

**MITIGATING HIV/AIDS THROUGH DIETARY
DIVERSIFICATION: A STUDY OF INDIGENOUS FOODS
INTAKE AMONG POST-PRIMARY TEACHERS IN
NAIROBI.**

**UNIVERSITY OF NAIROBI
EAST AFRICANA COLLECTION**

BY

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THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS
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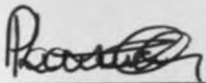


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DECLARATION BY THE CANDIDATE

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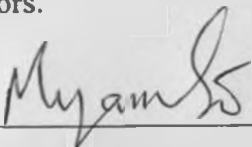
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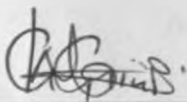
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DEDICATION

Affectionately dedicated to
My two little delights, Eman and Leon.
You are the joy, happiness and highlight of my life,
keeping me on toes.
You have taught me,
Motherhood is not for cowards.
My dear husband and friend,
Mike
Our experiences together
As I unleashed my potential for excellence,
Have endowed us
With what is truly essential in life,
A stronger spirit and braver heart
A keener mind
And God's grace that was sufficient and made me whom I am.

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ABBREVIATIONS

| | |
|----------|---|
| ACU | AIDS Control Unit |
| AIDS | Acquired Immune Deficiency Syndrome |
| AJFAND | African Journal of Food, Agriculture, Nutrition and Development |
| AJFNS | African Journal of Food and Nutritional Sciences |
| AMREF | African Medical and Research Foundation |
| ARV | Antiretroviral |
| AVRDC | Asian Vegetable Research and Development Center |
| DFID | Department for International Development |
| EFA | Education For All |
| FANTA | Food and Nutrition Technical Assistance Project |
| FAO | Food and Agriculture Organization of the United Nations |
| FORMAT | The Forum for Organic Resource Management and Agricultural Technologies |
| GOK | Government of Kenya |
| HAART | Highly Active Anti-Retroviral Therapy |
| HBC | Home Based Care |
| HIV | Human Immunodeficiency Virus |
| IFP | Indigenous Food Plants |
| IPGRI | International Plant Genetic Resources Institute |
| KEMRI | Kenya Medical Research Institute |
| KENEPOTE | Kenya Network of Positive Teachers |
| KENRICK | Kenya Resource Center of Indigenous Knowledge |
| KICOSHEP | Kibera Community Self Help Programme |
| KNUT | Kenya National Union of Teachers |
| MMAAK | Movement of Men Against AIDS in Kenya |
| MOEST | Ministry of Education Science and Technology |
| MOH | Ministry of Health |
| NACC | National AIDS Control Council |
| NGO | Non Governmental Organization |
| NMK | National Museums of Kenya |
| OI | Opportunistic Infection |
| PLWHA | People Living with HIV/AIDS |
| TASO | The AIDS Support Organization, Uganda |
| TSC | Teachers Service Commission |

| | |
|------------------|---|
| UNACC/SCN | United Nations Administrative Committee on Coordination/ Sub- Committee on Nutrition |
| UNESCO | United Nations Educational and Scientific Cultural Organisation |
| USAID | United States Agency for International Development |
| VAD | Vitamin A Deficiency |
| VCT | Voluntary Counselling Centre |
| WHO | World Health Organization |
| WOFAK | Women Fighting Against Aids in Kenya |

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ABSTRACT

Nutrition and HIV are strongly interrelated. Malnutrition leads to the impairment of the immune system whereas HIV/Aids decimates, the immunity leading to malnutrition. This worsens the effect of HIV and is catalytic to Aids. For efficacy of ARVs a good diet is a prerequisite for maintenance of weight and muscle tissue and good micronutrient status.

This study was designed to establish the role of indigenous foods and nutritional intervention in mitigating HIV/AIDS among post-primary teachers. Specifically the researcher sought to: study the feeding habits and the level of appreciation of indigenous foods, identify specific nutritious and medicinal indigenous foods which are appealing and appropriate to the health status of HIV carriers and AIDS patients, establish respondents' level of awareness of changing nutritional requirements during the various stages of HIV infection and AIDS and identify elements of dietary counselling that need to be promoted.

The study was guided by the patient centred counselling model that reflects principles from research supported theories of: Consumer information processing theory (CIP), the Health Belief Model, the stages of change model and social cognitive theory. The patient-centred counselling model enhances long-term dietary adherence. This model facilitates change by assessing patient needs and subsequently tailoring the intervention to the patient's stage in the process of change, personal goals, and unique challenges. Clients are expected to engage in specific actions to deal with their problems. These theories stipulate that relevant information must be provided in order for people to make informed choices.

The researcher focused on the post-primary teachers in Nairobi with and without the HIV causing virus. Information from the field was collected by use of interview schedules and use of interview guides for the key informants. The Frequency Food Questionnaire (FFQ) was used to estimate usual dietary intake patterns over the past 6 months. The FFQ had the ability to reflect dietary eating habits of post-primary teachers and their IFPs consumption. Coloured photographs of selected IFPs were provided to help respondents visualize the IFPs under study. Health variables obtained from the FFQ included vitamin and mineral supplement use, previous feeding habits, consumption of IFPs and self reported health status. The data obtained from the interview schedules was analysed through descriptive inferential analysis. Repeated 24-hour recalls of diet records where daily intake information was taken allowed reliable estimation of usual nutrient intake distribution in the groups.

The study revealed that the teachers strongly liked IFPs, yet their consumption was minimal. Modernization is deeply rooted among the teachers whose highest composition of meals was the modern and not balanced type of meals. The foods commonly cited as their favourites were the highly refined foods and exotic vegetables. This deviation from traditional foods to modern foods according to the teachers was the hallmark of modernity. The study findings indicate that Post-Primary Teachers in Nairobi are not well grounded in the importance of IFPs. According to the findings, the HIV+ teachers are appreciating and consuming more of IFPs. Infact, findings posit that they eat better than the general teachers. They have a higher consumption of grains in their natural form that enhances diversity of nutrients in their meals.

There is not much consumption of natural grains from the findings. Very interestingly, a majority of the respondents know that unrefined grains are more nutritious, help in diversifying the diet and are immune boosters because they are nutrient packed, yet they consume the refined form more. Consumption of natural grains it was established is hindered by their lack of appeal and taste that many respondents said needed an improvement. This is so if the grains were to compete favourably with the highly refined grains in the market and which are quite appealing and tasty.

Most important, despite the teachers' positive attitude towards IFPs, a majority lack sufficient knowledge as to what value the IFPs adds to meals. They lack knowledge on the suitable cooking methods that enhance nutrient preservation. There is need to advocate for quality and not quantity eating. This will have an impact on every sector of our economy because as the old adage stipulates 'health is wealth'.

The respondents especially the general teachers cohort were not very knowledgeable about nutritious and medicinal foods that are appealing and appropriate to the health status of HIV carriers and AIDS patients or even to themselves. Nutritional education with an emphasis to IFP ought to be initiated.

The teachers and key informants reported that education is a powerful tool in checking the lost diversity of IFPs. Education enables one to acquire knowledge, skills and attitudes that

could result in behavioural change. Teachers, who are opinion shapers in the communities where they live, can be instrumental in preserving the indigenous knowledge. Kenya being a low-resource country, culturally and economically relevant nutritional education and dietary counselling would be a simple yet effective means of stabilizing or increasing body weight in HIV-infected patients. Nutrition education should entail principles of healthy eating (regular meals; foods from all of the basic food groups, energy- and nutrient-dense food), socio-economics of nutrition (practical advice for healthy economic eating) and food safety (to decrease the risk of food-borne infections). Patients should be given individualized dietary guidelines according to identified problems and symptoms. Findings from the study are in support of IFPs and dietary diversification as having mitigating effects on illnesses and strengthening the body's immunity.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Since 1984, more than 2 million Kenyans have succumbed to AIDS-related deaths. It is estimated that another 3 million people are infected (UNAIDS, 2000: 124)). Statistics show that 500 Kenyans die daily from HIV/AIDS (Republic of Kenya, 2003: 2). HIV/AIDS is more than a health problem. It has social, economic and even political ramifications (Republic of Kenya, 1997: 8-19). In Kenya, it impacts negatively on the education sector, militating against the universal commitment of the United Nations towards Education For All (EFA) (Republic of Kenya, 2004:4). It also works against the Government of Kenya's (GOK's) efforts to provide education at all levels - from early childhood to higher education (UNESCO, 2003a: 3). It is important to note that this scourge has devastated pupils, students, teachers, parents and the education personnel (EFA News, 2003:10). It is compromising the quality, access, equity, supply and demand for educational services (Republic of Kenya, 2004: 5), as well as reversing gains made in the education sector.

HIV/AIDS has liberally decimated teachers in Kenya. Unconfirmed reports indicate that out of every 10 deaths reported in hospitals, two of these are teachers, and that 20-30 teachers die every month in Nyanza province (UNESCO, 2003b: 6). To fight its spread, the Teachers Service Commission (TSC) in April 2004 established an AIDS Control Unit (ACU). The intention was to boost the capacity to fight the scourge among the teaching fraternity. The Ministry of Education Science and Technology (MOEST) in May 2004 further launched the Education Sector Policy on HIV and AIDS manual that acts as a guideline for effective prevention, care and support within the ministry. Unfortunately, HIV/AIDS continues raging unabated among teachers, calling for innovative ways to tackle it.

Current estimates from the United Nations Education Scientific and Cultural Organisation (UNESCO) indicate that AIDS claims an average of 4 – 6 teachers a day countrywide. The rate of chronic absenteeism and time wastage of both teachers and learners continues to increase (UNESCO, 2003b: 7). The Ministry of Education Science and Technology (MOEST) considers the fight against HIV/AIDS an integral part of EFA that must be taken into account if the GOK is to achieve the EFA goals by 2015. Researchers have established that in Africa a teacher with HIV loses six months of professional time before developing AIDS and then loses

an additional 12 months before dying of the disease (KEMRI, 2003: 5). The MOEST needs to anticipate the consequences of these losses and try to keep as many as possible productive. In a survey of Kenya, Zambia, Zimbabwe and Uganda, it was found that the number of new teachers that shall be needed will exceed their availability at least through 2010 (KEMRI, 2003: 5). This necessitates new approaches to mitigating the impact of AIDS.

Teachers are a prime target group because of the central role they play in the wider society. The importance that the government places on the education sector was evident during the 2004 budget when the sector received the highest allocation among all ministries, a whopping Kshs. 83.7 billion! (Mwiraria, 2004). But such financial good-will is dampened by AIDS, whose toll on teachers is cause for worry. It is estimated that the overall cost of achieving the EFA goals is likely to be about 20% higher than would be in the non-AIDS scenario (UNESCO, 2003a: 3).

While numerous behavioural campaigns have been undertaken through the National AIDS Control Council (NACC), the prevalence continues soaring (UNESCO, 2003b: 2). Ironically the rising numbers are attributable to initial 'broad' casting through the mass media. In 1984, when the first case of AIDS was diagnosed in Kenya, initial communication through national newspapers, radio and television, suggested a 'terrible' disease that needed to be avoided like the plague. Reversing this initial 'miscommunication' by advocating the embracing rather than shunning of AIDS patient's has proved a monumental challenge. The latter would appear to call for change of strategy, in addition to incorporating the lessons learnt from the previous approaches. Towards this end, this study endeavours to look into the role of dietary diversification as a mitigating option against the devastating physical impacts of HIV.

1.2 Problem Statement

Healthy and indigenous foods have been neglected and discarded for modern exotic foods in Kenya (Savala et al, 2003: 116). Many people's diets have been simplified to a limited number of high-energy foods (AJFAND, 2003: 45). There is a misguided preference for most of these trendy exotic foods, most of which are expensive (Maundu et al, 1999:1). The Indigenous Food Plants (IFPs) are today considered especially by the younger generation (Omare et al, 2002:4) unimportant, inferior food for the poor or low class within society (AJFNS, 2001:47) and have no aesthetic value (Osero, 1997: 5). There is an increase in fast food shops that sell trendy junk

foods such as chips, burgers, *pizzas*, and soft drinks that are the preference of many, especially the youth (Omare et al, 2002: 4). Modern diets consist of highly processed grains robbed of fibre, and with concentrated calories devoid of vital nutrients (Ludington, 2000: 177). White bread, white rice and white *chapati* are consumed more than whole wheat or grain. These are refined grains where the germ and bran are removed and only the starchy endosperm is used (Mateljan, 2004:1). We therefore deprive our bodies when we consume the refined grain (Classen, 1997: 84). Soft drinks contain phosphoric acid, a powerful acid used to etch glass and which prevents calcium retention, and may irritate sensitive stomach lining (Ludington, 2000:149).

Good nutrition is important in Home Based Care (HBC) for People Living With HIV/AIDS (PLWHA) as it aids in maintaining weight and optimal nutritional status throughout the course of infection (Baldwin, 1993: 6). Nutritious food compensates for the problems caused by the illness (MOH, 2002: 3). PLWHAs have problems related to nutrition. Malnutrition is common in the patients due to mal-absorption, resultant from diarrhoea (Polo, 2002: 242) thus necessitating re-nourishment. Early HIV infection is accompanied by a range of micronutrient deficiencies that contribute to the impairment of immune function seen in HIV infection (ACC/SCN, 1998: 11).

The importance of good nutrition in the fight against HIV/AIDS has not been fully exploited in Kenya (Haraksingh, 2003: 5). Fortunately, efforts are being made to incorporate it in HBC. The value of IFP to PLWHA has not been studied to gauge its impact on productivity, target reduction in the severity of diseases and opportunistic infections and reducing the progression of HIV infection to AIDS (Polo, 2002: 21). Vegetables are the most affordable and sustainable sources of micronutrients, which are essential for healthy needs (Savala, 2003: 116). If the growing of IFP were promoted for PLWHA, then the affordable vegetables would allow poor families to have greater access to nutritious diets (Kalb, 2003:6). Potential health-related functions of IFP include antibiosis, immunostimulation, nervous system action, detoxification, anti-inflammatory and antioxidant (AJFAND, 2003: 47). The nutritional value of diet's is enhanced by traditional legumes, oil seeds, fruits and vegetables (AJFNS, 2001: 48).

