis	2*	45 (32.6)	13 (9.4)	74 (53.6)	6 (4.3)	$\chi^2=5.105, p<.05$
	3	45 (30.6)	13 (8.8)	77 (52.4)	12 (8.2)	
Yeast	1*	47 (33.3)	9 (6.4)	78 (55.3)	7 (5.0)	ns
Infection	2*	47 (33.8)	10 (7.2)	74 (53.2)	8 (5.8)	ns
	3	46 (31.3)	13 (8.8)	75 (51.0)	13 (8.8)	ns

\*Missing Values, total values add to 147.

A further comparison of the intervention and control groups on other measures of urogenital health also showed that women in the intervention group were significantly less likely to report genital sores or ulcers, inflammation or redness of the genital area, and swelling of the genital area (Table 12). Also, women consuming the probiotic yoghurt daily reported less prevalence of genital itching, genital discharge or dripping, foul smelling discharge, genital warts, and blood in urine proportionally, however these differences between the groups were not significant. When factoring in the time component, respondents in the intervention group were significantly less likely to report swelling in the genital area at time 2 ( $\chi^2=5.067, p<.05$ ). The urinalysis results also demonstrated that 2.0% of women had nitrites, 2.3% presented calcium oxalate crystals, 14% had pus cells and 25.4% had epithelial cells. Other deposits included red blood cells (22.3%) and leukocytes (30%) in their urine. All comparisons are temporal.

**Table 12:** Prevalence of Urogenital Symptoms amongst Women

Symptom	Control vs. Intervention			Prevalence	Total n=147 Percent
	Control n=59 (%)	Intervention n=88 (%)	Test of Significance		
Genital Itching	52 (88.1)	79 (89.8)	ns	131	89.1
Genital Discharge/Dripping	41 (69.5)	49 (55.7)	ns	90	61.2
Burning pain on Urination	27 (45.8)	48 (54.5)	ns	75	51.0
Foul Smelling Discharge	24 (40.7)	34 (38.6)	ns	58	39.5
Genital Sores/Ulcers	29 (49.20)	26 (29.5)	$\chi^2=4.477, p<.05$	55	37.4
Inflammation/Redness of Genital Area	29 (49.2)	27 (30.7)	$\chi^2=3.874, p<.05$	56	38.1
Swelling of Genital Area	31 (52.5)	27 (30.7)	$\chi^2=5.299, p<.05$	58	39.5
Painful Sexual Intercourse	11 (18.6)	27 (30.7)	ns	38	25.9
Genital Warts	18 (30.5)	20 (22.7)	ns	38	25.9
Blood in Urine	8 (13.6)	7 (8.0)	ns	15	10.2

From an analysis of self-reported chronic conditions, the data indicate that there is a high prevalence of skin conditions, shortness of breath, high blood pressure, stomach ulcers and digestive problems within the study population (Table 13). A significant difference between the intervention and control group is reported for circulatory problems ( $\chi^2=9.816, p<.005$ ) and digestive problems ( $\chi^2=10.871, p<.005$ ). Respondents in the intervention group were more likely to report experiencing circulatory problems; however, the respondents in this group were less likely to report having digestive problems – which coincides with the literature on the positive effects of probiotic yoghurt on digestive ailments. The mean number of chronic conditions

experienced per participant was 1.88 and 1.72 for the control group and the intervention group respectively. There was no statistical significant difference between the groups. However, the control group was more likely to report two or more co-morbidities in the form of chronic disease, although not significantly different.

**Table 13:** Prevalence of Chronic Conditions in Women

Condition	Intervention vs. Control			Prevalence	Total n=147 Percent
	Control n=59 (%)	Intervention n=88 (%)	Test of Significance		
Skin Conditions*	25 (42.4)	58 (65.9)	ns	83	56.5
Arthritis/Rheumatism	14 (23.7)	23 (26.1)	ns	37	25.2
Shortness of Breath	49 (83.1)	61 (69.3)	ns	110	74.8
Asthma*	13 (22.0)	21 (23.9)	ns	34	23.1
High Blood Pressure*	30 (50.8)	36 (40.9)	ns	66	44.9
Circulatory Problems*	4 (6.8)	19 (21.6)	$\chi^2=9.816, p<.005$	23	15.6
Heart Disease*	5 (8.5)	12 (13.6)	ns	17	11.6
Diabetes*	5 (8.5)	2 (2.3)	ns	7	4.8
Urinary Problems/Kidney Disease*	4 (6.8)	4 (4.5)	ns	8	5.4
Stomach Ulcers	52 (88.1)	61 (69.3)	ns	113	76.9
Digestive Problems	42 (71.2)	32 (36.4)	$\chi^2=10.871, p<.005$	74	50.3
Cancer*	0 (0.0)	1 (1.1)	ns	1	0.7
TB*	17 (28.8)	27 (30.7)	ns	44	29.9

\*Small numbers in cells.

Participants were also asked to self-report on the presence of several symptoms including headaches, colds, dizzy spells, nausea etc., which they may had experienced

over the last two weeks (Table 14). There were several significant between-group differences for the symptoms joint pain, loss of appetite and chest pain. Respondents in the intervention group were less likely to report having symptoms of joint pain two weeks prior to the interview, this was significantly different from the control group ( $\chi^2=4.25$ ,  $p<.05$ ). The women in the intervention group were also more likely to report improved appetite ( $\chi^2=4.50$ ,  $p<.05$ ) as compared to the control group. Additionally, participants in the control group were more likely to report feeling chest pain ( $\chi^2=4.87$ ,  $p<.05$ ).

**Table 14:** General Symptom Reporting Between the Intervention and Control Group for Women as a total across the three time points.

Control vs. Intervention					
Symptom	Control n=175 (%)	Intervention n=263 (%)	Test of Significance	Total Prevalence	Percent
Headaches	131 (74.9)	179 (68.1)	ns	310	70.9
Trouble Sleeping	75 (42.9)	95 (36.1)	ns	170	38.9
Dizzy Spells	88 (50.3)	118 (44.9)	ns	206	47.1
Nausea	84 (48.0)	108 (41.1)	ns	192	43.9
Joint Pain	93 (53.1)	94 (35.7)	$\chi^2=4.25$ , $p<.05$	187	57.0
Loss of Appetite	86 (49.1)	103 (39.2)	$\chi^2=4.50$ , $p<.05$	189	43.2
Stomach Pain	70 (40.0)	104 (39.5)	ns	174	39.8
Diarrhoea	32 (18.3)	47 (17.9)	ns	79	18.1
Sinus Congestion	54 (30.9)	61 (23.2)	ns	115	35.1
Sore Eyes	65 (37.1)	81 (30.8)	ns	146	44.6
Colds	82 (46.9)	131 (49.8)	ns	213	48.9
Runny Nose	40 (22.9)	53 (20.2)	ns	93	28.4
Sore Throat	48 (27.4)	51 (19.4)	ns	99	30.3
Earaches	28 (16.0)	23 (8.7)	ns	51	15.7

Chest Pain	59 (33.7)	11 (4.2)	$\chi^2=4.87, p<.05$	117	40.3
Coughing	59 (33.7)	74 (28.1)	ns	133	40.5
Trouble Breathing	34 (19.4)	59 (22.4)	ns	93	21.3
Skin Rashes	38 (21.7)	66 (25.1)	ns	104	23.8
Lower Back Pain	83 (47.4)	98 (37.3)	ns	181	55.4
Nosebleeds	19 (10.9)	37 (14.1)	ns	56	12.8
Bruising	33 (18.9)	65 (24.7)	ns	98	22.4
Trouble Urinating	30 (17.1)	53 (20.2)	ns	83	19.0
Blood/Pus in Stool	12 (6.9)	22 (8.4)	ns	34	7.8

With the high levels of vitamin and nutrient deficiency and under-nutrition among the people of Oyugis-Rachuonyo, the nutritional benefits provided by the consumption of probiotic yoghurt, have been substantial. The data analyses reveal a variety of health benefits – physiological (e.g. weight gain, fewer urogenital conditions, reduced circulatory and digestive problems, reduced joint pain, reduced need for medical treatment) and psychological (e.g. improved perceptions of bodily appearance, improved function to perform daily activities, reduced need for medical treatment, feel as though they have a meaningful life). This also includes improvements in ARV adherence, which is typically a challenge when taking ARV therapy without food due to the severe side effects.

### 5.2.7 Results: Adult Men

The study was designed to include a total of 200 men. There was strong enrolment initially, with 178 males registered to begin the program, over time though, the number

of men participating in the program declined greatly. By the end of the study the number of men who had completed surveys at the required time points (Time 1 and Time 3) decreased to a total of 80 – 59 men in the intervention group and 21 in the control group.

A descriptive analysis of the sample reveals that the mean number people per household was 5.81 (SD=3.499) and 5.17 (SD=2.262) for the intervention and control group respectively. The male participants had an average age of 45. The intervention group had a mean age of 46 (SD=12.146) and the control group 43 (SD=11.309). The difference between the groups in terms of number per household and age was not statistically significant. The number of males in the intervention and control group as measured on the characteristics of education, employment, income, and marital status were not found to be significantly different from one another (Table 16).

Although, there is no statistical difference between groups as measured for these variables, it is worth noting that a larger proportion of men in the intervention group than in the control group were widowed (13.6%) and a larger proportion of men in the control group were employed full-time (67%). It is also interesting to note that 33% of the control group had completed high school or had training from an institute of higher education. This was reflected accordingly in their reports of household income (Table 15). A large proportion of the intervention group (39%) reported a household income below 10,000Ksh per year (approximately \$125 USD per year), while 29% of the control group reported household earnings between 20,000-50,000Ksh per year (approximately \$250 – \$625 USD per year). A comparison of the groups indicates that farming is the most common occupation (48% of the total sample), followed by tailoring

(7%). By and large, the proportion of men involved in skilled (occupations that require training and are part of the formal sector) and unskilled labour (occupations that are in the informal sector) was approximately equal for both groups.

**Table 15:** Characteristics of Men in the Probiotic Yoghourt Group and Control Group

Characteristic	Control n (%)† N=21	Intervention n (%)† N=59	Test of Sig.
<b>Income*</b>			
Less than 10,000 Ksh	5 (24)	23 (39)	ns $\chi^2=0.429$
Between 10,000 – 20,000 Ksh	4 (19)	12 (20)	
Between 20,000 – 50,000 Ksh	6 (29)	7 (12)	
50,000 Ksh +	3 (14)	10 (17)	
Don't Know/Refused	3 (14)	7 (12)	
<b>Marital Status*</b>			
Married or Living with a Wife	16 (76)	44 (75)	ns $\chi^2=0.869$
Widowed	2 (10)	8 (14)	
Divorced/Separated/ Never Married	3 (14)	7 (12)	
<b>Employment*</b>			
Full-time	14 (67)	30 (51)	ns $\chi^2=0.332$
Part-time	7 (33)	26 (44)	
Unemployed	-	3 (5)	
<b>Education*</b>			
No Schooling	-	2 (3)	ns $\chi^2=0.291$
Some Elementary	6 (29)	23 (39)	
Completed Elementary	8 (38)	15 (25)	
Some High School	-	6 (10)	
Completed High School/College (Higher Education)	7 (33)	13 (22)	

\* Cells have an expected count less than 5.

† Percentage within Treatment Group



### 5.2.8 Weight Gain & Body Mass Index (BMI)

To determine if there was an improvement in weight gain and BMI for the intervention group as compared to the control group, a repeated measures ANOVA (mixed design between-within ANOVA) was performed. The assumption of compound symmetry, variance within each of the populations, and Levene's test of variance demonstrated that all assumptions were met for both variables.

Upon examination of the data it was determined that there was no statistically significant difference in weight gain between the intervention and control groups,  $F(1, 73) = .301$ ,  $p = .59$ , partial eta squared = .004. Although, there was no difference between the groups, a within-subject difference was present between the two time periods. There was a significant main effect for time [Wilks' Lambda = .94,  $F(1, 73) = 4.30$ ,  $p = .042$ , and a partial eta squared = .056], meaning that participants had increased weight gain at time 2 as compared to their baseline measures.

The results showed a significant difference in means between the pre-test (T1 – prior to the intervention) and post- test (T2 – after the intervention) measures. Comparing the totals for the two time periods, overall, subjects had increased BMI at T2 (mean=4.52) than their previous BMI at T1 (mean=1.30). At T1 the transformed BMI scores were 1.31 for the control and 1.30 for the intervention groups, by T2 the BMI scores had increased to 4.58 and 4.50 respectively. There was a significant main effect for time, Wilks' Lambda = .008,  $F(1, 73) = 9121$ ,  $p = .000$ , partial eta squared = .99, with both groups showing an increase in BMI across the two time periods. The scores across the two time periods differed significantly – BMI was significantly greater at T2.

However, the interaction between the treatment group and time was not significant, Wilks' Lambda= .99,  $F(1,73) = .870$ ,  $p = .354$ , partial eta squared = .012.

Based on a between-subjects comparison, it became evident that the intervention did not have an effect on the outcome. The main effect comparing the intervention and control group was not significant,  $F(1, 73) = .297$ ,  $p = .30$ , partial eta squared = .015, suggesting no difference in the effectiveness of the probiotic yoghurt in increasing BMI (see Table 16). The men in the intervention group did not have a significantly higher BMI than those in the control group.

**Table 16:** Between-Group Differences for Men in the Intervention and Control Group across Time.

Characteristic	Time	Treatment Arm (Control vs. Intervention)	N (n=75)	Mean	SD	Sig.
Weight (Kg)	T1	Control	19	7.81	.68	ns
		Intervention	56	7.69	.69	
	T2	Control	19	7.85	.69	
		Intervention	56	7.77	.70	
BMI (kg/m <sup>2</sup> )	T1	Control	19	1.31	.06	ns
		Intervention	56	1.30	.06	
	T2	Control	19	4.58	.34	
		Intervention	56	4.50	.30	

### 5.2.9 HIV Serostatus, CD3/CD4 Comparisons, and Mode of Infection

In general, 47.5% of men in the intervention group were asymptomatic, 47.5% were symptomatic and 5.1% were AIDS seroconverted. In comparison, 38.1% of men in

the control group were asymptomatic and 61.9% were symptomatic, but none were AIDS seroconverted. The difference between the groups was not statistically significant.

During preliminary qualitative assessments of the effects of probiotic yoghurt on well-being, the majority of participants self-reported their *perceived* improved well-being and quality of life. As such, it was fitting to explore the effect that regular consumption of probiotic yoghurt may play in increasing CD3 and CD4 cells counts, which in effect reduces the progression of advanced HIV-related disease, faster disease progression and HIV related illness episodes and mortality.

The results from a one-way between groups analysis of variance was conducted to explore the impact of the probiotic yoghurt on absolute CD3 and CD4 levels. An absolute count provides a measurement of how many functional CD4 T-cells are circulating in the blood and able to fight infection, resulting in a stronger immune system. The results in Table 17 show the mean differences between the control and intervention group at the 95% level of confidence. There was a weak statistically significant difference at the  $p < .05$  level in CD3 cell counts [ $F(1,118)=3.961$ ,  $p = .049$ ], however the effect size (strength of association) in mean scores between the groups was more robust. Calculated using eta squared, is 0.32, indicating a large effect, and explains the magnitude of difference between means. Although, there was a significant difference between the two groups in terms of CD3 cell counts, there was no statistically significant difference in CD4 cell counts. However, the intervention group did display higher CD4 counts as compared to the control group. Despite a lack of statistical significance in CD4 counts, the link between CD3 and CD4 is critical in maintaining a

strong immune function – when CD3 cell counts are low, it is harder for other T-cells (CD4) to become activated and fight off infection. As such, the intervention group may potentially better positioned to fight off opportunistic infections and disease progression.

When the men were asked about their personal mode of infection, 20 out of the 80 male respondents (12.5% of the total sample population) indicated it was through sex with a man. Although the majority of infections still occur through heterosexual contact, this is a key finding and critical to highlight as prevention programs have mostly focused their energies on transmission through male-female interaction rather than same-sex infections. This is especially important as the majority of men within this context retain some form of heterosexual relationship to meet cultural expectations (Beyrer et al., 2011), thus increasing the risk of cross-infection between populations even greater.

**Table 17:** Comparison of CD3 and CD4 counts in men between the Intervention and Control Group.

Characteristic	Treatment Arm (Control vs. Intervention)	N (n=121)	Mean	SD	Sig.
CD4	Control	24	420.92	296.42	ns
	Intervention	97	447.08	189.95	
CD3	Control	24	1461.92	473.61	p = .049
	Intervention	96	1904.74	1061.34	

### 5.2.10 Nutrition

Amongst the male participants, 62.5% reported having three meals a day, while 30% reported two meals a day, only a small proportion reported having one meal a day (1.3%) and more than three meals a day (6.3%). Although, the majority of participants reported having three meals a day, the respondent's daily diet is comprised of foods that are not *nutrient rich or dense*. Rather, the foods are *energy dense* – high calorie foods with very few proteins, nutrients and vitamins, which do not facilitate the maintenance or improvement of nutritional status and micronutrient levels. Both nutritional status and micronutrient deficiencies have been linked to reduced CD4 cell counts, faster disease progression and HIV-related diseases.

When asked about their personal perception of food, and the number of times respondents experienced feeling hungry both the control and intervention groups were, comparatively, almost the same. However, the control group was more likely to report feeling satiated after only eating a few mouthfuls. Although the difference was not significant, it is important to note that individuals who feel satiated sooner are more likely to eat less and as such less likely to meet minimum required nutritional needs, especially if they are already nutrient and vitamin deficient.

Upon closer examination of the Food Frequency Questionnaire, it is clear that there is very little variation in the men's daily diets and nutritious foods are eaten sparsely throughout the week or month, since they are generally either more expensive or culturally considered a 'poor man's food'. Despite being an agricultural community with very fertile soils, fruits and vegetables are not consumed on a daily basis although

they are produced and the potential for growing agricultural products in this area is high. For instance, only 3 types of vegetables are eaten on a regular basis, tomatoes (92%), onions (92%) and kale (69%), and the majority of the local diet is composed of Ugali, a staple starch, with very low nutritional value which is eaten daily.

Although not much variance existed between the control and intervention groups in terms of their diets, there were a few significant differences. The intervention group was significantly more likely to consume mangoes, ( $\chi^2=15.32$ ,  $p<.01$ ) (high in dietary fiber, Vitamin B6, and are a good source of Vitamin A and Vitamin C), pumpkin leaves ( $\chi^2=8.03$ ,  $p<.05$ ) (very good source of protein, vitamin A, vitamin C, Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Iron, Magnesium, Phosphorus, Potassium, Copper and Manganese), millet ( $\chi^2=10.81$ ,  $p<.05$ ) (rich in Niacin, Vitamin B6, folic acid, calcium, iron, potassium, magnesium and zinc), beans ( $\chi^2=11.70$ ,  $p<.010$ ) (a good source of soluble fibre, protein, complex carbohydrates, folate, and iron), and fried chicken ( $\chi^2=8.40$ ,  $p<.05$ ) (a good source of Vitamin B6, Phosphorous and Copper, Thiamin, Niacin and Vitamin B12).

More importantly, the majority of all respondents reported never consuming a serving of pasteurized or unpasteurized milk, goat's milk, cheese or any other type of dairy product over a period of two weeks, unless they were part of the intervention group and consumed yoghurt on a regular basis ( $\chi^2=37.92$ ,  $p<.001$ ). Only a very small proportion of men (both in the control and intervention groups) indicated consuming milk and kefir on a relatively regular basis, however this can be considered insignificant. As previously mentioned, this is not surprising as dairy is not consumed due to its

prohibitive cost, and a lack of dairy goats and cows in the area. These insufficient diet regimens can leave the most vulnerable open to a multitude of micronutrient deficiencies and at risk for other conditions.

Overall, 95% of men were satisfied with the idea of probiotic yoghurt as a food supplement to improve nutrition and as a food supplement which could help to alleviate symptoms of HIV/AIDS. Those in the intervention group and were eating probiotic yoghurt daily were significantly more likely to report satisfaction with the effect that the probiotic yoghurt was having on their health ( $\chi^2=20.61$ ,  $p<.001$ ).

From this brief overview of the respondent's nutritional profile it is evident that the yoghurt works towards creating a more balanced diet and is an important source of vitamins and nutrients which otherwise are lacking from the traditional diet. Thus, it is important to incorporate it, not only as a daily food supplement, but also considered as a widely available complementary therapy to current HIV/AIDS treatment regimens.

#### **5.2.11 Health, Well-Being & Quality of Life**

Using the WHOQOL-Bref, the male participants were asked about their quality of life, health and other areas of life in general. Based on the responses 52% of participants did not have a regular health care provider, and of the 48% who believed they had a regular health care provider and attended a regular health care centre/clinic/hospital, were not attended to by the same health professional who knew their medical history. Further, 38% of male respondents needed health care in the last 8 months but did not receive it either due to a lack of services, and other issues

surrounding accessibility – cost, distance, and transportation, or as a result of a combination of the preceding factors.

Men in the intervention group were more likely, although not a significant difference, in the 8 months preceding the study to spend more nights in the hospital. Approximately 21% of men in the intervention group spent between 1-10 nights in hospital or a convalescent home, which corresponds to 28% of intervention group reporting the need for a substantial amount of medical treatment to function in daily life. In comparison, approximately 74% of the control group reported needing a moderate amount of drugs to function in daily life although they had fewer recorded illness episodes requiring hospitalization.

When the participants were asked about satisfaction with their ability to perform daily activities, approximately 77% of the men in the intervention group reported that they were significantly more likely ( $\chi^2=13.25$ ,  $p=.010$ ) to be satisfied with their abilities. They were also more likely to report greater deal of satisfaction with their capacity to work and sleep (no significant difference).

With regard to the prevalence of certain symptoms, the intervention group was less likely, although not significantly, to report less frequent episodes of sore throat, irritated/sore eyes and the presence of digestive problems. It is important to note this last difference, as many who suffer from HIV/AIDS, also frequently experience digestive problems due to numerous factors such as, but not limited to, stress, stomach ulcers, poor diet, and the effects of anti-retroviral drugs (ARVs). Digestive problems often lead to a lapse in ARV adherence as well as a poor diet, resulting in a vicious cycle and



ultimately reduced health and well-being and more likely to suffer from opportunistic infections, complications and other ailments. Therefore, the yoghurt may be an important supplement to implement in order to alleviate these secondary health issues which can have an effect on normal function in daily life.

### **5.3 Summary of Findings for Adults**

The benefits conferred by yoghurt consumption on the men and women taking part in the epidemiological study is significant. Given the high levels of vitamin and nutrient deficiency and malnutrition in this community the data reveal health benefits following consumption of the probiotic yoghurt. Although the strength of the sample size was not as large as initially planned, the reduction in certain conditions among the men and women in the intervention group is worth taking note of. This is consistent with the plethora of literature (e.g. Parvez, Malik, Ah Kang, Kim, 2006; Fioramonti, Theodorou, & Bueno, 2003; Ouwehand, Salminen, Isolauri, 2002; ) whereby the positive effects of probiotic bacteria have been demonstrated to improve health status and alleviate symptoms from HIV/AIDS as well as other health conditions (e.g. both men and women in the intervention group experienced weight gain, had better dietary habits, increased appetite as well as improved function to perform daily living activities). Importantly, men in the intervention group had increased CD4 cell counts.

The analysis demonstrates that the women taking the probiotic yoghurt experienced better dietary habits and improved appetite. The reported weight gain and decreased episodes of diarrhoea while not statistically significant are both valuable and

favourable outcomes of the study in an HIV/AIDS community where the virus causes weight loss and chronic diarrhoea leading to other potential health complications and the inability to function normally in daily life to perform duties. Additionally, the reduction in urogenital symptoms among women in the intervention group is worth highlighting. The women were also more likely to report changes in health and it was shown that the women in the intervention group had a reduced need for medical treatment, improved perception in bodily appearance, reduced circulatory problems, decreased joint pain and digestive problems.

Examining the whole adult sample, none of the participants consumed dairy as a regular part of their daily diet. The compelling levels of satisfaction with the yoghurt and the boost in energy levels by those consuming the probiotic yoghurt daily further strengthens the importance of consuming 'Fiti' as a nutritional supplement. Importantly, it also lends itself as a critical factor towards improving quality of life by enabling participants to contribute to their household and community.

The next section will explore in greater depth the effects of the probiotic yoghurt on quality of life as reported by a sample of participants.

## **5.4 Qualitative Findings**

Building on the results from the quantitative study of the WHOQOL-HIV Bref, which provides an adequate snapshot of quality of life, the sections that follow present the participants' perceptions of their health-related quality of life based on the domains

of the instrument as well as the responses to the questions designed to supplement the WHOQOL – HIV Bref constructs. The in-depth interviews provide a deeper understanding of the respondents’ unique circumstances, and allow participants to give an account of their self-reported health and the impacts of the probiotic yoghurt on their quality of life.

The age, gender, and other socio-demographic distributions of the participants are summarized in Table 18 below.

**Table 18:** Sample Characteristics: Gender and Age Distribution of Participants

Variable	N=26	(%)
<b>Sex</b>		
Male	8	31
Female	18	69
<b>Age Range</b>		
≤30	2	8
31-35	6	23
36-40	4	15
41-45	5	19
46-50	3	11
51-55	2	8
56-60	1	4
61+	3	11
<b>Number of Children</b>		
0	1	
1-2	7	
3-4	7	
5-6	9	
7-8	2	
9-10	0	
<b>Income per month</b>		
	<b>Females</b>	<b>Males</b>
Less than 10,000 Ksh	12	5
Between 10,000 – 20,000 Ksh	6	1
Between 20,000 – 50,000 Ksh		1
50,000 Ksh +		1
Don't Know/Refused		

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<b>Marital Status</b>		
Married or Living with a Partner	4	5
Widowed	14	1
Divorced/Separated/Never Married		2
<b>Employment</b>		
Subsistence Farming	13	3
Contracted Farming Services	3	1
Farming & Selling Produce	2	-
Market Vendor	5	-
(Clothes/Vegetables/etc.)		
Catering	1	-
Babysitting	1	-
Bartender	1	-
VCT Councillor/Hospital	2	1
Mechanic	-	1
Carpenter	-	1
Contractor	-	1
Tourist Industry	-	1
Yoghourt Mama	3	-
Unemployed	1	2
<b>Education</b>		
No Schooling	1	-
Some Elementary	11	1
Completed Elementary	3	1
Some High School	1	3
Completed High School/College (Higher Education)	1	3

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**Source:** Qualitative Survey Results

\*Some cells add up to more than 26 as some respondents reported participating in more than one income generating activity.

## 5.5 Impact of Probiotic Yoghourt on Quality of Life

Direct quotations from the transcribed interviews are used to illustrate the emergent themes, and serve to frame and categorize the responses thematically and Table 20, near the end of this chapter provides a summary of responses from the in-depth interviews. The results present accounts of the participants' self-reported health and life experiences with the probiotic yoghurt as related to quality of life. With the analysis, it has become evident that concepts revealed in the epidemiological study are

further supported with the findings from the in-depth interviews as it will be demonstrated in the pages to follow. The respondents' point of reference for responses would be a comparison of their quality of life prior to enrolling in the program and while taking ARVs (unless otherwise indicated within the table). The six domains identified below reflect the issues that have come to be considered by experts and lay people as important facets to quality of life (WHOQOL, n.d.). Specific participants' experiences are shared using their gender and age in the paragraphs that follow, e.g. Female, 33.

The significance of quality of life and by proxy well-being as a public health concern is not new. The World Health Organization (WHO) coined the definition of health in 1949 as "a state of complete physical, mental, and social well-being and not merely an absence of disease and infirmity" (WHO, 2006). People living with HIV/AIDS are living longer than before and there is a need for researchers to change the methods they examine their health, looking beyond the obvious morbidities and examining the relationship of health to the quality of life of the individual which may in fact be a greater determinant of health.

Health-related quality of life takes into account broad 'categorical' domains related to physical, mental, social and emotional performance, and each of the facets within the respective domains are multidimensional and interlinked. Often trying to separate the ideas that emanate from each of the facets can be complex and delicate since the sum of all of these factors are what truly comprise health-related quality of life.

Assessments of HRQOL go beyond measures of population health, morbidity, life expectancy and cause of death and concentrates on the impact of health on quality of life. Of particular relevance is the integration of well-being into the concept of HRQOL, whereby an individual attempts to improve their physical, mental and social functioning in the context of supportive environments in order to live a productive, satisfying and full life (Kobau, Sniezek, Zack, Lucas, Burns, 2010). In the anecdotes that follow, the impact of targeted food aid on PLWHAs demonstrates the positive impacts of nutritional support: improved health, strength, ability to work, and overall general well-being. By promoting well-being there is an emphasis on an individual's physical, mental and social resources which work to enhance protective factors and conditions that foster health (Lindstrom & Ericsson, 2005). It has become evident, based on the findings that promoting integrated treatment programs, with effective nutritional support, can potentially lead to improvements in well-being which results in self-management, disease resistance, and resilience (CDC, 2000).

Since none of the domains *alone* can fully represent the concept of health-related quality of life and capture the degree of improvement and well-being of the beneficiaries. Selected excerpts from the interviews will be used to provide a more complete representation of the participants' lived realities and the impacts of probiotic yoghurt as targeted food aid to improve health-related quality of life and well-being. Since the majority of responses from both men and women are very similar in nature, table 19 will highlight excerpts from different participants that fall under each of the domains in order to help create a comprehensive picture of the impacts of the probiotic

yoghourt on well-being and quality of life. Domains and facets that require a deeper exploration are discussed in the pages that follow.

**Table 19:** Quotes from Participants: Categorized by WHOQOL – HIV Bref Constructs

<b>Domain</b>	<b>Participant Particulars</b>	<b>Excerpt</b>
<b>Physical</b>	Female, 42	Initially I could not go to the farm, or even stay 2hrs in the farm. Now I can farm for 2hrs and then continue with domestic chores and feel energetic. Also, whenever I had to go to work I would have to take a Piki-Piki, but now I walk from home, 6km in total, I feel strong enough.
	Male, 63	My immunity has improved, before the yoghurt it was poor, my CD4+ was around 320 and it went up to 600. I feel great. I even feel stronger, more energetic and healthier. Prior to starting the program, I would have coughs, colds, the flu and it would take me 3 weeks to recover from something minor. I had many opportunistic infections and once my CD4+ was low, there was a lot of illness. But because it increased, there are no illnesses.
<b>Psychological</b>	Female, 48	Being in the program has changed my perceptions about life. I had negative thoughts about life, and felt hopeless. When on the program I was happy and healthy which translated into more positive thoughts about the future and being around to assist family.
	Male, 42	I now view life more positively, initially I was stressed and felt hopeless, thinking that my time was up and was going to die very soon. Now I live happily and I am less stressed because I feel better, look better and feel that I am going to live longer.

<b>Level of Independence</b>	Female, 30	The program has helped me gain strength, I do not need to rely on others anymore. Initially I was very weak and could not stand and sell my produce in the market, I would have to send a proxy. Also, previously I could not carry the onions I sell to the market. The bag is very heavy; I could not carry the load and had to depend on others or hire a piki-piki. Now I can carry the whole load myself.
	Male, 42	My ability to work and carrying out my daily activities has improved. I can now farm my 1-acre farm for 3-4 days, and then from the shamba (farm) I am able involve myself in other income generating activities such as slashing the compound and then also go to work at the hotel. My need for medical treatment also declined because I stopped experiencing frequent illnesses. I used to spend an average of 3,000Ksh every 2-3 weeks on drugs and medical treatment. Now I do not spend this money unless there is an unexpected illness.
<b>Social Relationships</b>	Female, 51	We have been able to help each other, financially. We have made a group to aid one another. If one has a financial problem we assist each other through this newly formed grouped. If a woman has trouble getting up due to illness, we pay for her transport to go to the district hospital to pick up her drugs. We have formed a merry-go-round. Every woman contributes 60Bob, totalling 900 (15 women), on a selected day we give a particular lady 700Bob for that day, and the rest of the money remains in the account and is used for transport in emergency situations.
	Male, 63	My friends and family admire my current appearance, very many friends deserted me, and some of them have even died since...and I am still kicking around. Some of them have tried to come back to be my friends again...my wife deserted and even my brothers.
<b>Environment</b>	Male, 55	When I first started taking the yoghurt I could not pick-it myself. I would send others because the distance was so great, and in



		some cases the weather the was very poor. When it rains, the river floods making it impassable, and the roads very muddy and challenging to walk. Slowly, slowly after some time I could walk to Oyugis and pick the yoghurt from the kitchen.
<b>Personal Beliefs (i.e. worldview, outlook)</b>	Female, 42	I felt like was dying tomorrow, and was only ready for death. My major worry is how we should be living as a family (referring to a disbanded family situation).
	Male, 33	I see myself dying soon, sick people like me don't last very long and this makes me feel sad. My wife died and left me with a son. I worry about how my child will be educated and live a better life. I live with my son, but I when I go back to Malindi I will leave my son with his grandmother and I will be supporting him from Malindi.