Experts agree that Vitamin A Deficiency (VAD) has catalyzed the spread of HIV/AIDS in Africa (Kalb, 2003: 6). VAD is associated with faster progression from HIV to AIDS, higher

infant mortality and child growth failure (FANTA, 2001: 15). Many IFP are rich in B-carotene, a precursor of vitamin A and they even increase the bio-availability of micronutrients in staple foods when cooked together (Kalb, 2003:18). Spiderplant (mwangani) contains 10452 micrograms of B-carotene (IPGRI, 2003). The IFP have a special role in the HIV/AIDS crisis. Sweet potatoes are very rich in vitamin A, and if consumed regularly, the benefits of improved micronutrient status are likely to be sustained over time reducing the need for supplementation (Micronutrient Initiative, 2001: 24). A diversified vegetable-rich diet can bolster the immune system and help it to fight the disease (Kalb, 2003: 12).

During the 29th session of nutrition symposium, Mrs. Monico, the Director of The AIDS Support Organization (TASO), noted that the fall in the prevalence of AIDS in Uganda in 1997 was partly due to the role played by food assistance, which was given as an incentive for clients to seek services. Nutritional counselling and education are important components in the TASO package and they help clients to use locally available food resources wisely (UNACC/SCN, 2001: 3). On the role of micronutrient supplementation in Tanzania, a study carried out amongst HIV positive pregnant women showed that the use of vitamins reduced low birth weight by 44% (UNACC, 2001: 3).

Post-primary teachers, who earn meagre salaries, have shunned indigenous foods for available 'modern' junk food, either out of ignorance, 'class' pressure or lack of information on the nutritive value of traditional foods. Combating HIV/AIDS through nutritive foods that will strengthen immune systems and tackle opportunistic diseases has not been given due consideration by these opinion shapers. Antiretroviral drugs prevent HIV from disabling the immune system, hence enhancing their quality of life (Foreman, 2002:47). Consumption of a diversified diet of IFP can be sustainable as they contain antioxidants that immobilize free radicals, chemicals which are formed in the body as part of its metabolism and defense against bacteria (Classen, 1997:22).

Indigenous foods have in the past contributed significantly to the nutritional well-being of communities (Epstein, 1995:6). This supports calls to complement our diets with diverse IFP. They contain protective nutrients such as zinc, copper, selenium, vitamin A, C and E that help to make up protective antioxidants enzymes (Classen, 1997: 165), and are necessary for the

maintenance of a viable immune system (Catalysis, 2000:2). These are the nutrients that are used in many nutritional supplements.

A study of indigenous foods in relation to HIV/AIDS status and nutrition counselling among post-primary teachers in Nairobi, Kenya, was necessary. The researcher is not aware of any such study in the past. Post-primary teachers, the central focus in this study, can be a powerful force if carefully mainstreamed into the campaign of mitigating AIDS. They are responsible for the physical welfare and education of a large number of young people (UNESCO, 2003a: 5). While the AIDS campaign, since inception, concentrated on sensitization (Republic of Kenya 2003: 4), fitting home-grown alternatives such as the utilization of 'traditional foods' has not been given due attention (AJFAND, 2003: 47). ARV therapies, a major component of current treatment of AIDS, have limited efficacy and significant toxicity (Niekerk et al, 2000: 407)) which can be reduced by good nutrition.

1.3 Broad Objective

This research sought to establish the role of indigenous foods and nutritional intervention in mitigating HIV/AIDS among post-primary teachers in Nairobi.

Specific Objectives

1. To study the feeding habits and the level of appreciation of indigenous foods by post-primary teachers in Nairobi, Kenya.
2. To identify specific nutritious and medicinal indigenous foods which are appealing and appropriate to the health status of HIV carriers and AIDS patients.
3. To establish respondents' level of awareness of changing nutritional requirements during the various stages of HIV infection and AIDS.
4. To identify elements of dietary counselling that need to be promoted among post-primary teachers in Nairobi.

1.4 Scope and Limitations

The geographical coverage of the study was Nairobi Province due to its being a cultural microcosm of Kenya. It is the capital and nerve center of the country. Nairobi is densely populated with people of diverse cultural backgrounds, attributable to its cosmopolitan status. Nairobi has high incidences of HIV/AIDS cases that can be attributed to overexposure. Being the capital city, it is the epicenter of new technologies, hence new food habits. Nairobi is also a place of inter-cultural exchange where there are varieties of indigenous foods of various cultures that can be blended well to enrich diets.

The study specifically focused on post-primary teachers with and without the AIDS causing virus within the school set-up. Teachers play a central role in the society, are considered role models and are the opinion shapers as they are found in every community. Post-primary institutions are hardest hit by the pandemic compared to the primary institutions because this is where there is need for specialized subject-matter teachers (UNESCO, 2003b: 3). Unlike their primary counterparts who can teach any subject to fill in for an ailing colleague, it may be difficult in post-primary institutions where teachers have specialized areas of study.

The major limitation in this study was reaching out to the HIV/AIDS teachers. This is because HIV/AIDS is a sensitive issue and professional ethics demands that confidentiality of patients be maintained high. To get teachers who have gone public posed a major challenge to the researcher since the issue of stigmatization is still prevalent and many teachers were not willing to go public. It was therefore difficult to capture the HIV/AIDS teachers in schools.

CHAPTER 2: LITERATURE REVIEW

There is need to keep as many teachers as possible HIV-free. This is to protect and care for those already infected and to provide education on HIV/AIDS in schools and other educational settings (Republic of Kenya, 2004: 10-31). Teachers need to be equipped with skills that prepare them to deal with real-life situations and experiences. People who have AIDS can use food as medicine. If they are not sick with opportunistic infections, good food may help to keep them strong for a long time; and if they are sick, the right food may help them to get well (Epstein, 1995: 4). It is important to understand the health problems of PLWHA and offer food remedies for these problems and promote healthy eating of indigenous nutritious foods to complement the foods being consumed.

However, focus on feeding habits, with emphasis on the promotion and diversification of indigenous nutritious foods, needs to be explored. Many people are not knowledgeable about the high nutritive value of available IFP (Maundu et al, 1999: 1) and the daily allowance that is required. There are over 220 IFP in Kenya (Maundu et al, 1999:53). Unfortunately, they are un-exploited (AJFNS, 2001:47). This study considers dietary counselling as a major part of any advocacy campaign aimed at changing the ingrained, injurious, negative feeding culture in Kenya.

2.1 Review of Current Strategies in Mitigating HIV/AIDS

Education and awareness creation to alter behaviour and by extension attitudes have failed to counter the fast spread of HIV/AIDS in Kenya. There are many strategies by Non Governmental Organizations (NGOs) and seropositive HIV crusaders to prevent and mitigate HIV/AIDS. The GOK is concentrating more on palliative care (relief from symptoms of diarrhoea, pain and headache), prevention and treatment of opportunistic infections (OI's) and Anti Retroviral (ARV) drug therapies in an attempt to combat HIV/ AIDS (World Bank, 1997: 14).

The provision of cheaper generics of ARV drugs is high on the government's agenda. The drugs prevent HIV from disabling the immune system (Foreman, 2002: 47) and allow many people with HIV to live normal lives for more years. In Kenya, the drugs reach a very small percentage of those who need them (UNAIDS, 2003: 88) due to cost implications (ACC/SCN, 1998:13). During the International AIDS Conference in Bangkok, it was noted that in Kenya,

where over 300,000 people require ARV, only about 10,000 are able to access the life-prolonging drugs (Mwaniki, 2004: 11). If ARVs are not correctly balanced they are toxic (Classen, 1997: 23), so it is safer to eat plenty of fruits and vegetables. Kenya relies on donor funding from the Global Fund to Fight AIDS. In June 2004, NACC suffered a major setback in the fight against AIDS when the World Bank withheld crucial funding (Mwaniki, 2004: 60). Over-reliance on external funding is therefore not a sustainable endeavor, as recipients are at the mercy of the donor. Initially, Kenya was among the developing countries that had been denied a license by the World Trade Organization to import or manufacture cheap generic AIDS drugs (Okwembah, 2004: 11). However, recently this position has changed. Glaxo-Smithkline has been given licence to manufacture the ARVs. This drastically reduces the cost of ARVs. Unfortunately they are still unaffordable for many. There is currently concerted international effort to develop an AIDS vaccine. However, the reality is that it is a tedious, expensive and long process (UNAIDS, 2000: 68).

In Kenya, an initiative by Kenya AIDS Vaccine Initiative (KAVI) to develop a vaccine at the University of Nairobi (UON) terribly failed (Daily Nation, 13 September, 2004). The initiative at the UON was supported by international researchers. Unfortunately, their painstaking studies backfired. Instead of so much money being pumped for such expensive trials, why can the money not be channelled to food-related initiatives to enlighten people on the importance of a diversified diet and IFP consumption as a viable mitigating initiative? In light of this, the study **hypothesized** that dietary improvement initiatives especially IFP consumption would be more sustainable, affordable and accessible than medication for the majority of the population.

The concepts of Voluntary Counselling and Testing (VCT) and Home Based Care (HBC) are gaining ground. VCT communication programmes are being scaled up (Republic of Kenya, 2003: 5). VCT is the process by which a person finds out whether or not he or she is infected with HIV, the virus that causes AIDS (NAS COP, 2002: 6). VCT includes specialized counselling by a team of trained and experienced counsellors. VCT testing usually provides same day test results (NAS COP, 2002: 6). Some VCT centres do not have clear follow-up programmes for those who test positive. HBC is an approach that represents a continuum of care from the health facility to the community, to the family, the individual infected with HIV/AIDS and back again (Republic of Kenya, 2002:vii). HBC combines clinical services, nursing care, social support, counselling and psycho-spiritual care. While all these approaches

are good, it is worth noting that an ingrained culture cannot be altered overnight. A single intervention can therefore not change attitudes. Long-term behaviour change is not likely to be achieved without long-term access to dietary counselling, support and advice.

2.2 Strategies by the Ministry of Education Science and Technology (MOEST)

Teachers Service Commission (TSC) has boosted its war against the scourge by establishing a TSC AIDS Control Unit (ACU). The ACU's main focus is coordination, resource planning, budgeting and liaising with sectoral partners to develop a shared strategy aimed at preventing the spread of the epidemic and mitigating its impact on the education sector (Republic of Kenya, 2004:33). In May 2004, MOEST launched the Education Sector Policy on HIV and AIDS manual that acts as a guideline for effective prevention, care and support within the ministry (Republic of Kenya, 2004). In a major policy shift, TSC now encourages teachers and their spouses to serve in the same station, and discourages transfers that separate spouses and partners unnecessarily (Ramani, 2004: 1).

To address the rising numbers of AIDS patients among teachers, UNESCO between March 4th and 6th 2003, called a consultative meeting at the Kigali Institute of Science and Technology (KIST) in Rwanda (UNESCO, 2003a: 1). The intention was to look at the impact of HIV/AIDS on education and the part education plays in mitigating the effects of the pandemic. It is important to note that these worthwhile efforts are a drop in the ocean. In 1999, AIDS in Kenya was declared a national disaster by former President Daniel Moi. On 12th June 2001, Kenya's Attorney General, Amos Wako, published Legal Notice No. 4015 vide which he established the *Task Force on Legal Issues Relating to HIV/AIDS* (Namwamba, 2004: 11). On 23rd of March 2004, President Mwai Kibaki launched total war on HIV/AIDS. He established and chairs a cabinet sub-committee on AIDS.). However, all these worthy interventions are an exercise in futility if good and diverse nutrition is not mainstreamed into every HIV/AIDS mitigation initiative.

2.3 The Value of Educators in Mitigating HIV/AIDS

Teachers' daily interaction with students demands that they be role models, and hence agents of positive change (MOH, 1997: 61) in AIDS matters. They are leaders, opinion shapers and guardians of young people (UNESCO, 2003:13). Sound interventions at school have significant impact. This is because teachers and learners are at the work station everyday. It is

also important to note that many teachers live near schools (UNESCOb, 2003: 13). Unfortunately, they have not been fully involved in the AIDS mitigation campaign. Teachers can be used to sensitize school-going children and the wider community on the dangers posed by the HIV/AIDS pandemic. The education sector has the potential to influence behaviour formation and change, as it reaches almost 50% of the population impacted on and engaged with the sector.

Dissemination of food and nutrition guidelines to PLWHA and their families calls for the training of trainers (TOT) such as home economists, nutritionists, doctors and teachers (Haraksingh, 2003: 17). Nutrition education can be incorporated into parents day meetings. This means helping people to learn new information about nutrition, helping them to develop attitudes, skills and confidence that they need to improve the amount and sort of food eaten (Savage, 1992: 376). The emphasis should be on nutritional behaviour change communication (Linkages, 2002: 20). The strategy of promoting local foods that are affordable and culturally acceptable should be used.

There is need to sustain the quality of education provided by strengthening the infected teachers to enable them to be more productive. Projections on teacher mortality indicates that Kenya will lose 1.4% of its teachers each year from 2000 to 2010 (UNESCOb, 2003: 11) which will militate against Education For All (EFA) goals. Learners cannot refuse to be taught by a teacher on the grounds that s/he is positive (Republic of Kenya, 2004:28). However, it is worth noting that the presence of a teacher who gradually succumbs to AIDS is likely to have debilitating psychological impact on students (KEMRI, 2003: 5). Thus the need to enhance their nutritional status that improves their physical out-look, giving them the confidence that is absent in emaciated AIDS patients.

2.4 Nutrition Transition and Diet Diversity

Diets in developing countries are now higher in energy, including fats heated under oxidizing conditions. They have lower diversity of fruits and vegetables than those consumed historically, resultant in many present-day degenerative diseases (AJFAND, 2003: 48). In compiling a list of the world's healthiest foods, Mateljan (2004: 2) ranked whole foods at the top. He states that whole foods are the richest sources of the essential nutrients in their natural state. They are nutrient-dense and contain the highest amount of essential nutrients and the

least caloric and fatty content. Studies by the Food and Agricultural Organization (FAO) indicate that traditional foods are slowly being abandoned in Africa (FAO, 1998: 24). Their high food value, coupled with medicinal potency, needs to be explored in the light of the prevalence of HIV/AIDS cases. There is a drop by more than half between 1963 and 1998 in the consumption of traditional cereals of millet and sorghum and a reduction in legumes consumption in Kenya (AJFAND, 2003:48). Going by this trend, then in the year 2013 there will be negligible consumption of traditional foods by the majority of the population.

Researchers Michio Kushi and Alan Jack suggest that dietary habits that propagate overproduction of acid and increased consumption of foods rich in simple sugars appear to preserve, protect and activate AIDS viruses (Willis, 2002: 76). Unfortunately, this is a major composition of today's diets (AJFAND, 2003: 48). To win the battle against diseases precipitated by western lifestyle, we must reconsider the excesses of today's diet (Ludington, 2000:248). Grains and cereals are highly refined and polished and robbed of vital nutrients and high fiber content. Worth noting is that there is increased dependence on deep-fried foods derived from starchy sources such as cassava, wheat and potatoes, and decreased intake of fresh fruits and vegetables in many African cities (AJFAND, 2003:48). This low fiber, high fat and high cholesterol foods damage the body's vital oxygen-carrying arteries and upset important metabolic functions, resulting in thickened and narrowed arteries (Ludington, 2000:15), leading to poor health.

Global rates of obesity and other non-communicable diseases are soaring in most urban areas (AJFAND, 2003: 48). One is more likely to witness obesity and epidemics of heart disease and diabetes among urban than rural dwellers, as the latter have little access to rich foods beautifully packaged and highly promoted in supermarkets (Ludington, 2000: 15). Nepal is documented as having severe Vitamin A Deficiency (VAD) due to their over-dependence on rice and limited intake of fats and more diverse elements (AJFAND, 2003: 49).

Kenya is synonymous with the aroma filling and appetizing roast meat (*nyama choma*), that has developed into a national delicacy. Unfortunately, *nyama choma* is a major contributor to poor feeding habits, as many consume it day in-day out with alcohol. While it gives a feeling of satisfaction, it offers a very unbalanced diet. The argument advanced by many consumers of this meal is that it is readily available at most *watering places* (bars). An article titled

“Diabetes cases on the increase” quotes Dr’s Eva Njenga and Kitrida Achaya, medical directors of the Diabetes Management and Information Centre (DMIC) as saying that, the daily consumption of this meal directly leads to an unhealthy protruded belly and development of gout and other complications such as diabetes (East African Standard, 2002). This is unlike western countries where there is more consumption of alcohol, but whose adverse effects are checked with exercises and a more balanced diet. African food culture is an under-utilized vehicle in promoting positive dietary behaviour.

2.5 Malnutrition and HIV/AIDS

Malnutrition and HIV affect the body in similar ways. Both of them weaken the capacity of the immune system to fight infection and keep the body healthy. Before AIDS, the impairment of the immune function caused by malnutrition was called Nutritionally Acquired Immune Deficiency Syndrome (NAIDS) (RCQHC, 2003: 27). Poor nutrition can also reduce medication efficacy and adherence, and can accelerate the progression of disease (USAID, 2003: 1)

Most regions of Africa have impoverished diets. As a result, there is high infection prevalence in those areas (Willis, 2002: 76). Given that the majority of people with HIV live in countries in which communities are under-nourished, nutrition must be addressed as an integral part of any strategy to ensure adequate treatment and care for PLWHA (UNAIDS, 2003: 33). Malnutrition is a multi-sectoral problem requiring solutions from several sources. About 95% of HIV infections are in developing countries where resources to combat the epidemic are scarce (KEMRI, 2003: 7). About 20% of the developing world population suffers severe malnutrition. This is in excess of 800 million individuals (Elmadfa, 2003:160).

Poor nutrition is a major stumbling block to every aspect of personal, social and national development, and the war on AIDS cannot be won unless malnutrition is eradicated. Of the 10.4 million children under 5 years of age who die yearly globally, over 5 million (50%) succumb to malnutrition-related causes, an average of about 14,000 each day (Elmadfa, 2003:181). In Kenya, 23% of children under 5 years of age are underweight, and 34% are stunted (FANTA, 2000: 1). These horrendous statistics show why malnutrition and poverty must be addressed in the face of HIV/AIDS. Over the last 10 years, Sub-Saharan Africa was the only region in the world in which no progress was recorded in the reduction of childhood

malnutrition (Elmadfa, 2003: 182). HIV/AIDS affects the economically productive age group of 21 to 49 years (Republic of Kenya, 2003: 3). This is more than 75% of the formal sector workforce (KEMRI, 2003: 9) and newly trained members of the society (FANTA, 2000: 2).

HIV/AIDS has impacted heavily on food security. Food resources are dwindling as the scourge is killing many farmers (Republic of Kenya, 2003: 3). Studies by FAO estimate that since 1985, in the 27 most affected countries that include Kenya, over 7 million farmers have died of AIDS (USAID, 2003: 1). This causes loss of knowledge, practices and skills and their transmission from one generation to the next. This decreases the agricultural labour force and leads to a change in household nutritional status (FAO, 2003). The end result is increased malnutrition among PLWHA and other household members due to increasing impoverishment.

HIV/AIDS and malnutrition operate in tandem. Poor nutrition increases the risk and progression of the disease, and in turn disease exacerbates malnutrition (UNACC, 2001:3). HIV/AIDS contributes to malnutrition for physiological reasons related to the infection. PLWHAs often have diets that are deficient in energy, protein, vitamins and other nutrients (Piwoz, 2000: 1). Infection with HIV/AIDS damages the immune system, which leads to infections such as fever and diarrhoea and lowers the food intake. This reduces the appetite and interferes with the human body's ability to absorb food, leading to malnourishment, weight loss and eventually weakness (WHO/FAO, 2002:10). Malnutrition and HIV negatively affect each other in a vicious cycle. Progressive weight loss and wasting, often the most disturbing symptom, occurs in most patients with HIV (Baldwin, 1993:6). There is reduced immune function and competence, vitamin and mineral deficiencies, increased susceptibility to secondary infections and increased nutritional needs (RCQHC, 2003: 26). Good nutrition can be a problem for many PLWHA because when your body fights any infection, it uses more energy and you need to eat more than normal. But when you feel sick, you eat less than normal (KEMRI, 2003 June: 3). Poorly nourished people get sick from HIV-related infections and other health problems sooner than if they had enough of the right foods to eat (UNAIDS, 2003: 33).

Of the four most notable nutritional diseases in Africa, three are micronutrient related: Vitamin A Deficiency (VAD), nutritional anaemia, and Iodine Deficiency Disorders (IDD) (Elmadfa, 2003: 282). In Kenya, VAD has been documented in 11 districts and micronutrient deficiencies

have been declared a national public health problem (Oniang'o, 2003: 4). The causes are poverty, inequity, poor food production and distribution and lack of knowledge. During a state of chronic (long-term) illness, the body requires more food than normal. Multiple nutritional deficiencies are shown to occur early in the course of HIV infections. This weakens the immune system including T-cell function (Patterson, 1999: 89).

The nutritional challenges of PLWHA occur due to several reasons such as malnutrition; either for not eating enough or the body not being able to use food. Mal-absorption is another reason. In this case, the intestines may be unable to absorb nutrients properly. Diarrhoea may also occur. This condition affects food absorption as there is a limited food retention period. Another reason is nausea. This is a condition of loss of appetite and vomiting which lowers the amount of food available for digestion. Metabolic changes also affect the way a body uses up nutrients in food. This leads to sores and ulcers in a mouth or oesophagus, which is the tube that connects the mouth and stomach. This makes it hard to eat and swallow (Patterson, 1999: 89).

Good feeding habits mitigate most conditions that we have described. The body works like cogwheels in a clock. If one part has an anomaly, the cogwheels do not move and the wrong time is given. We can liken the diverse nutrients that make up a complete diet to cogwheels. Similarly, the destruction of the cogwheels co-relates with diseases and the clock stopping is equated with death, when the system goes completely awry and succumbs.

2.6 Advantages of Good Nutrition over Drugs

Good nutrition means getting enough macro and micro-nutrients. Macro-nutrients contain calories (energy): proteins, carbohydrates and fats. They help in maintaining body weight. Micronutrients include vitamins and minerals and they keep cells working properly (KEMRI, 2003: 6). They are micronutrients because the body requires them in minute quantities for growth, development and maintenance (FAO, 1997: 3). Better nutrition is not only one of the basic human rights and a measure of the well-being of an individual, but it is also one of the most important and tangible indicators for development (Elmadfa, 2003:281). IFP are rich sources of micronutrients such as vitamin A and iron and are prevalent within Kenya (NMK, 1993: 53).

Supplements are short-term interventions that provide specific target groups with the deficient nutrients at certain times. Food-based approaches can prevent the deficiencies in a sustainable manner for most of the population (FAO, 1997: 11). The benefits of a food-based strategy are numerous. They go beyond the prevention and control of micronutrient deficiencies because they can address multiple nutrient deficiencies simultaneously. They are also cost effective and sustainable. They can be subjected to different cultural and dietary traditions and locally feasible strategies (FAO, 1997: 13). They are broad based aiming to improve the overall quality of the diet of a population. The amounts consumed are within normal physiological levels. Therefore, there are no risks of toxicity and food-based approaches foster the development of sustainable, environmentally sound food production systems (FAO, 1997: 13). Diets can be tailored to adapt to the habits and preferences of each patient, taking their socio-economic condition into consideration (Polo, 2002: 244). Establishing early support favours a better response to treatment than in the already cachexia phase.

In Kenya, cultural practices have influenced feeding habits. While dinner is a critical meal, most Kenyans eat to satisfy themselves thrice everyday. It is common for many families to have a healthy mug of tea and slice of bread in the morning, a hilly maize-meal paste (*ugali*) and greens for lunch and another equally hilly *ugali* and beans in the evening. This unfortunate scenario lays more emphasis on quantity as opposed to quality.

The effect of some drugs on nutritional status is cause for concern. This is due to the frequency of occurrence of adverse gastro-intestinal effects (Patterson, 1999: 89). ARV also have undesirable side effects. There is evidence that some people who take protease inhibitors (ARV) gain weight in the form of fat on the stomach and breasts, whilst they lose fat from the arms and legs (Patterson, 1999: 13). This disfiguring fat redistribution in the body (Willis, 2002:37) can be extremely traumatizing. It was noted during an international congress in Vienna in 2001 that some patients were considering stopping Highly Active Anti-Retroviral Therapy (HAART) due to the significant impact on body image and concern over possible future cardiovascular risks (Elmadfa, 2003:160).

People who are otherwise physically fit fare better at every stage of HIV/AIDS infection: the initial primary infection may be virtually symptom-less; the latency period of infection may be extended; and they may show fewer of the various symptoms of O.I (Willis, 2002: 76). The

high-fruit, high-vegetable regime rich in antioxidants recommended for the prevention of heart disease and cancer helps to boost the immune system and on-going response in the HIV-infected (Willis, 2002: 76). Naturalpathy or nature cure is the essence in this treatment. It is the science of preserving and restoring health by means of those substances, agencies and influences that have a normal relation to life that is food, air, water, sunlight, sleep, rest, warmth and such helpful mental influences as hope, faith and peace (Kokwaro, 1993: 11).

Epstein and other researchers posit that good nutrition is of value to HIV/AIDS patients (Epstein, 1995: 5). The main objective of nutritional support in HIV patients should be to maintain weight and optimal nutritional status throughout the course of infection (Baldwin, 1993: 6). There is an on-going fortified VIUSID (a special nutritional supplementation) HIV/AIDS project in Nyanza and Western provinces being carried out by Dr. Charles Mbakaya, a scientist at the Kenya Medical Research Institute (KEMRI). Dr. Mbakaya argues that in recognition of the importance of nutrients, the project randomizes two groups. One group is given only VIUSID, while the other group is given VIUSID and additional micronutrient supplements of vitamin A, E, C, B12, zinc and selenium combined. After two weeks of supplementation, the viral load dropped remarkably by 50% for the second group (Mbakaya, 2004). Promising as they are, these are short-term interventions because supplements are not life-long. This study hypothesizes that only food-based approaches can prevent micronutrient deficiencies in a sustainable manner for most of the population (FAO, 1997: 11). Clinical trials done on effect of nutrition on HIV/AIDS show that nutritional supplements and counselling interventions may reduce PLWHA vulnerability to weight loss and muscle wasting especially if done in the early stages. Supplements need to be taken in the correct doses because too many can be harmful (Clasen, 1997:23). It is safer to eat a diverse diet that cannot be toxic and will supply varied nutrients. From this argument, the study **hypothesized** that dietary improvements and interventions are more sustainable, affordable and accessible than medication or supplementation for majority of the population

2.7 Importance of IFP in Diet Diversification

The health benefits of traditional food systems include socio-cultural, economic and nutritional benefits (Elmadfa, 2003: 222). People have strong cultural traditions and knowledge of natural resources, including unique food species. Unfortunately there are threats to loss of this knowledge through the processes of economic change. The health status of people needs to be

improved using their own traditional foods through capacity building within their own cultural context. The modern diet is a far cry from the foods people ate many years ago. Before agriculture, human beings were primarily hunters and gatherers, with dietary needs met by fruits, vegetables, roots, nuts, legumes, fish and wild game. Scientists believe that our ancestors ate about three times as much fruits and vegetables than we do. Berries existed in the wild and gave antioxidant protection as they contain the richest sources of healthful plant nutrients called flavonoids, which play a role in preventing heart disease, stroke, cancer and other diseases (GNLD, 1997: 4). Today, the closest many people get to eating a berry is using jam occasionally, thereby denying the body antioxidant protection.

IFP may be the key to food security and good nutrition in Kenya (Kalb, 2003: 5). The IFP adapt well to the ecological conditions. In the past, many existed wildly. Therefore, they require very little effort to survive. They have proven nutritive value due to their superior proteins, minerals, carbohydrates and vitamins than most exotic vegetables (Chweya, 1999: 53). Consuming micronutrients, especially vitamins A, B6 and B12 and iron and zinc is important for building a strong immune system critical in fighting infections among PLWHA (FANTA, 2000: 15). *Miroo* is an IFP that contains microbial food ingredients with beneficial health effects that minimize incidences of cancer in human beings (Clasen, 1997:357). They add value and variety to diets, thus broadening the food base. IFPs grow quickly and can be harvested within a short period of time (Oniang'o, 2003: 9). In Africa, IFP supply an estimated 80% of vitamin A and more than one third of vitamin C (AJFNS, 2001: 48). Therefore if IFPs are discarded, VAD deficiencies will prevail. With the reduced labour force, IFP can improve food security because the crops are drought resistant, are grown without much tending and have good storage qualities (AJFNS, 2001: 48).