*Source: Quality of Life Survey Instrument - Data*

Overall, those with higher levels of well-being judge their life as going well which results in improved quality of life (Diener, Lucas, Schimmack, Helliwell, 2009). Those who feel healthy and are full of energy to take on their daily activities feel more satisfied, interested and engaged overall with their lives. With this increased engagement in daily activities, and increased productivity there is a sense of accomplishment which leads to feeling that life is more meaningful. Ultimately, those that are more content and happy are less likely to experience depression and anxiety – feel more hopeful and motivated. A spin-off effect of this, is that individuals are able to nurture and experience more wholesome social relationships that are supportive in nature.

### 5.5.1 Probiotic Yoghourt, Physical Health and Quality of Life

The detailed effects of poor nutrition have been documented here and in the literature, and based on the empirical evidence the importance of providing probiotic yoghurt as targeted food aid to vulnerable populations becomes more critical than ever.

A 42-year-old male explains how that his quality of life was poor before the intervention and it has improved dramatically while he being in the program:

To me the most important to me is my health, and my quality of life has improved. I saw very much improvement, my weight increased from 48Kg to 59Kg and sometimes even up to 60Kg. My CD4+ was previously 325, when I started, and now it has gone up to 424. I also do not have any skin conditions, I had skin rashes and severe itchiness, but now I do not have any of these conditions. I noticed these changes and the doctors at the hospital also confirmed these changes in my body. Initially, I was frequently ill, every two weeks I was sick. At that time, I had boils, and headaches. The headaches were so severe I thought I was going to become a mad man from the pain. After beginning the program, I did not experience any illnesses. During the program these incidences subsided/vanished, and when I got sick the duration of the illness was dramatically reduced. Before being on the program my illness episodes would last 2-3 days, however while on the yoghurt I would only be sick for a day. (Male, 42)

Similarly, in the comments below, a female also talks about the effect of probiotic yoghurt on her health:

My quality of life was very poor at the initial stages but now it is very good. My weight and CD4+ have improved. My weight has increased, and my CD4+ was at 700 and now it is 1000. The number of illness episodes decreased since being involved in the program. I was frequently sick previously, every two weeks I would fall ill. (Female, 31)

These results substantiate what is already in the literature, but also serve to provide firsthand information of the effects of probiotic yoghurt on this under-researched population.

### **5.5.2 Probiotic Yoghurt and Mental Health**

Depression, anxiety, and generally poor mental health have been determined to play a key role in the acceleration of disease progression. An HIV diagnosis, compounded by low-income and income insecurity, food insecurity, competing subsistence needs (e.g. unstable housing), poor social networks and of course illness can lead to less than poor mental health, which leads to reduced uptake of ARVs and non-adherence to ARV treatment. The importance of sound mental health can not be understated in the ‘war’ against HIV/AIDS. This further supports the importance of the probiotic yoghurt as a food intervention program and confirms that the health effects reported in the convincing narratives that participants have shared are in fact authentic and not contrived to influence the continuation of the project.

#### **5.5.2.1 *Depression, Anxiety and Stress***

The majority of participants, 77% indicated experiencing some sort of anxiety disorder, tremendous amounts of mental stress as well as depression and despair. As described above, these mental states can have a profound effect on physical health. The participants interviewed reported feeling this way not so much at the time of diagnosis, but rather in the days, weeks, months, and years after their diagnosis. They had difficulty

stabilizing negative feelings due to a multitude of concerns – weight loss, increasing treatment costs, increasingly severe, frequent and long bouts of illness due to opportunistic infections, prolonged periods of unemployment and reduced participation in income generating activities, pressure to support their families, and concerns about their future, to list a few. However, once the program commenced participants expressed better overall mental health due to improved perceptions of life and physical well-being.

This is demonstrated through with the following comment:

Mentally, I was very distressed. When I was not on the program I was stressed, I am the head of the household, and my husband passed on in 2001 and all the burden is on me. At times I feel hopeless, an incredible burden...Since I became HIV+ and sick I viewed myself as having a poor life and this stressed me out very much. When I was on the program I was improving and began to feel hopeful about life and was no longer stressed, I gained strength and felt encouraged. Physically I felt weak, but when I was on the yoghurt all the weakness disappeared and I ceased being dizzy and forgetful. Before this, I was often dizzy, very stressed and my mind was constantly preoccupied. This stress presented itself physically whereby I would tremble from the anxiety, would cough frequently, and had chest pain around the heart. I went to the hospital and the cough was diagnosed as TB, this lasted for 8 months. When I was enrolled in the program all of this changed, I rarely coughed and the coughing has resumed now that we have been stopped from taking the yoghurt. (Female, 51)

The mind-body connection is undeniable – our feelings, thoughts, beliefs, and attitudes either positively or negatively affect our biological functioning. The complex interrelationship between the mind and the body becomes even more complicated when struggling with a terminal illness such as HIV/AIDS that alters the individuals mental state. Mental states can be fully conscious or unconscious and emotional reactions to situations and thoughts without knowing why there is a reaction. Each mental state has a

physiological response associated with it – and can be either positive or negative but is always felt in the physical body. For instance, the mental state of anxiety causes the production of stress hormones. The mind and the body are inseparable sharing a common chemical language and are constantly communicating with one another – the brain and the peripheral nervous system, the endocrine and immune system, and all of the organs. As such, controlling negative mental states is imperative maintaining optimal levels of health.

#### ***5.5.2.2 The Social and Psychological Impacts of Bodily Appearance***

When you look good, you typically feel better – spirits are lifted and there is a sense of empowerment to face challenges including terminal illnesses with greater confidence. Participants reveal that looking better improved their social relationships, they experienced less abandonment by friends, family and peers and began to feel less isolated and secluded which ultimately has a negative effect on mental health. Many highlighted a hypersensitivity towards their appearance, but increasingly came to feel more confident as their appearance began to improve due to weight gain, fewer skin conditions, reduced thrush around the lips and mouth, boils and other opportunistic infections that affected their appearance. Males and females were equally concerned with their appearance.

My appearance is smart! Before I began with the yoghurt program, I wanted to isolate myself from social gatherings because I felt uncomfortable...I had rashes, I hated scratching in front of other people...I was a prominent figure in the community with many connections and I was stressed due to my rashes

and appearance...When I had all of these rashes people feared approaching me. People thought that the scabies and rashes were leprosy, they feared coming close. Now that they have seen a dramatic improvement they come to talk with me and approach me. (Male, 60)

Human beings tend to love those who are well, and shy away from the sick. Because of this, my people have shunned me, now that I am looking better, they are returning to me, communicating and associating with me. Previously, they would refer to me as being part of the “people of the last calling”. When they abandoned me I felt an incredible amount of stigma and loneliness. My sister-in laws abandoned me, they did not want to have anything to do with me, or help take care of me especially when I was ill. (Female, 48)

### **5.5.2.3 *Improved self-esteem***

Participants were asked if they experienced increased self-esteem as a result of taking part in the program which has allowed them to take part in activities that would have enhanced their sense of self-esteem. With any intervention, it is important that the impact is accompanied by improved levels of self-esteem, otherwise the benefits can be counteracted by a variety of factors that contribute to continued health disparities.

Further, bodily appearance has been found to be a key predictor of self-esteem. Many of the participants expressed concern towards the outwardly and obvious physical manifestations of HIV/AIDS – e.g., weight loss, boils, skin rashes, looking sickly and the effect of this on their self-esteem.

When feelings of low self-esteem are accompanied by negative emotions such as stress, anxiety, and depression the combination can result in increased risk of heart disease among other physical manifestations that can be chronic in nature. The

psychosocial factors such as stress and negative emotions that come with low self-esteem weaken the body's immune system and increase levels of inflammation – factors that have been associated with a number of health conditions such as increased cholesterol levels, high blood pressure and more seriously heart disease (Chen, 2012). On the contrary, high levels of self-esteem strengthen mental and physical health. There is also convincing evidence that people with high self-esteem are more content, as well as more likely to undertake difficult tasks and persevere in the face of challenges.

Now I am the chairman of the sub-location health committee. And I am a Home Based Care provider (HBC) assisting PLWHAs and OVCs (Orphans and Vulnerable Children) for most of Kasipul – Kotieno, Kakelo, and Kokech. Previously, before being in the program I was nocturnal! I would go out only at night when people would not see me (referring to his skin condition). I now speak openly about my status. After the referendum I will be going to Kisumu for a testimonial – sharing the story of my life and journey with HIV/AIDS. Previously, I would not even think about doing something like this. (Male, 60).

My bodily appearance has improved and I do not have any outwardly signs of the illness being visible. I feel human once again. I can talk to people frankly, openly and can now also advise people about HIV which is infecting and affecting them. Previously, I did not have the confidence to talk to people, to socialize and even talk about HIV. Now I feel look good, feel stronger and can find inner strength and confidence to direct them to go to the hospital for testing – I am acting as a peer educator. (Female, 31)

### **5.5.3 Economic Upturn and Healthier Financial State**

The HIV/AIDS epidemic has had a profound impact on people's livelihoods and ultimately well-being. There are three types of economic impacts that can be distinguished: 1) the loss of income of the family member who has fallen ill (typically this

is the primary breadwinner in the household); 2) the increase in household expenditure to cover medical costs, and 3) the indirect costs of absenteeism as family members must take time away from work and school to care for their ill family member.

When asked to reflect on their financial health the majority of participants indicated that their financial situation had improved as a result of a number of factors. The decreased need for health care, a reduction in monthly costs for medical treatment due to reduced dependence on medication and treatment; their improved work capacity and abilities to carry out daily activities – which included being gainfully employed and the capacity to take part in income generating activities; and the yoghurt as a food aid eased the household food needs and diverted income for other household costs such as soap, matches, the purchase of food stuffs and other items. While many participants expressed many of the same ideas, one participant, a young widow summarizes the above very well in the narrative below:

Before being involved with the project I would have headaches daily, I had chest congestion which was not related to TB...I had severe coughing, rough skin, chest problems...I was at District (Rachuonyo District Hospital) many times per month. I was unable to provide for my family especially because I would have to purchase drugs. I would roughly use 600Ksh per month to treat my conditions, now I only use 60 bob for painkillers per month for my headaches. While on the program, I was able to conduct all my household chores easily, washing, preparing the children for school, and then going to the shamba (farm) for about 4 hours. Previously, I could only spend an hour in the shamba taking care of an area that is only 3x3 meters and would have trouble producing maize and vegetables which are household staples. I would then have to buy these items from the market which meant that there was less income. Earlier on when we still had maize in our stocks I would have to go to the market and sell it so I could buy drugs. Eventually, the stocks were depleted and we could not even meet our own food needs. Then my physical health deteriorated more, I became even more weak, and could



not stand and sell produce in the market, I would have to send a proxy. Eventually, I had to sell my cows, which we milked, because I could not cope, and we needed money. I also had to pull the children out of school because I could not afford to pay for their school fees. Once I became the head of the household, I found it very difficult to deal with my life circumstances. This caused additional stress which further affected my health. Now though, I sell onions in the market, the bag is 50Kg I carry the whole load by myself and after this, I do not feel exhausted and have the strength to continue with other work. (Female, 29)

As can be derived from the narrative, AIDS-affected households can make a rapid transition from relative 'wealth' to relative poverty. Faced with the direct costs of HIV/AIDS – cost of treatment, cost of lost work time, as well as secondary costs such as funeral expenses, HIV/AIDS has a profound impact on the economic viability of the household, and in more severe cases forcing some families to disband. The epidemic continues to contribute to female-headed households with younger children and restricted capacity to contribute to farm work as well as off-farm income generating activities as they are often trying to cope with disease and multiple burdens. As such, any effective and viable intervention such as the yoghurt becomes an invaluable contribution to the quality of life.

#### **5.5.4 Positive Impacts on Risky Behaviours and Lingering Bitterness**

Participants shared candidly that before enrolling in the program one of the only ways they could cope with their status and their situation was by drinking copious amounts of alcohol. However, once they began taking the probiotic yoghurt they felt hopeful – their perceptions and disposition towards life was more positive which lead to

an increased focus on taking care of themselves, their families, children and in some cases leading in meaningful community and peer education activities at local events.

In the comments below some participants described the circumstances of their behaviours and the need to escape their lived realities:

I had many opportunistic infections and I wanted to drink, drink, drink and drink until I died because the ARVs did not assist with the opportunistic infections which made me have an even more negative outlook on life. I became careless about life....I stopped drinking and smoking after taking the yoghurt. I started to see an improvement and I stopped cold turkey. I now focus on spending my time facilitating workshops and seminars and participate in community activities to create awareness. I try to create awareness no matter where I am – at barazas and funerals. Discussing the seriousness of the problem and how orphans are HIV+ and both parents have died. (Male, 60)

It has totally helped me reduce my risk taking behavior. I do not think of being 'evelish'. When I was deserted, I had suicidal thoughts, and was thinking of so many bad things. I would drink to forget, reduce stress and loneliness. I would think about indulging in immoral sexual behavior with women, but when I started the program and began to notice the positive health effects, I stopped having these thoughts. (Male, 47)

One female participant explains that she reduced her participation in risky sexual behavior which put her health in a precarious situation:

Since I began taking the yoghurt and had fewer illness episodes, I insisted that we (husband) use a condom during intercourse. If I do not use a condom I get sick immediately. It is not psychosomatic, if there is fluid exchange I become sick a week after unprotected sex as a result of the viral load. (Female, 38)

The interviews also uncovered a lamentable practice that is working to perpetuate the disease. It became evident that there is a 'pass-it along' culture – HIV should be shared. According to a few participants many individuals harbour the attitude that

the disease should be passed along to others. It was given to someone, who then passed it on to them, and as such they should pass it along to someone else. This finding was deeply disturbing.

One male and two females state:

When I was in the program my thoughts of seeking out a sexual partner decreased because I saw myself as healthy and I did not want to bring further harm to my health by engaging in unsafe sex or sex with a casual partner. Previously, I was often consumed by thoughts of wanting to seek out a partner and engage in immoral behaviour. (Male, 33)

Similarly, but more candidly about their thoughts and possible actions two females describe:

When I was tested after the death of my husband, and the result came back positive I thought about searching for other partners to pass the illness on to them. There was no need to live and fight anymore, or to be healthy. I was hopeless...but due to being in the program I gained some knowledge and began thinking about avoiding negative behaviours. Being part of the program I feel like there is a reason to live and have stopped considering passing the disease along. (Female, 41)

My husband is alive, but being sick I was thinking of searching for young boys to pass the disease onto them. I felt bitter, mixed with hopelessness. By being in the program my hope was boosted, so I can at least think brightly about the future and stop thinking of harming myself and anyone else. Being in the program made me realize that distributing the virus to other people would harm me eventually, I would develop deep self-hate. (Female, 40)

Thoughts of suicide consumed the participants before they enrolled in the program. While the men were more likely to and tended to more frequently mention suicide in their responses, the two women that considered taking their lives had conceived of more elaborate plans to also take the lives of their children. This

unanticipated and surprising finding is not unexpected, considering the fact there is a greater number of single mothers and widows with children than there are widowers. The men would likely have the option of leaving their children with their spouse if they decided to take their life, whereas a widow especially within Luo culture would have very few social support networks that would take her children on without reluctance.

The men for example stated:

Initially, I was never negative about my life, but after I got sick I thought about it often...since most people hang themselves or jump in front of a vehicle, I thought of doing the same thing to end my life. (Male, 42)

I used to have very many many negative thoughts because I had coughs, rashes, anxiety. Before this I was a [successful business man] making money and living well. When I couldn't work and the money stopped flowing it affected my psychology greatly! I developed an extremely negative attitude towards life, became careless about life and thought about taking my life many times. What was there to live for? I only thought about my wife, and who would take care of her if I followed through with it. (Male, 60)

In comparison, a female participant shares the following:

When I was not enrolled in the program I was so negative about my life that I even thought about committing suicide with my children. I thought, if I die first will their father help them? I use to have these thoughts very often. By mingling with the other clients and the women in the kitchen I felt whole, part of a family. We would talk and share ideas which made me rethink these actions and thoughts. (Female, 43)

The excerpts demonstrate the critical importance of such food intervention programs and community health and development projects which provide targeted food aid and nutritional support. The impacts of the HIV epidemic are far reaching and distressing. It is critical at this juncture that a sustainable model for food intervention programs are seriously considered as a regular part of

HIV/AIDS treatment regimens. The fact that many of these behaviours stopped once the food aid was provided can potentially point to the fact that poor nutrition - food insecurity and food insufficiency are associated with and can lead to drug and alcohol abuse and tobacco dependence.

### **5.5.5 Attitudes towards the future, dependents and dying**

Owing to the early diagnosis of HIV (if testing is sought early enough), improved testing techniques, and the increasing availability of ARVs, the potential for increased life expectancy and improved outlook on life has somewhat lessened the impact of an HIV+ test result and the ensuing life disruption that occurs. Although participants expressed renewed hope, decreased feelings of despair, depression, anxiety, and helplessness, 77% of participants expressed concerns about dying but in relation to the security, well-being and future of their family and dependents. Respondents were not concerned per se with the physicality of their own death, but reported being exceedingly worried about the survival of their children and how they would be supported, alongside coping with other social obligations, and carrying out additional responsibilities to other family members that are more or less dependent on them. Primary concerns centred around the provision of education, payment of school fees, their care after death and the complete dissolution of the family.

A 34-year-old woman with 4 children describes her feelings around dying and the future of her family:

I have been frequently stressed as I think about taking care of my children all alone. This has been the case for two years now. Before starting with the program, I really thought about my children...I was very stressed...I considered myself as someone who could not do anything, a widow, sick and moving towards death. The fact that I am going to die worries me that I will leave my children stranded. I worry, I want to bring myself up as a whole with my family. I pray to God to give me life so that I may see my children educated and living well. I accept any help from any well-wisher.

Similarly, a 31-year-old woman explains that she worries about her children's future because of her health. Fearing that she will be unable to support them through school and life - assisting them to prepare their homes and seeing them through special times.

Further, a 46-year-old father of four explains his household responsibilities and the additional duties he takes on to assist his married children:

Before joining the program, I had no willingness to engaging income generating activities, I felt there was no point. After taking part, my attitude has changed. Now I worry very much about my children in terms of their education, their well-being and staying together as a unit. My eldest son is 25 years old, he completed college and is unable to get gainful employment to assist his younger siblings. Now, it is my duty again to support all the family and to pay for the children's school fees (2 younger children in primary school). My two older daughters are married elsewhere they married into families which are very very poor. They always send me requests for food and support (money). Who will pay for school fees and their general livelihood? They all depend on me.

Men and women were typically equally worried about their families' well-being, but those that were single, childless, older or had children that had passed through certain life milestones and are now more or less established had significantly fewer worries about the future and dying.

When participants were asked to respond to the question “How often do you have negative thoughts about your future? Has this changed since participating in the program?” The majority of respondents had a positive outlook with regard to their future since the response was based on their circumstances at that moment – enrolled in the program. However, when examining the first segment of that question, it becomes clear that feelings of despair prior to beginning the program are extensive. With the termination of their enrollment in the program participants will be in precarious situations once again. A 40-year-old female participant expresses her outlook prior to beginning the yoghurt program and highlights how being part of this has changed her perspective:

When I was not taking the probiotic yoghurt, I had negative thoughts about myself. There was no need to even farm or care for and help the children because I was going to die....and eventually they would starve to death....but that changed. When I began the program I was happy, I became stronger, I had a renewed sense of life. I went from a negative perspective to a positive one.

A 62 year-old female receiving the yoghurt and ARVs shares:

Initially when my husband died in 2002, I was left with 6 children. I had negative thoughts very often and I knew I was going to die soon. Since the program though, I have stopped having these negative thoughts and I know that I will live longer, even though death is there for everyone.

The present study demonstrates the multidimensional nature of health related quality of life and provides a holistic picture of some of the challenges faced by those living with HIV in resource-limited settings. It also, hopefully highlights the importance

of ARV treatments to be complemented with effective nutritional support programs. This community health and development project has given great hope to the members of the community that were enrolled in the program. Although quality of life is highly dependent on good health, other spin-off benefits such as social support, economic empowerment, and psychological support have augmented the impacts, and these domains of life must be addressed within clinical settings and public health policies to ensure that it is not solely an aspiration, but rather a realization. While participants expressed renewed hope for the future as a direct result of the project and their participation, the fundamental challenges associated with the cessation of their participation remains. Unfortunately, without the ability to subsidize the cost of the program to support those with HIV/AIDS and to encourage its continuation, or direct intervention by policies to ensure its economic feasibility, the benefits described above will surely regress to a certain degree and adversely affect the quality of life for many either directly or indirectly.

#### **5.5.6 Misconceptions of Probiotic Yoghourt as a Cure**

While the acknowledged health benefits of probiotics are many, there was a tendency for some participants to refer to the probiotic yoghurt as 'cure' and express their delight with the fact that they were 'cured'. Although some may debate that the word 'cure' may be based on meanings generated out of traditional definitions of health/disease and or cultural constructs of health, the conceptualization of cure in this



specific context is undeniably referring to a method of treatment that has rid them of HIV.

A yoghourt mama describes:

People will ask me: Do you know so-and-so? They are looking better these days, were they given any medicines that have cured them of their HIV? And I reply, no it is just the yoghourt. When these people approach me, they do it very slowly, respectfully, quietly, dodging what they want to ask and at long last they come out and ask. (Female, 31)

Another participant states:

I suspect I am fully cured...I feel great, I am grateful for the initiative due to its impacts. (Male, 60)

Additionally, owing their health improvements to the probiotic yoghourt, it came to be perceived as a cure to their HIV/AIDS status – a potentially dangerous situation when combined with risky-behaviours. This finding is very alarming. This misconception around the purpose, function, use and effective properties of probiotics relating to HIV/AIDS is leading to negative and risky health behaviours with serious public health implications that work to counteract any headway made in terms of prevention strategies, and even diminish to an extent the positive impacts of the project on the community and beyond.

My wives are aware of my status, but they do not insist on using condoms. My second wife was tested recently because she was giving birth – she tested negative as did the child. The yoghourt enables me to have enough energy to satisfy their conjugal rights. The yoghourt has made me healthier and I feel as though I am cured and as such there is no need to use condoms. (Male 46)

Some people are saying that if one partner was taking the yoghurt and the other was not they would have to use a condom because the one taking the yoghurt was cured. Those people also said that if you adhere to the yoghurt daily you will be cured and if you go to the hospital you will see that you have been cured. These rumours were started by some of the people taking the yoghurt because they were occasionally tested and due to the fact that it revolved around so much research they took it as a cure. They thought they were cured and said they would not have any other sexual partners. (Female, 43)

As with any health promotion strategy, education is key, however it can be difficult to prevent such misconceptions from occurring even with continued counselling and education around the purpose and efficacy of probiotics. The VCT counsellors (those who were assisting with the distribution of the yoghurt via the clinic) at the Rachuonyo District Hospital as well as the yoghurt mamas constantly reminded and followed-up with participants regarding the specific purpose of the yoghurt to ensure that such misconceptions were not generated, harboured and eventually spread into the community. It has never been suggested that the yoghurt is a cure or contains medicine that cures HIV/AIDS and this needs to be made abundantly clear to those consuming the yoghurt, and also within the community to avoid such detrimental misconceptions.

**Table 20:** Summary of Most Common Responses/Themes

<b>WHOQOL Domains for Assessing Quality of Life</b>	<b>Number of Mentions (number of participants) (n=26)</b>	<b>Percent of Respondents</b>
<b>1. Physical</b>		
Improved Energy and Fatigue (Strength)	86(26)	100
Improved sleep and rest	7(5)	19
Weight gain	29(22)	85
Improved appetite/ability to eat	9(8)	31
Improved overall wellness	32(26)	100
Consider oneself to be healthier		
Diagnosed	4(3)	12
Perceived/Self-Reported Health	31(26)	100
Improvements with pre-existing health conditions (skin rashes, diarrhoea, asthma, dizziness, herpes zoster, joint pain, fever, etc.)	59(26)	100
Reduced Illness Episodes (Frequency, Severity, Duration)	67(26)	100
Increases in CD4	12(12)	46
<b>2. Psychological</b>		
Perceptions of life		
Positive Perceptions (feel hopeful)	28(20)	77
↓Negative Perceptions (despair, anxiety, depression)	27(20)	77
Happier	13(12)	46
Felt unworthy of living/apathetic towards life (prior to and/or after program)	7(5)	19
Thoughts of suicide (prior to and/or after program)	19(9)	35
Reduced risk-taking behavior	16(10)	38
Improved memory, concentration and focus	2(2)	8
Improved body image and appearance	24(19)	73
Feelings of motivation, drive & renewed hope	23(17)	65
Diminished feelings of helplessness/dependence	20(17)	65
Increased levels of self-esteem/self-worth/self-confidence	29(20)	77
Reduced stress levels & anxiety	35(19)	73

### 3. Level of Independence

Increased activities of daily living	46(23)	88
Improved work capacity	46(23)	88
Improved productivity	45(22)	85
Reduced dependence on medication or treatments	22(20)	77
Reduced need for health care & treatment	27(21)	81
Able to adhere to ARVs due to probiotic yoghurt	21(18)	69

### 4. Social Relationships

Improved relationships due to changes in bodily appearance	30(22)	85
Improved social support/stronger relationships	17(15)	58
Increased levels of social inclusion	17(12)	46
Diminished feelings of abandonment by friends and family	20(15)	58
Participation has led to increased discrimination/stigma/victimization	9(7)	27
Participation has led to envy from others/gossip	8(4)	15
Tensions in the community	1(1)	4
Peer pressure to drop out of program because the yoghurt it is a harmful 'Western' product laced with drugs	4(4)	15
Creation of social networks	19(16)	6
Peer educator (about benefits of yoghurt, importance of getting tested)	19(18)	62
Increased community engagement	14(9)	35
Support from social networks (emotional, spiritual, financial)	30(22)	85

### 5. Environment

Improved financial health		
Due to decreased need to buy medication	25(19)	73
Due to increased work capacity & output	22(17)	65
Yoghurt as food aid eased household food needs & diverted income for other costs	21(20)	77
Fewer days hospitalized/bedridden	10(7)	27
Diminished fear of others ill doings, increased sense of security	1(1)	4

Participation in recreation/sports & leisure activities	1(1)	4
Health and Social Care: accessibility and quality	6(6)	23
Awareness and opportunities for acquiring new information about health related and social services	17(14)	54
<b>6. Personal Beliefs</b>		
*↓Concerns about the future	9(5)	19
Concerns with leaving family behind (dependents)	32(20)	77
↓Concerns about death and dying	5(4)	15

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\* ↓ = decrease

## 5.6 Main Findings

The community in which this initiative is taking place is similar to many low-income communities in SSA and more generally in the developing world. Typically, these communities are characterized by high levels of nutrient and micronutrient deficiencies, under-nutrition, and limited access to medical care. Therefore, the introduction of an initiative which produces high-biologic-quality protein (yoghourt) with the added benefits of probiotics, confers numerous advantages which can potentially relate to improved health and well-being. The project provides an economic stimulus to local suppliers of goods and services, farmers, and those producing the yoghurt, while also improving immune function, the ability to work, and decreasing the number of illness episodes and duration of those consuming the yoghurt regularly.

The study was undertaken in order to determine the effects of probiotic yoghurt on immunity, its ability to alleviate symptoms of HIV/AIDS, improve nutritional status,

reduce the incidence of urogenital infections in women, and overall, improve well-being and quality of life.

In general, the study was very well received by the community, and a great deal of interest was shown in the study. Despite this eagerness to participate, a substantial amount of time and human resources were spent dispelling myths (at the community level), there was an unmet need in rural areas due to the inability to extend the program, and challenges were faced in recruiting participants, especially men. Time and resources were spent explaining to the community that the probiotic yoghurt was not a cure or a stand-alone treatment after being prescribed ARVs – rather, it was a supplement to be taken with ARVs and it was not a cure for HIV/AIDS. Additionally, many in the community were of the outlook that the project was initiated by the ‘white man’ as a means to spread disease resulting in death. Those in this mindset were reluctant to participate and purchase yoghurt from the kitchen because they thought that the yoghurt was laced with unwholesome contents with the purpose of spreading a new virus. However, once these individuals began to see a marked difference in friends and family in the program they were quite quick in accepting the initiative, and in many instances asking to also be enrolled.

It was also very unfortunate that the study could not recruit or serve individuals in semi-rural areas. There was a large unmet need in areas which were not very far from the several established distribution points; however, individuals in great need were unable to access the yoghurt and other health care services easily. Due in part to this reason, it was quite challenging to recruit and retain the men in the study. It has

been widely documented that women are more likely to seek health care services as compared to men; in this case, the majority of men seeking participation were from quite far. As such, the women's results were more robust than the men's as they were more likely to adhere to the program and attend on a regular basis. Further, many of the male participants would send a relative or acquaintance to collect their yoghurt, this ultimately decreased the chances of the participant receiving and consuming the yoghurt. In some instances, the individual who was sent to collect the yoghurt consumed it, or due to other extraneous factors (time of day, weather and road conditions, personal gain etc.) failed to deliver the yoghurt to the participant. The effects then, within the male sample appear to be less vigorous. Admittedly, some of the women shared their yoghurt with children or other family members, however, the female participants more often than not, consumed their probiotic yoghurt at the community kitchen.

From the analyses, the data reflected that some of the most important measures in the study such as CD4, weight, and BMI did not reach statistical significance, however, the results and the overall impact of the probiotic yoghurt should not be underestimated. The measures across all of these variables (i.e. CD3, CD4, weight, BMI) increased, indicating improvement, but also the ability of the probiotic yoghurt as an effective method of increasing and maintaining weight and consequently BMI within a group of people who are vulnerable to wasting and weight loss. Further, the link between CD3 and CD4 is critical in maintaining a strong immune function – when CD3 cell counts are low, it is harder for other T-cells (CD4) to become activated and fight off

infection. As such, any increase in immune function positions PLWHAs to be better able to fight off opportunistic infections and disease progression - any increase is a welcome one. The results demonstrate that probiotic yoghurt in conjunction with ARVs is an effectual method to improve immune function.

Participants also expressed a great deal of satisfaction with the idea of probiotic yoghurt as part of their treatment regimen and the effects it had on their health, physical and psychological well-being and quality of life. For participants in the intervention arm, the total number of chronic conditions experienced over time decreased and the amount of medical treatment required to function was also reduced. This is critical not only in terms of the health impacts, but also the resulting social and economic impacts at the household level. With fewer chronic conditions requiring medical treatment and with improved overall health, the amount of medical treatment needed is reduced, making available a substantial amount of income that can be diverted and used for other activities such as school fees, groceries, and other household needs. Additionally, many individuals often do not have the luxury of a 'disposable' income to be used for medical treatment and transportation to the nearest health facility, creating an enormous amount of stress to find, borrow and repay anyone within their social network who is willing to assist. Assistance, however, is also difficult to obtain. As can be seen from the above results, the majority of participants in the control arm were very dissatisfied with the support they received from family and friends. This is due in large part to several reasons, such as stigma, fear, and lack of personal resources. As such, the resulting effects of fewer illness episodes and



improved economic status influences one's outlook on life as their ability to perform daily living activities improves, and they regain a purposeful and meaningfulness to their life which was otherwise lacking. Further to this, participants expressed that with improved health status and bodily appearance, their social ties with family and friends dramatically improved. Those who had abandoned them slowly began rekindling ties as the participants showed health improvements.

The results also show that those in the intervention group, and more specifically the women, had improved urogenital health, fewer episodes of bacterial vaginosis and yeast infections. This is consistent with the literature whereby probiotics have been shown to improve urogenital health and have the potential to protect women from sexually transmitted infections and diseases which leaves them increasingly vulnerable to HIV infection. The numbers also seem to support the idea that there is a larger initial gain, with a plateau, where improved well-being is sustained, especially for those who are in worse condition as compared to those who are relatively healthy. Although, everyone has the potential to benefit from this nutritional supplement, the greatest gains are seen among individuals who are worse off at baseline.