Whether one talks of the slimy medicinal Luhya's, *murere* (*Corchorus olitorius*), or the traditional Kalenjin *mursik* milk, the Luo's tasty *athola* and *osuga* (*solanum nigrum*), the nutritious *ukiye* porridge of the Meru, or even the very rich Kikuyu's *terere* or *mchicha* (*Amaranthus*), the food value of these IFPs is by far superior to most commonly eaten modern foods (see table 1 and 2). *Murere* is very rich in vitamin A (B-carotene) and the vitamin B-complex group (Maundu et al, 1999: 256). *Osuga* among the Luo's is medicinal to the gastrointestinal tract (AJFAND, 2003:47). The *ukiye* porridge is a mixture of finger millet (*Eleusine coracana*), bulrush millet (*Pennisetum glaucum*) and sorghum (*Sorghum bicolor*), that are very

rich in both macro and micronutrients (Maundu et al, 1999: 255 - 259). Kenyans in rural areas identify with IFPs, know where to get them, cultivate them but most times only the poorest of families collect and eat them (AJFNS, 2001: 47). With Africans (read Kenyans) cultural shift to embrace western values, indigenous foods are unfortunately being forgotten and are now threatened with extinction (Guarino, 1999: 1). Cultivation of maize has superseded millet, which used to be grown due to its low yields (Maundu et al, 1999: 123). To sustain a desirable level of health, it is necessary that a country's level of its nutritional status be maintained high by diversifying the diets consumed (Mbatia, 1990: 1).

In urban areas, exotic vegetables such as cabbage, *sukuma wiki* and spinach have replaced the more nutrient-packed IFP (Savala et al, 2003:116). The major composition of cabbage is water and small traces of nutrients. Cabbages consist of 91.4gm water, 0.7 iron, 100micrograms of B-carotene, and 47 mg of calcium as compared to Amaranth (*mchicha* or *terere*) an IFP that contains 84gm water, 8.9mg iron, 5716micrograms of B- carotene and 410mg of calcium per 100gm edible portion (IPGRI, 2003). The nutritional potency of micronutrients in Amaranth, by far outweighs that of cabbage. In schools cookery classes, western foods like potatoes are preferred over indigenous foods like plantain or cassava (Waundo, 2002). For breakfast, tea and pre-cooked cereals are fast replacing the more nutritious paste of millet, sorghum and finger millet porridge (Maundu et al, 1999:3), which are very rich in calcium, iron and B-vitamins (Maundu et al, 1999:20). This replacement has negative nutritional impact on society and has a bearing on the fast spread of HIV/ AIDS. Kenya has high cultural diversity, with an array of rich traditional diets that are now unfortunately fast decreasing (AJFNS, 2001:48). IFPs have higher nutritional value that is very useful in AIDS mitigation.

IFP are very rich in antioxidants. Antioxidants protect against free radicals therefore are part of our defence system (Epstein, 1995: 21). Free radicals are chemicals formed in the body as part of its metabolism and defence against bacteria (Clasen, 1997: 23). HIV increases the number of free radicals in the body, hence an increased need for antioxidants (Epstein, 1995: 21). To cope with radicals, the body needs more antioxidants than it can produce especially in times of illness. The antioxidants beta-carotene, vitamin C, vitamin E and selenium are important as scavengers of free radicals. Selenium is found in avocados and is important in delaying the progress of HIV infection and increases the ability to digest food (Clasen, 1997: 15).

2.7.1 Comparative Nutritional Values of Selected IFP versus Commonly used Exotic Foods especially the Micronutrients Deficient in PLWHA.

Table 2.1: Commonly used Indigenous and Exotic Breakfast Food Items

Food Value

| FOOD TYPE | Vit A (ug) {1500 - 2000} | Vit B1 (mg) {1.5- 2.6} | Vit C (mg) {60} | Vit E (mg) {8-10} | Fe (mg) {10-15} | Ca (mg) {1000- 1300} | Protein (g) {50-70} | CHO (g) {80} | Fibre (g) {7} |
|------------------|---|---|--------------------------------|----------------------------------|----------------------------|---|------------------------------------|-----------------------------|------------------------------|
| Sorghum | 20 | 0.29 | 0 | | 15.6 | 30 | 9.8 | 73.6 | 2.3 |
| Bulrush millet | 25 | 0.3 | 3 | | 20.7 | 22 | 10.4 | 71.6 | 1.9 |
| Finger millet | Tr | 0.18 | | | 17.1 | 397 | 7.4 | 77.7 | 4.3 |
| Sweet potato | 2.006 | 0.066 | | 0.28 | 2.6 | 35 | 1.65 | 21.3 | 3 |
| Arrowroots | | | | | 1.62 | 6.17 | | | |
| White bread | 0 | 0.16 | 0 | | 1.7 | 37 | | | |
| Brown bread | 0 | 0.22 | 0 | | 2.6 | 20 | | | |
| Bread/fried eggs | - | 0.03 | 20 | | 1.8 | 35 | | | |
| Weetabix | 0 | 1.0 | - | | 7.6 | 30 | | | |

Sources: Sehmi, 1993. Maundu, 1999. KNH. IPGRI, 2003. Osero, 1997, Zest for Life, 2003.

NOTE: Figures enclosed in {} are RDA values.

KEY:

RDA- Recommended Dietary Allowance, CHO- carbohydrates, Fe- Iron, Ca- Calcium, g- grams, ug- micrograms, Mg-milligrams, tr-traces.

Table 2.2: Indigenous and Exotic Vegetables, Whole and Polished Staple Foods

Food Value

| FOOD TYPE | VitA (ug) {1500- 2000} | Vit BI (mg) {1.5-2.6} | Vit C (mg) {60} | Vit E (mg) {8-10} | Fe (mg) {10-15} | Ca (mg) {1000- 1300} | Protein (g) {50-70} | CHO (g) {80} | Fibre (g) {7} |
|--|---------------------------------------|--------------------------------------|--------------------------------|----------------------------------|--------------------------------|-------------------------------------|------------------------------------|-----------------------------|------------------------------|
| Amaranth (<i>Mchicha, terere</i>) | 6545 | 0.05 | 64 | | 8.9 | 410 | 4.6 | 8.2 | 1.8 |
| Spider plant (<i>mwangani, saget</i>) | 10452 | - | 13 | | 6.0 | 288 | 4.8 | 5.2 | 1.4 |
| African nightshade (<i>Mnavu, managu</i>) | 3660 | - | 20 | | 1.0 | 442 | 4.3 | 5.7 | 1.3 |
| Bush okra (<i>Murere</i>) | 6410 | 0.15 | 80 | | 7.2 | 360 | 4.5 | 12.4 | 2.0 |
| Pumpkin leaves (<i>Marengo</i>) | 3600 | 0.06 | - | - | 15.6 | 475 | 5.11 | 3.8 | 4.92 |
| Cow peas leaves (<i>Kunde</i>) | 7970 | 0.37 | 56 | - | 9.6 | 428 | 5.8 | 7.2 | 0.7 |
| Cabbage (<i>Kabiji</i>) | 100 | 0.04 | 32.2 | 0.1 | 0.59 | 47 | 1.44 | 3.12 | 2.3 |
| Spinach | 580 | 0.08 | 28.1 | 1.89 | 2.7 | 99 | 2.86 | 0.8 | 2.7 |
| Kale (<i>Sukuma wiki</i>) | 900 | 0.25 | - | - | 1.84 | 194 | 3.79 | 9.99 | 1.95 |
| Brown rice | 0.12 | 0.26 | - | 0.72 | 1.96 | 21 | 14.7 | 68.7 | 62 |
| White rice | - | 0.07 | 0 | - | 0.8 | 9 | 6.61 | 79.3 | - |
| Wholemaize meal flour | 47 | 0.24 | - | 0.25 | 2.38 | 7 | 12.4 | 3.6 | 13.4 |
| Whitemaize flour | - | 0.25 | - | 0.25 | 2.38 | 7 | 6.93 | 63.5 | 13.4 |
| Irish potato | - | 0.088 | 19.7 | 0.06 | 0.76 | 7 | 2.07 | 16.4 | 1.6 |
| Sweet potato | 2.006 | 0.066 | 22.7 | 0.28 | 2.6 | 35.4 | 1.65 | 21.3 | 3 |
| Yam | | | | | | 69 | 3.0 | 27.0 | 10 |

Sources: Sehmi, 1993. Maundu et al, 1999. Kenyatta National Hospital. IPGRI, 2003. Osero, 1997. Zest for Life, 2003.

NOTE: Figures enclosed in {} are RDA values

KEY:

RDA- Recommended Daily Allowance, **CHO-** carbohydrates, **Fe-** Iron,

Ca- Calcium, **g-** grams, **ug-** micrograms, **Mg-** milligrams, **tr-** traces.

To ensure that one meets the RDA avail four or more servings of foods containing those nutrients daily.

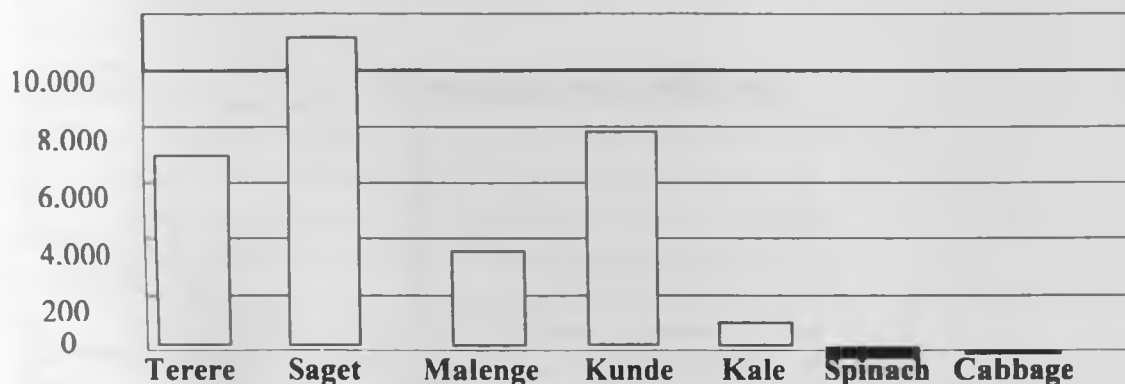
The RDA used in the two tables represents the establishment of a nutritional norm for planning and assessing dietary intake, and the levels of intake of essential nutrients considered to be adequate to meet the known needs of practically all healthy people. However, the requirements differ with age and body size owing to difference in genetic make-up, with the physiological state of individuals, growth rate, pregnancy, lactation and sex/gender. The RDA computed is for both males and females of ages 15-50 and above. To ensure that one meets the RDA avail four or more servings of foods containing those nutrients daily.

Table 2.1 and Table 2.2

From these tables it is evident that IFP have superior nutrients compared to exotic foods. For example, while the RDA of vitamin A is 1500-2000 ug, the vitamin A values of IFP such as *terere*, *managu*, *marenge*, and *kunde* range between 3600 – 10452 ug, way above the RDA. Table 2 also shows that the vitamin A values of exotic foods such as cabbage, spinach and kale is 100, 580 and 900 ug respectively, way below the RDA. The contrast is enormous. The RDA of vitamin C is 60 mg. The values of IFP such as *murere* and *terere*, are 80 mg and 64 mg respectively, above the RDA whereas for cabbage and spinach, the values are 32 mg and 28 mg, below the RDA, and these are the popular vegetables in towns. Since PLWHA require micronutrients in higher quantities than the RDA for an healthy person, the IFP would be appropriate to prevent deficiencies leading to improved health status. Similarly, the polished grains have a decreased nutritive value compared to whole grains. The observable pattern is that IFP contribution to micronutrients is much higher compared to most exotic vegetables. Usually the darker the vegetable, the higher their contents of vitamin A and most IFP are dark-green in colour.

In spite of Kenya being well endowed with over 220 IFP, vitamin A deficiency is rampant (documented in 11 districts) (Oniang'o, 2003:4) and it catalyses the spread of HIV. In this regard this study **hypothesized** that the higher the levels of acceptance of IFP and their consumption, the better the health status of teachers. Asian countries have retained traditional diets with high consumption of food plants, and are less affected by degenerative diseases and other adverse consequences of the nutrition transition (AJFAND, 2003: 50). The higher the consumption of IFP, the more improved the health status. IFP are rich sources of antioxidants resulting to more resistance to disease including HIV/AIDS. Figure 1 shows computation of vitamin A values of selected vegetables from the presented tables.

Figure 1: Graphic Representation of Vitamin A Values in Micrograms



Source: Computed using values from table 1 and table 2

Improved technology has led to cereals being highly processed and refined, stripping the grains of vital nutrients and fibre leading to nutritional deficiencies. This has led to the introduction of enrichment programmes where synthetic nutrients are added (Ludington, 2000:99). The refined foods look more appealing than in their natural state but are less nutritive. Ironically the 'chaff' is fed to cows as fodder meaning the animals feed more nutritiously than human beings.

Tables 2.3 and 2.4 below are introduced to demonstrate the effects of high processing and refining of wheat and rice to white.

Table 2.3: Loss of Nutrients in Refining of Wheat to White

| Nutrient | Percentage loss in white flour |
|-------------|--------------------------------|
| Thiamine | 77 |
| Riboflavin | 80 |
| Niacin | 81 |
| Vitamin B 6 | 72 |
| Calcium | 60 |
| Phosphorus | 71 |
| Magnesium | 85 |
| Potassium | 77 |
| Iron | 76 |
| Zinc | 78 |

Source: Adapted from GNLD, 1997: 10

Table 2.4: Loss of Nutrients in Refining Rice to White

| Nutrient | Percentage loss in white rice |
|--------------------------|--------------------------------------|
| Protein | 11 |
| Fat | 79 |
| Fiber | 67 |
| Calcium | 25 |
| Phosphorus | 57 |
| Iron | 50 |
| Potassium | 57 |
| Thiamin | 79 |
| Riboflavin | 40 |
| Niacin | 66 |
| Alpha-tocopherol (Vit.A) | 84 |

Source: Adapted from GNLD 1997: 11

Table 2.3 and 2.4

Tables 2.3 and 2.4 show what little amounts of nutrients we take in when we consume polished grains of rice, wheat and maize. 84% of vitamin A is stripped out of rice yet VAD is rampant in Kenya and is responsible for the fast spread of HIV. This deficiency can be easily tackled by eating whole grains. With the above tabulation this research sought to establish whether the high consumption of polished grains that are less nutritive, is attributable to ignorance and lack of knowledge. The argument the study **hypothesized** is that if people were more knowledgeable on the nutritive content of their meals, then they would be more receptive to nutritive feeding habits.

There is therefore, need to find an affordable method of enhancing the productivity levels of the infected, while strengthening the affected. Piwoz and Preble (2000), FAO/WHO (2002), FANTA Project (2000) are some of the studies undertaken on nutrients necessary for PLWHA. Research is needed to identify local alternatives instead of going by the dictates of the West. Unless emphasis is placed on the adoption of sustainable interventions and on good nutrition that can prolong the period of well-being early in the infection (FAO, 1997:13), then it is an exercise in futility. Knowledge of dietary improvement would increase levels of acceptance and consumption of IFP, and is more sustainable than medication for majority of the population. Nutrition is a component of HBC and emphasis is on eating a balanced diet. This research has explained why consumption of IFP and a diversified diet should be emphasized on

when counselling PLWHA instead of only insisting on a balanced diet. Diets consisting of IFP would be tailored to meet various local needs thus more sustainable and accessible for the majority population. This study therefore set out to test **whether or not** dietary improvement is more sustainable and accessible than medication for majority of population.

2.8 Theoretical Framework

This study was guided by the modernization and behavioural change theories. Emphasis of the latter is on positive goal attainment.

Risk and Modernization

The modernization theory is a dominant analytical paradigm in American sociology for the explanation of the global process by which traditional societies achieve modernity. Forces of globalization are disintegrating the traditional boundaries that once separated people from a macro to micro level (Weinstein, 1997:105). The modern styles that had the force of colonial authority were adopted and are now seen as “up-to-date”. They are misconceived as being more superior to local styles and standards. The traditional styles have come to be regarded as “backward”. This attitude is inclusive of local cuisine. There are changes in the industrialization of food production that have contributed to the consumption of a diet higher in fat (particularly saturated fat) and protein content and lower in complex carbohydrates (WHO, 1998: 24).

In discussing modernization, reference will be made to the works of Anthony Giddens and Ulrich Beck who have written extensively on risk and modernization. The developments in the modern world are advantageous, but it also has a sombre side. Modernity is a risk culture. It reduces the general riskiness of certain areas and modes of life but at the same time introduces new risks, some completely unknown before (Beck, 1999: 135). Ulrich Beck sees this risks contributing to the formation of a global risk society. The risks affect all countries and social classes; they have global, not merely personal consequences. The world is today confronted with ‘manufactured risks’- risks that are caused by the impact of our knowledge and technology on the natural world (Giddens, 2001: 65). Manufactured risks are spreading to the health sector and are linked to the food consumed. Exotic foods are exposing people to the risk culture of modernity. Modernization has directly or indirectly led to the deleterious dietary patterns that contribute to the development of a number of HIV opportunistic infections due to an already poor nutrition. The introduction of high agricultural mechanization and processing

of foods has exposed consumers to what (Giddens, 2001: 67) refers to as a “health risk”, as we will see in a moment.

Cultural shifts impede good intentions. Western culture, modern science and even technology are eroding valued traditional practices, inclusive of discarding highly nutritive indigenous foods (Guarino, 1997: 1). New lifestyles and feeding habits have emerged with modernization and have negatively influenced nutritional status (Ludington, 2000:182). McDonald’s fast foods have become a symbol of a new ‘cultural imperialism’ which threatens to smother local cultures with powerful brands from the west (Giddens, 2001: 65). No wonder there is a proliferation of fast food cafes in every corner of most developing cities. Ritzer refers to this as ‘McDonaldization’ of society in which local cuisines are being sidelined as efforts are expended to make the world a global village. To Ritzer, McDonaldization is the process by which the principles of the fast food restaurants dominate more sectors of American society as well as the rest of the world (Ritzer, 1996: 126). Menus in fast food cafes and most peoples’ diets have been oversimplified and are limited to a number of high-energy foods presenting unprecedented obstacles to human health associated with emerging diseases such as diabetes, hypertension and cancer (AJFAND, 2003:45).

Farming techniques are now dictated by modernization and are compromising food safety. Chemical pesticides and herbicides are widely used. Animals are fattened in feedlots without exercise and with antibiotics, hormones and growth enhancers (Ludington, 1997: 14). Mad cow disease is linked to feeding cattle, normally herbivorous, on food containing traces of parts of other animals. This in turn causes a degenerative brain condition (Giddens, 2001: 69). Improved technology has led to cereals being highly processed and refined, stripping the grains of vital nutrients and fibre. In the market today, it is common to see promotional food labels such as “enriched and fortified”. It has been proven that many nutrients are lost in the processing stage. Synthetic nutrients are therefore added to enrich cereals. In the milling of wheat, at least 24 known minerals and vitamins were largely removed and this led to nutritional deficiencies, hence the introduction of enrichment programmes (Ludington, 2000:99). The rationale of stripping grains of their natural nutrients, then adding inferior synthetic nutrients to the same grain is questionable. The refined foods look more appealing than in their natural state. The **question** that one may ask is: do consumers purchase foods

based more on their aesthetic value than on nutritive value? With nutrition counselling, probably most people can modify their eating habits to enhance their nutritional status.

Market liberalization and export-oriented agriculture, large-scale operations with high levels of mechanization (AJFNS, 2002: 22) are products of modernization. This has led to food supplies being inadequate in quantity and quality, contributing to widespread malnutrition (AJFNS, 2002: 22), a major health risk. It is now clear that malnutrition and HIV affect each other negatively. To address HIV mitigation successfully, malnutrition must be addressed. It would be possible if poor countries built self-sufficiency by ensuring their food sovereignty. This would enable them engage in the global market from a position of strength. Many kinds of native foods or cooking styles are disappearing globally (Elmadfa, 2003: 223), and this might lead to uniform consequences of almost complete loss of food diversity. This would lead to poor health.

The modern trend of using packaged foods is favoured. This has partly led to the shift from small-scale enterprises and local production, especially farming of IFP for local consumption, to export crop production. Simple, natural, home-grown foods have no place in globalization. Actually, globalization has resulted in widespread malnutrition. The process of modernization and economic transition has seen most countries move towards industrialization. Everywhere one goes, Euro-American values, beliefs and practices have made a lasting impact (Weinstein, 1997: 105). Globalization is a form of cultural imperialism in which values, styles and outlooks of the western world are spreading so aggressively that they smother individual national cultures (Giddens, 2001:64). It tends to standardize the way most people behave and believe. Styles of art, manners and cuisine have entered cultures throughout the world, spreading risks to other areas. Modernization is a major contributing factor to widespread malnutrition in Kenya due to over-reliance on export crop production.

To counteract the ingrained feeding culture, there is need for dietary counselling to impart knowledge and sensitize people to bring about behaviour modification. Behaviour modification aims to increase people's skills so that they have more options for responding (Corey, 1990: 285). A well-nourished person has a strong body for coping with HIV and fighting illnesses. Maintaining adequate nutritional status means consuming a variety and adequate amounts of foods to ensure the body gets the necessary nutrients it needs.

Behavioural Theories

Behaviour modification is the application of the results of learning theory and experimental psychology to the problem of altering maladaptive behaviour (Redd, 1979:7). The **patient-centered counselling model** that is the focus enhances long-term dietary adherence. This model facilitates change by assessing patient needs and subsequently tailoring the intervention to the patient's stage in the process of change, personal goals, and unique challenges (Rosal et al, 2001). Clients are expected to engage in specific actions to deal with their problems. The theory argues that the inherited/ genetic and constitutional determinants of an individual are not important, but rather the observable patterns/ traits of an individual's behaviour. The patient-centered counselling model provides an effective approach for intervening with patients to promote dietary change and long-term adherence. The shared responsibility of the nutritionist and the patient in achieving dietary change is emphasized. This model reflects principles from several research-supported theories and models: Consumer Information Processing Theory, the Health Belief Model, the Stages of Change Model and Social Cognitive Theory, each of which are briefly described below (Rosal et al, 2001).

Consumer Information Processing Theory (CIP) whose proponent was William Mcguire postulates that information must not only be available but also believed to be useful to the consumer, and the consumer must have the time, energy, and level of comprehension to process the information. The information must be presented at times when the patient is most receptive, and at a level that he or she can comprehend. The more the provider is able to relate the patient's health concerns to his or her diet and is confident that the patient understands and is able to use this information, the greater the likelihood that the patient will be motivated to make and maintain dietary changes. In this regard information on nutritive value of IFP and benefits of consumption of a diversified diet of IFP should be provided.

The Health Belief Model was developed by psychologists Hochbaum, Rosenstock, Leventhal and Kegeles in 1958. It asserts that cognitive factors influence a patient's decision to change or modify a specific behavior (Rosal et al, 2001). An individual will change a specific health-related behaviour if he or she believes that the behavior makes him or her vulnerable to (or at risk for worsening) disease; changing the behavior will decrease risk; there will be serious consequences if the behavior is not modified; he or she is capable of taking action to change

the behavior; and the potential costs of taking action are outweighed by the benefits. In this regard, the dangers of modern day feeding habits will be explained and a more diversified diet encouraged as reducing risks to disease.

The Stages of Change Model of behavior was developed in 1982 by psychologists James Prochaska and Carlo Diclemente. It suggests that individuals change problem behaviours by moving through a series of stages representing several levels of readiness to change (Rosal et al, 2001). These levels reflect a process of change moving from not considering change (pre-contemplation), to motivation to change (contemplation) prior to making a commitment to change, and making the change (action). This model emphasizes that to be effective, interventions should be tailored to the specific stage at which the patient is. It emphasizes that traditional interventions are action oriented (focused on immediate behavior change) and thus do not address issues faced by patients who are not yet ready to make a change. For example, counselling for a pre-contemplator or contemplator requires the provision of information and materials stressing the benefits of dietary changes and feedback on the patient's current diet-related risk. Counselling a patient in the preparation or action stages warrants development of an action plan with specifically stated goals, and discussion of relapse prevention strategies (Rosal et al, 2001).

Social Cognitive Theory states that the process of learning involves active participation by the patient. It asserts that behaviour patterns are not in-built but learned therefore maladaptive behaviour can be replaced by more adaptive ones (Corey, 1991: 286). A child learns from his environment/ situation. Self-efficacy, the central concept of social cognitive theory, refers to a patient's belief in their ability to change or maintain a specific behaviour. The level of self-efficacy has a direct impact on a person's willingness to engage in a certain behaviour and to persist in the face of obstacles. For example, a positive belief that one has the necessary knowledge and resources to eat a diversified diet full of IFP and is capable of doing it will lead to a greater commitment and persistence in maintaining such change. Another important construct is outcome expectations or the degree to which a patient believes that a given course of action will lead to a particular outcome (eg, how firmly an individual believes that IFP and diet diversification will reduce risk for disease). Outcome expectations must be favourable for behaviour change to occur. The person then sees the outcome of impoverished diets and the increase in degenerative diseases as the punishment.

The objectives of the patient-centered counselling for dietary change are to: increase the patient's awareness of their diet-related risks; provide the patient with nutrition knowledge; increase the patient's confidence in his/her ability to make dietary changes and enhance skills needed for long-term adherence to dietary change plans. The patient-centered counselling model helps nutrition professionals to tailor the intervention to the patients' stage of change.

From the literature review it is evident that modernization has been a factor in the poor eating habits of Kenyans, which have resulted in multiple nutritional deficiencies. Modernization has directly or indirectly led to the deleterious dietary patterns that contribute to the development of a number of HIV Opportunistic Infections (OI). The outbreak of AIDS has made a bad situation even worse because the OI are accompanied by nutrient deficiencies. With an already weakened immunity due to nutritional deficiencies, survival chances of patients are reduced. To change the ingrained culture, counselling with an attempt to long-term adherence to dietary-change plans needs to be enhanced. The patient-centered counselling model if carefully administered by a professional can increase one's self-efficacy, to change and maintain positive rewarding feeding habits especially the IFP consumption. The expected outcome is good health status; and when the patient firmly believes that IFP and diet diversification have reduced risk for disease, he/she will gradually change his/her poor dietary habits. This in turn will cause improved health status leading to positive goal attainment as the skills for long-term dietary adherence will be enhanced.

2.9 Hypotheses

The purpose of hypothesis is to study explanation for certain facts and guide in investigation of others. From the above literature review, the following propositions have been derived;

Hypothesis 1 Increased consumption of IFP combined with a diversified diet enhances the efficacy of HIV/AIDS medication and supplementation, improving health status.

Hypothesis 2 Knowledge of the value of dietary diversification / improvement increases levels of consumption of IFP.

Operational Definitions

Post-primary teachers is used to mean secondary school teachers.

CHAPTER THREE: METHODS

This chapter deals with the research design used in this study. The chapter covers site selection and description, target population, unit of analysis, sampling procedure, the data collection procedures and data analysis. The field experiences and ethical considerations are also highlighted.

3.1 Site Selection and Description

The geographical coverage of the study was Nairobi Province, which is a cultural microcosm of Kenya. Nairobi is densely populated with people of diverse cultural backgrounds, attributable to its cosmopolitan nature. Nairobi has a high incidence of HIV/AIDS that can be attributed to overexposure. Being the capital city, it is the epicentre of new technologies that have influenced new eating habits. Nairobi is also a place of inter-cultural exchange. There are varieties of indigenous foods of various cultures that can be blended well to enrich diets. There are also numerous NGOs tackling HIV/AIDS issues. Most have formed post-positive test clubs where PLWHA meet to share experiences. In these clubs, PLWHA are encouraged as much as possible to disclose their status, in order to minimize stigmatization. The researcher visited some of these NGOs, to seek out teachers for interviewing. Some of the notable ones visited include Movement of Men Against AIDS (MMAK), Women Fighting AIDS in Kenya (WOFAK), Kibera Community Self-Help Programme (KICOSHEP), National Empowerment Network of People Living With HIV and AIDS in Kenya (NEPHAK) and Kenya Network of Positive Teachers (KENEPOTE).