Within the cultural context of food, fermented products such as yoghurt, were once widely produced and consumed, however, such traditions have slowly fallen away. The project is a way to reintroduce yoghurt into the traditional diet in a cost effective and socially beneficial manner. For example, the area is rich in milk, however, milk is rarely consumed, and by the time dairy products reach the shelves, they are unaffordable to the majority of the population. Therefore, yoghurt, with the added

benefits of probiotics is a highly nutritious food full of protein, vitamins and minerals that can be consumed by all, regardless of class. Even by individuals who are conscious about consuming vegetables for fear of being stigmatized and characterized as poor.

Lastly, an interesting finding has been the number of men who openly admitted having had contracted HIV from having sex with another man, especially as it still a cultural taboo particularly in the rural context. In Kenya, men who have sex with men (MSM) are from diverse socio-economic backgrounds, occupations, vary in age, and include both unemployed and professionals which are highly educated (Beyrer, et al., 2011). Importantly, within the Kenyan context transgender typologies and taxonomies vary – therefore MSM does not necessarily equate to homosexuality. These roles show significant fluidity and further, these identities correlate with sexual positioning and HIV risk (Beyrer, et al., 2011).

Within the Kenyan context, and more so the rural context, men who have sex with men are stigmatized and ostracized from the community, therefore, prevention and health care services targeting this vulnerable group are rare and would be very difficult to implement due to ostracization and related social stigma. Such circumstances make HIV/AIDS prevention strategies very difficult to implement, while the spread of HIV becomes all the more prevalent, especially as most men maintain some form of heterosexual relationship.

This finding suggests that education surrounding such practices need to become part of any prevention strategy (no matter how challenging), and this must begin at younger ages targeting the most at risk cohort, with simultaneous public messaging

around same-sex practices as acceptance of this group in society is necessary if any headway is going to be made. Although these practices are relatively more common in urban and tourist areas, there is a hidden sub-culture of such behaviour in smaller centres, such as towns and villages where services, discrimination and outreach are even more limited.

Beyond the numbers, the initiative has been able to and continues to bring together many members of the community to drive change. The community kitchen is a hub for building both social and financial support networks for the Yoghourt Mamas, and the community that otherwise would not have existed. It creates an environment, a safe haven of sorts, for PLWHAs to coalesce and discuss their health concerns, useful therapies and any other troubles they may be experiencing. The project has also been able to corral local leaders, community based and non-governmental organizations and government, which has helped to bring greater awareness and openness about HIV/AIDS, prevention and the importance of getting tested to the community. Additionally, the local Yoghourt Mamas were able to leverage their association to the Ministry of Health, KEMRI and the World Bank to obtain funding from the National AIDS/STI Control Programme and AMREF to carry out Home Based Care training and outreach, as well as to shelter and educate 20 HIV/AIDS orphans, some of whom are also HIV positive, for the next several years. Needless to say, the spin off effects have been numerous and felt beyond the boundaries of the community kitchen.

This further supports the importance of the probiotic yoghurt as a food intervention program and confirms that the health effects reported in the convincing

narratives that participants have shared are in fact authentic and not contrived to influence the continuation of the project.

## **5.7 Chapter Summary**

This community health and development project provides valuable information and insight about the nutritional deficits of women, men and children with HIV/AIDS within the Kasipul district – an under researched area. These findings suggest that those consuming the probiotic yoghurt may have a nutritional advantage over those that are not able to supplement their diet with nutritional support. By improving nutritional status, it is possible to prevent and treat certain infections. Beyond the direct health benefits of the probiotic yoghurt provides to the Kasipul community, the community kitchen has created new networks and strengthened existing local support networks by bringing together various groups - mothers, farmers (milk producers), non-governmental organizations, medical research institutes, hospitals, and community members. The kitchen has become a hub of social support for the community and the Yoghurt Mamas propelled into the limelight as leaders and exemplars in the community.

## CHAPTER VI

### Results:

### **Empowerment: An approach to advancing women's health while promoting social and economic capital development.**

#### **6.1 Introduction**

The following chapter presents the results from the qualitative component of the study focusing on the economic empowerment and health of the women participating in the project. The findings from this section are also augmented by in-depth interviews with the husbands of the yoghurt mamas as well as three informants that played key roles in the project at its inception through to the end of the World Bank Development Place Grant. The results are further supplemented by focus group discussions surrounding project sustainability which thematically tie into the core themes and concepts of empowerment and health.

The chapter begins by presenting a description of the study sample characteristics followed by the findings. Key concepts and ideas are further revealed in the sections that follow according to the primary objectives of the study and are presented based on the themes which emerged from the interviews. Direct quotations from the transcribed interviews are used to illustrate the emergent themes, and serve to frame and categorize the responses thematically. The results present accounts of the participants own perceptions and experiences concerning development projects in

general, its impacts as they relate to health, economic, self-esteem, family relationships and community perceptions.

### **6.1.1 Sample Characteristics**

Since the summer of 2009, the Orande, Baraka and Besigre women's groups have taken on the initiative, operating the kitchens and producing probiotic yoghurt for the study as well as the community. The average age of the yoghurt mamas was 42 years old as the group members ranged in age from 30 to 62 years of age. The majority of participants were married, and all had children. Forty percent of the yoghurt mamas were widowed, and the average number of children per family within the sample is 5.65 and is slightly above the national average of 4.6 and marginally higher than the average in Nyanza province of 5.4 (Graff, 2012; Population Reference Bureau, 2011). Additional sample characteristics: age, educational level, relationship status, and family size are presented in Table 21. The in-depth interviews with the women were conducted outside of the kitchen quarters, at a community based conference facility near the kitchen. It was expected that the women's responses would be less guarded in an environment they are familiar with, and would feel more comfortable to speak openly and share ideas about their lives and project experiences in the absence of their peers.

**Table 21: Sample Characteristics of the Yoghourt Mamas**

Pseudonym	Family Size	Relationship Status	Education	Average Monthly Income (Ksh)	Group
	Dependents			Separate from Project Earnings	
<b>Martha</b>	7	Married - Monogamous	Class 4 - Incomplete	0 – 1500	Orande
<b>Catherine</b>	3	Married - Monogamous	Class 8- Completed	0 – 1500	Orande
<b>Rory</b>	13	Widowed	Class 6 - Incomplete	0 – 1500	Orande
<b>Georgia</b>	5	Married - Polygamous	Form 4 - Completed	3000+	Besigre
<b>Doris</b>	6	Married - Monogamous	Class 8- Completed	0 – 1500	Orande
<b>Esther</b>	6	Married-Polygamous	Class 7 - Completed	3000+	Orande
<b>Janice</b>	8	Widowed	Class 2 - Completed	0 – 1500	Orande
<b>Heather</b>	13	Married - Polygamous	Class 4 - Incomplete	1500 – 3000	Orande
<b>Linda</b>	4	Married - Monogamous	Class 6 - Incomplete	1500 – 3000	Orande
<b>Sarah</b>	2	Widowed	Class 8- Completed	0 – 1500	Orande
<b>Lordis</b>	7	Married - Polygamous	Class 7 - Incomplete	0 – 1500	Orande
<b>Melanie</b>	4	Widowed	Class 8- Completed	3000+	Baraka
<b>Petra</b>	4	Widowed	Class 4 - Incomplete	0 – 1500	Baraka
<b>Jacenda</b>	5	Married - Monogamous	Class 6 - Incomplete	0 – 1500	Besigre
<b>Jean</b>	3	Married - Monogamous	Form 4 - Completed	3000+	Besigre
<b>Nadia</b>	3	Widowed	Class 6 - Incomplete	0 – 1500	Baraka
<b>Randi</b>	6	Widowed	Class 4 - Incomplete	0 – 1500	Besigre
<b>Beth</b>	4	Married – Polygamous	Class 4 - Incomplete	3000+	Baraka
<b>Rachel</b>	5	Widowed	Class 4 – Incomplete	0 – 1500	Besigre
<b>Faith</b>	6	Married – Polygamous	Class 8 - Completed	0 – 1500	Baraka
<b>Count</b>	<b>113</b>				
<b>Average</b>	<b>5.65</b>				

Data came from individual and group interviews and are supported with field observations. Table 22 will provide a summary of responses from the in-depth interviews and focus group discussions. Key excerpts which help to demonstrate some of the main themes will be followed by a description of the participant so as to provide a better idea of the context in which the comments were made. Respondents will be identified using their assigned pseudonym, age range, marital status, whether they are the head of the household and number of dependents in the following format (e.g. Jacenda, Female, mid-30s, widowed, HH, 3D).

## **6.2 Probiotic Yoghourt for Women's Entrepreneurship at a Grass Roots Level**

One of the key tenets of the Western Heads East project is to engage interested resource poor women with little or no formal education and train them successfully to use local resources to produce high quality, nutrient rich yoghurt for consumption, and sell the surplus –to generate income. Participation in such 'cooperatives' is often seen as an instrument for the empowerment of women, opening new opportunities for them, and exposing them to training on financial skills and economic enterprises which will operate successfully and sustainably (Malhotra and Mather, 1997; Donahoe, 1999).

Two probiotic yoghurt kitchens have been constructed in Oyugis and Kadongo, Rachuonyo District of Kenya, in Nyanza Province, with start-up funds for the buildings and equipment provided by a World Bank Development Marketplace Grant. The Orande Women's Group was trained by the women (Yoghourt Mamas) from Mwanza,



Tanzania how to produce probiotic yoghurt, and the Orande Women's Group trained the women from the Baraka and Besigre Women's Groups. The women themselves play a vital role in helping transfer the required knowledge - by providing training to new groups and the skills for the successful operation of the community kitchens. Through a 'a fee for service' arrangement, women provide women with the necessary tools, resources and hands on training to produce probiotic yoghurt and operate a small community based business. The expectation is that hands on training from woman to woman (which have been exposed to comparable contextual experiences and share in similar lived realities), will allow for the successful transfer of necessary skills and expertise to produce high quality nutrient rich probiotic yoghurt. It is also expected that the knowledge needed to operate a successful revolving micro-credit scheme and a micro-enterprise based on the ideology of cooperativization are passed along. The overarching expectation is that the women will learn the technical skills as well as essential business skills (such as accounting and marketing) to manage this micro-enterprise, and the women training them will have the opportunity to refresh their skills as well as supplement their group income with the minimal training fee.

The project scheme itself is structured to operate on the basis of cooperativization. According to this system, the resultant outcome should be a sustainable food-based community micro-enterprise for better health, which fosters leadership, empowerment and advocacy skills among women and knowledge transfer to other women and future generations. The district where the two probiotic yoghurt kitchens have been replicated were selected based on a number of factors that were

key to the project and auxiliary activities – their proximity to a rich dairy producing area, proximity to a lab for probiotic culturing and quality control, proximity to markets, and importantly situating them in an area to maximize outreach to resource poor women, nutritionally vulnerable populations and those affected by HIV/AIDS.

All of the women actively participating on a regular basis in the project, from both sites, live in rural areas around the vicinity of the project and usually walk on average 5km to reach the kitchen on rural unpaved roads. For nine of the twenty women interviewed, the project is their only source of relatively 'stable' household income, and they farm a smallholding within their homestead typically growing one type of crop – maize or beans. These smaller parcels of farm land produce limited crop yields sufficient only for family needs and for part of the year only. Some of the women also have a few chickens and/or non-dairy cattle or goats. On occasion, if an opportunity presents itself, these women partake in other activities such as construction, and/or as domestic labourers in other homes within the community carrying out household chores and agricultural work in order to supplement their earnings. However, the income from these activities is unpredictable in terms of frequency and income. The other yoghurt mamas are more economically active in the informal business sector typically selling foodstuffs (such as bananas, avocados, beans, maize, sukuma wiki and sweet potatoes) which they have grown, one of the yoghurt mamas sells second hand clothes (*matumba*) at various markets, and another owns a kiosk - these women make more comfortable earnings, however they can still be considered meagre. Only one of

the yoghurt mamas which is actively involved on a regular basis with the project participates in formal sector activities as a teacher.

In this context, the initiative works towards alleviating poverty and empowering women primarily through a broadening of economic opportunities. Poorer women who belong to marginalized social groups are encouraged to work together in a cooperative form and to increase their support networks outside the home. The size of each of the groups varies according to the different sites. However, all of the groups perform the same functions: receiving the milk from the wholesaler, inspecting its quality, processing, packaging and selling the yoghurt as well as cleaning and maintaining the equipment and facility (kitchen). Generally, a group size not more than 20 members is suggested as ideal for forging solidarity among members and for effective monitoring of each member's performance. The team in Oyugis began with 15 active members and at the time of the study had 13 (two of which were on maternity leave and are expected to return to full duties) and the Kadongo team has 30 registered members with 15-19 members participating actively at any given point. Group membership and participation also depends on the time of year, with participation dropping during harvesting which is the most labour intensive activity of the growing season. The groups were advised to keep their membership below 20 women, but ultimately the decision of group size was left to their discretion.

The cooperative structure of the project provides the benefits of participating in group enterprise activities such as sharing the workload and building self-help capabilities, but also by mobilizing group savings. All three sites (Mwanza, Oyugis,

Kadongo) have created their own group micro-credit schemes which encourage the development of other income generating activities (either as a group or on an individual basis) that help alleviate some financial burdens of group members. On examining the socio-economic profile of the members interviewed, it was revealed that the average age of the members in the group was 42 years old (ranging from 30-62 years of age); and the average family size ranged from five to seven members. Both groups held meetings about once a month and the percentage of attendance varied from 30 to 75 percent - this varied depending on the issues on the agenda, time of year and group. The 'group leaders' and members opined that attendance at meetings is often poor and cited a number of reasons which will be explored below. For instance, the Oyugis team operated in a more or less collegial fashion, while the Kadongo team often faced challenges with coalitions/alliances that worked to marginalize some members of the group.

In terms of administrative and operating procedures, the structure of each group's governance scheme is different, as devised by each of the teams and based on their group needs. Nonetheless, they generally operate in a comparable fashion and maintain similar governance structures. The Oyugis team has three elected members: the chair, the treasurer and the secretary/clerk. Daily operations are monitored by one of the yoghurt mamas which acts as the group's ad hoc leader while evening sales are managed by three of the yoghurt mamas on a rotating schedule. While the team in Kadongo has an elected chair, assistant chair, treasurer, secretary and daily group leaders responsible for opening and closing, monitoring production, and the daily

distribution system. The role of the Chair involves such tasks as providing feedback, mentoring, motivating, and assigning official roles. The group leaders are responsible for assigning tasks and coordinating daily operations and activities. Usually, yoghurt mamas with previous experience or competence to discharge various functional responsibilities are selected as the leaders. Unofficial assistant leaders have also materialized and often assume the responsibilities of the group leader in their absence. In addition, the teams also shared an appointed project co-ordinator that was hired by local partners (Rachuonyo District Hospital and the Kenya Medical Research Institute) to assist with: the construction of the kitchens, equipping the facilities with the appropriate supplies, providing supplemental training and support to the yoghurt mamas (i.e. general food safety and hygiene in the kitchen, general business practices), technical aspects of the on-site bacterial culturing, and higher level administrative tasks (i.e. reporting, grant/proposal writing, project development – financial stability such as increasing sales and expansion), and overall, primarily providing direction and management to the groups.

A Steering Committee representing all the stakeholders was also eventually established and scheduled to meet once every month. The steering committee was established to bring together the various members -- Project Manager, Project Co-ordinator, Kenya Medical Research Institute (KEMRI), Ministry of Health (MoH), Community Development Officer and the representatives of the women's groups to engage in dialogue about the project by addressing common concerns (funding, dissemination of resources, brainstorming new funding sources), spearheading

challenges (packaging, financial reporting, group dynamics, inter-group rivalry) and approaches to moving the project forward (promotion, advertising, alternate sales venues and expansion). While the premise of instituting a committee was critical to improving the function and inclusivity of the project, it failed to meet more than three times over a time period of a year and a half and to accomplish key action items that were previously put forward. Some of the obvious challenges were distance, means of transportation and the provision of stipends. The sections that follow explore the key findings from the research.

### **6.3 Overall Conceptions about the Western Heads East Project**

By and large, the WHE project and the concept of using probiotic yoghurt as a nutritional supplement to improve overall well-being and alleviate symptoms of HIV/AIDS has been readily received by different communities (e.g. the medical and scientific communities, and consumers of probiotic yoghurt). There was general consensus that the project has provided various groups with tangible benefits, improved their quality of life and standard of living. The yoghurt mamas also affirm that they have gained skills, knowledge and training that have benefited them substantially. The findings reveal there is tangible enthusiasm for the project and for it to become sustainable, and indicate that there is a high level of commitment among all groups to the future success of the project. In particular, respondents were unanimous in their beliefs that

production and sales can be increased, including expansion to other communities. It is clear that the project serves an important role within the communities and to the yoghurt mamas. Notwithstanding these benefits, there are inevitably challenges within such projects and partnerships. Further impacts and challenges are explored in the sections that follow to extract key lessons that will allow other development organizations to build upon these achievements.

#### **6.4 Perceived Health Improvements and Impacts of the Project**

The women reported on the perceived health improvements of their family members, which included: improved physical strength, increased energy (lack of fatigue), the ability to get out of bed for those who were previously bedridden due to illness, ease of bowel movements, the cessation of skin rotting and cutaneous larval development (Myiasis) with a co-infection of HIV/AIDS, fewer rashes, improved concentration among their school aged children and improved nutritional status. In describing the health benefits of probiotics one yoghurt mama commented:

It [the probiotic yoghurt] has helped people (those who are HIV+) to boost their immune system, as well as improve nutritional status of those who are malnourished (adults & children). I am proof, my CD4 levels have gone up and I have gained weight – my test results from district [Rachuonyo District Hospital] show this, before I was too skinny...my children too...before, I noticed that they were feeling so tired and did not want to do anything, but now they have energy and feel strong (Doris, Female, early-30s, married, 6D).

Numerous participants (5), even those who were not HIV positive, indicated that their fatigue was so severe that they could not work, and in some severe cases had trouble with walking and vision. In the comments below, participants declared the perceived important health benefits from probiotic yoghurt:

There is a huge change in my health. I initially felt fatigued and weak and could not work on the farm. Now, I am able to work. The types of foods I was eating were poor and did not provide me with the right type of vitamins and nourishment, and we did not have money to purchase food. I hope our salary increases so that I can live a better life than presently (Linda, Female, early-50s, married, 4D).

In all cases where a prior illness was reported, the respondent indicated an improvement during the period the yoghurt was being consumed regularly. Additionally, half of the project participants reported lowered stress levels (physical, emotional and or mental) and respondents (8) indicated significant improvement in physical strength. Physical weakness, fatigue and stress can be the result of a variety of factors, including poor nutrition creating a vicious cycle. Another recurrent theme within the responses was an improvement in physical, emotional and mental stress levels as a result of being part of the initiative. It is critical then to consider the physical health consequences of adversity and resilience. Overall, the women felt that the support they garnered from one another was a key determinant of their improved physical and mental health. In the following statements, participants explain how the yoghurt mamas act as an ad hoc support group for one another which also results in reduced stress levels and improved mental and physical health:



I have benefited both economically and psychologically. With the money I get I can budget to purchase soap and paraffin...since we have come together as a group, we support one another from mental stress. I am not idle, brainstorming on my own how to solve my problems (Martha, Female, early-40s, married, 7D).

In the comments below a yoghurt mama highlights the extent of her mental distress with a description of the physical manifestations presented as a result of constantly heightened stress levels:

Working with the group, I am able to overcome my mental stress. My health has also improved because I can interact with women who are in the same position as me. We support one another mentally and physically and share ideas with one another. I am healthier now as a result of taking the yoghurt, I have improved body image and there is less psychological stress because we come together. We have unity and support. I only want to say thank you in aiding and bringing the women together to relieve the mental stress we have (Janice, Female, early-50s, widowed, HH, 8D).

Overall, the women reported improved personal health, nutritional status, changes in immunity, as well as improvements among their family members. In some cases, these improvements were diagnosed, and in other instances the recuperations were perceived based on personal monitoring and experience. While some may argue that improvements are not tangible unless they are diagnosed, self-diagnosis and treatment are common practices due to the prohibitive costs and distance in accessing health care. As such, many of the yoghurt mamas are proficient in gauging health improvements or lack thereof and are proficient on self-reporting. This is especially true since illness episodes are more severe and the outcomes more dramatic (either one improves or deteriorates) within this context.

## 6.5 Access to Health Care Services and Treatment

The study also explored whether access to services and medication had improved since beginning to work with the project. For this low socio-economic group, it would be difficult to access health care services due to prohibitive costs and often distances to health care facilities. It was noted that 65% of the yoghurt mamas had difficulty in accessing medical care and treatment. The views from the majority of the respondents are consistent with the notion that even where health care services are available and individuals are aware of beneficial health treatments, the cost of seeking out care can delay or prevent the poor and marginalized from accessing them. In the following passages, participants identified cost as one of the greatest inhibiting factors to accessing appropriate treatment and medications:

At times when the finances are not there, I am not able to access the appropriate health services. This happens quite often because my husband's income is not reliable or stable...there are times when I felt I needed health care for myself or my children which I could not access because of our finances and the cost (Catherine, Female, early-30s, married, 3D).

When I fall sick, and have little money I cannot access services or even treatment, this is the same when my children are unwell (Esther, Female, early-40s, married, 6D).

While the cost of accessing health care services and treatment is a dominant theme, the project has worked to provide additional significant benefits to the yoghurt mamas and their families. The study findings show that a number of participants indicated that their affiliation with the project has afforded them with improved treatment at the

district hospital, rapid service as well as complimentary services and medications which helps to offset the associated costs.

Since I have started with the project, I am able to access health care services more easily; due to the networking with the hospital through MoH [Ministry of Health]...I am closer now too, the kitchen is not too far from District [Rachuonyo District Hospital]. When I go to the hospital I receive attention and medication right away because of the project. Because we are helping the community we have gained popularity and we receive better care from the hospital (Doris, Female, early-30s, married, 6D).

## **6.6 Economic Empowerment & Productivity**

Economic empowerment is a primary goal for the project participants, and one of the basic underpinnings for implementing such a programme. Unfortunately, the data reveal that this has not been a solid outcome of the project to date. Participants were asked to discuss how they fared financially before the beginning of the programme as compared to their status at the time of the study. Relative to the project timeline, the study took place approximately 1.5 years since the project's start. There was unanimous agreement however among the participants that the project has provided other important benefits. While the yoghurt mamas make 50 bob (0.50 Ksh) a day in take home income, and is on par with what they might make if employed in other activities, it is still not significant enough to pull them out of poverty and comfortably pay for school fees, household items and help them to achieve a financially secure future. While, there are benefits garnered from the project that assist monetarily in other realms of daily life and household domains, the income provided by sales is meager, and strategies need to continue to be developed to improve their sales and

ultimately their take home income. Although the project has offered increased economic freedom/stability as a result of personal income, it is not a substantial enough amount to care for dependents, contribute to savings and invest in alternate income generating activities for sustained prosperity.

I am concerned about the amount we are being paid. The money should be increased to serve my daily needs. The pay was increased at one point, but this was not sustainable, we [the group] then decided we should bank more and keep the daily pay at 50 bob. Comparing the amount of work and time that is committed to the project, the pay does not reflect our efforts. I would like for the pay to be increased to 100 bob per day (Lordis, Female, early-30s, married, 7D).

I have six children to take care of, the money I earn is not adequate to take care of the family which distresses me incredibly, and I have a great deal of psychological stress when I think about it...which is often. Not being able to provide for them has made me dull, and pre-occupied, and I am constantly losing weight. I do not even have time to exercise because I am so busy at the kitchen, the only exercise I get is at workshops where I exercise my mind (Doris, Female, early-30s, married, 6D).

Despite being unable to fully realize financial freedom based on yoghurt production and sales, the women's groups have exercised agency by modifying the project design to develop alternative financial empowerment mechanisms. The small amount of money generated each day from the sales of probiotic yoghurt is partly allocated to a revolving fund. Fifty percent of the proceeds from daily sales are apportioned to this fund, and distributed to one of the yoghurt mamas determined by using a merry-go-round framework. In other words, it can be considered to be a rotating bonus cheque in addition to the payment scheme of 50 bob per day. There is no restriction regarding how each participant uses the proceeds. Commonly, the funds

are used either for school registration fees, major health costs, or purchasing food items such as meat and fish. One yoghurt mama explains:

We have a merry-go-round amongst ourselves in the kitchen whereby money is collected from everybody in the group and then given to us while we are on duty. The 50 bob that we received daily was too little, so we each sum our daily wages and distribute it to a chosen person who is on duty at the end of the day. The money is given out on a rotation according to the day. This program has helped me economically, I can now send my children to private school rather than public school - private school provides them with better basic knowledge, the children will be transferred to public school at the class 3 level (Catherine, Female, early-30s, married, 3D).

Additionally, the provision of yoghurt to each family has allowed for household income and discretionary income to be allocated towards the purchase of foodstuffs, or to be spent on other items. Food accounts for a significant portion of the household budget. Thus, provision of nutritionally beneficial consumable yoghurt can be considered a materially important economic benefit of the project. Even though all of the participants recognized that receiving yoghurt was a benefit, and that the increased household income was significant to their livelihood, about 90% of the yoghurt mamas expressed that this had not freed up sufficient money to always satisfy their food needs and to provide a balanced diet to their families consisting of some variety - such as rice, beans, meat and fish. The widows, yoghurt mamas with larger families and those with small plots of arable land that were not agriculturally productive year round had trouble meeting daily food needs.

I do have trouble meeting household food needs. When I pay the money for the merry-go-round, I have trouble buying/meeting the food needs for the

family. However, when I receive the money from the merry-go-round I am able to buy a bigger fish! I receive approximately 650 KSh whenever it is my turn. I usually spend 150 on maize and save the rest for the family. When it's my turn to receive the money, I am so happy! (Esther, Female, early-40s, married, 6D).

A yoghurt mama's husband also describes their difficulties in meeting household nutritional needs:

Because of our financial hardship, we do have trouble meeting our household food needs, about 5 times a week. The burden is at least eased on Tuesday and Friday when we can buy Omena (small fish) or fish, which can be made into soup and eaten with ugali in larger quantities. We are only able to purchase these items on Tuesday and Friday because Mama Martha is paid and we are able to make these purchases. The other days of the week we eat mostly one type of vegetable, such as sweet potato with tea (without sugar) or porridge. If we have sukuma (greens) it is eaten with ugali (Male, early-50s, married, HH, 7D).

Overall, there was general consensus that the project had provided a degree of economic empowerment that was previously non-existent, even amongst the yoghurt mamas that were facing the greatest hardships and were struggling to meet their family's most basic needs. While there is no dispute that the take home income earned can be greatly improved upon, the economic gains were substantial enough to augment the household budget for everyday items. Consequently, working towards improving the standard of living and quality of life, as well as permitting some of the yoghurt mamas to initiate or engage in other income generating activities which afforded them greater financial stability.

## **6.7 Perceptions of Empowerment and Sense of Worth**

Empowerment is considered a process in which women gain greater control over: resources (information, technology, knowledge, skills and training, income), challenge the ideology of patriarchy in leadership, decision-making processes, enhance their self-image and that of other women, become active participants in the process of change and to develop the skills to assert themselves (Sharma & Dua, 2012). Theory surrounding the concept of empowerment also espouses that it can emerge at four levels: 1) personal, 2) small-group, 3) organizational and 4) community. These levels are by no means mutually exclusive with clear boundaries in space and time; however, there categorization aids to flesh out the various levels on which empowerment can occur. On the personal level, empowerment is achieved by gaining control and influence in daily life and in community participation. At the small-group level, empowerment is derived through the shared experience, analysis and influence of small groups on their own efforts. At the organizational level, empowerment is achieved through capacity building that influences decision-making processes, and lastly, empowerment at the community level entails gaining and utilizing resources and strategies to enhance community control (Health Promotion, 2006). Therefore, involvement in such cooperatives is often regarded as an instrument for the empowerment of women, opening new opportunities to master financial skills, creating economic enterprises (Malhotra & Mather, 1997; Donahoe, 1999) and improving quality of life (overall well-being including the built environment, physical and mental health, education, recreation and leisure time, and social belonging). Several excerpts

presenting the yoghurt mamas' accounts support these themes within empowerment. Importantly the yoghurt mamas reflect on the skills they have gained through training and other types of exposure:

#### *Personal Empowerment*

I can even use this knowledge in my house, and share this with others in my community (Georgia, Female, mid-40s, married, 5D).  
The project has helped greatly, I speak for myself, but I can see this is true for the others...our knowledge of milk, how to work with it, milk production and storage has improved dramatically. We have gained skills and knowledge through various training sessions, how to make the yoghurt and business training – there has been knowledge and skill transfer which we otherwise would not have gained (Petra, Female, late-30s, widowed, HH, 4D).

#### *Organizational and Community Empowerment*

We have been empowered in terms of education and training on cleanliness and the importance of environmental cleanliness, in addition to the skills for making the yoghurt (Georgia, Female, mid-40s, married, 5D).

Our communication skills in English & Kiswahili have improved with the increased interactions with the interns and others in the community and through workshops & training (Doris, Female, early-30s, married, 6D).

#### *Small-Group Empowerment*

We have gained much important information about how to keep things sanitary and how to avoid contamination which assists us to prevent illnesses, especially diarrhoea...this afflicts us all at one time or another, and is a concern. (Georgia, Female, mid-40s, married, 5D).

It [the project] has given us the opportunity to learn to write – through group work we have trained one another on how to write [basic proposals and record keeping], it [the project] has also allowed us to develop our interpersonal skills too...some women were so very shy and were not able to speak to people outside of their social circles, now they have become more free to share their ideas and thoughts without awkwardness (Doris, Female, early-30s, married, 6D).



### **6.7.1 Perceptions of Empowerment, Sense of Worth, (Di)stress and Mental Health**

Low socio-economic status (SES) is one of the most pervasive and strongest social factors to affect physical health (Chen, 2012). For example, by the age of 25, individuals from the lowest SES cohort have been found to live 6 years less than those from the highest SES cohort (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010) and the effects of low SES persist across a variety of diseases and countries (with privatized care and with universal health care) (Adler & Rehkopf, 2008; Chen, Matthews & Boyce, 2002; Adler, Boyce, Chesney, Folkman, & Syme, 1993).

As described earlier on in the yoghurt mamas' testimonials, the most prevalent health concern as expressed by the yoghurt mamas, has been worry about their mental health and the excessive distress faced on a daily basis related to meeting the everyday demands of life such as supporting their family's needs. However, as the yoghurt mamas elaborate on these conditions, it is apparent that the project has become a medium for improved self-esteem and self-worth, and a conduit to reduce stress which can work as a protective factor against mental and physical distress that contributes to health disparities in low-SES contexts.

I had a change in my own view of my abilities and competencies; I became more confident, and comfortable with expressing myself in front of others. I have found my own voice and strength to achieve something more. I have a sense of autonomy and strength that was not there before (Petra, Female, late-30's, widowed, HH, 4D).

The yoghurt mamas have also come to be viewed as role models in the community. This new social position acts as a co-existing protective factor that extends beyond the individual, to the yoghurt mamas' immediate family and community members. With their increased self-esteem, confidence and optimistic attitudes, the yoghurt mamas have become positive role models throughout the community, and are able to orient others towards improved coping mechanisms. This can potentially have a positive effect on their children which will buffer them from the physiological consequences of long-term exposure to stress due to adversity. By modelling adaptive emotional and behavioural responses to stressors, the yoghurt mamas are able to teach effective emotion regulation strategies to children and other adults. They are also able to orient others towards more positive outlooks to life by promoting optimism and the search for meaning. For instance:

My involvement has disproven the law of widowhood...widows are generally seen as someone who needs to be constantly assisted. However, my involvement has allowed others to see that I can manage on my own and I do not need assistance, and it is proof that they can do the same. Just because you are a widow it does not mean that you are incapable of taking care of yourself (Sarah, Female, early-30s, widowed, HH, 2D).

Taken together, role models can diminish the effects of adversity on pathogenic mechanisms that may lead to chronic disease because they are able to effectively model the "shift-and-persist" strategy, which embraces: acceptance of stressors, a more positive appraisal of stressful situations and techniques to effectively regulate emotions in stressful situations while enduring adversity with strength, finding meaning in life and

holding an optimistic outlook about the future (Chen, 2012). The yoghurt mamas assert this by explaining how their daily interactions have changed, and the ease with which they are able to interact in the community because of improved self-esteem, self-worth and confidence.