3.2 Target Population

The study targeted post-primary teachers within the 48 public secondary schools in Nairobi who are within the reproductive age-bracket. Teachers living with HIV/AIDS in Nairobi were targeted from various AIDS-related NGOs. All the HIV+ teachers (n= 31) were on antiretroviral therapy. Two groups, an observational group and a control group, were studied to understand their dietary habits. This was to establish whether any changes have been made to their diets and the reasons for any such change. The samples were drawn from these groups of HIV+ teachers and the general teachers in schools.

3.3 Unit of Analysis

Singleton (1998) defines unit of analysis as that which a researcher aims to study and make generalizations about. In this study, the unit of analysis as well as, the unit of observation was the post-primary teacher, both HIV-positive and negative or status unknown. The respondents were the teachers and key informants to whom interview schedules were administered to collect data from, in the field.

3.4 Sampling Design/ Procedures

This study drew heavily from experimental studies and called for careful sampling approaches. It involved comparing three groups of teachers who have previously been exposed to different treatments. One group was that of 32 randomly selected teachers in the school set-up whose status was either known or unknown. The other two groups were derived from 31 HIV positive teachers. Several research problems, limitations and constraints were encountered in the process of implementing this research. In the initial draft and plan, the researcher had targeted a sample size of 60 HIV+ post-primary teachers, but only 31 were interviewed as discussed in section 3.7. The researcher had also targeted an equal number of the experimental as well as the control group. That too, proved a monumental task due to the limited number of respondents and difficulties experienced as mentioned in section 3.7.

For purposes of hypothesis 1, the HIV positive teachers (n= 31) who were actually interviewed were divided into two groups, an experimental and a control group. The experimental group consisted of 21 teachers who were using medication/supplementation as well as IFP. The control group was made up of the remaining 10 HIV/AIDS teachers who were only using medication and supplementation. In this study, a combination of simple random sampling and snowball sampling methods were applied in the selection of both the schools and teachers, as described below. Stratified random sampling uses the principle of first sub-dividing a population into two or more mutually exclusive groups or strata. Nairobi was therefore stratified into the eight administrative divisions.

Sampling of Schools within Nairobi:

To ensure that all parts of Nairobi were covered, it was decided to select an equal number of schools from each of the city's eight administrative divisions, namely: Kasarani, Embakasi, Dagoretti, Starehe, Westlands, Makadara, Langata, and Kamukunji. Using a sampling frame of

secondary schools within the divisions of Nairobi obtained from TSC, simple random sampling was done to select a representative school. Only one school was selected from each division, making a total of 8 schools. The selected schools were:

Table 3.1: Distribution of Sample Schools by Administrative Divisions Within Nairobi

| SCHOOL | DIVISION |
|-----------------------|-----------|
| Kamukunji Secondary | Kamukunji |
| Aquinas Secondary | Makadara |
| Lenana School | Lang'ata |
| Ngara Girls | Starehe |
| Precious Blood Riruta | Dagoretti |
| Eastleigh Secondary | Kasarani |
| St. Georges Secondary | Westlands |
| Embakasi Girls | Embakasi |

Source: Nairobi PDE, School Statistics

Sampling of Teachers in the Selected Schools:

Systematic random sampling was carefully done to ensure that there was an even distribution of teachers from the four subject/teaching departments comprising sciences, humanities, languages and technical in the schools. Hence, one teacher per department was interviewed and this prevented interviewing more than one teacher in one department. It was not necessary to get teachers from other non-teaching departments because all teachers belong to a teaching department, and were therefore covered in the four selected departments. In every school therefore, a total of four teachers were selected to whom interview schedules were administered. In total, the number of teachers that were interviewed in schools were: 4 teachers per school X 8 schools therefore $n= 32$ teachers.

Sampling of Sero-Positive Teachers:

HIV/AIDS still remains a sensitive, personal issue and ethics demand that a high level of confidentiality regarding HIV positive teachers be maintained. In the interview schedules administered, the study could not ethically have had a column for HIV status. Therefore, snowball sampling was used to get teachers in the various post-positive test groups in the

different NGOs within Nairobi that the researcher visited. The researcher found out that these NGOs network with each other. The researcher first conducted a preliminary search of several NGOs that had members who are post-primary teachers, and who had disclosed their status. The NGO that had the largest number of post-primary teachers was the first to be targeted for interviewing. Snowballing technique is an approach that enables access to private but interrelated settings. To draw a snowball sample, the researcher identified an HIV positive teacher from the first targeted AIDS NGO who had disclosed his/her condition. The researcher interviewed him/her, and then asked him/her to identify others, who were interviewed. This went on until 31 teachers were captured. This was a major set-back due to the problems discussed in section 3.7, because the researcher had intended to interview 60 HIV+ respondents and only 31 HIV+ teachers were realized. Thus the sum total of the sample became: 32 general teachers + 31 HIV+ teachers = 63 teachers.

For purposes of hypothesis 1, the HIV+ teachers (n=31) were divided into two groups: an experimental and a control group. From the gathered data, 21 teachers were using medication as well as IFP and only 10 were on medication alone though in the proposal an equal number of 30 control and 30 experimental participants had been anticipated. This was not realized due to the constraints mentioned in section 3.7. The experimental group consisted of the 21 teachers who were using medication/ supplementation as well as IFP. The control group was made up of the other 10 HIV/AIDS teachers who were using only medication and supplementation. This was aimed at providing a basis for inferring that any differences that may be found on the dependent variable were due to the experiment, thus ensuring validity. Hypothesis 2 utilized the two samples of both HIV+ and the general teachers in schools to compare the usage and knowledge of IFP and their health status.

There were 12 key informants comprising 8 nutritionists in hospitals and institutions within Nairobi, 2 doctors and 2 ethno-botanists who were randomly selected. Of the 8 nutritionists, 6 were from Kenyatta National Hospital (KNH). The rationale being that KNH is a referral hospital that handles cases from all over Kenya and hence provided a representative sample. Secondly, KNH has several nutrition divisions that cater for different nutritional needs. The researcher visited all these divisions that comprised medical, surgical, obstetrics and gynaecology, pediatrics and the private wing. The other two nutritionists were randomly sampled, one from Ushirika clinic in Kibera that specializes in treating HIV/AIDS patients,

and the other was a nutritionist from an NGO known as Modu Health Management that manufactures food supplements for PLWHA using indigenous food plants. The two ethnobotanists were sampled from the National Museums of Kenya. They were interviewed on nutritional deficiencies that are prevalent in their areas of operation. The researcher tried establishing the potential consumption of IFP and the role of IFP in mitigating HIV/AIDS effects. Their contribution complemented or supplemented the data that was gathered from the post-primary teachers.

3.5 Sources of Data

The problem under investigation required a combination of primary and secondary data to give a general view on potential acceptability and consumption of IFP as a nutritional remedy for PLWHA.

Secondary Sources

This was mainly from the literature review. A detailed collection of data through library and desk research was done. Literature ranging from books, journals, recipe books, government publications and research reports and records was reviewed. This was sourced from the National Museums of Kenya (NMK), hospitals, ethno-botanists, libraries such as AMREF, the World Bank, Kenya AIDS National Consortium (KANCO), National AIDS Control Council (NACC), Food and Agricultural Organization (FAO), Rural Outreach Programme (ROP), Kenya Resource Centre for Indigenous Knowledge (KENRIK), KNH medical library and other organizations that majored on nutritional issues. This data revealed the nature and magnitude of the problem and identified solutions and missing gaps. This captured all the data not captured in the primary data.

Primary Sources

Data was collected in the field from post-primary teachers who were both HIV positive and negative by use of interviews. This entailed a face-to-face personal interview with teachers on their knowledge, acceptance and consumption of IFP. The 24-hour food recall and the Food Frequency Questionnaire (FFQ) were chosen for their ease in administration, consistency across multiple study sites and their ability to reflect dietary eating habits of teachers. The FFQ was administered in an interview format and a pictorial page showing select IFPs was provided

to help participants to visualize the foods in question. Other sources of data were nutritionists, doctors and ethno-botanists.

3.6 Methods of Data Collection

Detailed interview schedules that derived both qualitative and quantitative data were administered on teachers. In-depth personal interviews with nutritionists, doctors and ethno-botanists involved the use of an interview guide. Observation on the general health of the teachers was recorded. Both open-ended and closed-ended questions were asked so as to capture as many unique responses as possible from the respondents. Review of the secondary data was done to supplement the primary data.

3.7 Field Experiences

The time frame for data collection in the field was slightly over 2 months from 12th November to 18th January. Several research problems, limitations and constraints were encountered in the process of implementing this research. The main challenge was reaching the anticipated sample target of 60 HIV+ teachers in the proposal and only 31 were interviewed. This owed to the fact that the management in some of the NGOs was simply unco-operative, due to their sensitivity concerning confidential details on their members. The management had first to seek the consent of the members we wanted to interview prior to disclosing their identities to us. This compelled us to make many repetitive trips as we awaited clearance, spending a longer period in the field than was initially anticipated. The researcher had also targeted an equal number of the experimental as well as the control group. This proved a monumental task due to the limited number of respondents and difficulties experienced as mentioned earlier. From the respondents, we were able to get 21 teachers in the experimental group who were on medication as well as using IFPs, and 10 teachers in the control group, who were only on medication.

The researcher had wanted to personally administer the interview schedules to all the respondents but in some instances, the HIV+ teachers out-rightly refused to meet face to face and insisted that they were literate enough to fill in the interview schedules. Given the limited number of respondents in this category, we had to comply. This entailed leaving the interview schedules and our cellphone numbers at the organizations, for follow-ups. Fortunately for us, all those that filled in had cellphones and called to pick up the questionnaires and for

clarification. At this point we would ask them to direct us to another member. Most used to give the person's phone number that enabled us call and arrange for a meeting. Incidentally, those that we met face-to-face were really co-operative and warm. We received minimal hostility.

The researcher made use of a research assistant owing to the magnitude of the anticipated task. Daily checks were made to avoid interviewing the same person twice. The service of a computer programmer (SPSS) was used for data analysis. The researcher had anticipated to spend at least four weeks in the field but ended up spending more than two months owing to the sensitive nature of the investigation. Teachers in the schools were interviewed in the third term during the examination period and this proved a challenge. A number declined to be interviewed as they were trying to beat deadlines for submitting examination results. A number of male teachers in the schools targeted declined being interviewed citing that the area under investigation was a woman's domain and felt they had little control over what they ate. This consumed more time than anticipated.

December 1st is World AIDS day. National celebrations are held, media supplements on HIV/AIDS topical issues captured in the mass media and those infected and affected share their experiences publicly. This offered fertile ground for the researcher as being equated to a festive period for the PLWHAs, major on their agenda is seeking recognition to prevent stigmatization. The moral support they got during this period encouraged most of our respondents, who were quite receptive. It is fortunate also that KENEPOTE, the first ever organization of teachers living with HIV/AIDS, was launched during the period the researcher was in the field. The researcher attended the launch, and had a chance to establish crucial links that gave momentum to the snow-ball methodology.

3.8 Ethical Considerations

Ethical research practices were carefully observed throughout this study. The interview schedule did not reveal the name of the respondents instead the respondents were assigned case numbers. Confidentiality of the information given was observed and respondents were assured of the same.

3.9 Operational Definition of Variables

A study variable refers to the characteristics of units that vary, taking on different values, categories or attributes for different observations (Singleton, 1988: 72).

The experimental approach adopted in this research involves manipulation and control. Experiments enable the experimenter to test a hypothesis that one variable causes a change in another variable. The first hypothesis formulated for this study stated that the health status of post-primary teachers was independent of the consumption of IFP and diversified diet and use of medication and supplementation. This was measured by change in quality of life, life expectancy and immunity/resistance levels. In order to test *hypothesis 1* the researcher used the HIV+ cohort who were further divided into two groups, the experimental and control group. The experimental group was made up of teachers who were using both medication and IFP. The control group was made up of HIV+ teachers who were using medication only. The researcher thereafter observed and measured the effects of the changes in their quality of health over a three-month period, to establish whether the variable (IFP) caused a change in another variable. Health status was categorized into: excellent, good, fair and can be better. The multiple linear regression model was used to test the significance of the relationship between health status and the consumption of IFPs and the use of medication and supplementation. This was practical because the study being a probabilistic model had more than one independent variable that in turn had many other related variables. Therefore it was critical to incorporate these related variables and other potentially important independent variables into the model in order to make accurate predictions.

The second hypothesis stated that the levels of consumption of IFP are independent of the knowledge of IFP and dietary diversification measured by type of IFPs used, duration of time IFPs have been eaten and the presence of a market that sells fresh and diverse IFPs. In hypothesis 2, a comparison is made between HIV+ teachers and the general teachers in schools in terms of their consumption of IFPs. Differences in their consumption are measured using the chi-square at a significance level of 0.05.

Table 3.2: Study variables and measurement of indicators

| Hypotheses | Type of variable | Variable name | Variable indicators/measurements |
|-------------------|-------------------------|--|--|
| Hypothesis 1 | Dependent | Health status | <ul style="list-style-type: none"> ● Quality of life enhanced ● Strengthened immunity ● Resistance to diseases |
| | Independent | Consumption of IFP and diversified diet | <ul style="list-style-type: none"> ● Are IFP eaten? ● If yes, what types, and how often per week? ● Duration of time that they have been eaten. ● What types of grains are commonly eaten? ● Are the grains in the natural or refined form? |
| | Independent | Use of medication and supplementation | <ul style="list-style-type: none"> ● Type of medication and supplementation used ● How often used ● Duration of time used ● Any presence of toxicity when used over a period? ● Is nutritious food given consideration? |
| Hypothesis 2 | Dependent | Levels of consumption of IFP | <ul style="list-style-type: none"> ● Are IFP eaten? If yes, what types and how often per week? ● How long have they been eaten? ● Are they eaten as a side dish or a main dish? ● presence or absence of a market that sells fresh and diverse IFP |
| | Independent | Knowledge of IFP and dietary diversification | <ul style="list-style-type: none"> ● Perception of IFP ● Presence of a home menu /guideline with a variety of IFP and whole grains which is followed strictly |

CHAPTER FOUR: DESCRIPTIVE DATA ANALYSIS

The data generated from interview schedules which had many open-ended questions, were coded using a code-book. The information was entered into code-sheets and cleaned using Epi-data, a special computer package for this purpose intended to eliminate any coding errors hence avoiding data-processing hiccups. Thereafter it was analyzed using the Statistical Package for Social Sciences (SPSS).