I have now developed a self-confidence without feeling uncomfortable...I had trouble talking to both men and women before. In our community, parents feel discomfort talking to their children about issues too, which leads to poor upbringing and now I am able to speak to them directly...I can discuss and speak to them about difficult topics, which I thought were taboo before. Also, now I can speak and discuss with my husband, openly about different matters and assist him with problems he is facing (Doris, Female, early-30s, married, 6D).

From the accounts the yoghurt mamas provide it can be gleaned that development projects of this kind demonstrates that targeting women at the local level has the potential to impact women, change their realities, and empower the women by increasing their skills and knowledge, and by fostering an environment which is conducive to promoting positive social change within the community. They have become more engaged in community activities, increased their social interactions, their participation in social/community meetings is more fulfilling, developed their leadership qualities, actively participate in solving problems related to women and the community, have increased their decision-making capacity in the family and community, have built self-confidence, and have developed an enhanced awareness and sense of achievement. The study now turns to how this may have influenced family and community relationships.

## 6.8 Family Relationships

The women which form these groups are from diverse backgrounds; have different levels of commitment to networking and project activities, different household arrangements and of course varying levels of wealth, status, needs, interests and religion. As such, the specific cultural and social context of women's lives has to be taken into consideration. If these differences are not recognized, it will remain difficult to sustain a successful group approach to such an entrepreneurship scheme because of the multiplicity of ways a person operates within the sphere of their lived reality.

For instance, external factors such as family relationships can pose challenges for the success of the group, especially for gender based entrepreneurship. In a context where women's autonomy and physical mobility can be restricted by gender inequalities within the family, differences in economic roles and power as well as oppressive cultural traditions, this lack of encouragement can decrease a woman's participation in the public sphere.

In a number of cases, the women interviewed often emphasized the presence of gender-specific difficulties at different levels, such as political involvement or lack of gender sensitivity among clan Chiefs at the community level, and resentment by females within their close social circles and other clan members (especially female). In other instances, a number of the women and their husbands expressed some domestic difficulties at the onset of the project, but since, have been able to come to a mutual understanding of project and household responsibilities and have been able to balance domestic and project demands. Often, the control of women's involvement in the

public sphere is strongest at the family level – with husbands actively working towards preventing women from working outside the home; using domestic quarrels, violence and other forms of intimidating behaviour to prevent them from participating. In this study, it was, very promising to hear that generally, all of the husbands and other members at the family level actively encouraged the yoghurt mamas to participate in the project. Nevertheless, a participant described the challenges she experienced at the hands of her extended family.

My children are proud of me and my participation in the program, they are in support of the project because they were previously learning in a public school which was not good at all, the education was very poor. Now they are enrolled in a private school where they are learning English and Kiswahili. Previously, they were envious of the other children who were better off. But my extended family...father-in-law and brother-in-law are not happy with my participation because they always expected me to be permanently dependent on them since I am widowed. My independence from them has resulted in them beating me and injuring me severely which resulted in hospitalization and a police case. My extended family has had a negative perception of this participation because I am no longer dependent on them, this has severed our bond to a certain extent and they are jealous of my money and independence (Sarah, Female, early-30s, widowed, HH, 2D).

What can be taken away from these lessons is that with project expansion and greater involvement with similar groups; assessments should be carried out to ensure that the women are not at risk for intimidating and unsafe behaviour by family members.

The dynamics of family relationships are also changing. Socio-cultural norms are experiencing speedier transformations as shifts in gender roles are being pushed by other factors. With the recent global economic crises, there are decreased

opportunities for men to earn a 'household income' and to be the sole breadwinner for the family. This means that many households are not able to meet their needs from male-earned wages alone and in many cases the woman's contribution to the family income pool is not only expected, but encouraged and has increased over the years. Additionally, with the prevalence of HIV/AIDS and increased numbers of female-headed households, women are required to take up employment in order to earn an income.

The program has really benefited me, for the last 5 years when I was not taking yoghurt I was usually weak and could not participate in any income generating activities.....at least Mama Martha is able to come home with some income to purchase food, so even when I am unable to work, or do not have work she can purchase food and support the family with basic needs ( Male, early-50s, married, HH, 7D).

Further, the income generated by the credit that the women receive has also allowed their spouses to engage in other income generating activities. One husband elaborates on how he is able to budget their household discretionary income to improve their quality of life as a result of income that has been freed up.

Given that I earn little, and she is earning some money she can buy vegetables for the family. She can also buy the orphans and the kids some clothes. I feel relieved that our [son] can take milk from the kitchen which relieves me of the stress for having to buy milk for the baby which is an added expense. Mama Doris, is also more independent now, and does not rely on me financially as much anymore. The added cash flow allows us to buy more nutritious food for the family. Now, my salary is being used for other income generating activities, they have not provided any income as of yet, they are still nascent, but at least my income is no longer used for as many household responsibilities such as food and housewares. One of my activities is to farm maize, because I have the extra money to do so, and now this will help us to meet some of the household food needs (Male, early-40s, married, HH, 6D).

The yoghurt mamas and their husbands elaborate on some of these themes, such as pressure and stress to balance work and home tasks, the number of hours committed to the kitchen and being in town, decision-making processes, and control over household assets:

When asked to discuss the stresses of balancing work and home tasks the husbands felt:

There is not much burden because she does her domestic chores before her daily duties, and if she fell behind with burdens, then she would be upsetting herself, this is not happening so I know that there is a balance (Male, early-40s, married, HH, 6D).

There is more pressure to balance work and home tasks. There is child care, cooking, security [referring to safe guarding the compound], and I can not come to town to socialize, and I worry...I worry about what the children will eat for lunch – she does not pack a lunch for them, so I have to do that. I feel that I am being stifled professionally and socially because I have to take care of the household chores when she is away and this causes tension and friction between us (Male, early-40s, married, HH, 6D).

The husbands also shared some of their perspectives on how they felt about their wives spending a substantial amount of time in town and at the kitchen:

I have nothing to say because the women work daily, I know it is a legitimate business and it is upon them to organize themselves accordingly. It does not bother me that she comes to town or devotes so much time to the kitchen (Male, late-50s, married, HH, 7D).

I suppose I am fine with this now, but it is not ideal. Especially at first, our child 'Jacob' was young, very young when she went to Tanzania. There was a lot of tension between us as a result of this. I had to take care of the child because he was so young and needed care. I also thought that after she began to gain money she would be a different person, and I would lose control (Male, early-40s, married, HH, 6D).

When asked to reflect on household decision-making processes with their wives, the men had very different standpoints from their wives in what constituted shared household decision-making. The men felt that it was a mutual task, shared equally:

Yes, we have joint discussions about household decisions, and this was what we practised prior to the project. Even when we married and she did not have money to join the Orande Women's Group merry-go-round we would sit and discuss this as a couple (Male, early-50s, married, HH, 4D).

We sit down as a family to make decisions, it has been like this for a very long time now, not just now that she is earning an income. Because of my health, it is important to discuss the issues which need to be addressed within the family. She does not shun away from me anymore and she will sit next to me and discuss (Male, early-50s, married, HH, 7D).

The men were also asked to share their thoughts on equitable control over household assets; they all stated that there is shared control over money and household resources.

Two comments especially stood out as an encouraging sign of change in gender relations:

It [equitable control] has always been there over assets, but the project itself has allowed her to boost herself and take more active control in such discussions. I see that there has been a positive change in her attitude, she is more empowered (Male, late-50s, married, HH, 7D).

We share our assets, and control is equal, I understand that we need to communicate about such things and this leads to better understanding in the household – we are closer and stronger because of this (Male, early-50s, married, HH, 7D).

The yoghurt mamas were asked to reflect on the same set of questions (pressure/stress to balance work and home tasks, the number of hours committed to the kitchen and being in town, decision-making processes, and control over household assets), and were invited to elaborate on their viewpoints about these issues. Overall,



the perceptions of their daily realities surrounding the project were in agreement with those presented by the men, however there were differences in opinion as well. This aspect is illustrated with the declarations of the women who affirm:

My husband took the project as a positive element, and he agreed that I should participate. I asked for permission and he said that it was ok. He did at first complain about the long hours and me coming home late, however I have since spoken to him and everything is well now (Catherine, Female, early-30s, married, 3D).

It is difficult for me to tend to my farm, but I receive support from my family. When I am not there to supervise I feel uncomfortable...that my instructions are not being carried out or the farm is not being tended to properly (Janice, Female, early-50s, widowed, HH, 8D).

Initially, he was not happy with the project, because I would leave early in the morning and come home late and I did not have time to work on the farm – he felt as though I was not working, this created conflict and sometimes we quarrelled. But now he encourages me to come to work and he is ok with the schedule because of the financial improvements. When I was going out I would leave without preparing anything and he would not approve of this, now he [husband] helps me to prepare food at home for the children (Faith, Female, mid-30s, married, 6D).

Importantly, when asked to describe if they had more control over their personal resources/assets in the household and if there was more equitable control, the yoghurt mamas living with a male family member generally provided accounts of improvement in power over financial decisions involving household assets and their personal resources. However, there was also evidence that not all the women had experienced the same degree of emancipation. The comments below present the views of some participants:

Yes, the project has had a positive impact. With the savings I have and the personal bank account I opened after beginning work with the project, things are moving on well. If it was not for the project I would not have control over any finances, household assets or other major decisions within

our home. My husband still has overall control over household assets, but I am more capable of accessing personal assets and controlling my own resources (Doris, Female, early-30s, married, 6D).

Back at home, one of my children recently cleared the primary level. I gave my husband advice to begin searching for the school fees and I would cater for the child's other needs. I feel that I have greater power in decision-making for the household, and now I can buy housewares, soap, and other supplies. Regrettably, I do not have the ability as of yet to bring more expensive assets such as the chairs into the house [*pause - thinking*]...but I have the control over the money – my husband has few words to speak about this (Esther, Female, early-40s, married, 6D).

Although, the project has increased the yoghurt mamas' work burdens as a result of being responsible for performing duties both in the private and public sphere, they seem to be balancing their household duties very well. There have also been tangible improvements with respect to household equality which are encouraging signs of empowerment in three areas – increased equity, increased control of assets, and increased joint decision-making. It can only be hoped that future projects will have comparable positive outcomes and enriching experiences such as these on the yoghurt mamas and their families.

## **6.9 Community Engagement and Perceptions of the Project**

Community engagement and perceptions of the project are important predictors of its potential success. With positive community perceptions and engagement, the project can act as a catalyst to mobilize greater efforts amongst community leaders and local government officials to seek strategies to develop and implement health policy and reform to reduce social and health inequities within the broader community.

Motivation stemming from the project can be leveraged to solve collective concerns as well as improve and maintain the well-being of the community.

The yoghurt mamas, their husbands and key informants felt that the project has been embraced by the community and support its activities – their opinions of the project have been positive and accepting. Those who back the project, support it staunchly. They also agreed unanimously that the project has led to increased awareness among local community leaders and government officials of the potential of probiotics as an adjunct regimen for HIV/AIDS. The project has also highlighted the capabilities of women as entrepreneurs, their status as role models and mentors, and the pivotal role of women in fostering family health. Unfortunately though, support from local and regional officials has been symbolic rather than substantive. In fact, the respondents undisputedly concurred that local leaders and government officials had not planned strategies or passed policies (e.g. coordinate and facilitate additional partnerships between other state, parastatal or private organizations to ensure that strong collaborations are built - between leaders of all sectors of the community, service providers and social welfare organizations) that would support the continued success of the project; or make a commitment towards a mandate to offer the probiotic yoghurt to those who are HIV+ and taking ARVs within the community. In fact, many members of the town council were not even aware that the project existed in their community, a despondent reality considering the relative size of the town and publicly accessible project activities that explicitly served to create awareness within the community across multiple levels of civil society and the local/municipal government. Several events were

organized by the project and others whereby local government officials were invited (e.g. music festival, annual high school sporting event). The various implementers (RDH, WHE, yoghurt mamas, project coordinator) had also on occasion made concerted efforts to acquaint the local government of project activities by visiting the municipal government. Perhaps the project could benefit from, increasingly concentrated efforts with identified outputs/deliverables that the implementers and the local government could jointly work towards.

From childhood, many East African women are brought up to believe that their place is at home, especially among farming families in rural areas. Consequently, women lack the skills and motivation needed to take up non-traditional economic activities. Indeed, women who do not follow this trend need to be identified as leaders setting examples for other women and young girls. As it emerges from the interviews, the yoghurt mamas felt that the local government agencies and their clan chiefs neglected to play this supportive and encouraging role, although they generally backed the project.

The local leaders do not offer any aid to us. They argue because we have support from AMREF [African Medical and Research Foundation] and TOWA [Total War Against AIDS], and the project [KEMRI, MoH, Western] enough has been provided to the group. It is as though they don't want to see us to prosper...their disposition and bad manner makes us feel second rate even though we have achieved such success and approval from the community. The local leaders don't understand that they are causing harm by not supporting us (Nadia, Female, mid-30s, widowed, HH, 3D).

The affirmations above demonstrate that attitudinal barriers appear to prevail, and changing these ways of thinking may take a substantial amount of time to alleviate.

Reminding us that empowerment, shifts in entrenched socio-cultural paradigms (such as challenges to gender norms that may lead to improvements in social position), and changes in attitude are time consuming processes. A case in point is the proceeding example. Although this community and the surrounding areas are stricken by the highest prevalence rates of HIV/AIDS in all of Kenya, people continue to cast disapproving attitudes towards those who are HIV+ or appear to be HIV+. The concerns raised by the yoghurt mamas, are indicative of the necessity to pursue additional community-level HIV/AIDS public education, particularly targeting social stigma, ostracism and fear. Specifically, there is an opportunity for the community kitchen to enlarge its role as a site for health promotion, health education and increased community engagement and awareness regarding HIV/AIDS, especially since the yoghurt mamas and the kitchen already act as an ad hoc support group in many ways and the yoghurt mamas take part in community Home Based Care. The kitchen and the yoghurt mamas already work towards mitigating the pressure of stigma and ostracism; however, there is more that can be done.

Initially, when I joined the group I had a phobia that I would be seen as someone who is sick, however I have overcome that, now and I am able to buy medication and go to the hospital to access drugs because of the project – I have money and I am not scared of being associated with HIV anymore even though I recently found out that I am HIV positive (Linda, Female, early-50s, married, 4D).

Expanding on the idea of increased community engagement, many of the yoghurt mamas cited that at current levels of participation with community engagement they have experienced increasingly optimistic attitudes which have led to

positive impacts. The yoghurt mamas commented about increased self-awareness, a greater likelihood to contemplate change, a growing interest in serving their community which provided them with a deeper understanding of community and the feeling of personal growth. Networking with other women and groups has allowed them to expand their knowledge, skills, and broaden their learning opportunities. They also indicated that participating in the project has provided new social networks. By establishing these vital connections with community members, some local leaders and government officials they have been able to disseminate information and increase awareness about the project, while receiving valuable encouragement and support. Adding to this, all of the yoghurt mamas and a sizeable number of their clientele stated frequently that the kitchen fosters a supportive environment whereby the women are able to share ideas, express themselves freely, and gain moral and emotional support from one another. The kitchen has become a public hub for engaging the community and a place to share knowledge. It provides a space to meet others in a non-judgmental environment where they can exchange information about health concerns, finances, and other matters. In fact, a number of the clients formed their own micro-credit group as a result of meeting at the kitchen.

Community engagement is a strategy that provides people with the sense that they can proactively solve their problems through reflection and collective action. While many individual factors contribute to the achievement of greater community participation/engagement, there is a mutual understanding that the core value of community engagement is that it provides a mechanism for people to participate in

activities that have the potential to positively impact their lives. For instance, activities related to their health or taking greater interest and involvement in political spheres.

One of the most significant benefits cited by the yoghurt mamas is the heightened sense of responsibility and conscientiousness regarding their ability to achieve change – for their health, the health of the community, and exert influence with social and civic spheres. This professed gain in power, can be attributed to their acquisition of new skills and control over resources (Meier, Pardue & London, 2012; Dujardin, 1994). The yoghurt mamas and the community have the opportunity to educate themselves to the possibilities of controlling their own destiny, often resulting in more equitable relationships between oneself and others. Another benefit of the kitchen is the potential for greater diffusion of health knowledge in the community and the sharing of indigenous expertise between the yoghurt mamas and other community members. Further, the yoghurt mamas involvement with other groups such as the African Medical and Research Foundation and others has offered to them additional training and experience through particular initiatives that has enhanced their knowledge.

In summary, to be both long lasting and effective, community engagement must become an integral part of the entire community's common experience and not remain as a structure imposed from the outside. Community engagement should be supported by access to needed and usable information and be given genuine support by local leaders, chiefs, and the political/administrative system.

## **6.10 Civic Engagement and Broad Spectrum Networking**

Research in development literature is abundant with examples of participation in and engagement with communal activities bringing people into contact with one another and fostering an environment that is conducive to civic engagement and networking. For instance, work beginning as early as 1983 (Chambers), demonstrated that participation and cooperation are essential to the accumulation of social capital secured through social relations by virtue of actors' connections that have enabled access to resources in the networks or groups of which they are members - social capital embodied in norms and networks of civic engagement can be a precondition for development, economic and otherwise, as well as a means for effective governance (Putnam, 1993).

The project has allowed the groups to establish networks and access resources beyond the immediate community. For example, the Oyugis team were given the opportunity to network and access resources from Maanisha-AMREF, the Koderia Greenland Group, the Ministry of Health (MoH), and the National AIDS Control Council – Total War against HIV and AIDS Project (NACC-TOWA). The value of affiliating with such organizations extends beyond networking to strengthened capacity building, knowledge and skill building as well as improved resource capacity of civil society organizations and community based organizations (CBOs) such as this.

The partnering/affiliation between the institutional stakeholders and the yoghurt groups serves to authenticate their existence as an organized community based project and legitimize their related activities. As such, networking with and



accessing funds earmarked for specific projects as set out by larger state, parastatal, and international bodies and receiving training has increasingly become easier for the women and benefited them greatly.

During the course of the interviews (some of the women and the project manager), revealed that the team had applied for and received two grants: 1) Maanisha-AMREF for the sum of 410,000 KES (approx. \$ 4,825.00 CAD) and from 2) NACC-TOWA for the sum of 350,000 KES (approx. \$ 4,120.00 CAD). The team became aware of these opportunities and were able to submit proposals as a result of their institutional affiliations with the MoH and the public health officer. With the assistance of these stakeholders, the group prepared and submitted the successful grant proposals which allowed them to participate in broader community outreach programmes. NACC-TOWA provided them with funds to assist orphaned and vulnerable children (OVCs) within the community that are under the women's foster care with: school fees (primary and secondary level education), school uniforms and supplies, and foodstuffs. The funds from AMREF, under the Maanisha programme were provided to undertake activities that included indispensable training on how to provide home and community-based care for people living with HIV, educating young people to prevent HIV infection, encouraging people to be tested, and supporting orphans and widows; some supported people to abandon harmful social and cultural practices such as sexual cleansing that fuel the spread of HIV. One of the yoghurt mamas explains:

Our involvement [with the yoghurt project] has enabled us to get money from TOWA and AMREF. We can easily be helped by these organizations because we are seen to operate at the grass-roots level with focused objectives which allows us to access funds more easily than most. We have

been able to provide school uniforms to our children as well as orphans through the funds (Janice, Female, 53, widowed, HH, 8D).

Another yoghourt mama states:

My involvement with AMREF because of the [yoghourt] project allowed me to receive training on Home Based Care which gave me knowledge on how to take care of my own family and their health needs. I can take care of those in the community now too...when someone has a problem in the village they come to me first before they go to district [Rachuonyo District Hospital]. I am grateful for the money that was given to assist with my children's school fees and orphans fees that are under my foster care, I couldn't send them all to school with uniforms and books without the extra money (Lordis, Female, 33, married, 7D).

While this type of partnering is important for civil society engagement, training opportunities and networking, it is also vital for the future financial sustainability of the project (especially with the withdrawal of World Bank funding) and capacity building. By strengthening the skills, competencies and abilities of the women in proposal writing as well as knowing where to access information regarding development programmes that provide funding is imperative to their future sustainability and success. Within the Kenyan context, for a small CBO such as Orande, obtaining funding was a significant accomplishment, an important step forward in their advancement as a group, and a boost in their self-esteem and confidence. The success of the grant proposal, coupled with the administration of the funds, demonstrates that the members possess the skills necessary to manage project funds and carry out administrative tasks.

## **6.11 Main Challenges with the Group Approach: Does it Encourage Empowerment, Cooperativization and Sustainability?**

While the economic conditions of women are an essential part of community and social development, it is critical, to also examine and understand the performance of these forms of group entrepreneurship from a socio-cultural point of view in order to locate them within a broader social and policy (administrative and strategic) context. Several elements regarding the performance of the kitchens are highlighted and critically examined to determine whether they threaten empowerment, cooperativization and long-term sustainability of the project. Important issues for understanding the dynamics that can lead to failed groups are explored – for instance how the groups were formed and on what basis, how the local socio-cultural inequalities continue to persist and affect a group, and how the hierarchy of class led to marginalization, lack of participation and equitable access to shared information. Unfortunately, these core ‘group factors’ can counteract the individual gains discussed above.

### **6.11.1 The style of leadership is not always participative and democratic**

The majority of members, irrespective of group, expressed that transparency in decision-making, accounting and financial record keeping, accountability, good leadership, and cooperation among members are essential for efficient functioning and sustainability of the group. Additionally, the teams identified the role of the project co-

ordinator and group leaders are primary factors that could result in the success or failure of a group.

A mutual complaint made by both the Oyugis and Kadongo groups was their lack of decision-making authority specifically as it pertained to the selection of a male project co-ordinator and administration of funds. The project co-ordinator was hired and directed locally based on the fact that a background in food sciences was ideal, but input was not sought from the women's groups in this hire, the role and responsibilities of this position or whom might be best suited in this role. Participants reported that the project co-ordinator's management style was at times in discordance with the expressed needs of the groups and its members.

In the case of the project co-ordinator, the women from the Oyugis focus group discussion revealed candidly their opinion about the management and project co-ordination:

We see ourselves growing the project without male input – internally we do not want male intervention in the kitchen...Since it is an organization whereby most involved are widows, we all aspire to work towards working hard to make the project big. However, we need a leader who can guide us and provide direction. We need someone to be a supervisor who can lead and direct us, someone who unites us so that we can work as a group towards a common good. [Also, the communication within and between groups and the various stakeholders has been a challenge and needs to be improved] (Oyugis – FGD).

[Principal group managers] must be trained by social services in how to handle sensitive situations and problems. [Group members should be trained on conflict resolution] (Kadongo – FGD).

As well, project operating funds were administered by one of the institutional partners (KEMRI) to the project manager and then dispersed to the project co-ordinator

rather than the groups directly. Although the purpose of this was to prevent the misappropriation of funds and other power struggles within the group and between the two groups, the women generally felt excluded from the overall funding scheme, accounting, financial decisions including procurements, maintenance, and financial oversight strategies. The teams appealed for greater inclusion in decisions that affected them and increased consultation on matters pertaining to general project management, however, their requests for more inclusive participation in decision-making were not successful until there was a change in the structure of project management.

There is miscommunication in terms of operations and transferring of money, which perplexes us, we do not understand why it takes such a long time for the money to reach the ground, and why we can not decide what it should be used for (Kadongo - FGD).

With regard to the group leaders, they were chosen from among the group members through a semi-formal selection process, the sole prerequisite was that the leaders had to be literate in order to perform the record-keeping and maintain the accounts. It was typical that the group leader had received little more education than the other members of the group, which resulted in problems within the group, as the group leader often projected an air of superiority over the rest of the women. The focus group discussion (FGDs) and in-depth interviews (IDIs) revealed that the group leader was often the only executive and decision-maker for the teams -- sometimes the decisions taken were for the benefit of the team, but the leader also regularly carried out decisions based on ulterior motives or as an agent. In many cases, the group

leader's decision was reinforced by the assistant leader, which served to provide a sense of legitimacy.

Furthermore, the two groups came very close to collapse on a number of occasions due to a lack of internal trust. Leaders were often cited for failing to reveal the details of sales, concealing the account books, and keeping other important records (e.g. bank statements, constitution etc.) in inaccessible locations (e.g. locked office and filing cabinet, floor safe with lock) – such secretive actions created suspicions of corruption and theft. In another instance, there were accusations of deposits being withheld from the bank. These types of misunderstandings have the power to create rifts between members and groups. Members from both groups expressed the need for increased transparency, especially with regard to the finances and the record-keeping. One of the yoghurt mamas belonging to the Kadongo group affirms this with the following statement:

There should be transparency and accountability at the kitchen in Kadongo, and every member of the group should know the amount in the account, and the books should be open to everyone to see and read. This is one of the reasons I am not pleased at all (Georgia, Female, mid-40s, married, 5D).

We have no follow-up of what is being kept in the bank. [Some members] have the upper hand on all of the kitchen issues and they are not open with the rest of the group. Whenever we try to inquire about the bank account, a disagreement always erupts. We have the knowledge on how to read the bank statements but there is no transparency. When the issue of looking at the files is presented there is chaos – the key holders do not let us see the files, and they state that if there is a bone of contention the person with the problem should leave the group. The office is only accessible by three people, the chair, the treasurer and the clerk (Martha, Female, early-40s, married, 7D).

Such practices work against the grain of creating effective group networks and trust building through cooperative actions. Theoretically, there should be no division of responsibility and decision-making within the group; however, this was often concentrated due to the inherent social and cultural inequalities of the society that the women represent.

### **6.11.2 Group Heterogeneity: Complexities in Group Dynamics Linked to Class, Power Structures and Gender Relations**

One of the basic tenets of the of the WHE project scheme is to involve women from the most marginalized groups of society – those that are the most socially and economically vulnerable. However, it has become evident that some women are significantly better off than others within these groups. This socio-cultural constraint prevents an increase in the participation of the women in the project, and ultimately limits their empowerment. Although both groups in the study have members participating from different social classes, the divisions between members of one of the groups are more pronounced. In other words, the women belonging to one of the groups are more alike in a number of respects, particularly socio-economic variables, as compared to the women that compose the other team.

The women participating in the project were selectively chosen by members of their respective women's groups to form and participate in the yoghurt mama group. However, the process served to marginalize some of the most vulnerable women and excluded them from the larger project. This has also led to an imbalance between the groups. The Baraka Women's Group as a whole, has a greater number of women that

are better off, as compared to the Besigre Group. Additionally, those who are better off were nominated to participate in the yoghurt project. The result has been the formulation of a yoghurt mama group that is unbalanced, inequitable and marred by frequent conflict due to abuses of power and resentment.

One of the main challenges of this project was the known reliance of using a pre-existing structure to house each of the kitchens that was owned by one of the group members. The elected Chairs of each of the kitchens were by default (even through 'democratic' processes) the women who owned the buildings which were renovated to house the kitchens. Although the Chairs were 'elected' through formal processes, it is believed by many of the group members which are further removed from the immediate clan that the results of the elections were thrown. This viewpoint is especially prominent in Kadongo whereby members of two separate groups have come together to form one. The members of the Besigre Women's Group often feel marginalized in the decision-making processes and their ideas are frequently dismissed and deemed as inadequate. Their integration into the larger group framework has been challenging and strenuous. The transition has been particularly difficult for those that are more empowered and boldly express their opinions, and are accustomed to certain levels of respect and seniority within their own group. This fuels animosity and a lack of trust within the group.

I try my level best to be here on time when I am on duty, and attend our meetings, but it is very frustrating. I help in the kitchen and go to the field, I see many things we can improve on...my suggestions are never taken into consideration. The committee members - the women that are better off and are friends with the Chair, who is their relative, their ideas are always



followed...these women are too influential in the group, and me, I come from a poor family, I have to obey them. Sometimes I want to quit the group. I know they won't care or ask for an explanation. They don't enable us to become part of the group and they fail to realize our potential contribution and benefits (Patricia, Female, late-40s, widowed, HH, 5D).

Overall, all groups expressed the need for engaged leadership that is actively involved in the direction and objective management of the project and the use of strategies fostering effective communication.

At both sites, the husbands' of several of the group leaders became virtual leaders of the group, influencing their wives' actions, thoughts and practices. Some of these husbands affirmed that they were more educated and experienced and the women should accept their guidance. Many of the group members found the interferences from the men as intolerable and expressed that they should be prevented from interfering with project activities.

The creation of overdependence on leaders has also been found within the groups, which can adversely affect the sustainability of the project. Leaders must learn to relinquish some power and control, while group members must also learn to become self-reliant. In general, it is advisable for the groups to develop a second line of leadership to take up roles and responsibilities in the event of extended absences, and with the gradual withdrawal of stakeholders which play a role in direction and management of the project. This is illustrated by several of the yoghurt mamas:

[One of the elected leaders] wants to do everything in the kitchen and won't let anyone do anything else, everyday we should adhere to our tasks to complete our duties, but she always interferes and tells us we are doing everything wrong, from the cooking, to the packaging...(Jacenda, Female, early-40s, widowed, HH, 5D).

As an old lady, I request that the group become unified because they are divided. They are divided in two groups; [one of the elected leaders] feels she is in control which is causing the group to become more divided. The Chair lady and the treasurer fought very hard to bring the project to the ground [to Kadongo], but the [elected leader] was not actively involved and now she wants full control...it seems as though she is trying to undermine one group and support another (Jacqueline, Female, 54, married, 6D).

Also, field observations and interviews indicated that several of the leaders kept prominent positions within the group term to term. Although their constitutions state that leaders are to be elected afresh once every year, in both groups it was found that the same leaders were in 'office' since the inception of the project. This trend seems to have emerged where the 'educated', the better-off, or those considered to be in a position of power, dominated the groups and were re-elected several times as leaders – these actions are explicable to a certain extent by the members' lower levels of education, and lack of personal confidence in their abilities to take on the more demanding responsibilities of being in a leadership role and traditional socio-cultural structures which can work to dictate protocol.

The group leaders that were chosen seem to have become empowered and advanced the most. Although this is not an undesirable outcome, confinement of empowerment to themselves alone gives them the opportunity to dominate over the other yoghurt mamas in the group. Unless the group leaders work to include and educate the entire team to manage the group, maintain accounts and other records, this will eventually lead to unbalanced empowerment within the group, and not empowerment to its fullest extent. This control over power by the more robust

members of the group has also led to the gradual decrease in interest among other group members, a decline in the effective functioning, and resentment towards the leaders. This has also worked to contribute towards a continuing build-up of distrust between the members and segregation into factions. One member and a concerned spouse explain:

I am not happy at all with the leadership; I don't know how they were chosen to be our committee or leaders. I feel that those who have worked hard on bringing the project here, and those that work hard every day have been by-passed as committee members. Some, those that have not struggled for the project, just want to take over – they walk in and take over (Jacenda, Female, early-40s, widowed, HH, 5D).

If it weren't for these three ladies, the program could be much better, and stronger. Instead of these women empowering the less fortunate women amongst them to become stronger they are distressing them, causing more stress in the work environment (Male, late-50s, married, HH, 7D).

A troubling example of the misappropriation of funds and resources, was the purchase of separate stocks of milk for private sale, and misuse of kitchen supplies and resources, thus jeopardizing the success of the project. Several group members began obtaining; pasteurizing and selling separate stocks of milk for their own advancement and personal benefit using project resources. In this case, the majority of yoghurt mamas interviewed one-on-one as well as in the focus group discussions affirmed that this practice had taken root and felt demoralized. Several of the issues described above are clearly articulated by a middle-aged member of the group and brings into focus several of the issues:

Their practice of selling private milk at the kitchen is demoralizing. This has resulted in some of the women not wanting to sell at the market. They are reluctant to take a greater initiative to sell at the market because we don't want to sell the milk for those mamas who are buying milk separately...they buy one jerry-can and sell it at the market but the money is not shown in the books. The profits are then taken to their bank accounts. They use the gas in the kitchen to boil the milk, the soap and water to wash the sufurias. The issue has brought a lot of controversy amongst our group. Most of the mamas come in late because we don't want to boil milk and sell for the two making extra money on the side...This is a malpractice that is deeply rooted...they are reluctant to stop despite constant pleas from the rest of us (Martha, Female, early-40s, married, 7D).