This chapter presents a descriptive analysis of the data gathered from respondents in Nairobi. The researcher analyzed data collected from the field in an orderly way and used the descriptive technique in organizing, summarizing, interpreting and communicating quantitative information from observation on the respondents' demographic, health and dietary behaviour characteristics. Data is analyzed from the open-ended responses from the teachers where their feeding habits have been established and their appreciation of IFPs understood. Categorization as a form of measurement was widely utilized whereby the participants' responses were grouped into mutually exclusive categories that were ordered with respect to some property. The summarized data is described in terms of measures of central tendency and cross tabulations and interpreted in the form of frequency distribution tables, bar graphs, histograms, percentages and pie-charts. These have helped in describing patterns and drawing conclusions.

4.1 Background Information of the Respondents

A total of 63 respondents were interviewed. Of these (n= 63), 32 were general teachers whose status was either known or unknown. They were drawn from eight public secondary schools in Nairobi, as previously indicated. The other respondents (n=31) were HIV/AIDS positive teachers who had disclosed their status and were drawn from various HIV/AIDS related NGOs, some who are members of the Kenya Network of Positive Teachers (KENEPOTE). The researcher met with the network members at one of their workshops in Nakuru, where the interview schedule was administered. The socio-economic parameters studied comprise the gender, age, education level, marital status and feeding characteristics. This mainly involved cross tabulations of various variables.

4.1.1 Geographic Distribution of the Respondents

Table 4.1 shows the geographical distribution of the sample respondents who were classified into their respective home provinces. This is critical to this study, considering the heterogeneous nature of the Kenyan society and the Kenyan foods.

Table 4.1: Distribution of the Sample (n=63) by Home Province

| Province | General Teachers | | HIV+ Teachers | | Totals | |
|--------------|------------------|------------|---------------|------------|-----------|--------------|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| Eastern | 7 | 21.9 | 2 | 6.5 | 9 | 14.3 |
| Western | 4 | 12.5 | 8 | 25.8 | 12 | 19.0 |
| Central | 11 | 34.4 | 5 | 16.1 | 16 | 25.5 |
| Nyanza | 6 | 18.8 | 14 | 45.2 | 20 | 31.7 |
| R/Valley | 3 | 9.4 | 1 | 3.2 | 4 | 6.3 |
| N/Eastern | 1 | 3.1 | 0 | 0 | 1 | 1.6 |
| Coast | 0 | 0 | 1 | 3.2 | 1 | 1.6 |
| Total | 32 | 100 | 31 | 100 | 63 | 100.0 |

Source: Field Data

Table 4.1 shows that Central province is the modal class for the general teachers (n=32) with over one-third of the respondents 11 (34.4%). Nyanza province on the other hand is the modal class for the HIV+ teachers (n=31) with a ratio of 14:31 at 45.2% nearly half of the HIV+ study cohort. These findings tally with the observation made in the literature review that the highest infections are in Nyanza province, with 20-30 teachers dying every month. Western province in this study followed closely with 8 (25.8%) whereas Rift Valley and Coast provinces both had 1 (3.2%) participant. It was therefore a representative sample because it exhibited characteristics typical of all the provinces in Kenya, hence our ability to capture information on foods from all these regions.

4.1.2 Gender Distribution of the Sample

Table 4.2 shows the gender distribution as illustrated below:

Table 4.2: Gender Distribution of the Sample

| Gender | General teachers | | HIV+ Teachers | | Totals | |
|--------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| Male | 5 | 15.6 | 13 | 41.9 | 18 | 28.6 |
| Female | 27 | 84.4 | 18 | 58.1 | 45 | 71.4 |
| Total | 32 | 100.0 | 31 | 100.0 | 63 | 100.0 |

Source: Field Data

From table 4.2, there was only good gender representation from the HIV+ sample. There was notable gender disparity among the general teachers (n= 32), with a female-male ratio of 27:5 who accounted for over three-quarter of the cohort. There was an almost equal representation of the HIV+ teachers (n=31) with the female-male ratio of 18:13 at 41.9% male and 58.1% female. This is an indication that there is no co-variability in gender and sero-positivity, all gender were equally affected there being no significant disparity. The snowball method that the researcher used adds credence to this fact because predictability of the next respondent's gender could not be determined, yet we were able to capture an almost equal number of male and female without any bias. The minimal male participation (n=5) of the general teachers in schools and who were sampled randomly, is attributable to the fact that most male who declined being interviewed, perceived the area of investigation relating to food, a woman's domain. They felt that they had little control over meals presented at the table unlike their HIV+ male counterparts (n=13) who reported that after knowing their status, they made conscious and deliberate efforts to maintain their health by closely monitoring their diet.

Establishing HIV Status of the Sample by Gender

The researcher sought to establish if gender mattered in the establishment of teachers' HIV status. Only the general teachers (n=32) are analyzed because in the HIV+ sample, all the respondents knew their status, as the researcher sampled those whose sero-positive status was known and had disclosed.

Table 4.3 indicates this:

Table 4.3: Establishment of HIV Status of the General Teachers by Gender

| Cared to Know status | Male | | Female | | Totals | |
|----------------------|-----------|--------------|-----------|--------------|-----------|--------------|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| Yes | 2 | 40 | 17 | 63.0 | 19 | 59.4 |
| No | 3 | 60 | 10 | 37.0 | 13 | 40.6 |
| Totals | 5 | 100.0 | 27 | 100.0 | 32 | 100.0 |

Source: Field Data

From table 4.3, over half 19 (59.4%) of the general teachers cared to establish their HIV status as compared to 13 (40.6%) who did not with the female-male ratio of 17:2 or 63% compared to 40% respectively, who had cared to know their HIV status. A higher percentage of male 3 (60%) as compared to female 10 (37%) respondents were not keen on knowing their status an indication that female respondents were more receptive. Both samples however, had varied reasons for seeking to know their status as is shown below. For general teachers n= 19 whereas for the HIV+ teachers n= 31. The sum total for the two samples is n= 50. The reasons for the general teachers who had not established their status (n=13) will be analyzed in the next table.

Table 4.4: How HIV Status was established

| Reasons for Testing | General Teachers | | HIV+ Teachers | | Totals | |
|------------------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| Due to ailment | 1 | 5.3 | 14 | 45.2 | 15 | 30.0 |
| Mandatory in pregnancy | 6 | 31.6 | 3 | 9.7 | 9 | 18.0 |
| To live positively | 7 | 36.7 | 8 | 25.8 | 15 | 30.0 |
| Donated blood | 1 | 5.3 | 1 | 3.2 | 2 | 4.0 |
| For insurance policy | 4 | 21.1 | 0 | 0 | 4 | 8.0 |
| Death of spouse | 0 | 0 | 5 | 16.1 | 5 | 10.0 |
| Total | 19 | 100.0 | 31 | 100.0 | 50 | 100.0 |

Source: Field Data

From table 4.4, the reason frequently shared by the two groups is that of living positively by 7 (36.7%) general teachers and 8 (25.8%) HIV+ teachers. This is an indication that people are embracing the aggressive campaigns by VCT centers calling on people to take control of their lives. External requirements beyond the sample respondents control were highly cited by the other respondents. In the general teachers for 6 (31.6%) female, it was a mandatory requirement in antenatal clinics during pregnancy, for 4 (21.1%) it was mandatory for an insurance policy, while for 1 (5.3%), it was when donating blood. Nearly half 14 (45.2%) of the HIV+ cohort cited repeated ailment and with death of a spouse having 5 (16.1%). An unfortunate observation and a confirmation of this scenario is that one-quarter 8 (25.8) of the HIV+ respondents were widowed.

The 13 (38.7%) general teachers who were not keen on knowing their status had varied reasons as seen in the table below:

Table 4.5: Reasons for not Establishing HIV Status (n=13)

| Reason for Not Testing | General Teachers | |
|---------------------------|------------------|--------------|
| | Frequency | Percent |
| Faithful to Spouse/ trust | 6 | 46.2 |
| Staunch Christian/ trust | 4 | 30.7 |
| Fear of the unknown | 3 | 23.1 |
| Total | 13 | 100.0 |

Source: Field data

From the table above, more than half of the general teachers 6 (46.2%) reported that they were faithful to their spouses and trusted them. Over one-quarter 4 (30.7%) reported to be staunch Christians and similarly trusted their spouses. Therefore infidelity and careless living for them was out of question and they did not see the need to. However, 3 (23.1%) reported that they feared the aftermath of testing and would be better of not knowing. This, however, did not affect the sample because the researcher was only keen on understanding the general teachers feeding habits, compared with that of the known and disclosed HIV+ teachers.

4.1.3 Distribution of the Respondents by Age

The age of the respondents sampled was measured at an interval scale of 10 and categorized into four, namely the 20s, 30s, 40s and 50s age bracket. The 20s ranged between 20-29, 30s between 30-39, 40s refers to the 40-49 age bracket and 50s, those between 50-59 years. This is to establish the age range of teachers and the age group most affected by the disease.

Table 4.6: Respondents' Age Distribution

| Age | General Teachers | | HIV+ Teachers | | Totals | |
|--------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| 20s | 4 | 12.5 | 7 | 22.6 | 11 | 17.5 |
| 30s | 18 | 56.3 | 16 | 51.6 | 34 | 54.0 |
| 40s | 9 | 28.1 | 7 | 22.6 | 16 | 25.4 |
| 50s | 1 | 3.1 | 1 | 3.2 | 2 | 3.2 |
| Total | 32 | 100.0 | 31 | 100.0 | 63 | 100.0 |

Source: Field Data

The study captured the views of respondents who were between the ages of 22 to 52 years hence reflecting a range of 30. The 30s age bracket was the modal class in both samples with the general teachers (n=32) recording 18 (56.3%) and the HIV+ cohort (n=31) having 16 (51.6%) respondents. This means that it was the worst hit age group having more than half of the total HIV+ teachers (n=31). The 20s and 40s age group had 7 (22.6%) each for HIV+ cohort and 4 (12.5%) and 9 (28.1%) for general teachers cohort, respectively. We can deduce that a majority of teachers in schools fall between the 20s and 40s age-bracket, a period when most professionals are well grounded in their careers, are mentally alert, physically strong to impart knowledge and mould the youth who can reap optimum benefits from them. From this table it is arguably the trend and a confirmation of the literature review that posits, teachers in their most productive years (prime) are most affected. This underpins the necessity for stringent measures to curb the devastating effects of HIV that are spelling doom for the country's education sector.

The researcher also sought to establish if the age of respondents was a motivating factor in influencing their desire to know their HIV status. The age interval scale used earlier was

utilized. Only general teachers (n=32) were analyzed because all the HIV+ teachers knew their status irrespective of age. This is indicated below:

Table 4.7: General Teachers Age versus Establishing HIV Status

| Age | Cared to Know Status | | Did Not Care to Know | |
|--------------|----------------------|--------------|----------------------|--------------|
| | Frequency | Percent | Frequency | Percent |
| 20s | 2 | 10.5 | 2 | 15.4 |
| 30s | 11 | 57.9 | 7 | 53.8 |
| 40s | 5 | 26.3 | 4 | 30.8 |
| 50s | 1 | 5.3 | 0 | 0 |
| Total | 19 | 100.0 | 13 | 100.0 |

Source: Field Data

From the above table, all the age groups were keen on knowing their status however, over half of the 30s age group recorded the highest frequency of 11 (57.9%). The most interesting finding on the age analysis is that teachers in the 30s record the highest frequencies in all the areas under study. They also recorded high frequencies of those who did not care to know their status. If serious interventions were directed to this age group that seems receptive and makes up the majority of teachers, probably a break-through would be realized.

4.1.4 Respondents' Level of Education.

The level of education of the respondents and a study of their feeding habits in regard to their sero-positive status was conducted.

Table 4.8: Highest level of Education Attained

| Level of education | General Teachers | | HIV+ Teachers | | Totals | |
|-----------------------|------------------|-------------|---------------|-------------|-----------|-------------|
| | Frequency | % | Frequency | % | Frequency | % |
| Ordinary Diploma | 6 | 18.8 | 15 | 48.4 | 21 | 33.3 |
| Bachelors Degree | 20 | 62.5 | 11 | 35.5 | 31 | 49.2 |
| Post graduate Diploma | 3 | 9.4 | 5 | 16.1 | 8 | 12 |
| Post-graduate Degree | 3 | 9.4 | 0 | 0 | 3 | 4.8 |
| Total | 32 | 100. | 31 | 100. | 63 | 100. |

Source: Field Data

Table 4.8 above shows that the modal class for general teachers (n=32) is the bachelors degree with 20 (62.5%) teachers more than half of the sample. For the HIV+ teachers (n=31), ordinary diploma scooped nearly half of the respondents 15 (48.4%). This is an indication that teachers are quite qualified in their areas of specialization and are well endowed in the required skills. Only 6 (18.8%) of the general teachers sampled held an ordinary diploma. The decline in the diploma holders in secondary schools can be attributed to the current TSC policy of redeploying diploma holders from secondary to primary schools. The educational standards and sero-positivity were not co-variables because from this trend, it is arguable that educational qualifications do not automatically lessen moral decadence. No wonder the pandemic is being felt in all sectors of our economy, even amongst the most learned who have a duty to better the living conditions by virtue of their exposure and knowledge. This underpins the need to improve the health status in order to lessen the brain drain the disease is causing.