Overall, although members of both groups confirmed in many instances that one of the strengths of the project model is that it has been formed with the aim to assemble the most marginalized members of the community together, and those with similar socio-economic backgrounds, remarks by the two-thirds of the women interviewed indicated that there were difficulties of interaction between members across clans and class divides. Such ruptures are not uncommon. In many instances, members alluded to missing a 'real' cohesiveness leading to alienation and discord within the group.

### **6.11.3 The Need for Equitable, Supportive and Constructive Relationships**

Numerous challenges have led to the decreased functioning of the kitchens, and threaten the sustainability and success of each of the sites. The various problems can be grouped into categories: infrastructure and equipment (deteriorating buildings, poor quality equipment and packaging) production and technology (spoilage due to contamination, inconsistent bacterial culturing of the probiotic), raw material (variable

milk supply particularly during the dry season), capital flows and finance, marketing and sales as well as other problems. However, from the IDIs and FGDs with the members of the groups, it has become apparent that less than optimal functioning is due more to the lack of management, coordination, collaboration and communication a) between the groups and the stakeholders, b) between the groups, and c) within the groups. Important concerns about communication and collaboration were revealed during the course of these IDIs, FGDs, and discussions – they are subsequently summarized.

As the participants elaborated throughout the IDIs and FGDs, it became evident that communication was an area of major concern. Communication was described as weak, lacking or non-existent between: groups-other stakeholders, group-group, and within groups. An analysis of the information pathways showed several areas of weakness with respect to project communication. Dissemination of project information within institutions was often patchy, indicating vertical linkages are missing or incomplete and horizontal communication linkages between the partners have not been properly established. It was usually, the project manager who acted as the communication channel between the institutional stakeholders, the project coordinator and the yoghurt mamas. Among the yoghurt mamas, there is concern over the lack of direct communication linkages between themselves and the institutional partners such as WHE and KEMRI. It became clear that regular and structured communication between the institutional partners and the project participants was needed to foster common goals. This would also allow all stakeholders to develop a

shared sense of ownership regarding project outcomes, strategize and effectively resolve challenges as they arose.

The groups also openly declared that they can learn from one another by communicating and exchanging knowledge on how to overcome shared challenges, even beyond the project, and should collaborate on joint ventures to improve their productivity, sales and income.

There is very poor communication and understanding between us and Kadongo. It is very regrettable that we are the same project and we can not work side by side efficiently to become stronger. If we train other women and open other branches of the project, there needs to be co-operation between us – setting common prices and common products, as well as problem solving amongst the different groups talking about challenges and solutions (Oyugis – FGD).

Our communication strategies should improve, now between us [the two groups] and as we continue to expand. The communication between the two kitchens is very poor, it would be better if we could collaborate and assist one another. If at all we had effective communication, we could organize seminars which would train other women in different areas on the importance of yoghurt. But this has not happened due to the poor communication between the two sides. We need to unite with one another to move forward and progress (Kadongo – FGD).

Despite this outward expression of the need to communicate and collaborate, implicit in the tone of the dialogue, was an atmosphere of resentment, antagonism and competition from both groups. Field observations and experiences also support this conclusion as the groups fought over their sales areas as the Kadongo team often encroached the Oyugis team's sales area. The interviews showed that one-third of the members, particularly the committee members of both groups had trouble actively participating in this process of knowledge sharing with the other group. The groups

protect their knowledge, production/recipe secrets, resources, and sales territory.

Information and strategies to improve sales was not shared on an equal or regular basis.

#### **6.11.4 Lack of External Support from Stakeholder Institutions**

As it emerged from the interviews, the women felt that external support from the partner institutions and others (such as those involved with development activities e.g. Community Development Fund and their local chiefs) was lacking, especially KEMRI. The women felt that as a local partner, they neglected to play a supportive and encouraging role in their development and advancement of the project. Most of the concerns that surfaced related to structural weaknesses within the project – stakeholder linkages were not adequately established at the beginning of the project, and weak communication exacerbated the situation.

Given the complex socio-cultural and economic environment in rural areas such as Oyugis and Kadongo, the development schemes employed and the partners involved should address specific contextual needs and requirements of the women rather than act as restrictive instruments and or agents. Partners, such as KEMRI (which have, in this case received compensation for project activities such as administration and scientific support) should be able to provide financial and commercial support systems, opportunities for research and training, and an extension of consultancy services that are yet to reach these rural locations (and women) adequately, and to address risk factors associated with development and sustainability. Despite receiving a percentage of the grant for providing external support, KEMRI was less willing to assist with

providing adequate monitoring and quality control (ensuring that the product was probiotic, ensuring that there were no other pathogens being carried in the milk) which is important for all, and increasingly more so for the demographic to which the yoghurt was being marketed to – the immunocompromised. Additionally, their lack of interest in further building capacity by encouraging and initiating technical/scientific training to hospital staff (which were actively involved with the project and probiotic culturing despite being constrained by resource-limited circumstances) and the yoghurt mamas. This served to weaken the support networks which were initially set out in the project mandate. Unfortunately, these observations make it evident that there is a lack of initiative from the some of the southern partners to wholeheartedly participate in jointly achieving common goals.

## **6.12 Main Findings**

The case study demonstrates, that if we take an uncritical stance towards this *'group approach'*, it can be considered to empower all women considerably with improved lives - with health, social and economic improvements, and is a manifestation of a communitarian vision (Bauman, 2001; Gutmann, 1985).

Further, the project, overall, can be considered a critical medium which provides an enabling environment for these groups of women. Whereby the skills and knowledge the women gain can be considered self-enhancing tools, provided in an encouraging setting with support systems, which in turn aids them in making decisions and to exert control over their lives. Women's empowerment must be considered a



process, which embodies 'self' and cannot be attained through the direct interventions of outside agents, it must be self-selected and self-driven and is not susceptible to interventions of those wishing to 'empower' (IPPF, 2007). Community participation projects which are contextually and locally relevant and focus on empowering women can create both direct and indirect benefits. Future community efforts should be supported by local leaders and government, as effective participatory community projects can be viable methods of creating sustainable lifestyles, improving health and the quality of life of subordinate and marginalized groups.

### **6.13 Chapter Summary**

This chapter examines the results of the WHE community-based enterprise led by women which is formed by a network of self-help groups. By individuating some of the main challenges, it becomes clear that while the 'group' and social forms of entrepreneurship have inherent benefits, it can be very difficult for these enterprises to operate successfully, and the model should be re-examined before it becomes the ultimate paradigm for all WHE health and development projects. Multiple stakeholders without clearly defined roles and responsibilities increases the complexities further adding to the challenges. Acknowledging the complex dimensions of entrepreneurship and community-based entrepreneurship, there is no denial that significant achievements have been made and the benefits outweigh some of the challenges along the path of development processes.

**Table 22: Summary of Responses from IDIs (with Yoghourt Mamas, Husbands and Key Informants) and FGDs**

Response	In-Depth Interviews	Number of Mentions (number of participants)			
		Yoghourt Mamas (n=20)	Husbands (n=5)	Key Informants (n=3)	Focus Group Discussions (n=34)
<b>Changes in Health Status</b>					
Improved Physical Health		47 (19)	18 (5)	11 (3)	10 (8)
Reduced Stress Levels		35 (18)	25 (5)	7 (2)	-
Improved Mental Health		42 (18)	12 (5)	8 (2)	-
Changes in Nutritional Status		24 (17)	8 (3)	9 (2)	-
Improved Quality of Life		18 (14)	14 (5)	13 (3)	-
Social Support Networks Improve Health		32 (15)	7 (3)	8 (2)	18 (14)
<b>Access to Health Care Services &amp; Treatment</b>					
Distance to hospital from home is an obstacle		18 (16)	4 (3)	4 (2)	-
Insufficient funds for Transportation		19 (14)	6 (4)	5 (2)	-
Lack of funds for treatment		24 (18)	12 (5)	7 (2)	-
Improved access to health care and treatment		17 (16)	6 (2)	11 (3)	-
Reduced wait times		18 (18)	2 (2)	8 (2)	-
Complimentary services and medications		15 (15)	7 (3)	4 (2)	25 (14)
Networking with doctors and staff		13 (13)	8 (3)	4 (2)	28 (14)
Better care and attention		25 (18)	7 (3)	6 (2)	16 (14)
<b>Economic Empowerment &amp; Productivity</b>					
Pay is too low – should be increased		23 (18)	4 (4)	-	43 (20)
Increased agency to develop alternative sources for economic empowerment		14 (12)	5 (2)	2 (2)	24 (17)
Income is not sufficient to always satisfy their food needs		19 (18)	20 (5)	4 (1)	4 (8)
Improved Standard of Living		25 (18)	16 (5)	9 (3)	18 (18)
Engage in Income Generating Activities		16 (14)	9 (4)	8 (2)	-
Improved Quality of Life		22 (17)	15 (5)	10 (3)	28 (14)
Means to pay for school fees/uniforms/books		19 (17)	8 (3)	4 (2)	14 (14)
<b>Project Perceptions of Empowerment and Sense of Self-Worth</b>					
Feelings of motivation, drive & renewed hope		18 (14)	6 (3)	7 (2)	-
Sense of Autonomy and Strength		13 (14)	-	4 (2)	-
Increased levels of self-esteem/self-worth/self-confidence		29 (18)	9 (4)	9 (2)	-
Perceived as positive role models		24 (16)	14 (5)	14 (3)	-
Renewed confidence and optimistic outlook		17 (15)	8 (5)	5 (2)	-
Developed a sense of independence & self-reliance		15 (13)	9 (5)	4 (2)	-
Diminished feelings of helplessness		20 (16)	10 (5)	7 (2)	-
New skills and knowledge		31 (20)	17 (5)	17 (3)	41 (22)
Financial Freedom/Stability		30 (18)	16 (5)	7 (3)	15 (15)

**Family Relationships**

Lack of Gender Sensitivity	8 (7)	-	2 (2)	20 (14)
Resentment by clan members & chief	17 (16)	10 (4)	4 (2)	18 (16)
Intimidating behaviour by family members	6 (6)	-	3 (2)	-
Improved household decision-making	22 (15)	12 (5)	3 (1)	-
Shifts in family dynamics and gender roles	17 (16)	11 (5)	2 (1)	-
Improved control over household & personal assets	25 (19)	12 (5)	-	-

**Community Engagement & Perceptions of the Project**

Attitudinal Barriers can Effect Success	16 (15)	5 (5)	6 (2)	9 (8)
Lack of Support from Clan Chiefs & Local Officials	18 (17)	13 (4)	7 (2)	-
Increasingly Optimistic Attitudes Towards Life	15 (14)	6 (5)	3 (2)	-
Increased Self-Awareness	13 (13)	4 (4)	3 (2)	-
Greater Likelihood to Contemplate Change	12 (12)	7 (4)	4 (2)	-
Sense of Personal Growth	15 (14)	7 (5)	3 (2)	-
Mitigating the Pressure of Stigma & Ostracism	20 (15)	7 (3)	10 (3)	-
Community Hub of the Exchange of Knowledge	24 (17)	19 (4)	14 (3)	-
Established New Social Networks	30 (18)	27 (5)	13 (3)	-
Sense of Responsibility & Conscientiousness in Ability to Achieve Change	14 (13)	8 (4)	4 (2)	-
Diffusion of Health Knowledge & Indigenous Expertise	24 (18)	9 (3)	9 (3)	-

**Civic Engagement & Broad Spectrum Networking**

Broad Networking Opportunities	20 (15)	7 (4)	10 (3)	14 (14)
Access to Financial & Educational Resources from External Sources	16 (14)	7 (4)	7 (3)	14 (14)
Additional Training Opportunities	18 (14)	5 (3)	10 (3)	14 (14)
Organization-to-Organization Partnering	18 (14)	6 (3)	8 (3)	14 (14)

**The Style of Leadership is Not Always Participative & Democratic**

Lack of Decision-making authority	15 (12)	-	-	45 (30)
Lack of Internal Trust	21 (15)	9 (3)	5 (2)	38 (29)

**Group Heterogeneity: Complexities in Group Dynamics**

Socio-cultural constraints limit sense of empowerment	24 (16)	7 (3)	6 (2)	10 (9)
Selection bias in group membership	18 (13)	-	-	-
Marginalization of Yoghourt Mamas	27 (17)	14 (4)	5 (1)	-
External Interferences	22 (17)	18 (4)	-	-
Cultivating an Overdependence on Leaders	19 (13)	4 (2)	-	-
Corrupt Group Practices	31 (16)	31 (5)	3 (1)	30 (16)

**The Need for Equitable, Supportive & Constructive Relationships**

Lack of Proper Management	21 (15)	10 (3)	-	30 (15)
Poor Coordination of Project Activities	18 (15)	-	-	15 (7)
Poor Communication Between Groups and Within Groups	28 (18)	-	4 (3)	102 (34)
Improve on Group Cohesiveness	22 (16)	16 (5)	7 (3)	40 (34)
Lack of Collaboration Between Groups	24 (19)	-	9 (3)	70 (34)

**Lack of External Support from Stakeholder Institutions**

Project-Stakeholder linkages were not adequately established	12 (10)	-	7 (2)	9 (9)
Stakeholder Institutions Acted as Restrictive Agents	10 (8)	-	3 (1)	51 (20)
Lack of Interest by Local Partners in Strengthening Capacity Building	15 (9)	1 (1)	5 (2)	49 (17)

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**Source:** *Interview Results*

## **CHAPTER VII**

### **Discussion and Conclusions**

#### **7.1 Introduction**

The following chapter provides a summary of the major findings of this thesis and a discussion of their implications. It also considers the theoretical, methodological and policy implications, limitations and presents future directions and recommendations for the project. The major findings of the thesis are situated within the dominant discourses of health, empowerment and development theories.

The main objective of the thesis was to examine the health, social and economic impacts of this community based health and development project. The thesis employs a mixed methods approach using a survey and in-depth interviews and focus group discussions to examine the study objectives.

#### **7.2 Summary of Findings**

This section organizes the main study findings to the objectives of the thesis:

1. To investigate the prevalence of malnutrition, diarrhoeal disease, urogenital infections in PLWHAs in the Oyugis community and to examine the perceived improvements in health and well-being – including increases in CD4 cell counts, and the utility of this nutritional supplement to improve the quality of life for those consuming the probiotic yoghurt;

2. To examine the health, social and economic impacts of the project on the women and to determine the women's perceptions of empowerment resulting from participating in this community based health and development project;
3. To identify and analyse project management challenges threatening perceptions of empowerment and project sustainability.

#### **7.2.1 Impact of Probiotic Yoghourt on the Health and Quality of Life of PLWHAs**

The community in which this initiative is taking place is similar to many low-income communities in Sub-Saharan Africa (SSA) and more generally in the developing world. Typically, these communities are characterised by high levels of nutrient and micronutrient deficiencies, under-nutrition, and limited access to medical care. Therefore, the introduction of an initiative which produces quality protein (yoghourt) with the added benefits of probiotics, confers numerous advantages related to improved health and well-being. The project also provides an economic stimulus to local suppliers of goods and services, farmers, and those producing the yoghurt, while also improving immune function, the ability to work, and decreasing the number of illness episodes among those consuming the yoghurt regularly.

In general, the study was very well received by the community, with a great deal of interest. Despite this eagerness to participate, a substantial amount of time and

human resources were spent dispelling myths (at the community level), and challenges were faced in recruiting participants, especially men. Time and resources were spent explaining to the community that the probiotic yoghurt was not a cure or a treatment for HIV - rather, it was a supplement to be taken with ARVs. Some individuals were reluctant to participate and purchase yoghurt from the kitchen because they were under the assumption that the yoghurt was laced with unwholesome contents with the purpose of spreading a new virus. However, once these individuals began to see a marked difference in friends and family in the program they were asking to also be enrolled.

From the analyses, the data reflected that some of the most important measures in the study such as CD4, weight, and BMI did not reach statistical significance, however, the results and the overall impact of the probiotic yoghurt should not be underestimated. The measures across all of these variables (i.e. CD3, CD4, weight, BMI) increased, indicating a potential improvement (if the observed effect was not random), but also the ability of the probiotic yoghurt as a method of increasing and maintaining weight and consequently BMI within a group of people who are experiencing significant weight loss. Further, both CD3 and CD4 are critical in maintaining a strong immune function – when CD3 cell counts are low, it is harder for other T-cells (CD4) to become activated and fight off infection. As such, any increase in immune function positions PLWHAs to be better able to fight off opportunistic infections and disease progression.

Participants also expressed a great deal of satisfaction with the idea of probiotic yoghurt as a nutritional supplement and as part of their treatment regimen due to the

effects it had on their health - physical and psychological well-being and quality of life. For participants in the intervention arm, the total number of chronic conditions were reported to have decreased. This is critical not only in terms of the health impacts, but also the resulting social and economic impacts at the household level. The resulting effects of fewer illness episodes and improved economic status influences one's outlook on life including an improvement to perform daily living activities, and a purposeful and improved meaningfulness to their life. Further to this, participants expressed that with improved health status and bodily appearance, their social ties with family and friends dramatically improved. Those who had abandoned them slowly began rekindling ties as the participants showed health improvements.

The community kitchens are also serving as hubs for building both social and financial support networks for the Yoghourt Mamas, and the local community at large. The kitchens serve as safe havens of sorts, for PLWHAs to coalesce and discuss their health concerns, useful therapies and any other troubles they may be experiencing. The project has also been able to corral local leaders, community based and non-governmental organizations and government, which has helped to bring greater awareness and openness about HIV/AIDS, prevention and the importance of getting tested to the community. Additionally, the local Yoghourt Mamas were able to leverage their association to the Ministry of Health, KEMRI and the World Bank to obtain funding from the National AIDS/STI Control Programme and AMREF to carry out Home Based Care training and outreach, as well as to shelter and educate 20 HIV/AIDS orphans, some of whom are also HIV positive, for the next several years. Needless to say, the



spin off effects have been numerous and felt beyond the boundaries of the community kitchen.

The findings from the qualitative study assessing quality of life corroborate and further substantiate the results from the quantitative study. Many of the participants found solace in being able to discuss their health, life circumstances and thoughts with others that were part of the project. The psychosocial health benefits experienced by the participants and the social support networks that are created as a result are vital in sustaining the health status of those living with HIV/AIDS. Although health services in resource-limited settings are already stretched to maximum capacity, trying to incorporate a psychosocial health component into the HIV/AIDS treatment regimen could potentially help to improve health outcomes.

The benefits of this community health and development project are far reaching and extensive – the project continues to bring together many members of the community to drive change. The community kitchen is a hub for building both social and financial support networks, not only for the Yoghurt Mamas, but community members who create and build networks at the kitchen. Furthermore, PLWHAs are able to come together to share and discuss their health, useful information around therapies, and life circumstances that are troubling them. These opportunities and networks would not have otherwise existed without the project.

### **7.2.2 Empowerment as a Means Towards Improved Health, Social and Economic Status**

The case study demonstrates that unconditional acceptance of the group approach as one that empowers all women equitably and works to considerably improve lives equally - with health, social and economic improvements, and as one that is a manifestation of a communitarian vision (Bauman, 2001; Gutmann, 1985) can be damaging. The group approach (while it has many benefits), once applied needs to be critically examined and re-examined to ensure the internal group workings are not regressive, marginalizing the poorest and least powerful. Similarly, discourse has been entrenched in GAD schemes, however, it neglects to scrutinize the gender relations that these women are subordinated to, which according to Kabeer (1994), must be taken into consideration in any effort to truly make headway in empowering women (Moser, 1989). The research demonstrates that participation should not always be considered the sole indicator of success of community-based enterprises in achieving women's empowerment since the women's experiences are indeed diverse. While the project undeniably empowers the women at the individual level within a number of domains, the group structure can be considered to offset some of these gains, quite possibly counteracting some of the benefits of participating. The study revealed many underlying concerns surrounding group dynamics, threats to project sustainability/functioning and highlighted areas of concern regarding general project operations that can adversely affect its success and thwart the positive impacts gained by the yoghurt mamas. Although the yoghurt mamas feel empowered and healthier, the long-term effects of being part of a group which does not encourage an environment of equitable

empowerment can counteract the impact of individual gains and compound the range of poor health outcomes associated with low SES and hardship.

Furthermore, scrutinizing the unenthusiastic stance of certain important members of the community, it is important to consider whether empowerment strategies may be at odds with the notion of 'community' whereby empowerment of a few may lead to others within the same place/community to feel marginalized. Of course, it is difficult to satisfy the needs and expectations of all; however, it is important to question whether empowerment of disenfranchised individuals and groups simultaneously brings about a greater sense of community - strengthening community ties or if it is promoting certain individuals or groups at the expense of others increasing competitiveness and lack of community cohesion. Although, most community members were very responsive to the project, it is undeniable that empowerment strategies stress the development of new skills and activism for a few. The essence of these approaches is autonomy and 'conflict', but the essence of community is cooperation, communitarianism and connectedness. Thus, situations that foster assertive self-determination may be the opposite of those which foster community cohesion and may result in tension and lack of acceptance, eventually, bringing about the breakdown of the project. Therefore, in learning new skills, becoming more engaged and gaining knowledge – it is important to give back and help to advance and develop the community by involving others (in the community) as well, to avoid negative perceptions of the project in the long-run. For example, the yoghurt mamas could extend their outreach beyond current activities and become bona fide mentors for at

risk youth, host scheduled HIV support group sessions and even perhaps in the future provide business development workshops to those who want to begin a start-up.

With regards to reports of economic empowerment, the results were mixed. Despite reporting of a lack of individual/personal economic empowerment, there was unanimous agreement among the participants that the project has provided other important benefits. The provision of yoghurt to each family has allowed for discretionary income, previously allocated to the purchase of food, to be spent on other items such as tuition, school uniforms, health care services and treatment as well as other income generating activities. Even though all the participants recognized that receiving free yoghurt was a benefit, they stated that earning more income would be of increased benefit.

There are a number of factors affecting current income levels. One of the key factors of reduced potential for economic empowerment is the project participants themselves. Holding other considerations constant – context, the amount of time the project had been in operation, abilities, and other inhibiting factors, it can be maintained that there is a tendency of the project participants to avoid engaging in the activities necessary to increase production, such as seeking out additional milk suppliers, willingness to work extra hours at the community kitchen facility, or a willingness to approach local vendors who might order or sell the product. The business culture of the yoghurt mamas needs to be inspired – motivating them to avoid corrupt practices and seeking out opportunities to improve their sales and ultimately their income. Successful businesses are often achieved by aggressive competitive behaviours – ‘a go

out and get' em' attitude, leading to new market opportunities and conquests. However, this is not typically socially acceptable behaviour for women within this context. The need for this 'masculinist approach' in a capitalistic environment is probably uncomfortable territory for many of the yoghurt mamas, and is a socio-cultural factor that should be considered as a component of future training exercises.

### **7.2.3 Project Management Challenges Threatening Empowerment and Sustainability**

By individuating some of the main challenges, it becomes clear that while the 'group' and social forms of entrepreneurship have inherent benefits, it can be very difficult for these enterprises to operate successfully, and the model should be re-examined before it becomes a paradigm for other health and development projects. Multiple stakeholders without clearly defined roles and responsibilities increases the complexities further adding to the challenges of project sustainability. Acknowledging the complex dimensions of community-based entrepreneurship, there is no denial that significant achievements have been made and the benefits outweigh some of the challenges along the path of development processes.

Over the last few years, there has been a strong propensity to consider the group approach in community-based enterprises and the establishment of networks among women as critical components towards improving the conditions of women and enhancing their development. Consequently, factors such as class, education, age, ethnicity and religious hierarchies that lead to diversities among the different groups of women have been underestimated. Many of the most marginalized women in this

project emphasized how their lower social status inhibits their successful function in such groups as the others prevent them from realizing their fullest potential, limiting their contributions, and often reinforcing original feeling of powerlessness. This socio-cultural constraint prevents the effective participation of these women and diminishes their determination, limits their degree of empowerment, and epitomizes social stigma. The main lesson drawn from this is the necessity to create groups based on a clear assessment of the needs of different groups of women according to age and socio-economic conditions. Of course there is no such thing as a perfect project group, however the parameters for a more 'ideal' project group could possibly be considered. Alternatively, the group scheme can be maintained, if a more formal and structured model is introduced, with a hired 'plant'/kitchen manager with the authority to implement strict procedures highlighting that class and power imbalances will not be tolerated. Otherwise, development projects such as the WHE model can move away from using the group model, and use 'hiring' strategies substituting the use of already formed women's groups, by employing women that can establish a newly formed women's group. Of course, all approaches have their disadvantages, however, the current model of using existing groups or selecting members from existing groups needs to be re-evaluated.

To date, distribution of probiotic and non-probiotic yoghurt in the form of "maziwa lala" has been limited, and sales can be significantly increased. As mentioned earlier, this is due to a number of factors including lack of branded packaging, advertising funds, marketing skill, lack of willingness by project participants to approach

local business owners and corrupt practices within groups that diminish morale to increase sales. Yet, opportunities to sell the product exist. For example, yoghurt is consumed by many, and more expensive options offered by large companies are unaffordable to the average consumer. Establishing a market for the probiotic yoghurt is critical if the group members wish to earn an adequate livelihood through their participation in the project.

The provision of additional monetary incentives, supported by a percentage of the proceeds from sales should also be considered for those in leadership roles as certain positions involve additional workload. This would also require rotating leadership roles to all in the kitchen to be fair. Non-availability of incentives to group leaders can lead to a loss of interest, and gradual declines in efficiency of functioning. Furthermore, by imposing mandatory rotations to various leadership roles, will increase transparency and assist in mitigating some of the current issues being faced in the kitchen.

For these women's groups, this project represents a significant departure from prior life and work experience. There are few opportunities for Kenyan women to make business decisions, establish a bank account, manage funds, and control their own assets. While, the women have made tremendous progress in administering the project, constant training to maintain their knowledge and upgrade their skills is important. Proper record keeping and taking inventory are also essential and is currently lacking as well as the contacts required to source supplies, particularly when stocks run out in their respective towns. It would be helpful to develop a list of local

businesses and key contacts for the project participants. During transition periods when no intern is present, or in the absence of a project coordinator, the group members would be better able to assume administrative responsibilities. As well, in keeping with the overarching goal of fostering empowerment for the female participants, group members should be encouraged to actively seek out solutions to their problems without relying on WHE interns or paid staff.

During the implementation phase with funds from the World Bank Grant, the groups were participants but not equal partners in the project. Decisions affecting the direction of the WHE project were taken without involving the women. Current theory underscores the wisdom of designing development projects that are participatory and in which local members are considered stakeholders. Thus, it is recommended that structural changes be implemented to allow the groups to actively participate in decision making, to share fully in the risk taking process, and to also experience empowerment to a greater extent.

Overall, the project is a critical medium providing an enabling environment for these groups of women. Whereby the skills and knowledge the women gain can be considered self-enhancing tools, provided in an encouraging setting with support systems, which in turn aids them in making decisions and to exert control over their lives. Women's empowerment must be considered a process, which embodies 'self' and cannot be attained through the direct interventions of outside agents, it must be self-selected and self-driven and is not susceptible to interventions of those wishing to 'empower' (IPPF, 2007). Community participation projects which are contextually and



locally relevant and focus on empowering women can create both direct and indirect benefits. Future community efforts should be supported by local leaders and government, as effective participatory community projects can be viable methods of creating sustainable lifestyles, improving health and the quality of life of subordinate and marginalized groups.

## **7.3 Contributions of the Study**

### **7.3.1 Theoretical Implications**

Development and empowerment discourse is saturated with literature uncritically accepting the group approach, neglecting to scrutinize the gender relations that women are subordinated to; which according to Kabeer (1994), must be taken into consideration in any effort to truly make headway in empowering women (Moser, 1989). Although the group approach is one that can work to empower women participating in community projects, participation should not always be considered the sole indicator of success of community-based enterprises in achieving women's empowerment since the women's experiences are indeed diverse. While the group approach and the project has its benefits, undeniably empowering the women at the individual level within a number of domains, the group structure can be considered to offset some of these gains, quite possibly counteracting some of the benefits of participating. The research then, demonstrates the need to revisit theories of the group approach.

### **7.3.2 Methodological Implications**

The research shows the value of employing a mixed methods approach in exploring the impacts of the probiotic yoghurt on participants and their experiences. Usually, biomedical research using clinical study designs do not adopt a mixed methods approach to describe the experiences of the participants. The use of a mixed methods approach resulted in a number of insights which would not have been possible if only one method was used. The survey was important for collecting CD4 cell counts, dietary information and other health related data. Augmenting this information were the interviews which provided a rich description of the participants' lived realities and experiences. The data collected provided useful information, developing an in-depth story which better contextualizes the impacts of the probiotic yoghurt on the health and quality of life of the participants.

In addressing the question of empowerment and threats to project sustainability, the qualitative research provides a rich description of the power relationships that exist and the social phenomena that shape the participant's lives. By using these stories, the data provided a fuller picture and better understanding of certain project outcomes and the conduct (behaviour) of several of the yoghurt mamas.

### **7.3.3 Policy Implications**

The findings from this research provide a platform for policy makers to examine the need to incorporate additional nutritional support programmes, available to PLWHAs on ARVs. Current nutritional support programmes, offer dry powdered and

fortified mixes – however, their timely delivery is often marred by shortages and corrupt practices (pilfering) resulting in the food items being out of stock for extended periods of time. However, this project is contextually and locally relevant and is positioned to fill this gap with a high quality food product that not only benefits PLWHAs, but has multiple direct and indirect benefits. The project can be a viable method of creating sustainable lifestyles, improving health and the quality of life of sub-ordinate and marginalized groups. Great gains can be made if the programme could be subsidized by the government to provide nutritional support to PLWHAs, thus allowing the kitchens and the women’s groups to potentially gain a more robust stronghold. This can potentially serve to expand the project into increasingly rural areas with more remote distribution centres with the use of piki-pikis (motorcycle taxis).

Additionally, by developing an environment which fosters community empowerment, the opportunity to change conditions of power at the micro-level will enhance health. It is hoped that the research will provide additional support to existing literature on the importance of empowerment of women (through economic development and skill transfer) for reducing disparities in health and quality of life (QOL) across gender and ethnic groups. Dynamic new programmes which are personal and considerate of cultural dimensions reflecting gender differences, political and economic factors, are needed to generate awareness and produce behaviour change within the population. Effective models and methods of women’s empowerment movements in underserved and disadvantaged communities will provide a stepping stone for national policy makers to make further recommendations to health system reforms, and

promote nationally the empowerment of women as an indirect means of health promotion.

#### **7.4 Limitations of the Study**

The research presented in this thesis was conducted in the Rachuonyo District of Kenya, where the existent health, economic and social conditions of this area makes it a fairly unique example. While these conditions are not uncommon in other parts of Sub-Saharan Africa, specific locational characteristics have combined to create a unique set of circumstances in place, and *may* limit the ability to generalize all of the findings to other settings. Oyugis is a budding town with a relatively active medium sized market and a high number of transient workers whereas Kadongo is a very small town with almost no amenities. At the same time, Oyugis and Kadongo are also rural with a population spread out over a wide geographic area. Thus, the results of the study are most applicable to the rural and semi-rural regions of Luo, Kenya and might not apply to different areas populated by other ethnic groups (e.g. Kisii, Kalenjin, Kamba etc.), or other countries where the circumstances – geographical (physical), socio-cultural and economic vary. However, along general lines, as a health and development initiative, many of the project challenges and the findings are transposable to other settings.

The presented studies here are either controlled (randomized control trial) or exploratory in nature. Thus, the evidence presented is limited to testing and documenting the efficacy of the probiotic yoghurt within the sample population and secondarily, investigate the links between health and socio-economic development.

However, the findings appear to be comparable across studies conducted in different locations in East and West Africa (Tanzania, Nigeria). The first two studies were conducted in a phased manner, one leading to the next. Findings from the controlled trial led to the design of the complementary exploratory study examining the links between the probiotic yoghurt and quality of life. Thirdly, gathered field observations helped to hone the design of the study focusing on economic empowerment and health.

**(i) Limitations within the Quantitative Study**

The quantitative study provided a valuable contribution to the overall understanding of the population within this area. Very few studies have been conducted with the population in this area, and the data highlight key areas of concern such as the need for adjunct nutritional support for those on ARVs and emphasizes areas deserving further study, as well as methodological pitfalls warranting improvement on the current research model for recruiting, retaining and following participants as well as addressing falling response rates. The following section provides an overview of the limitations affecting the randomized control trial.

The randomized control trial relied on self-reported behaviours which may be subject to social desirability, recall biases, and response biases for fear of stigma. For instance, some respondents provided different responses on separate occasions regarding the highest level of education achieved. Another example, points to response bias when participants were asked about their mode of infection. A number of respondents reported becoming infected through blood products when interviewed at

baseline, but subsequently reported 'sex with a woman' as a mode of infection during the intermediate and final portions of the study. Concerns also surround the issue of repeated data collection which can affect data reliability and validity. However, to reduce biases related to repeated data collection and improve recall, the questionnaire was designed to refer to the period just prior to the study and then 3 months and 6 months since the initiation of the intervention and data collection. Participants were also encouraged to respond truthfully by assuring them that their responses would not affect their participation in the project, their services at the hospital and that there were no 'right or wrong' responses to the questions. Future studies involving sensitive data could use new technologies such as Audio Computer Assisted Self Interviewing (ACASI) to reduce social desirability biases when collecting data on sexual behaviours and other sensitive information.

Additionally, due to the political situation and ensuing civil war in 2007-2008, the project was delayed. As a result, much of the data collected at baseline was very rushed, and vital information was not recorded in haste to meet donor and project deadlines. In some cases, documenting during the registration was not thorough enough leading to attrition, height and weight were not taken and client cards were not validated. To fulfill this gap height and weight measurements were tracked using medical history files in cases where this was possible, and other information was recorded either during the participants' follow-up visits to the VCT clinic or during the intermediary data collection phase.

Recruiting men was also a challenge in the acceptable time period – often being recruited without question to their area of residence and proximity to a distribution centre. Men are also more likely to leave their area of residence to seek employment making it substantially more challenging to follow this highly mobile group. These factors in conjunction with the fact that men seek health care less often than women and are less likely to adhere to treatment played a significant role in the loss of the male sample. Men were also notoriously secretive of their dealings with the community kitchen and other distribution points, often sending others (friends and family) to pick up their yoghurt to avoid association with the project and were more likely to conceal their packet of yoghurt when leaving the kitchen. This of course also leads to concerns about adherence and regular consumption.

Furthermore, research assistants were not comprehensively trained prior to baseline data collection and some questions were incorrectly completed, or the collected baseline data did not match the responses and information provided during the intermediary data collection period. To resolve this, two training sessions were held prior to the intermediary data collection period to ensure that all questions were understood and being interpreted correctly. Also, all surveys were ‘case-matched’ and followed-up for consistency in their responses to ensure that the same individual was being surveyed.

For the intermediary and final data collection periods, surveys were double-checked by the head research assistant to verify their completion, and research assistants were held accountable for the quality of their work.

Overall, those committed to the program had strong attendance. However, illness, weather and road conditions, distance to distribution points, work commitments and other obligations did on occasion play a role in participant adherence and daily consumption of the yoghurt. Also, some of the participants chose to consume the yoghurt at home or have family and friends deliver it to them. In such cases, it can be difficult to monitor yoghurt consumption and whether the participant was not sharing the nutritional supplement with others in their family. In cases, where an individual was appointed to collect the yoghurt for participants it was either delivered very late in the evening or it would not be delivered, with the appointed person citing a lack of supply.

Also attributable to the political situation and subsequent related challenges, local partners had difficulty consistently taking quality control measures at the launch of the study. While probiotic culture was being added to the yoghurt and standard operating procedures were followed in the production of the yoghurt, quality control measures to verify bacterial counts were not always possible. As time passed however, samples were taken more regularly for testing.

Lastly, as a result of attrition, and incomplete survey responses across the three time points within the epidemiological study, many cases were lost, as such, some of the figures from the statistical analysis that were expected to be robust were more muted than anticipated. Beyond the numbers, however, the findings from the qualitative study sustain the importance of what was found. The probiotic yoghurt plays a significant role in reducing illnesses such as diarrhoea, skin conditions, improving weight and BMI while also acting as a critical influence on mental health.



## **(ii) Limitations within the Qualitative Studies**

The qualitative studies were a valuable contribution to the overall understanding of (a) the impact of the probiotic yoghurt beyond the health indicators measured in the structured questionnaire, and (b) community projects, potential challenges and best practices within the Kenyan context. As well, the findings provide project stakeholders with data on current achievements and highlights areas deserving of further study.

Two main concerns lie in the accounts told by the participants in the interviews about the impact of the probiotic yoghurt and the project as a whole, as well as the looming atmosphere of intimidation which may have affected the yoghurt mamas' responses and willingness to be entirely honest about some of the project activities. A number of participants (mamas and key informants) were reluctant to discuss many of the ongoing concerns due to tensions and the prevailing atmosphere of intimidation. It is likely that some interview participants held back some information due to fears of being exposed as an informer or expelled from their respective groups as a result of being candid. This occurred despite repeated reassurances of complete confidentiality and the use different methods in an effort to capture their views about general project functioning. Therefore, certain themes may be underrepresented or absent.

Furthermore, the interviews relied on participant accounts. The reliability of these findings depends on a number of factors such as the levels of trust between the interviewer and the interviewee, and the interviewer's interpretation of the research findings. According to Cloke et al. (2004), the interviewer is implicated in the

construction of meanings with the interviewees. During the interview process, the interviewee and the translator act as active subject mediating and negotiating what is told to the interviewer (Cloke et al., 2004). As such, there is room for the interviewee and the translator to embellish, exaggerate and amplify certain experiences or contrastingly withhold important information. Although the quantitative data supports participant accounts and information was triangulated to verify the authenticity of the experiences which were described during the interviews in each of the studies, there is a degree of subjectivity in the qualitative findings that is unavoidable.

A limitation was the complexity of undertaking qualitative research in an environment where the participants were non-English speakers and the use of a translator was required. The need to employ a translator, cross-cultural variations, the variability in word meanings, the researcher's inability to identify and capture the subtleties of the participants' expressions (body language and verbal), and conceptualization of constructs. As a result, these language challenges may have influenced some of the findings.

The role of translation also raises concerns about the Dross rate in the interview. According to Field and Morse (1985) dross is described as collected data which does not relate to the topic being discussed. This type of information acts as unusable 'fillers' in the interview, and when reading through translated transcripts it makes it quite difficult to build comprehensively on the targeted concepts and themes. In some regards, part of this is attributable to difficulties finding appropriate words and terms in the process

of translation, which adds to the complexity of the situation due to a lack of concepts and expressions to explain certain ideas and beliefs.

The limitations described above are crucial in interpreting the results and have implications for the transferability of the research findings to a certain degree.

Nevertheless, the findings are particularly relevant to other countries in Sub-Saharan Africa, which along with Kenya are faced by many similar challenges.

## **7.5 General Challenges specific to Probiotic Technology**

Despite the increasingly widespread use and clinical applicability of probiotic strains, there are challenges to using probiotics as a tool for achieving improved health. Some of the challenges are specific to developing countries, others mainly to Western countries, and those that can be considered to be shared challenges. However, it is important to note that some of the challenges experienced within developing countries to using probiotics as a tool to alleviate symptoms to HIV/AIDS can be attributed to, in part, by the current shortcomings of science and systemic anomalies in regulatory environments.

Generally, advancements in the quality of information involving the mechanisms by which probiotics act, adequate administrative regiments, and probiotic interactions are needed which will work to increase people's confidence in their use, especially in areas where use has not become as accepted and established. Further investigation is warranted to confidently substantiate the health effects of specific probiotic strains especially in the form of probiotic yoghurt. In considering the scaling-up of operations,

other challenges to be considered included: accessibility and propagation of the strain in the field, strain viability (particularly during transport), dosage, lack of industry standardization in situ, limited knowledge around probiotic products and their benefits (especially in contexts where they have not been established), use and acceptance of probiotic yoghurt as a tool for alleviating symptoms of HIV/AIDS, food safety issues and concerns, strain specificity, regulation/policy, knowledge/technology transfer, patents, intellectual property rights, cultural challenges, quality control, as well as packaging/product delivery.

While the challenges of employing probiotics outside the western context and standard lab environment are numerous, the social impacts - benefits to the community and effect on physical and mental health are significant and with the right planning and commitment these challenges can be dealt with with specific management strategies such as top management support (willingness of top tier management to provide resources, authority and power), appropriate training of the necessary personnel, equipment and technical expertise, client acceptance, monitoring and feedback, communication and trouble-shooting with the ability to handle unexpected crises. This is not to say that by implementing these strategies will guarantee success, however, by proposing these factors during the planning phase and implementing them during appropriate stages of the project life cycle, can help avoid some of shortcomings related to applying probiotic 'technology'.

## **7.6 Working towards sustainability, scalability and maximized social impact**

Since 2003, when the journey of this project began, demand for such health and development projects has never ceased, with clear need beyond every geographic region the project was implemented in. Many opportunities to expand to other villages, towns and cities were turned away as the project was confronted with the constraints of limited profitability and lack of resources (human and financial) to justify the probability of a successful and sustainable expansion. The same questions always emerged – how could we meet the demand and further support the creation, operation and success of the project(s) in a more sustainable manner? Should we be scaling up? Scaling out? Scaling deep? What would this actually look like? How do you scale for impact when the profit margins are thin or almost non-existent and external funding is scarce? Critical to finding the best way forward, is understanding that scaling for social impact is not necessarily the same as scaling a business, especially in resource limited settings (although many of the components are the same).

In considering this community health and development project through the lens of a social enterprise with various components (part social innovation and part business, with social impact and little or no profits), it has become evident that the challenges presented and the ‘business model’ require a unique approach beyond the traditional business and franchise models in order to build ‘success’. Before moving into some of the key factors specifically affecting the project and a remix of potential strategies that can be considered as methods to help move the project towards sustainable, scalable

and maximized social impact while maintaining the benefits of the current model, the existing structure is briefly reviewed.

It is apparent the underlying premise, overall design, and characteristics of the project are structured to behave as a *social franchise* (one strategic option to grow the project). While social franchising is similar to commercial franchising, there are some differences that make social franchise systems distinct (Ahlert, Ahlert, Van Duong Dihn, Fleisch, et al, 2008). Most importantly, it is the social impact or mission that is driving the relationship, more so than the financial motivation at the higher organizational level. In recognition of this, a ‘road map’ with key elements is proposed that may be helpful in strategically planning the scalability (scaling up and scaling out) and replicability (“this does not simply imply copying the [project], but rather replicating th[e] ideas and approaches that are successful in an appropriate manner for a given context.” (Ahlert et al., 2008, p. 14)) of the project - factors that have been deliberated, but not necessarily executed at the community level.

The following framework could act as a ‘road map’ to better assist the decision-making process. When considering to scale and replicate, it is important to identify which elements might be core to the concept delivery, while others might have contextual flexibility as the project is moved into new ‘geographies’ and can be built locally as needed. What is most important is determining the elements of the model that should be scaled – such as the elements of local success, and reviewing the elements that are open to adaptation and evolution (Berelowitz, Richardson, Towner, 2013). For instance, vision, process, idea, knowledge, health and safety are considered

core concepts for delivery, while brand, training, monitoring and evaluation, business plans and networks are subject to adaptation and evolution. The table below (Table 23), adapted from Ahlert et al., 2008) depicts an overview of the assessment needed at each step in planning to scale and replicate a project that can be used as a ‘road map’.

**Table 23:** Framework for Implementing a Social Franchise

<b>Step 1: Franchisability</b>		
<p><b>Analyze your project.</b></p> <ul style="list-style-type: none"> <li>• Is the concept replicable?</li> <li>• What are the benefits of scale?</li> <li>• What indications are there that it is to time to scale?</li> <li>• Is franchising the best replication strategy?</li> </ul>	<p><b>Analyze the market and environment.</b></p> <ul style="list-style-type: none"> <li>• Is there a clear social need beyond the geographic region?</li> <li>• Which of the potential markets can be served best by franchisees?</li> <li>• Is there a potential local champion of this model in these markets?</li> </ul>	<p><b>Analyze your capacity.</b></p> <ul style="list-style-type: none"> <li>• Is there potential for sufficient financial backup?</li> <li>• Is your organizational capacity sufficient to brave slow growth?</li> <li>• Does the project have the required skills?</li> <li>• Considerations around licencing the technology, product or service.</li> </ul>
<b>2. Planning Stage</b>		
Contemplate carefully the idea of franchising the project and elaborate on all the steps. Establish a business plan.		
<b>3. Configuration</b>		
<ul style="list-style-type: none"> <li>• Develop a turnkey concept <ul style="list-style-type: none"> <li>- Standardize services and management processes.</li> <li>- Decide how to organize and govern franchisees (including the fee structure, and decision-making authority).</li> <li>- Set up a performance measurement system, financing/fundraising concept and franchisee-training concept.</li> </ul> </li> <li>• Test and improve the concept at a low cost.</li> <li>• Set up a franchisee profile.</li> <li>• Recruit and contract franchisees.</li> </ul>		
<b>4. Operational Issues</b>		
<ul style="list-style-type: none"> <li>• Prepare a detailed operating manual.</li> <li>• Induct the franchisees.</li> <li>• Establish and set-up a communication platform.</li> <li>• Market the franchise system including brand, awareness and association.</li> </ul>		
<b>5. Ongoing System Maintenance</b>		
<ul style="list-style-type: none"> <li>• Ensure the sustainability of the system.</li> <li>• Train and support the franchisees continuously, training the trainers.</li> <li>• Further develop the system and its services.</li> </ul>		

- Conduct regular marketing campaigns.
- Monitor the franchisees regularly.
- Arrange and manage relationships with donors.
- Conduct market research regularly.
- Identify opportunities to leverage economies of scale.
- Identify opportunities to leverage networks for systemic change.

**Adapted from:** Ahlert et al., 2008

In continuing with a granular examination of the project specific factors needed to achieve sustainability (financial and technological), scalability and maximized social impact, a champion is needed. This is a leader and change-maker that is committed to the advancement and sustainability of the initiative on a long-term basis. This champion should be local and entrepreneurially minded – competent as a project leader (administratively, technically, interpersonally) and with the *authority* to perform their duties (Pinto & Slevin, 1989). To ensure financial sustainability, scale and broader social impact, health and development projects need a leader that is trustworthy, impartial, is empowered and prepared to take sound business risks, can approach organizations to obtain funding for philanthropic activities, and is able to execute business models with the focus being an impact on health. Needless to say, the entire project team must also want the same - be likeminded and willing to cooperatively fulfill the project mission, goals and maintain a readiness to be deployed strategically in the face of challenges. The project leader is constantly faced with a barrage of issues to resolve – human conflicts, time pressures, budgetary constraints, and a variety of information that needs to be considered. These constraints can relegate the project leader to the role of ‘firefighter’ – trying to manage issues before they get out of hand, and it is key that they



have the full support of the project team. Further, the project leader and team must be entrepreneurially minded, willing to work for the long-term and not on a one shot basis, like a training camp.

Secondly, working towards achieving sustainability, a separate yet synchronous effort supporting project activities needs to be focused on: 1) building revenue and 2) maximizing social impact. It is extremely difficult for one person to focus energies on building financial sustainability while also developing the avenues for social impact both for members of the project and externally to the community. The group members (at all levels) must internalize short and long term project aims to achieve the desirable goals and work towards achieving project outputs and lasting outcomes. To assist in this process, several committees could be formed at the field level and one self-regulating body (e.g. a board) at the management level. More broadly activities should be divided to achieve overall programmatic goals and project goals. The committees would work closely with one another and also report to each other, and the board would function with the express purpose of harmonizing higher level activities leading towards sustainability, scalability and social impact through the oversight of broader project aims.

During the development of the initial project plan, forming a local sub-committee was identified as a key activity to help guide the project and ensure to some extent its effective operation. However, due to numerous constraints, the sub-committee was formed quite late and had only accomplished to meet once in limited capacity. Members of the sub-committee included representatives from the Ministry of

Health, the Kenya Medical Research Institute, the District Development Officer, Chiefs from Oyugis and Kadongo, as well as a member from the Department of Culture and Social Services and at least 3 Yoghourt Mamas from each group. Their main self-identified roles and responsibilities as a sub-committee included: 1) ensuring the sustainability of the existing community kitchens through the continued production of probiotic yoghurt, and most importantly ensure the reliable supply of probiotic yoghurt to PLWHAs and vulnerable community members; 2) identify a feasible expansion process and management plan focusing on quality control aspects; 3) identify the best methods to support the groups; 4) play a role in management and administration as the projects' regulating body - including ensuring profit motives do not supersede the need for equitable access of probiotic yoghurt to vulnerable populations. While all good ideas in theory, in practice several challenges lead to its poor function – members were geographically scattered making it difficult to hold more regular meetings, there was a lack of dedicated commitment, and the local culture dictated the provision of allowances to attend meetings (even those receiving substantial compensation from the project for their services were seeking additional allowances).

The proposed committees (e.g. operations – business and technical, marketing, fundraising) and board would be comprised of members with different skill sets and those that are ready and capable of sharing their resources. These resources do not necessarily need to be financial resources, but could be human capital, time, skills in any area of expertise and other resources (e.g. buildings, equipment, printing, etc.), broadly

considered as '*wealth raising*'. Further, participation could be incentivized, beyond immediate financial compensation to offset the costs of taking on the additional responsibility and expenditures of being a committee or board member. For instance, this could take the shape of offering project shares (based on a structured scheme) which may even work to increase the level of commitment by all members and improve the possibility of long term success for the project. Creating a revenue sharing program through project shares can strengthen commitment, sustainability and support the project's philanthropic activities. Other projects around conservancy using ecotourism have demonstrably been successful in helping the communities they operate in using these types of revenue sharing structures (e.g. Jozani Chwaka Bay National Park (Zanzibar, Tanzania); Bwindi Impenetrable, Mgahinga Gorilla, and Kibale National Parks, Uganda) to build schools and clinics. Of course the monies received here are more substantial than any profit that could be generated by the project, however application of the idea is possible, and this is not to say that these types of funding structures are immune to shortcomings, in fact revenue sharing models can fail due to poor governance, corruption, excessive inequality leading to disputes, threat of secession, and general instability (Goldwyn, 2002; Archabald & Naughton-Treves, 2001). All factors that have the ability to breakdown any initiative. However, with realistic expectations, revenue-sharing programs can succeed to the benefit of the community. Key components for success include transparency, accountability, collective goals, sound economic planning, and firm long-term institutional support (Goldwyn, 2002; Archabald

& Naughton-Treves, 2001). Again, all key components to achieving success for any initiative regardless of structure.

Thirdly, while this is a community health and development *project*, within the traditional business sense of the term, 'project' denotes a temporary endeavour with a defined beginning and end, usually constrained by time, funding and or deliverables, and undertaken to meet unique objectives and goals usually carried out to bring about favourable change or added value (Archibald, Di Filippo & Di Filippo, 2012). The temporary nature of projects can stand in opposition to business as usual operations, which are repetitive, semi-permanent or permanent functional activities to produce services or products (Archibald, Di Filippo & Di Filippo, 2012). Perhaps it may be beneficial for these types of community health and development microenterprises with deep-rooted philanthropic groundings to increasingly identify along the lines of business models – with an initial research and development phase (R&D) (otherwise known as a pilot phase) and possibly preceded by a framework such as that of the Small Business Growth Model (Churchill & Lewis, 1983). Naturally, the activities and processes would take on a holistic approach (the business model would overlap with project life cycle phases) and each sub-committee would be responsible for multi-project portfolios that would follow project life cycle phases.

In the case of the Kenyan kitchens, activities were highly pre-determined and constrained by the funding structure and timelines, however, in future expansion strategies, if funding and timing permits, the suggested strategies could be considered for implementation. With taxing timelines, initiatives that require concentrated inputs

to get started such as business training, development of training modules, human and technical capital, know-how and other resources it can be very difficult to achieve all that is necessary in a short period of time and to lay a strong foundation for a sustainable and scalable initiative.

By reclassifying the method with which operations are managed (committees, boards, revenue sharing, business cycle phases) and keeping in line with a more entrepreneurial mindset the stage is set for possible future investment by local and international companies looking to meet the mission of their social responsibility mandates, and equally prepares the ground-work for cross-sector collaborations. Industry (e.g., Danone, Brookside etc.) looking to partner with such initiatives typically seek a 5-10 year 'successful' track record in order to become involved (I. Le Mintier, personal communication, August 29, 2014). This stage in the process is considered to be ideal for industry to pursue partnerships as they are seeking for an initiative that is more stable than an R&D project or a pilot project. It is then that they begin to examine the actors involved, reasons the initiative was undertaken, assess willingness to continue, evaluate the level of engagement and capability for lasting participation, and a continued commitment to social entrepreneurialism (defined as a person or group trying to respond to at least one social issue using what the private sector company has to offer as an enterprise to achieve shared aims) (I. Le Mintier, personal communication, August 29, 2014).

Kenya has an established dairy industry (e.g., Brookside Dairies, among others), and a budding probiotic yoghurt market. Some products are authentically probiotic

and others are falsely advertised/packaged, however even this is encouraging – an indication that the environment and market is ripe for such a type of initiative and there is demand for product. Enterprises (local and international) face a range of challenges when working in low resource settings, including the need to adapt their business models to local market landscapes - economic, cultural, institutional and geographic attributes. Where enterprise lacks material resources or intangible knowledge needed to address these challenges, cross-sector collaborations with community-based organizations (CBOs) such as the Fiti initiative, or non-governmental organizations (NGOs) and government institutions may help to facilitate new modes of added value and value creation. In such cross-sector partnerships/collaborations, the various actors contribute complementary capabilities along each stage of the value chain to develop products that could not be produced alone, creating and delivering value in innovative ways while keeping costs at a minimum and minimizing risks (Dahan, Doh, Oetzel, Yaziji, 2010). Conceptualizing broadened business models to incorporate cross-sector collaborations can create and deliver social and economic value add, which can be mutually supportive for all actors involved. Dahan et al. (2010) highlight that CBOs/NGOs can contribute resources and competencies to such collaborations including market enterprise, legitimacy with the community and clients, legitimacy with governments and government institutions, access to local expertise, sourcing and distribution systems. Further, beyond contributing to specific value chain activities, CBOs/NGOs, enterprise and government can provide missing capabilities to complete each other's business and operating models and even work toward co-creating

innovative and novel multi-organizational business models that can be effective in constrained settings. Again, important strategic imperatives for success in such developing market partnerships include innovation, combining skills and resources of all actors; building trust; finding the right fit between enterprise, initiative and government; and understanding the local business environment and infrastructure.

Directly in relation to the project, such a cross-sector partnership could take on the following structure: Ministry of Health (Public/Government) – Brookside (Private Enterprise) – Yoghourt Mamas (Private). Brookside would provide the infrastructure and resources to produce and deliver the probiotic yoghurt, the Yoghourt Mamas could provide the labour (paid) and expertise, and the Ministry of Health could subsidize the cost of providing the probiotic yoghurt to PLWHAs and vulnerable populations through funding allocated to HIV/AIDS Programs. The probiotic yoghurt would be marketed as a socially responsible product and a revenue sharing scheme could be developed to distribute returns equitably and ensure the maximization of social impact. Of course, one of the most evident challenges is bringing each of these entities to work together. Again, a strong *local* project leader is imperatively needed to carry out these operations on the ground and to bridge the gap of being able to work within all spheres, the public and private sectors.

## **7.7 Project Recommendations**

It has been long acknowledged by policy makers, stakeholders and beneficiaries that the potential for community health and development projects such as this one, that

provide multiple benefits, but more specifically nutritional support, positively affect those living with HIV/AIDS and in turn the epidemic. A plethora of governments, non-governmental organizations and institutions (e.g. World Food Program, CARE, USAID, UNAIDS, WHO, UNICEF etc.) have been working to ensure that nutritional support programs are incorporated in HIV/AIDS care regimens where appropriate. For example, the United Nations Standing Committee on Nutrition 2001 pledged to incorporate food security and nutrition considerations into HIV/AIDS programming, the implementation of nutritional care and counselling as part of the basic HIV/AIDS package, the implementation of approaches to food assistance, processing and production activities as part of broader HIV/AIDS care packages and programs (United Nations, 2001).

Although these recommendations were made 15 years ago, a paucity of research exists documenting the impacts – cost effectiveness, efficacy and effectiveness of food interventions on clinical outcomes and other HIV related factors. A systematic review of randomized control trials conducted in developing countries exploring the effects of sustainable food production strategies and macronutrient supplementation on HIV morbidity and mortality yielded little to no results (Mahlungulu, Grobler, Visser, & Volmink, 2007). It is only relatively small non-randomized trials that have shown the potential positive effects food supplementation resulting in positive health outcomes among individuals living with HIV/AIDS (Partners in Health, 2009; Njenga, Karanja, Gathuru, Mbugua, Fedha, & Ngoda, 2009; Cantrell, Sinkala, Megazinni, Lawson-Marriott, Washington, & Chi, 2008). It is imperative for such research to be conducted if empirical



evidence is to guide policies toward incorporating food interventions into the HIV prevention, care and treatment programs.

Current approaches to food interventions championing improved HIV treatment and health outcomes, including quality of life that fall under the umbrella of food security are extremely limited in their sustainability and scalability (Sztam, Fawzi, Duggan, 2010). While they provide essential nutritional support they are unable to address the majority of downstream health consequences of food insecurity, they can cause dependency on health programs for receipt of food aid, and cause additional anxiety as there is an inherent uncertainty about food supply. It is also costly and challenging to scale up in a variety of settings.

This being said, livelihood interventions such as this community health and development project has the capacity to address upstream causes of food insecurity and may potentially have a stronger chance of improving health outcomes and decreasing the negative effects of the HIV epidemic by tackling numerous pathways (mental health, nutritional, and behavioural pathways). This community health and development project is well positioned to address some of the root causes of the epidemic – poverty, food insecurity, inequities, and negative health outcomes.

Broadly, the Fiti community health and development project is a creative and innovative approach to improve the needs of impoverished populations, through horizontal and vertical partnerships. It integrates a multi-faceted intervention with an HIV care and treatment program to improve the health and well-being of those living with HIV/AIDS and others within a community. It sits at the intersection of health, equity

and innovation, applicable and replicable in many settings as long as it is acknowledged that the formula for success is based on lessons learned that should be borrowed, replicated and remixed to develop an innovative model that meets the requirements of each context to maximize social impact and benefit.

## **7.8 Future Directions**

Given the positive impact of the probiotic yoghurt on the health and nutrition of participants, further study is warranted with a more controlled study design and sample to flesh out the actual effect of the probiotic yoghurt and to determine whether these effects are only a result of improved nutrition, the specific probiotic strain, taking ARVs, or a combination of these factors.

Using the developed framework and networks of home based care services to access patient's homes could be a way to distribute the probiotic yoghurt and ensure that it is being consumed by the participant along with their ARVs. Alternatively, a similar method could be used by employing research assistants or paid project representatives. While this may not wholly solve the problem of attrition, or guarantee that the yoghurt is actually delivered to the participant, it will help to mitigate some of the confounding factors that were faced with the current design. By reducing some of the logistical challenges for participants, could boost adherence and reduce attrition which will provide a more robust sample whereby multivariate analysis can be performed to tease out the nuances within the data.

Secondly, further attention should be given to the assessment of mental health within this population using a tool that is specifically designed with psychometric properties in mind for screening and is reliable, valid, sensitive and specific to teasing out the areas where mental health fitness can be improved to help cope with life's challenges. It is clearly evident that many participants suffer from a variety of mental health issues and special attention should be given to identifying at risk participants and high risk behaviours that could be dangerous to themselves, their families and others.

Lastly, although various approaches have been employed to assess the functionality of the project and identify its growing pains, group dynamics and potential points of relationship recalibration, a method of study to implement change has not been performed. As such, it may be useful to complete a Force Field Analysis, S.W.O.T Analysis (strengths, weaknesses, opportunities and threats) or similar. Developed by Kurt Lewin (1951), the Forced Field Analysis is widely implemented to inform decision-making, especially for planning and implementing organizational change. Using this type of tool kit or technique, can help assess and gain a comprehensive overview of the different forces acting on a particular organizational change issue, and for assessing their source and strength. Bringing together the various stakeholders (perhaps each homogenous stakeholder group first, followed by a heterogeneous (representative) sample of each of the stakeholders) to carry out a small group discussion and to identify needed areas of change, expressed as a desired policy goal or objective can help identify the forces in support of the necessary change and all the forces working against the change. The driving and restraining forces would be sorted around common themes.

These findings and ideas may well provide consensus on an action or way forward by reducing the restraining forces and to capitalise on the context based driving forces which could potentially lead to positive organizational change and improved functionality.

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# APPENDIX A



## Use of Human Participants - Ethics Approval Notice

**Principal Investigator:** Dr. Isaac Luginaah  
**Review Number:** 17988S  
**Review Level:** Full Board  
**Approved Local Adult Participants:** 0  
**Approved Local Minor Participants:** 0  
**Protocol Title:** Diffusion of Innovations: Probiotic Yogurt in the Context of HIV/AIDS in Africa  
**Department & Institution:** Geography, University of Western Ontario  
**Sponsor:** Ontario Graduate Scholarship

**Ethics Approval Date:** June 22, 2011

**Expiry Date:** August 31, 2011

### Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
UWO Protocol		
Letter of Information & Consent		
Other	Confidentiality Agreement	

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the NMREB.

The Chair of the NMREB is Dr. Riley Hinson. The UWO NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

### The University of Western Ontario

Office of Research Ethics

Support Services Building Room 5150 • London, Ontario • CANADA - N6A 3K7  
PH: 519-661-3036 • F: 519-850-2466 • [ethics@uwo.ca](mailto:ethics@uwo.ca) • [www.uwo.ca/research/ethics](http://www.uwo.ca/research/ethics)

## APPENDIX B

### Baseline Study Instrument DM 945 Probiotic Yogurt for Health and Nutrition in East Africa: Women Helping Women.

#### Adults – Women

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Survey ID No \_\_\_\_\_

Group: \_\_\_\_\_

RA's Name: \_\_\_\_\_

#### 1. INTRODUCTION: To be filled by MOH Interviewer

Hello, My name is [NAME]... on behalf of researchers from the KEMRI, KMOH and the University of Western Ontario. We are conducting the baseline phase of the study about health and nutrition benefits of probiotic yogurt in Oyugis. Most of the questions relate the benefits of probiotic yogurt to your health. Some of the questions are of a personal nature and some ask about mental and physical health. The interview will take approximately 30 minutes.)

I would like to let you know that you have the right to refuse to participate, and you also have the right to refuse to answer any questions at any time during the interview. Your responses, together with others will be reported in such a way that will protect the anonymity of the respondents.

ID Number: \_\_\_\_\_

Name: \_\_\_\_\_

Age \_\_\_\_\_

Phone No. \_\_\_\_\_

Care Taker/Guardian \_\_\_\_\_

PSC Clinic Card No \_\_\_\_\_

Weight (Kg) \_\_\_\_\_ Height (m) \_\_\_\_\_

BMI (Kg/m<sup>2</sup>) \_\_\_\_\_

Village/Town of Residence \_\_\_\_\_

Did the patient give his/her informed consent: Yes [2] No [1]

Is the patient under ARVs : yes [2] No [1]

Is the patient taking-

plumpy nut            yes [ ] no [ ]

fortified porridge    yes [ ] no [ ]

on multi-vitamin      yes [ ] no [ ]

other program (**drug or nutritional**)    yes [ ] no [ ]

If yes, specify: \_\_\_\_\_

**A. SOCIO-DEMOGRAPHIC QUESTIONS: to be filled by MOH Interviewers.**

A1 In what year were you born?

- Enter year of birth
- Don't Know
- Refused

A2 What language is spoken most often in your home?

- Kishwahili
- Other Specify
- don't know
- refused

A3 At present are you married, living with a husband, widowed, divorced, separated, or have you never been married?

- Married or living with a husband
- Widowed
- Divorced
- Separated
- Never Married
- Don't know
- Refused

A4a Including yourself, how many people live in your household?

- enter number
- don't know
- refused

A4b Including yourself, how many of the people in your household are 65 or over?

- enter number
- don't know
- refused

A5 Are there any children under 18 years of age in your household?

- yes
- no
- don't know
- refused

A6 If yes..how many of the children in your household are 5 years old or younger?

- Number
- Don't know

- Refused
- A7 How tall are you? (m/cm or ft/ in)
- enter weight in kg or lb  
 don't know  
 refused
- A8 How much do you weigh? (kg or lb)
- enter weight in kg or lb  
 don't know  
 refused
- A9 What is the highest level of education you have completed?
- no schooling  
 some elementary school  
 completed elementary school  
 some high school/junior high school  
 completed high school  
 some college  
 some technical school  
 completed college  
 completed technical school  
 some University  
 completed Bachelor's Degree  
 Post Graduate Training: MA, MSc, etc  
 Professional Degree (Law, Medicine, Dentistry)  
 Don't know  
 Refused
- A10 Are you presently working for pay in a full-time or in a part-time job, are you unemployed, retired, a homemaker, a student or something else?
- Full-time job, including during vacations from work  
 Part-time job  
 Sick leave, maternity leave, strike, etc.  
 Unemployed  
 Retired  
 Homemaker  
 Student (includes students working part-time)  
 Other (specify)  
 Don't know  
 Refused
- A11 What is your main occupation?



Occupation \_\_\_\_\_  
How many years have you been in this occupation \_\_\_\_\_

A12 If retired, what was your occupation before you retired? \_\_\_\_\_  
How many years have you been in this occupation \_\_\_\_\_

A13a In what year were you last employed?  
 enter year  
 was never employed  
 don't know  
 refused

What was your main occupation? \_\_\_\_\_

A13b How long were you at this job?  
 enter time  
 don't know  
 refused

A14a Is your spouse or partner presently working for pay in a full-time or in a part-time job, is s/he unemployed, retired, a homemaker, a student, or something else?

- Full-time job, including during leave from work
- Part-time job
- Sick leave, maternity leave, strike, etc.
- Unemployed
- Retired
- Homemaker
- Student (includes students working part-time)
- Other (specify)
- Don't know
- Refused

A14b What is your spouse's or partner's occupation? \_\_\_\_\_

Could you please tell me how much income you and other members of your household received in 2007? Be sure to include income FROM ALL SOURCES such as savings, pensions, rent, and unemployment insurance as well as wages. We don't need the exact amount; could tell me which of these broad categories it falls into...

- ...less than KSH10,000
- ...between KSH 10,000 and KSH 20,000 (KSH 19,999.99)

- ...between KSH 20,000 and KSH 30,000 (KSH 29,999.99)
- ...between KSH 30,000 and KSH 40,000
- ...between KSH 40,000 and KSH 50,000
- ...between KSH 50,000 and KSH 60,000
- ...between KSH 60,000 and KSH 70,000
- ...between KSH 70,000+
- ...Don't know
- ...Refused

Now I'd like to ask you some questions about your dwelling.

A15a Is this dwelling owned by you, a member of your household or it is rented?

- you
- a member of this household (even if it is still being paid for)?
- rented (even if no cash rent is paid)?
- don't know
- refused

A15b If renting, is the owner of the property living in the same building or in the neighbourhood?

- yes (same building)
- yes (in the neighbourhood)
- no
- don't know
- refused

## B. FOOD FREQUENCY QUESTIONNAIRE

During the past 2 weeks, how often did your child eat a serving of each of the foods listed here?

### Fruits Matunda

#### Banana Ndizi

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

#### Mango (Embe)

- 2-3 times per day
- once per day
- Once per week

- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

#### Pineapple (Nanasi)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

#### Papaya (Papai)

- 2-3 times per day
- once per day

- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Oranges/Lemon/Lime  
(Machungwa/limao/ndimu chenza)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Passion Fruit (pasheni)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Guava (Pera)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Watermelon (tikiti maji)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Vegetables Mboga**

Tomato (nyanya)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Eggplant (biringanya)

- 2-3 times per day
- once per day
- Once per week

- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Okra (Bamia)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cabbage (kabichi)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Onion (kitunguu)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cucumber (tango)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Mchicha (spinach)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Pumpkin Leaves (Msusa)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week

Survey

375

ID: \_\_\_\_\_

Date: \_\_\_\_\_

- 2-3 times per two weeks
- few times per month
- never
- Cassava Leaves (kisamvu)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Kale (Sukuma wiki)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Amaranth leaves
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Mchuzi
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Potato
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Sweet Potato (Yam)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Viazi (leaves of SP)  
Good source of VitA

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never
- Chips
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never

### Grains and Cereals

- Ugali (ugi)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Ugali from Maize
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Ugalia from Cassava (mihogo)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Rice
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Vitumbua (from rice)
  - 2-3 times per day
  - once per day

Survey

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ID: \_\_\_\_\_

Date: \_\_\_\_\_

- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Millet (for ugali – mtama)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Meats, Beans, and Nuts**

Nyoyo (beans and maize)

Kande

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Simsim (sesame seeds) ufuta

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Sorghum gruel with groundnuts & milk (uji)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Eggs (Yai)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Chicken (roasted)

- 2-3 times per day
- once per day
- Once per week

- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Chicken (fried) wa kukaanga

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Goat (mbuzi)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Beef (fried) (nya ma)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Chips mayai (fried ommlet)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Ground-nut

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cowpeas

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Fish (Samaki)**

**Sardine (Dagaa)**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Sugar**

**Raw sugar cane**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Granulated sugar**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Tea (Chai)**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Beer or other alcoholic beverages (Bia vileo)**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Milk Products**

**Pasteurized milk**

- 2-3 times per day
- once per day
- Once per week

- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Unpasteurized milk**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Goat's milk**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Cheese**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Yogurt**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Kefir (maziwa lala)**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Other milk products \_\_\_\_\_ (how often? \_\_\_\_\_)

**C. WHOQOL-HIV BREF to be filled by MOH Interviewer**

Please respond to the following questions if they are applicable to you:

- C1 What is your **HIV serostatus**? Asymptomatic / Symptomatic / AIDS converted
- C2 In what year did you first **test positive** for HIV? \_\_\_\_\_ (day/month/year)
- C3 In what year do you think you were infected? \_\_\_\_\_ (Year)
- C4 How do you believe you were **infected with HIV**? (circle one only):
  - Sex with a man
  - Sex with a woman
  - Injecting drugs
  - Blood products
  - Other (specify) \_\_\_\_\_

**D. WHOQOL-BREF to be filled by MOH Interviewer**

The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last four weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	5	4	3	2	1
4.	How much do you need any medical treatment to function in your daily life?	5	4	3	2	1
5.	How much do you enjoy life?	1	2	3	4	5
6.	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7.	How well are you able to concentrate?	1	2	3	4	5
8.	How safe do you feel in your daily life?	1	2	3	4	5
9.	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?	1	2	3	4	5
12.	Have you enough money to meet your needs?	1	2	3	4	5



13.	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14.	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well are you able to get around?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied are you with your sleep?	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18.	How satisfied are you with your capacity for work?	1	2	3	4	5
19.	How satisfied are you with yourself?	1	2	3	4	5
20.	How satisfied are you with your personal relationships?	1	2	3	4	5
21.	How satisfied are you with your sex life?	1	2	3	4	5
22.	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23.	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24.	How satisfied are you with your access to health services?	1	2	3	4	5

25.	How satisfied are you with your transport?	1	2	3	4	5
-----	--	---	---	---	---	---

The following question refers to how often you have felt or experienced certain things in the last four weeks.

		Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	5	4	3	2	1

**Do you have any comments about the assessment?**

*[The following table should be completed after the interview is finished]*

		Equations for computing domain scores	Raw score	Transformed scores*	
				4-20	0-100
27.	<b>Domain 1</b>	$(6-Q3) + (6-Q4) + Q10 + Q15 + Q16 + Q17 + Q18$ +   +   +   +   +   +	a. =	b:	c:
28.	<b>Domain 2</b>	$Q5 + Q6 + Q7 + Q11 + Q19 + (6-Q26)$ +   +   +   +   +	a. =	b:	c:
29.	<b>Domain 3</b>	$Q20 + Q21 + Q22$ +   +	a. =	b:	c:
30.	<b>Domain 4</b>	$Q8 + Q9 + Q12 + Q13 + Q14 + Q23 + Q24 + Q25$ +   +   +   +   +   +   +	a. =	b:	c:

**E. GENERAL HEALTH STATUS: to be filled by MOH Interviewer**

E1 I'd like to ask you a couple of questions about your health in general. In general, compared to other people your age, would you say your health is Excellent, Very Good, Good, Fair or Poor?

- Excellent
- Very Good
- Good
- Fair
- Poor
- Don't Know
- Refused

E2 How satisfied are you with your health? Would you say you are Very Satisfied, Somewhat Satisfied, Not Too Satisfied, or Not At All Satisfied?

- Very Satisfied
- Somewhat Satisfied
- Not Too Satisfied
- Not At All Satisfied
- Don't Know
- Refused

Now, I'd like to ask you about the things that could be done to improve your health.

E3a What is the most important thing that could be done in your community to improve your health?

- enter first mention (specify)
- no first mention
- don't know
- refused

E3b Is there anything else that could be done that would improve your health?

- enter second mention (specify)
- no second mention
- don't know
- refused

E3c Now, I'd like to ask you about your appetite and perception of food. In general, how would you describe your appetite:

- very poor
- poor
- average
- good
- very good
- don't know
- refused

E3d When do you feel full when you eat?

- after eating only a few mouthfuls
- after eating about a third of a meal
- after eating over half a meal
- after eating most of the meal
- hardly ever feel full
- don't know
- refused

E3e How often do you feel hungry?

- rarely

- occasionally
- some of the time
- most of the time
- all of the time
- don't know
- refused

E3f How many meals do you normally eat in a day?

- less than one meal a day
- one meal a day
- two meals a day
- three meals a day
- more than three meals a day
- don't know
- refused

E3g In general, how satisfied are you with the probiotic yogurt as a food supplement ? Would you say you are Very Satisfied, Somewhat Satisfied, Not Too Satisfied, or Not At All Satisfied?

- Very Satisfied
- Somewhat Satisfied
- Not Too Satisfied
- Not At All Satisfied
- Don't Know
- Refused

E3h How satisfied are you with the impact of the probiotic yogurt on your health? Would you say Very Satisfied, Somewhat Satisfied, Not Too Satisfied, or Not At All Satisfied?

- Very Satisfied
- Somewhat Satisfied
- Not Too Satisfied
- Not At All Satisfied
- Don't Know
- Refused

## **F. GENERAL HEALTH BEHAVIORS: to be filled by MOH Clinician/Nurse**

### Smoking

F1. Now I'd like to ask a little bit about health behaviors. So first, do you smoke cigarettes/cigar/tobacco?

- yes

- no
- refused

F2. At the present time how often do you smoke cigarettes/cigar/ tobacco? Would you say DAILY, OCCASIONALLY or NOT AT ALL?

- Daily
- Occasionally
- refused

F3 Did you ever smoke cigarettes/cigar/ tobacco on a daily basis?

- yes
- no
- refused

F4 On average, about how many cigarettes/cigar/ tobacco a day do you now smoke?

- enter number
- don't know
- refused

### Alcohol

Now, some questions about alcohol consumption. When we use the word drink it means: one bottle or can of beer or a glass of draft; one glass of wine or a wine cooler or one straight or mixed drink with one and a half ounces of hard liquor.

F5 During the past two weeks have you had a drink of beer, wine, liquor or any other alcoholic beverage?

- yes
- no
- refused

F6 During the past two weeks, how often did you drink alcoholic beverages?

- Once a month
- 2-3 times a month
- Once a week
- 2-3 times a week
- 4-6 times a week
- Every day
- Not at all

Preventive Care/Health Services Use

Now I'd like to ask about contacts with health professionals during the past 12 months, that is, from ---- to yesterday.

F7a Do you have a regular health care provider?

- yes
- no
- don't know

F7b If no, where do you go when you need health care?

Specify \_\_\_\_\_

F7c In the past two weeks, how many times have you seen or talked on the telephone with your family doctor or health care provider about your physical, emotional or mental health?

- none
- enter number of times (warning after 12)
- don't know
- refused

F8 In the past 12 months, how many nights have you spent as an inpatient in a hospital or convalescent home?

- enter number of nights
- none
- don't know
- refused

F9 During the past 12 months, was there ever a time when you felt that you needed health care but you didn't receive it?

- yes
- no
- don't know

F10 Thinking of the most recent time, what was the type of care that was needed?

- treatment of - a physical health problem
- treatment of - an emotional or mental health problem
- a regular check-up (including regular pre-natal care)
- care of an injury
- other ( specify)

## G. SYMPTOMS : to be filled by MOH Clinician/Nurse

G1 Now I'd like to ask you a series of questions about POSSIBLE health problems you MAY be experiencing.  
DURING THE PAST TWO WEEKS

How often have you had problems with HEADACHES?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G2 How often have you had TROUBLE SLEEPING?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G3 How often have you had DIZZY SPELLS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G4 How often have you had NAUSEA over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week



- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G5 How often have you had JOINT PAIN OR SWELLING?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G6 How often have you LOST YOUR APPETITE? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G7 How often have you had STOMACH PAINS? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G8 How often have you had DIARRHEA? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week

- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G9 How often have you had SINUS CONGESTION THAT IS NOT RELATED TO A COLD?  
...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G10 How often have you had IRRITATED, SORE OR RED EYES? ...over the PAST  
TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G11 How often have you had COLDS ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G12 How often have you had a RUNNY OR STUFFY NOSE THAT IS NOT RELATED TO A  
COLD?...over the PAST TWO WEEKS?

- More than once a day

- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G13 How often have you had a SORE THROAT THAT IS NOT RELATED TO A COLD?  
...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G14 How often have you had EARACHES? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G15 How often have you had CHEST PAINS...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G16 How often have you had COUGHING THAT IS NOT RELATED TO A COLD?...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G17 How often have you had WHEEZING OR OTHER TROUBLE BREATHING? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G18 How often have you had HIVES OR SKIN RASHES?...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G19 How often have you had LOWER BACK PAIN? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know

Refused

G20 How often have you had NOSEBLEEDS ?...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G21 How often have you had a problem with EASY BRUISING? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G22 How often have you had BURNING OR DISCOMFORT URINATING? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G23 How often have you had BLOOD OR PUS IN YOUR STOOL? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks

- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

**Note: Refer severe cases for treatment and observation noting each.**

G24a Have you had any other health problems over the PAST TWO WEEKS that I have not asked you about?

- Yes
- No
- Don't Know
- Refused

G24b What is that? \_\_\_\_\_

G24c How often have you had a problem with [fill G24a]? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

W1 How often have you had symptoms of VAGINITIS in the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

W2 Have often have you had symptoms of BACTERIAL VAGINOSIS in the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week

- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

W3 Have often have you had any YEAST INFECTIONS in the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

**H. CHRONIC HEALTH PROBLEMS: to be filled by MOH Clinician/Nurse s**

Now I'd like to ask about certain chronic health conditions you may have. We are interested in "long term conditions" that have been diagnosed by a health professional.

H1 Do you have skin conditions?

- Yes
- No
- Never been told/Don't Know
- Refused

H2 Do you have hay fever or other allergies?

- Yes
- No
- Never been told/Don't Know
- Refused

H3 Do you have arthritis or rheumatism?

- Yes
- No
- Never been told/Don't Know
- Refused

H4 Have you been woken by an attack of shortness of breath at any time in the last 12 months?

- Yes
- No

- Never been told/Don't Know
- Refused

H5 Have you had an asthmatic attack in the last 12 months?

- Yes
- No
- Never been told/Don't Know
- Refused

H6 If yes, are you currently taking any medication for asthma, including inhalers, aerosols or tablets?

- Yes
- No
- Never been told/Don't Know
- Refused

H7a Do you have any other respiratory problems?

- Yes
- No
- Never been told/Don't Know
- Refused

H7b If yes, please specify \_\_\_\_\_

H8 Do you have high blood pressure or hypertension?

- Yes
- No
- Never been told/Don't Know
- Refused

H9 Do you have any other circulatory problems? (Not sure respondents will understand term)

- Yes
- No
- Never been told/Don't Know
- Refused

H10 Do you have heart disease?

- Yes
- No
- Never been told/Don't Know
- Refused

H11 Do you have diabetes?



- Yes
- No
- Never been told/Don't Know
- Refused

H12 Do you have urinary problems or kidney disease?

- Yes
- No
- Never been told/Don't Know
- Refused

H13 Do you have a stomach ulcer or ulcers?

- Yes
- No
- Never been told/Don't Know
- Refused

H14 Do you have other digestive problems??

- Yes
- No
- Never been told/Don't Know
- Refused

H15 Do you have any type of cancer?

- Yes
- No
- Never been told/Don't Know
- Refused

H16 Do you have any tuberculosis (TB)?

- Yes
- No
- Never been told/Don't Know
- Refused

**CLINICAL AND LABORATORY QUESTIONNAIRE FOR WOMEN**

Name of Patient.....

Number.....

1. In the last 12 months have you had any of the following symptoms?

- Abdominal pain.....

- Lower back pain.....
- Painful sexual intercourse.....
- Genital discharge/Dripping.....
- Foul smelling discharge .....
- Burning pain on urination .....
- Redness/inflammation in genital area .....
- Swelling in genital area.....
- Genital sores/ulcers.....
- Genital warts.....
- Genital itching.....
- Blood in urine.....
- Other (specify) -----
- No

## 2. Clinical Diagnosis (After physical exam)

- Pelvic inflammatory disease.....
- Bacterial vaginosis.....
- Vulvo-vaginitis.....
- Cervicitis.....
- Urethritis.....

Ulcerative lesions of the genitalia (HSV-1, HSV-2, Treponema pallidum, Haemophilus ducreyi, C. trachomatis-LGV strains, Calymmatobacterium granulomatis)

- LGV.....
- Chancroid.....
- Genital herpes.....
- Syphilis.....
- Genital and anal warts.....

Vaginal discharges (HVS):

- Trichomoniasis.....
- Candidiasis.....
- Bacterial vaginosis.....
- pH.....

Neoplasias:

- Kaposi's sarcoma.....
- Body cavity lymphomas.....
- Squamous cell, dysplasias and cancers.....

Scabies (Sarcoptes scabiei).....

Pubic lice (Phthirus pubis).....

4. Laboratory Diagnosis

- N. gonorrhoea (gram stain).....
- C. trachomatis (gram stain).....
- T. pallidum (VDRL).....
- C. granulomatis (Gram stain).....
- HSV 1 or 2 (serology, if possible).....
- T. vaginalis (Microscopy) .....
- Clue cells (G. vaginalis, Mobililancus spp).....
- Other pathogens isolated (specify).....
- Urinalysis (pH)
- KOH (amine test).....

5. How often have you had DIARRHEA? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

6. If yes, was the diarrhoea bloody?

- Yes
- No
- Don't know

Name of Lab/Clinical Interviewer.....

Signature.....

Date.....

## APPENDIX C

### Baseline Study Instrument DM 945 Probiotic Yogurt for Health and Nutrition in East Africa: Women Helping Women.

Adults – Men

Survey ID No \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Group: \_\_\_\_\_

RA's Name: \_\_\_\_\_

#### 1. INTRODUCTION: To be filled by MOH Interviewer

Hello, My name is [NAME] on behalf of researchers from the KEMRI, KMOH and the University of Western Ontario. We are conducting the baseline phase of the study about health and nutrition benefits of probiotic yogurt in Oyugis. Most of the questions relate the benefits of probiotic yogurt to your health. Some of the questions are of a personal nature and some ask about mental and physical health. The interview will take approximately 30 minutes.

I would like to let you know that you have the right to refuse to participate, and you also have the right to refuse to answer any questions at any time during the interview. Your responses, together with others will be reported in such a way that will protect the anonymity of the respondents.

ID Number: \_\_\_\_\_ Name: \_\_\_\_\_  
Age \_\_\_\_\_ Phone No. \_\_\_\_\_  
Care Taker/Guardian \_\_\_\_\_ PSC Clinic Card No \_\_\_\_\_  
Weight (Kg) \_\_\_\_\_ Height (m) \_\_\_\_\_ BMI (Kg/m<sup>2</sup>) \_\_\_\_\_  
Village/Town of Residence \_\_\_\_\_

Did the patient give his/her informed consent: Yes [2] No [1]

Is the patient under ARVs : yes [2] No [1]

Is the patient taking-

plumpy nut            yes [ ] no [ ]

fortified porridge    yes [ ] no [ ]

on multi-vitamin     yes [ ] no [ ]

other program (**drug or nutritional**)            yes [ ] no [ ]

If yes, specify: \_\_\_\_\_

**A. SOCIO-DEMOGRAPHIC QUESTIONS: to be filled by MOH Interviewers.**

A1 In what year were you born?

- Enter year of birth
- Don't Know
- Refused

A2 What language is spoken most often in your home?

- Kishwahili
- Other Specify
- don't know
- refused

A3 At present are you married, living with a husband, widowed, divorced, separated, or have you never been married?

- Married or living with a husband
- Widowed
- Divorced
- Separated
- Never Married
- Don't know
- Refused

A4a Including yourself, how many people live in your household?

- enter number
- don't know
- refused

A4b Including yourself, how many of the people in your household are 65 or over?

- enter number
- don't know
- refused

A5 Are there any children under 18 years of age in your household?

- yes
- no
- don't know
- refused

A6 If yes...how many of the children in your household are 5 years old or younger?

- Number

- Don't know
  - Refused
- A7 How tall are you? (m/cm or ft/ in)
- enter weight in kg or lb
  - don't know
  - refused
- A8 How much do you weigh? (kg or lb)
- enter weight in kg or lb
  - don't know
  - refused
- A9 What is the highest level of education you have completed?
- no schooling
  - some elementary school
  - completed elementary school
  - some high school/junior high school
  - completed high school
  - some college
  - some technical school
  - completed college
  - completed technical school
  - some University
  - completed Bachelor's Degree
  - Post Graduate Training: MA, MSc, etc
  - Professional Degree (Law, Medicine, Dentistry)
  - Don't know
  - Refused
- A10 Are you presently working for pay in a full-time or in a part-time job, are you unemployed, retired, a homemaker, a student or something else?
- Full-time job, including during vacations from work
  - Part-time job
  - Sick leave, maternity leave, strike, etc.
  - Unemployed
  - Retired
  - Homemaker
  - Student (includes students working part-time)
  - Other (specify)
  - Don't know
  - Refused
- A11 What is your main occupation?

Occupation \_\_\_\_\_  
How many years have you been in this occupation \_\_\_\_\_

A12 If retired, what was your occupation before you retired? \_\_\_\_\_  
How many years have you been in this occupation \_\_\_\_\_

A13a In what year were you last employed?

- enter year
- was never employed
- don't know
- refused

What was your main occupation? \_\_\_\_\_

A13b How long were you at this job?

- enter time
- don't know
- refused

A14a Is your spouse or partner presently working for pay in a full-time or in a part-time job, is s/he unemployed, retired, a homemaker, a student, or something else?

- Full-time job, including during leave from work
- Part-time job
- Sick leave, maternity leave, strike, etc.
- Unemployed
- Retired
- Homemaker
- Student (includes students working part-time)
- Other (specify)
- Don't know
- Refused

A14b What is your spouse's or partner's occupation? \_\_\_\_\_

Could you please tell me how much income you and other members of your household received in 2007? Be sure to include income FROM ALL SOURCES such as savings, pensions, rent, and unemployment insurance as well as wages. We don't need the exact amount; could tell me which of these broad categories it falls into...

- ...less than KSH10,000
- ...between KSH 10,000 and KSH 20,000 (KSH 19,999.99)
- ...between KSH 20,000 and KSH 30,000 (KSH 29,999.99)

- ...between KSH 30,000 and KSH 40,000
- ...between KSH 40,000 and KSH 50,000
- ...between KSH 50,000 and KSH 60,000
- ...between KSH 60,000 and KSH 70,000
- ...between KSH 70,000+
- ...Don't know
- ...Refused

Now I'd like to ask you some questions about your dwelling.

A15a Is this dwelling owned by you, a member of your household or it is rented?

- you
- a member of this household (even if it is still being paid for)?
- rented (even if no cash rent is paid)?
- don't know
- refused

A15b If renting, is the owner of the property living in the same building or in the neighbourhood?

- yes (same building)
- yes (in the neighbourhood)
- no
- don't know
- refused

## B. FOOD FREQUENCY QUESTIONNAIRE

During the past 2 weeks, how often did your child eat a serving of each of the foods listed here?

### Fruits Matunda

#### Banana Ndizi

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

#### Mango (Embe)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month

- never

#### Pineapple (Nanasi)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

#### Papaya (Papai)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never



Oranges/Lemon/Lime  
(Machungwa/limao/ndimu chenza)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Passion Fruit (pasheni)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Guava (Pera)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Watermelon (tikiti maji)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

### **Vegetables Mboga**

Tomato (nyanya)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Eggplant (biringanya)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Okra (Bamia)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cabbage (kabichi)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Onion (kitunguu)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cucumber (tango)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Mchicha (spinach)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Pumpkin Leaves (Msusa)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cassava Leaves (kisamvu)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks

Survey ID: \_\_\_\_\_

Date: \_\_\_\_\_

- few times per month
- never
- Kale (Sukuma wiki)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Amaranth leaves
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Mchuzi
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Potato
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Sweet Potato (Yam)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Viazi (leaves of SP)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Good source of VitA
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Chips
  - 2-3 times per day

- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

### Grains and Cereals

- Ugali (ugi)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Ugali from Maize
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Ugalia from Cassava (mihogo)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Rice
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Vitumbua (from rice)
  - 2-3 times per day
  - once per day
  - Once per week
  - 2-3 times per week
  - 2-3 times per two weeks
  - few times per month
  - never
- Millet (for ugali – mtama)
  - 2-3 times per day
  - once per day
  - Once per week

Survey ID: \_\_\_\_\_

Date: \_\_\_\_\_

- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Meats, Beans, and Nuts**

Nyoyo (beans and maize)

Kande

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Simsim (sesame seeds) ufuta

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Sorghum gruel with groundnuts & milk (uji)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Eggs (Yai)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Chicken (roasted)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Chicken (fried) wa kukaanga

- 2-3 times per day
- once per day
- Once per week

- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Goat (mbuzi)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Beef (fried) (nya ma)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Chips mayai (fried ommlet)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Ground-nut

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cowpeas

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Fish (Samaki)**

Sardine (Dagaa)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks

Survey ID: \_\_\_\_\_

Date: \_\_\_\_\_

- few times per month
- never

**Sugar**

Raw sugar cane

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Granulated sugar

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Tea (Chai)**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Beer or other alcoholic beverages (Bia vileo)**

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

**Milk Products**

Pasteurized milk

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Unpasteurized milk

- 2-3 times per day
- once per day

- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Goat's milk

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Cheese

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Yogurt

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Kefir (maziwa lala)

- 2-3 times per day
- once per day
- Once per week
- 2-3 times per week
- 2-3 times per two weeks
- few times per month
- never

Other milk products \_\_\_\_\_ (how often? \_\_\_\_\_)

**C. WHOQOL-HIV BREF to be filled by MOH Interviewer**

Please respond to the following questions if they are applicable to you:

- C1 What is your **HIV serostatus**? Asymptomatic / Symptomatic / AIDS converted
- C2 In what year did you first **test positive** for HIV? \_\_\_\_\_ (day/month/year)
- C3 In what year do you think you were infected? \_\_\_\_\_ (Year)
- C4 How do you believe you were **infected with HIV**? (circle one only):
  - Sex with a man
  - Sex with a woman
  - Injecting drugs
  - Blood products
  - Other (specify) \_\_\_\_\_

**D. WHOQOL-BREF to be filled by MOH Interviewer**

The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last four weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	5	4	3	2	1
4.	How much do you need any medical treatment to function in your daily life?	5	4	3	2	1
5.	How much do you enjoy life?	1	2	3	4	5
6.	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7.	How well are you able to concentrate?	1	2	3	4	5
8.	How safe do you feel in your daily life?	1	2	3	4	5
9.	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?	1	2	3	4	5
12.	Have you enough money to meet your needs?	1	2	3	4	5
13.	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5

14.	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5
-----	--	---	---	---	---	---

		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well are you able to get around?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied are you with your sleep?	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18.	How satisfied are you with your capacity for work?	1	2	3	4	5
19.	How satisfied are you with yourself?	1	2	3	4	5
20.	How satisfied are you with your personal relationships?	1	2	3	4	5
21.	How satisfied are you with your sex life?	1	2	3	4	5
22.	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23.	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24.	How satisfied are you with your access to health services?	1	2	3	4	5
25.	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to how often you have felt or experienced certain things in the last four weeks.

		Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	5	4	3	2	1

**Do you have any comments about the assessment?**

*[The following table should be completed after the interview is finished]*

		Equations for computing domain scores	Raw score	Transformed scores*	
				4-20	0-100
27.	<b>Domain 1</b>	$(6-Q3) + (6-Q4) + Q10 + Q15 + Q16 + Q17 + Q18$ + + + + + +	a. =	b:	c:
28.	<b>Domain 2</b>	$Q5 + Q6 + Q7 + Q11 + Q19 + (6-Q26)$ + + + + +	a. =	b:	c:
29.	<b>Domain 3</b>	$Q20 + Q21 + Q22$ + +	a. =	b:	c:
30.	<b>Domain 4</b>	$Q8 + Q9 + Q12 + Q13 + Q14 + Q23 + Q24 + Q25$ + + + + + + +	a. =	b:	c:

**E. GENERAL HEALTH STATUS: to be filled by MOH Interviewer**

E1 I'd like to ask you a couple of questions about your health in general. In general, compared to other people your age, would you say your health is Excellent, Very Good, Good, Fair or Poor?

- Excellent
- Very Good
- Good
- Fair
- Poor
- Don't Know
- Refused



E2 How satisfied are you with your health? Would you say you are Very Satisfied, Somewhat Satisfied, Not Too Satisfied, or Not At All Satisfied?

- Very Satisfied
- Somewhat Satisfied
- Not Too Satisfied
- Not At All Satisfied
- Don't Know
- Refused

Now, I'd like to ask you about the things that could be done to improve your health.

E3a What is the most important thing that could be done in your community to improve your health?

- enter first mention (specify)
- no first mention
- don't know
- refused

E3b Is there anything else that could be done that would improve your health?

- enter second mention (specify)
- no second mention
- don't know
- refused

E3c Now, I'd like to ask you about your appetite and perception of food. In general, how would you describe your appetite:

- very poor
- poor
- average
- good
- very good
- don't know
- refused

E3d When do you feel full when you eat?

- after eating only a few mouthfuls
- after eating about a third of a meal
- after eating over half a meal
- after eating most of the meal
- hardly ever feel full
- don't know
- refused

E3e How often do you feel hungry?

- rarely
- occasionally
- some of the time
- most of the time
- all of the time
- don't know
- refused

E3f How many meals do you normally eat in a day?

- less than one meal a day
- one meal a day
- two meals a day
- three meals a day
- more than three meals a day
- don't know
- refused

E3g In general, how satisfied are you with the probiotic yogurt as a food supplement ?  
Would you say you are Very Satisfied, Somewhat Satisfied, Not Too Satisfied, or Not At All Satisfied?

- Very Satisfied
- Somewhat Satisfied
- Not Too Satisfied
- Not At All Satisfied
- Don't Know
- Refused

E3h How satisfied are you with the impact of the probiotic yogurt on your health? Would you say Very Satisfied, Somewhat Satisfied, Not Too Satisfied, or Not At All Satisfied?

- Very Satisfied
- Somewhat Satisfied
- Not Too Satisfied
- Not At All Satisfied
- Don't Know
- Refused

## **F. GENERAL HEALTH BEHAVIORS: to be filled by MOH Clinician/Nurse**

### Smoking

F1. Now I'd like to ask a little bit about health behaviors. So first, do you smoke cigarettes/cigar/tobacco?

- yes

- no
- refused

F2. At the present time how often do you smoke cigarettes/cigar/ tobacco? Would you say DAILY, OCCASIONALLY or NOT AT ALL?

- Daily
- Occasionally
- refused

F3 Did you ever smoke cigarettes/cigar/ tobacco on a daily basis?

- yes
- no
- refused

F4 On average, about how many cigarettes/cigar/ tobacco a day do you now smoke?

- enter number
- don't know
- refused

### Alcohol

Now, some questions about alcohol consumption. When we use the word drink it means: one bottle or can of beer or a glass of draft; one glass of wine or a wine cooler or one straight or mixed drink with one and a half ounces of hard liquor.

F5 During the past two weeks have you had a drink of beer, wine, liquor or any other alcoholic beverage?

- yes
- no
- refused

F6 During the past two weeks, how often did you drink alcoholic beverages?

- Once a month
- 2-3 times a month
- Once a week
- 2-3 times a week
- 4-6 times a week
- Every day
- Not at all

### Preventive Care/Health Services Use

Now I'd like to ask about contacts with health professionals during the past 12 months, that is, from ---- to yesterday.

F7a Do you have a regular health care provider?

- yes
- no
- don't know

F7b If no, where do you go when you need health care?

Specify \_\_\_\_\_

F7c In the past two weeks, how many times have you seen or talked on the telephone with your family doctor or health care provider about your physical, emotional or mental health?

- none
- enter number of times (warning after 12)
- don't know
- refused

F8 In the past 12 months, how many nights have you spent as an inpatient in a hospital or convalescent home?

- enter number of nights
- none
- don't know
- refused

F9 During the past 12 months, was there ever a time when you felt that you needed health care but you didn't receive it?

- yes
- no
- don't know

F10 Thinking of the most recent time, what was the type of care that was needed?

- treatment of - a physical health problem
- treatment of - an emotional or mental health problem
- a regular check-up (including regular pre-natal care)
- care of an injury
- other ( specify)

## **G. SYMPTOMS : to be filled by MOH Clinician/Nurse**

G1 Now I'd like to ask you a series of questions about POSSIBLE health problems you MAY be experiencing.

DURING THE PAST TWO WEEKS

How often have you had problems with HEADACHES?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G2 How often have you had TROUBLE SLEEPING?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G3 How often have you had DIZZY SPELLS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G4 How often have you had NAUSEA over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all

- Don't Know
- Refused

G5 How often have you had JOINT PAIN OR SWELLING?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G6 How often have you LOST YOUR APPETITE? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G7 How often have you had STOMACH PAINS? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G8 How often have you had DIARRHEA? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks

- Not at all
- Don't Know
- Refused

G9 How often have you had SINUS CONGESTION THAT IS NOT RELATED TO A COLD? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G10 How often have you had IRRITATED, SORE OR RED EYES? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G11 How often have you had COLDS ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G12 How often have you had a RUNNY OR STUFFY NOSE THAT IS NOT RELATED TO A COLD?...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day

- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G13 How often have you had a SORE THROAT THAT IS NOT RELATED TO A COLD? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G14 How often have you had EARACHES? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G15 How often have you had CHEST PAINS...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G16 How often have you had COUGHING THAT IS NOT RELATED TO A COLD?...over the PAST TWO WEEKS?

- More than once a day



- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G17 How often have you had WHEEZING OR OTHER TROUBLE BREATHING? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G18 How often have you had HIVES OR SKIN RASHES?...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G19 How often have you had LOWER BACK PAIN? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G20 How often have you had NOSEBLEEDS ?...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G21 How often have you had a problem with EASY BRUISING? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G22 How often have you had BURNING OR DISCOMFORT URINATING? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

G23 How often have you had BLOOD OR PUS IN YOUR STOOL? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

**Note: Refer severe cases for treatment and observation noting each.**

G24a Have you had any other health problems over the PAST TWO WEEKS that I have not asked you about?

- Yes
- No
- Don't Know
- Refused

G24b What is that? \_\_\_\_\_

G24c How often have you had a problem with [fill G24a]? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

#### **H. CHRONIC HEALTH PROBLEMS: to be filled by MOH Clinician/Nurse s**

Now I'd like to ask about certain chronic health conditions you may have. We are interested in "long term conditions" that have been diagnosed by a health professional.

H1 Do you have skin conditions?

- Yes
- No
- Never been told/Don't Know
- Refused

H2 Do you have hay fever or other allergies?

- Yes
- No
- Never been told/Don't Know
- Refused

H3 Do you have arthritis or rheumatism?

- Yes
- No
- Never been told/Don't Know
- Refused

- H4 Have you been woken by an attack of shortness of breath at any time in the last 12 months?  
 Yes  
 No  
 Never been told/Don't Know  
 Refused
- H5 Have you had an asthmatic attack in the last 12 months?  
 Yes  
 No  
 Never been told/Don't Know  
 Refused
- H6 If yes, are you currently taking any medication for asthma, including inhalers, aerosols or tablets?  
 Yes  
 No  
 Never been told/Don't Know  
 Refused
- H7a Do you have any other respiratory problems?  
 Yes  
 No  
 Never been told/Don't Know  
 Refused
- H7b If yes, please specify \_\_\_\_\_
- H8 Do you have high blood pressure or hypertension?  
 Yes  
 No  
 Never been told/Don't Know  
 Refused
- H9 Do you have any other circulatory problems? (Not sure respondents will understand term)  
 Yes  
 No  
 Never been told/Don't Know  
 Refused
- H10 Do you have heart disease?

- Yes
- No
- Never been told/Don't Know
- Refused

H11 Do you have diabetes?

- Yes
- No
- Never been told/Don't Know
- Refused

H12 Do you have urinary problems or kidney disease?

- Yes
- No
- Never been told/Don't Know
- Refused

H13 Do you have a stomach ulcer or ulcers?

- Yes
- No
- Never been told/Don't Know
- Refused

H14 Do you have other digestive problems??

- Yes
- No
- Never been told/Don't Know
- Refused

H15 Do you have any type of cancer?

- Yes
- No
- Never been told/Don't Know
- Refused

H16 Do you have any tuberculosis (TB)?

- Yes
- No
- Never been told/Don't Know
- Refused

**CLINICAL AND LABORATORY QUESTIONNAIRE FOR MEN**

Name of Patient.....

Number.....

1. In the last 12 months have you had any of the following symptoms?

- Abdominal pain.....
- Lower back pain.....
- Painful sexual intercourse.....
- Genital discharge/Dripping.....
- Foul smelling discharge .....
- Burning pain on urination .....
- Redness/inflammation in genital area .....
- Swelling in genital area.....
- Genital sores/ulcers.....
- Genital warts.....
- Genital itching.....
- Blood in urine.....
- Other (specify) -----
- No

2. If yes, which one? .....

- Abdominal pain.....
- Lower back pain.....
- Painful sexual intercourse.....
- Genital discharge/Dripping.....
- Foul smelling discharge .....
- Burning pain on urination .....
- Redness/inflammation in genital area .....
- Swelling in genital area.....
- Genital sores/ulcers.....
- Genital warts.....
- Genital itching.....
- Blood in urine.....
- Other (specify) .....

3. Clinical Diagnosis (After physical exam)

- Epididymitis/Orchitis.....
- Urethritis.....

Ulcerative lesions of the genitalia (HSV-1, HSV-2, Treponema pallidum, Haemophilus ducreyi, C. trachomatis-LGV strains, Calymmatobacterium granulomatis)

- LGV.....
- Chancroid.....
- Genital herpes.....
- Syphilis.....
- Genital and anal warts.....

Neoplasias:

- Kaposi's sarcoma.....
- Body cavity lymphomas.....
- Squamous cell, dysplasias and cancers.....

Scabies (Sarcoptes scabiei).....

Pubic lice (Phthirus pubis).....

#### 5. Laboratory Diagnosis

- N. gonorrhoea (gram stain).....
- C. trachomatis (gram stain).....
- T. pallidum (VDRL).....
- C. granulomatis (Gram stain).....
- HSV 1 or 2 (serology, if possible).....
- Clue cells (G. vaginalis, Mobiluncus spp).....
- Other pathogens isolated (specify).....
- Urinalysis (pH)
- KOH (amine test).....

#### 5. How often have you had DIARRHEA? ...over the PAST TWO WEEKS?

- More than once a day
- Daily
- Almost every day
- Once a week
- Once in two weeks
- Less often than once in two weeks
- Not at all
- Don't Know
- Refused

#### 6. If yes, was the diarrhoea bloody?

- Yes

- No
- Don't know

7. Stool lab results

Microscopy.....

Culture.....

8. Diagnosis.....

9. CD4 count.....

Name of Lab/Clinical Interviewer.....

Signature.....

Date.....



## APPENDIX D

### Letter of Information and Consent Form

#### PROBIOTIC YOGHOURT FOR HEALTH, NUTRITION AND WOMEN'S EMPOWERMENT IN KENYA: A COMMUNITY-BASED APPROACH

Dear Madam/Sir:

My name is Ellena Andoniou, and this is \_\_\_\_\_ (name of translator). I am a PhD student in the Department of Geography at the University of Western Ontario, and I am conducting interviews about the Western Heads East probiotic yoghurt project, known locally as FITI.

As a participating member of the FITI Probiotic Yoghurt Project, you are being invited to take part in this study. The purpose of this letter is to provide you with the information needed for you to make an informed decision on participating.

Over the next several days, interviews will be held with participants of the epidemiological study, in order to assess your perceptions of the project's impact on your overall quality of life. The research will serve as complementary findings to the quality of life questions asked in the survey questionnaire. The aim of this supplementary research is to delve deeper into the impacts of the probiotic yoghurt on your health. The session will be audio taped and transcribed. The interviews will take place in the boardroom of the Vesture Villa Hotel.

While the study is not meant to create discomfort, you may experience **risk and discomforts** if you participate. The questions are of a personal nature and you may find them uncomfortable to respond to. If at any time during the process you feel discomfort you are not required to respond to the question/contribute and may step out of the interview, or completely withdraw without any consequence.

Participation in the study is completely **voluntary**, and you have the right to refuse participation. You will not be compensated for your participation. During the interview you have the **right to refuse** responding to any questions and you may **withdraw** from the study at any time without ramifications. Your withdrawal or refusal to respond will not affect your involvement in the project in any way.

Your responses will remain **confidential** and your **anonymity** protected. The responses collected during the interviews will be stored in a locked cabinet in a secure office. Only the principal investigator (me) will have access to the collected information/data and any recorded

information will be destroyed upon study completion. Your name and any information that may disclose your identity will not be used when reporting the findings.

If you have any questions, comments or concerns about this study please contact Ellena Andoniou or Dr. Isaac Luginaah.

Thank you for considering participation in this study.

Sincerely,

Ellena Andoniou  
Faculty of Social Sciences  
Department of Geography  
University of Western Ontario

## Consent Form

I have read the Letter of Information, and agree to participate in the study. All of my questions have been answered, and my concerns addressed. I understand that my participation is voluntary and I am able to withdraw from the study at any point without consequences. Withdrawing from the study will not impact my participation in the yoghurt program in any way. I understand that all responses will remain confidential and anonymous.

By signing this form, **you do not waive any legal rights.**

Participant's Name:

Signature:

Date:

### ***Interviewer and Translator's Signatures:***

Interviewer's Name:

Signature:

Translator's Name:

Signature:

Date:

## APPENDIX E

### Quality of Life Survey Instrument

- ⇒ How would you rate your quality of life?
  - ⇒ How satisfied are you with your health?
  - ⇒ Since you have been involved in the program would you consider yourself to be healthier? what do they mean by answering yes or no? Ask for specific examples, and try to determine if they are 'real' (diagnosed, treated) or perceived.
  - ⇒ Have you experienced increased overall wellness? Ask for specific examples (physical and mental)?
  - ⇒ Did you experience increased illness before or after participating in the program? (illness episodes) – How serious, how frequent, duration.
  - ⇒ have you had increased energy since you began the program? How so?
  - ⇒ Did you experience increased strength since you began the program? How So?
  - ⇒ Has the amount of medical treatment increased or decreased since being involved?
  - ⇒ Describe your ability to perform your daily activities, has this improved?
  - ⇒ Has your participation altered your perceptions of life? Do you feel hopeful? do you often have negative feelings such as blue mood, despair, anxiety, depression?
  - ⇒ How often do you have negative thoughts about your future? Has this changed since participating in the program?
  - ⇒ Do you worry about the future of your family?
  - ⇒ How would you describe your bodily appearance? Has this changed since being involved? How so?
  - ⇒ If your health and bodily appearance have improved, has this altered your family relationships – have their perceptions of you changed? How so?
- 
- ⇒ While on the program have you had increased self-esteem since you have participated?
  - ⇒ Has participating in the program lead to a decrease in risk-taking behaviour?
  - ⇒ Has the program provided you with economic benefit? Or not? In what way?
  - ⇒ Describe how the targeted food aid has impacted you and your quality of life (other than in terms of health).

- ⇒ Do you feel this program is culturally appropriate?
  - ⇒ Has the program created tensions within the community?
  - ⇒ Since you have begun participating, were you discriminated against?
  - ⇒ Have you experienced peer pressure since you began taking part in the program?
  - ⇒ Since you have participated in the program you are more isolate/secluded from the greater community?
  - ⇒ Have you created social networks?
  - ⇒ Have these social networks helped you in any capacity in your daily life (emotionally, spiritually, support)?
- 
- ⇒ Would you say you are more knowledgeable about community social services now that have participated in the program?
  - ⇒ Are you more aware of health-related services within the community?
  - ⇒ Challenges that were met while taking up the program?

## APPENDIX F

### Letter of Information and Consent Form

#### PROBIOTIC YOGHOURT FOR HEALTH, NUTRITION AND WOMEN'S EMPOWERMENT IN KENYA: A COMMUNITY-BASED APPROACH

Dear Madam/Sir:

My name is Ellena Andoniou, and this is \_\_\_\_\_ (name of translator). I am a PhD student in the Department of Geography at the University of Western Ontario, and I am conducting interviews about the Western Heads East probiotic yoghurt project.

As a member of the FITI Probiotic Yoghurt Project, you are being invited to participate in this study. The purpose of this letter is to provide you with the information needed for you to make an informed decision on participating.

Over the next several days, interviews will be held with each of the women from these groups, in order to assess your perceptions of the project's impact on your economic empowerment, health, self-esteem, family relationships and gender relations, community perceptions and participation. During these interviews the aim is to discuss whether the project has had an impact – positive or negative on your daily lives. The session will be audio taped and transcribed. The interviews will take place in a private location near the community kitchen.

While the study is not meant to create discomfort, you may experience **risk and discomforts** if you participate. The study is focused on your perceptions of the project and explores ways in which to improve empowerment and health. The questions are of a personal nature and you may find them uncomfortable to respond to. If at any time during the process you feel discomfort you are not required to respond to the question/contribute and may step out of the interview, or completely withdraw without any consequence.

Participation in the study is completely **voluntary**, and you have the right to refuse participation. You will not be compensated for your participation. During the interview you have the **right to refuse** responding to any questions and you may **withdraw** from the study at any time without ramifications. Your withdrawal or refusal to respond will not affect your involvement in the project in any way.

Your responses will remain **confidential** and your **anonymity** protected. The responses collected during the interviews will be stored in a locked cabinet in a secure office. Only the principal investigator (me) will have access to the collected information/data and any recorded

information will be destroyed upon study completion. Your name and any information that may disclose your identity will not be used when reporting the findings.

If you have any questions, comments or concerns about this study please contact Ellena Andoniou or Dr. Isaac Luginaah.

Thank you for considering participation in this study.

Sincerely,

Ellena Andoniou  
Faculty of Social Sciences  
Department of Geography  
University of Western Ontario

## Consent Form

I have read the Letter of Information, and agree to participate in the study. All of my questions have been answered, and my concerns addressed. I understand that my participation is voluntary and I am able to withdraw from the study at any point without consequences. Withdrawing from the study will not impact my participation in the yoghurt program in any way. I understand that all responses will remain confidential and anonymous.

By signing this form, **you do not waive any legal rights.**

Participant's Name:

Signature:

Date:

### ***Interviewer and Translator's Signatures:***

Interviewer's Name:

Signature:

Translator's Name:

Signature:

Date:



## APPENDIX G

### Economic Empowerment and Health Evaluation Tool

#### **Background**

Name:

Education:

Age:

Family Size:

Tell me a little bit about yourself.

- Avg. Monthly Income
- Relationship status

Tell me a little bit about how you got involved with this initiative/program.

What do you think is good about the program?

What would you like to change about the program?

How are the working conditions here in the program?

#### **Impacts of the program**

How has this program impacted you?

#### **Health**

How would you describe your health?

What are some of the major challenges you experience in trying to be healthy or have good health? (Probe about access to health services)

Has that changed since being involved with the program?

#### **Economic Situation**

Has this program impacted your economic situation? If yes, how?

Do you supplement your income from other sources of paid work?

Do you have trouble meeting household food needs? (Probe-how many times a week this occurs)

#### **Self-Esteem**

Has this program made you feel better or different about yourself? Do you see yourself in a different way? Is there a reason for this change?

**Family Relationships**

What does your family (i.e., spouse/partner, children, extended family) think about you being involved with this program?

How did your significant other first react to you participating in the project? Was there a negative reaction and if so, how did it manifest itself?

Is there more pressure to balance work and home tasks?

While you are working, who cares for your children?

Do you feel that you are more equitable/have more control over your personal resources/assets in your household as a participant in the program?

**Community**

Has this program provided you with the opportunity to get to know other people?

How do you feel that this program is viewed in your community?

Is your community supportive of the program? (Probe about local officials)

How has your involvement influenced your relationships with others in the community?

Do you think this program is making change in the community? (Probe about creating awareness regarding women's issues and HIV/AIDS)

Is there anything else you would like to add?

Do you have any questions for me?

## APPENDIX H

### Letter of Information and Consent Form

#### PROBIOTIC YOGHOURT FOR HEALTH, NUTRITION AND WOMEN'S EMPOWERMENT IN KENYA: A COMMUNITY-BASED APPROACH

Dear Madam/Sir:

My name is Ellena Andoniou, and this is \_\_\_\_\_ (name of translator). I am a PhD student in the Department of Geography at the University of Western Ontario, and I am conducting focus group discussions and interviews about the Western Heads East probiotic yoghurt project.

As a member of the Orande & Baraka Women's Group, or key stakeholder, you are being invited to participate in this study. The purpose of this letter is to provide you with the information needed for you to make an informed decision on participating.

Over the next several days, two focus group discussions will be held with each of the women's groups, including interviews with key informants/stakeholders assessing project sustainability from your perspectives. During these interviews the aim is to discuss the evolution of the project to develop a grounded framework explaining the recurrence of successes and failures within this project, and to explore ways in which all stakeholders can work towards achieving long-term project sustainability. The session will be audio taped and transcribed. The focus group discussions will take place at each of the community kitchens, and interviews with stakeholders will be held separately in a private location.

While the study is not meant to create discomfort, you may experience **risk and discomforts** if you participate. The study is focused on the group's perceptions of the project and explores ways in which to create long-term sustainability. The questions may create tension within the focus group discussion, or may be considered personal and you may find them uncomfortable to respond to. If at any time during the process you feel discomfort you are not required to respond to the question/contribute and may step out of the interview/group discussion, or completely withdraw without any consequence.

Participation in the study is completely **voluntary**, and you have the right to refuse to participate. You will not be compensated for your participation. During the interview/focus group discussions you have the **right to refuse responding** to any questions and you may **withdraw** from the study at any time without ramifications. Your withdrawal or refusal to respond will not affect your involvement in the project in any way.

Your responses will remain **confidential** and your **anonymity** protected. The responses collected during the focus group discussions and interviews will be stored in a locked cabinet in a secure office. Only the principal investigator (me) will have access to the collected information/data and any recorded information will be destroyed upon study completion. Your name and any information that may disclose your identity will not be used when reporting the findings.

If you have any questions, comments or concerns about this study please contact Ellena Andoniou or Dr. Isaac Luginaah.

Thank you for considering participation in this study.

Sincerely,

Ellena Andoniou  
Faculty of Social Sciences  
Department of Geography  
University of Western Ontario

## Consent Form

I have read the Letter of Information, and agree to participate in the study. All of my questions have been answered, and my concerns addressed. I understand that my participation is voluntary and I am able to withdraw from the study at any point without consequences. Withdrawing from the study will not impact my participation in the yoghurt program in any way. I understand that all responses will remain confidential and anonymous.

By signing this form, **you do not waive any legal rights.**

Participant's Name:

Signature:

Date:

### ***Interviewer and Translator's Signatures:***

Interviewer's Name:

Signature:

Translator's Name:

Signature:

Date:

## Appendix I

### Project Sustainability

<b>NAME:</b>	
At the inception, what were your (your organizations) goals for the project?	
Has the project met your expectations? What were your expectations?	
How do you see the future of this project?	
What needs of yours (of the participants) does the project fulfill?	
What does a sustainable business mean to you? (what does sustainability mean to them), how do they achieve sustainability	
Do you think you have been provided with the necessary knowledge/skills/tools you need to keep the project sustainable?	
To this point, what were some of the key challenges the project encountered?	
How were these overcome?	
What are the current challenges?	
How may these be resolved?	
Do you think your current internal challenges could jeopardize sustainability?	
Do you think your current external challenges could jeopardize sustainability?	
What do you think the organizational structure of the kitchen should look like?	
Please comment on the level/type of communication you have with the other stakeholders and does this play a role in sustainability?	
Do you think it is feasible to increase production?	
Do you think it is feasible to expand the project to other communities?	
How should expansion take place, who should be involved and what would your role be in the process?	

How do you see the inter-kitchen relationships developing and evolving?	
What steps do you think you need to take for the project to reach sustainability?	
Can the project be sustained without external input?	
What role do you think the Project Co-ordinator should play in the kitchen and for the overall project?	
What do you think the role WHE should be in the future?	
How should decisions be made within the kitchen?	
Are there any impending issues which you feel need to be addressed by any of the stakeholders?	

## APPENDIX J

### Ellena Andoniou, BHSc, MSc, MPH

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#### EDUCATION

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*The University of Western Ontario*

**Ph.D Global Health and Development** **Current**

Dissertation: "Probiotic Yoghurt for Health, Nutrition and Women's Empowerment in Kenya: A Community-Based Approach"

*Lakehead University*

**MPH Master of Public Health** **2009**

Thesis: "A Program Planning and Evaluation Framework for a Community Food Based Project in Mwanza, Tanzania"

*The University of Western Ontario*

**MSc. in Health Geography** **2007**

Thesis: "Sexual Behaviour Change Among Men in the Context of the HIV/AIDS Pandemic in Nigeria"

*The University of Western Ontario*

**BHSc. Bachelor of Health Sciences (Honours)** **2003**

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#### AWARDS

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- Ontario Graduate Scholarship **2011-2012**
- Western Humanitarian Award Nominee **2010-2011**
- Western Graduate Research Scholarship **2006-2009**
- Ontario Graduate Scholarship **2006-2007**
- AUCC-Canada Corps University Partnership Program Internship **2006**
- Pleva Award for Teaching Excellence **2006**
- CAG Membership **2006-2007**
- Department of Geography Award-Highest Average in Geography 508A-599Y **2005-2006**

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#### REFEREED PUBLICATIONS

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- Smeltzer, S., Flesher, G.A., Andoniou, E. (2009). Probiotics in Tanzania: a multi-partner development project. *Development in Practice*, 19(7), 873-883.

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#### REPORTS & TRAINING MATERIALS

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- Andoniou, E. (2012). Fiti Probiotic Production Instruction Manual and Site Development Guide with Supplementary Instructional DVD.
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- Luginaah, I., and Andoniou, E. (2010). World Bank Development Marketplace Report: Yogurt for Health and Nutrition in East Africa – Women Helping Women. London, ON: The University of Western Ontario, Department of Geography.
  - Andoniou, E., & Flesher, G. (2007). *Probiotics in Tanzania: A Review* (Western Heads East Report). London, ON: The University of Western Ontario, Department of Geography.
  - Andoniou, E. (2007). *The Need for a Gender Analysis Framework: The case of the Tukwamuane Women's Group* (Western Heads East Report). London, ON: The University of Western Ontario, Department of Geography.
  - Andoniou, E. (2007). *Building a Results-Based Management Framework for a Community Health and Nutrition Project which Combats HIV/AIDS, & Promotes Empowerment & Social Entrepreneurship* (Western Heads East Report). London, ON: The University of Western Ontario, Department of Geography.

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#### BOOK REVIEWS

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- Agyeman-Duah, I. (2010). Pilgrims of the Night: Development Challenges and Opportunities in Africa [Review of the book *Pilgrims of the Night: Development Challenges and Opportunities in Africa*], Canadian Journal of African Studies. (2012). Special Issue: Religion and Transformation within and beyond Africa, 46 (3), 453-454.
- Almasi, O. (2012). Swahili for Beginners [Review of the book *Swahili Grammar for Introductory and Intermediate Levels: Sarufi ya Kiswahili cha Ngazi ya Kwanza na Katii*].
- Crane, J.T. (2013). Scrambling for Africa: AIDS, Expertise, and the rise of American Global Health Science [Review of the book *Scrambling for Africa: AIDS, Expertise, and the rise of American Global Health Science*].
- Huras, P., Switzer G., Eliasoph, H., (2015). The LHIN adventure: the journey continues [Review of the manuscript *The LHIN adventure: the journey continues*], Healthcare Management Forum (2015).

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#### CONFERENCES & WORKSHOPS

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- Canadian Conference on Global Health: Capacity Building for Global Health: Research & Practice, Montreal, QC – November 2015
    - Andoniou, E., Arya, N., Hatcher-Roberts, J., Sutherland, D. (2015). PEGASUS – Peace, Global Health and Sustainability: A lens for building capacity for global health.
  - Racial Justice Matters, Toronto, ON – October 2015
  - REINVENT: Conference on Neglected Diseases, Toronto, ON – October 2015
  - The Society for the Advancement of Science in Africa – Polokwane, South Africa – April 2013
    - Andoniou, E. (2013). Probiotics for Africa: Challenges and Opportunities for Health & Development.
  - Energy Futures and Health Conference, Kitchener, ON – September 2012
  - Transcending Borders Towards Global Health: Discovering Sustainable Pathways from Local to Global, London, ON – April 2012
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- XIV<sup>th</sup> International Symposium in Medical Geography-Durham, UK – July, 2011
    - Andoniou, E. (2011). Probiotics for Africa: Challenges and Opportunities for Health & Development.
  - American Association of Geographers (AAG) - Seattle, Washington – April, 2011
    - Andoniou, E. (2011). Women’s Empowerment through a Community-Based Probiotic Food Project in Rachuonyo District Kenya.
  - Canada Research Chairs: Thinking Ahead For A Strong Future, Toronto, ON – November 24-25, 2010
  - XIII<sup>th</sup> International Symposium in Medical Geography-Hamilton, ON – July, 2009
    - Andoniou, E. (2009). The impact of community produced probiotic yoghurt on health and nutrition in Mwanza, Tanzania. Paper presented at the International Symposium on Medical Geography (IMGS), Hamilton, Ontario.
  - Canadian Association of Geographers-Thunder Bay, ON – May, 2006
    - Andoniou, E. (2006). Sexual Behaviour Change in the Context of HIV/AIDS Pandemic in Nigeria. Paper presented at the Canadian Association of Geographers Conference, Thunder Bay, Ontario.
  - Gender and HIV/AIDS Workshop-Mwanza, Tanzania - July 2006
  - International Co-Operation Days-Ottawa, ON - October 2006

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#### PRESENTATIONS & GUEST LECTURES

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- “Challenges, Successes and Lessons Learned: Conducting Research in Developing Countries”, **Compassion in Action Workshop** (invited presenter). University of Western Ontario. London, ON: April 6, 2007.
- “Lessons Learned: Practical Lessons Gleaned as an Intern on a Community Based Food Project in Mwanza, Tanzania”, **AUCC/Scotia Bank Award for Excellence in Internationalization** (invited presenter). University of Western Ontario, London, ON: November 6, 2006.
- “Experiences as a Researcher in a Developing Country Context: Comparing the Research Environment”, **Symposium on East Africa** (invited presenter). University of Western Ontario. London, ON: October 15, 2006.
- “Health & Development: The Challenges of Assessing the Health Impacts of A Grass-Roots Food Project – A Case Study”, **Geographies of Development** (Guest Lecturer). University of Western Ontario, London, ON: October 26, 2010.

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#### TEACHING EXPERIENCE – THE UNIVERSITY OF WESTERN ONTARIO

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##### ***Teaching Assistant***

**2012**

**Course:** “Conservation and Development” **Level:** Third Year  
Responsible for grading exams, and providing materials for tutorial sessions

##### ***Special Needs Tutor***

**2012-2011**

**Course:** “*Geography of Health & Health Care*” **Level:** Third Year

**Course:** "People, Places and Landscapes" **Level:** Second Year

**Teaching Assistant**

**2011**

**Course:** "Geography of Tourism" **Level:** Second Year

Responsible for grading written assignments and exams, and meeting with students to discuss concepts for their assignments, as well as providing guidance with course material.

**Course Instructor**

**2011**

**Course:** "Health Geography" **Level:** Second Year

Course Instructor for Health Geography 2430 for Summer Intersession.

Developed and presented course material, assignments and exams.

**Teaching Assistant**

**Course:** "Africa South of the Sahara" **Level:** Second Year

**2010**

Responsible for grading written assignments and exams; meeting with students to discuss concepts for written assignments.

**Course:** "Fundamentals of Geography" **Level:** First Year

**2008-2009**

Responsible for grading laboratory assignments and exams.

**Course:** "Spatial Techniques" **Level:** Second Year

**2007**

Developed tutorial material and conducted weekly lab practicum, met with students upon request, and graded all written work, including mid-term and final exam papers.

**Course:** "Geography of Health and Health Care" **Level:** Third Year **2006-2007**

Developed tutorial material and conducted weekly sessions, met with students upon request, developed marking rubric for assignments, graded all written work, including mid-term and final exam papers.

**Course:** "Health Geography" **Level:** Second Year

**2005-2006**

Developed tutorial material and conducted weekly sessions, met with students upon request, developed marking rubric for assignments, graded all written work including mid-term and final exam papers.

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**WORK RELATED EXPERIENCES**

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**Research Administrator, The Dalla Lana School of Public Health, University of Toronto, February 2015 - April 2015**

- Coordinate and support the preparation of grant applications for various Canadian and international funding agencies.
- Updating Common CVs and accomplish Research Net forms.
- Prepare budgets for submission.

### ***Research, The University of Western Ontario, 2009-2010***

#### **Researcher**

- Conducted my PhD fieldwork in Oyugis, a rural town in Kenya from October 2009-August 2010 in partnership with the Kenya Medical Research Institute (KEMRI) and the Rachuonyo District Hospital - Kenya Ministry of Health (MoH), Public Health Division. Research activities included:
  - Developed qualitative interview guides used to collect primary data in the field.
  - Conducted in-depth interviews with 75 participants about quality of life, health impacts of the program, impacts of economic empowerment and project sustainability.
  - In-depth interviews with 5 KEMRI and MoH personnel.
  - Co-ordinated and implemented all aspects of an epidemiological study using a quantitative survey instrument for 480 participants.
- Composed reports based on the statistical analysis of the raw data collected and presented to the World Bank, KEMRI, MoH.

### ***World Bank Development Marketplace Grant, 2007-2010***

#### **Volunteer Project Coordinator (Out and In-Field)**

- Provide logistical and resource management support for a development initiative funded by the World Bank in Oyugis, Kenya.
- Act as a catalyst and facilitator to enable and support direct program delivery and research initiatives by the Ministry of Health, the Kenya Medical Research Institute, and the Kenyan Project Co-ordinator.
- Direct the implementation of project objectives and ensure the achievement of key milestones as set out by the World Bank.
- Developed new partnerships through regular contact with local partners, stakeholders and key beneficiaries.
- Co-ordinated all aspects of the project in the field between October 2009-July 2010.

### ***Western Heads East, Mwanza, Tanzania, 2006-2007***

#### **Volunteer In-Field Project Coordinator**

- Provide logistical support and resource management support for the Western Heads East (WHE) Project.
- Focused on establishing strong community relationships and capacity building efforts to increase production and sales of probiotic yoghurt.
- Acted as a catalyst and facilitator to enable and support direct program delivery by trained project participants.
- Coordinated faculty and corporate site visits to Tanzania
- Built and maintained partnerships through regular contact with local partners, stakeholders and key beneficiaries, while networking with key government officials and local business leaders.

- Developed a branding scheme, brand management and marketing proposal for the project.

#### **Researcher (Tanzania)**

- Developed the survey instruments, both quantitative and qualitative used to collect primary data in the field.
- Field-work was conducted to assess the health impacts of probiotic yoghurt; the impacts of economic empowerment on health; project sustainability, and the feasibility of expanding the WHE project to other communities.
- Composed reports based on the statistical analysis of the raw data collected.
- A Canadian International Development Agency (CIDA) Results-Based Management Report and Food and Agriculture (FAO) Gender Analysis were conducted.

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#### **VOLUNTEER ACTIVITIES**

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- Reviewer for the Journal of Global Public Health
- Reviewer for the Healthcare Management Forum
- Secretary, Socio Economic and Environmental Development Solutions (SEEDS)
- Director of Administration, Society for the Advancement of Science in Africa

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#### **LANGUAGES**

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- Greek – Advanced
  - Spanish - Conversational
  - French and Kiswahili – Basic
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