An investigation into whether the level of education influenced what the respondents ate was done by cross tabulating the level of education and their favourite meals. The favourite meals were categorized into modern, indigenous, or both (combination of modern and indigenous). This is critical in determining whether the education level has a bearing on what teachers eat as illustrated below:

Table 4.9: Linkage between Level of Education and Favourite Meals

| Highest level of Education | | General Teachers | | | | HIV + Teachers | | | |
|--------------------------------|-------|------------------|------------|------|-------|----------------|------------|------|-------|
| | | Modern | Indigenous | Both | Total | Modern | Indigenous | Both | Total |
| Ordinary Diploma | Count | 3 | 0 | 3 | 6 | 8 | 2 | 5 | 15 |
| | % | 50.0 | | 50.0 | 100.0 | 53.3 | 13.3 | 33.3 | 100.0 |
| Bachelors Degree | Count | 9 | 7 | 4 | 20 | 3 | 5 | 3 | 11 |
| | % | 45.0 | 35.0 | 20.0 | 100.0 | 27.3 | 45.5 | 27.3 | 100.0 |
| Post-Graduate Diploma | Count | 2 | 1 | 0 | 3 | 2 | 1 | 2 | 5 |
| | % | 66.7 | 33.3 | 0 | 100.0 | 40.0 | 20.0 | 40.0 | 100.0 |
| Post-Graduate Degree (Masters) | Count | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 |
| | % | 33.3 | 33.3 | 33.3 | 100.0 | 0 | 0 | 0 | 0 |
| Total | Count | 15 | 9 | 8 | 32 | 13 | 8 | 10 | 31 |
| | % | 46.9 | 28.1 | 25.4 | 100.0 | 41.9 | 25.8 | 32.3 | 100.0 |

Source: Field Data

Table 4.9 shows that modern foods are preferred by nearly half of the two cohorts with 15 (46.9%) general teachers and 13 (41.9%) HIV+ teachers. Diploma and post-graduate diploma holders had higher consumption of modern foods for the two samples. For the general teachers it amounted to half 3 (50%) ordinary diploma and more than half 2 (66.7%) for post-graduate diploma. There were 8 (53.3%) diploma and 2 (40%) post-graduate diploma respondents in the HIV+ sample. Not a single diploma holder ate an indigenous 'only' meal. The bachelors' degree holders seem to appreciate IFPs more than the other groups in the two samples. There is also a preference of both samples combining their meals of the IFP and modern foods. This is a good sign that needs to be exploited by imparting knowledge on the importance of IFPs.

4.1.5 Respondents' Marital Status Distribution

The marital status distribution of the respondents is critical in establishing whether this influences their feeding habits. Table 4.10 below shows this:

Table 4.10: Respondents' Marital Status

| Marital Status | General Teachers | | HIV+ Teachers | | Totals | |
|--------------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| Single | 6 | 18.8 | 7 | 22.6 | 13 | 20.6 |
| Married | 25 | 78.1 | 10 | 32.3 | 35 | 55.6 |
| Divorced/separated | 0 | 0 | 6 | 19.4 | 6 | 9.5 |
| Widowed | 1 | 3.1 | 8 | 25.8 | 9 | 14.3 |
| Total | 32 | 100.0 | 31 | 100.0 | 63 | 100.0 |

Source: Field Data

From the table above, the married group represents the modal class for both study cohorts with more than three-quarters of the general teachers 25 (78.1%) and over a quarter 10 (32.3%) HIV+ teachers. In the HIV+ group, divorce and separation soared recording 6 (19.4%) with also a significant number of widowed respondents being observed with 8 (25.8%) as compared to only 1 (3.1%) in the general teachers. This bears a testimony to the wave of destruction that the HIV virus leaves by destabilizing the family unit through divorce, separation and widowhood, as has been observed in the HIV+ sample.

An exploration of the marital status and their feeding characteristics was done. This involved a cross tabulation of marital status and the respondents favourite meal by sample. From their responses the favourite meals were analyzed and categorized into three: modern, indigenous and a combination of the modern and indigenous that was coded as 'both'.

Table 4.11: Respondents Marital Status by Feeding Habits

| Marital Status | | General Teachers | | | HIV+ Teachers | | |
|------------------------|-------|------------------|------------|------|---------------|------------|------|
| | | Modern | Indigenous | Both | Modern | Indigenous | Both |
| Single | Count | 3 | 1 | 2 | 6 | 0 | 1 |
| | % | 50.0 | 16.7 | 33.3 | 85.7 | 0 | 14.3 |
| Married | Count | 11 | 8 | 6 | 3 | 4 | 3 |
| | % | 44.0 | 32.0 | 24.0 | 30.0 | 40.0 | 30.0 |
| Widowed | Count | 1 | 0 | 0 | 1 | 2 | 5 |
| | % | 100.0 | 0 | 0 | 12.5 | 25.0 | 62.5 |
| Divorced/ separated | 0 | 0 | 0 | 0 | 3 | 2 | 1 |
| | 0 | 0 | 0 | 0 | 50.0 | 33.3 | 16.7 |
| Total | Count | 15 | 9 | 8 | 13 | 8 | 10 |
| | % | 46.9 | 28.1 | 25.0 | 41.9 | 25.8 | 32.3 |

Source: Field Data

The table above strongly indicates the respondents' preference for modern foods with intake range of 100%- 44%= 56% for general teachers and 85.7%- 12.5%= 73.2% for HIV+ cohort. This current trend of modern foods preference is an indicator of lost diversity as was observed in the literature review necessitating nutritional counselling. There was little IFPs consumption by the single teachers in the sample with 1 (16.7%) for general teachers and none in the HIV+ sample. There was however, more appreciation and increased consumption of IFPs by the HIV+ teachers. The married respondents ate more indigenous 4 (40%) whereas the widowed had the highest consumption of combined indigenous and modern foods 5 (62.5%). This is a better scenario that needs to be encouraged. From the findings, it is arguably the trend that consumption of IFPs increases when one realizes that they are ailing because the HIV+ respondents claimed to have made changes to their diets after discovering their sero-positive status.

4.2 Type of Grain Consumed

With increased mechanization being a feature of the modern society, it was necessary to establish whether refined grains were preferred to natural grains. This is an indicator of how diverse their meals are. Table 4.12 explores this:

Table 4.12: Type of Grain Consumed

| Grain Type | General Teachers | | HIV+ Teachers | | Totals | |
|----------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| Refined | 24 | 75.0 | 6 | 19.4 | 30 | 47.6 |
| Natural/ Whole | 7 | 21.9 | 25 | 80.6 | 32 | 50.8 |
| No Response | 1 | 3.1 | 0 | 0 | 1 | 1.6 |
| Total | 32 | 100.0 | 31 | 100.0 | 63 | 100.0 |

Source: Field Data

Natural, whole grain consumption was highly evidenced in the HIV+ sample with more than three quarters 25 (80.6%) teachers as compared to only 7 (21.9%) general teachers. On the other hand, refined grain consumption was very high in the general teachers group with three quarters 24 (75%) as compared to only 6 (19.4%) HIV+ teachers. There is little diversity in the general teachers meals because refined grains as was noted in the literature review are robbed of fibre and nutrient during the processing stage. The notable grains cited by the teachers are white rice, white ugali, white chapatti and white bread, all of which are highly polished. The teachers cited several obstacles that impede the effective utilization of natural grains; that they are not appealing and are not as tasty as the refined grains. There was however, a general consensus that the natural grains are very nutritious, have a good effect on health, improve the body's immunity to diseases and diversify diets.

From these findings it is evident that the HIV+ cohort respondents are eating more healthy and diverse diets than their counterparts. Due to the effects of the disease combined with unaffordable ARVs, this group is using food for mitigating the effects. However, nutritional care is limited by socioeconomic factors (financial deprivation) as was reported by the control group who claimed that finance was the major obstacle impeding the effective utilization of IFPs. We can deduce from this trend that people are careless about their eating habits until

illness wakes them up from their comfort zone as is seen in the IFPs intake. While this is good, it is also important to instill the same discipline in all people, irrespective of status, to promote good health. The old adage, 'prevention is better than cure', cannot be more relevant.

4.3 Usage of Supplements

A study of supplements usage was necessary to find out what the teachers did to supplement for the deficient nutrients. Table 4.13 explores this:

Table 4.13: Usage of Supplements by the Sample

| Gender | | General Teachers | | | HIV+ Teachers | | | Total |
|--------|-------|------------------|-------|-------|---------------|-------|-------|-------|
| | | Use | Don't | Total | Use | Don't | Total | |
| Male | Count | 0 | 5 | 5 | 7 | 6 | 13 | 18 |
| | % | 0 | 100.0 | 100.0 | 53.8 | 46.2 | 100.0 | 28.6 |
| Female | Count | 6 | 21 | 27 | 13 | 5 | 18 | 45 |
| | % | 22.2 | 77.8 | 100.0 | 72.2 | 27.8 | 100.0 | 71.4 |
| Total | Count | 6 | 26 | 32 | 20 | 11 | 31 | 63 |
| | % | 18.8 | 81.3 | 100.0 | 64.5 | 35.5 | 100.0 | 100.0 |

Source: Field Data

From the table above, supplement usage was high among the HIV+ cohort. More than half 20 (64.5%) of HIV+ participants reported using a vitamin or mineral supplement with the female-male ratio at 13:7. Supplement usage among the general teachers cohort was minimal by 6 (22.2%) all female. Multivitamin use is associated with a decrease in risk of progression to AIDS after a 6year follow-up period as observed in the literature review. This can explain the high usage of supplements in the HIV+ cohort because teachers with HIV infection may be at increased risk due to the energy and micronutrient demands necessary to compensate for infection as well as support growth and development. The high usage of supplements by the female respondents can be attributed to childbearing deficiencies in addition to lifestyles and eating habits that lead to poor quality diets. Supplements are expensive and short-term interventions and only dietary improvement would be a sustainable intervention.

Supplements Commonly Used by HIV+ respondents

Only 20 HIV+ respondents reported to be using supplements, hence, n=20. Table 4.14 below shows this:

Table 4.14: Type of Supplements Used by the HIV+ cohort

| Supplements Used | Male | | Female | | Totals | |
|-------------------|-----------|--------------|-----------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| GNLD | 0 | 0 | 4 | 30.7 | 4 | 20.0 |
| Health Aid | 1 | 14.3 | 1 | 7.7 | 2 | 10.0 |
| Modu Health | 2 | 28.6 | 1 | 7.7 | 3 | 15.0 |
| Genesis | 0 | 0 | 1 | 7.7 | 1 | 5.0 |
| VUISID | 1 | 14.3 | 1 | 7.7 | 2 | 10.0 |
| Traditional Herbs | 0 | 0 | 3 | 23.1 | 3 | 15.0 |
| Iron | 3 | 42.8 | 2 | 15.4 | 5 | 25.0 |
| Total | 7 | 100.0 | 13 | 100.0 | 20 | 100.0 |

Source: Field Data

From the table, of the HIV+ teachers (n=31), approximately one-quarter 5 (25%) reported using Iron supplements with a male-female ratio of 3: 2 at (42.8%) male and (15.4%) female. This could be due to the association of iron intake during early infection and CD4 (T cells) survival as was observed in the literature review. GNLD products usage followed with 4 (20%) all female. The high usage of supplements by the HIV+ sample confirms the rampant malnutrition due to deficiencies caused by the HIV virus as was observed in the literature review. All the supplements used by the respondents were a combination therapy and are enriched in micronutrients that supply extra vitamins and minerals. The researcher discovered that Modu Health Management makes flour mixtures using indigenous food plant materials of various communities, an indication that the IFPs are an untapped resource.

4.4 Drugs usage by HIV+ Respondents

Table 4.15 samples some of the commonly used drugs by the HIV+ respondents since they were all on antiretroviral therapy.

Table 4.15: Drugs Used by HIV+ Respondents

| Medication | Frequency | Percent |
|-----------------------------|-----------|--------------|
| Triomune 30 | 6 | 19.4 |
| Triomune 40 | 10 | 32.3 |
| Zerit/virex/ stocrine | 1 | 3.2 |
| Combivine/ Stockrine | 3 | 9.6 |
| Cosmo / Seprine | 1 | 3.2 |
| Arv/epivir/ Zerit/ varamune | 4 | 12.9 |
| Herbal Medicine | 6 | 19.4 |
| Total | 31 | 100.0 |

Source: Field Data

Table 4.15 shows that, over one-quarter 10 (32.3%) teachers use Triomune 40 while 6 (19.4%) use Triomune 30 and herbal medicine. Triomune 40 and 30 it was noted have basically the same ingredients, with the difference being Triomune 30 is prescribed for people below the weight of 59 Kg whereas Triomune 40 is for those above 60 Kg. The high usage of Triomune 40 and 30 is cost-related because they were the cheapest of the ARVs that the teachers were using selling at Kshs.2500 and Kshs.2435 respectively at Metropolitan hospital. They are a combination therapy of generic drugs from India containing Lamivudine, Stavudine and Nevirapine tablets. The price of the original drug from Germany triples that of Triomune as the patient would need to buy the tablets separately at the price of; Viramune Kshs.3336, Lamivudine Kshs.2690 and Stavudine at Kshs.368 all totalling to Kshs.6200. This excludes consultation fees, as these drugs are not bought over the counter. These prices are unaffordable as reported by the teachers' due to their meager earnings notwithstanding other responsibilities bestowed on them. The use of IFP can be a sustainable intervention.

Presence of Toxicity when Drugs are Used Over a Period

An investigation on whether there were notable problems resulting from taking the drugs over a period of time by the HIV+ respondents was done. Table 4.16 shows this:

Table 4.16: HIV+ Samples' Response on Presence of Drug Toxicity

| Problems | Male | | Female | | Totals | |
|---------------|-----------|--------------|-----------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| Yes | 8 | 61.5 | 6 | 33.3 | 14 | 45.2 |
| No | 4 | 30.8 | 10 | 55.6 | 14 | 45.2 |
| No response | 1 | 7.7 | 2 | 11.1 | 3 | 9.6 |
| Totals | 13 | 100.0 | 18 | 100.0 | 31 | 100.0 |

Source: Field Data

The table above shows a bimodal distribution where two modes are generated. Presence of toxicity is evidenced from the respondents with a male-female ratio of 8:6 at 61.5% and 33.3% respectively. The no response came from the teachers who had reported to having used the drug for less than 6 months and had therefore not experienced significant problems. Table 4.17 below shows some of the problems the HIV+ cohort (n=14) experienced due to drug usage:

Table 4.17: Problems arising from Drug Usage by the HIV+ Cohort

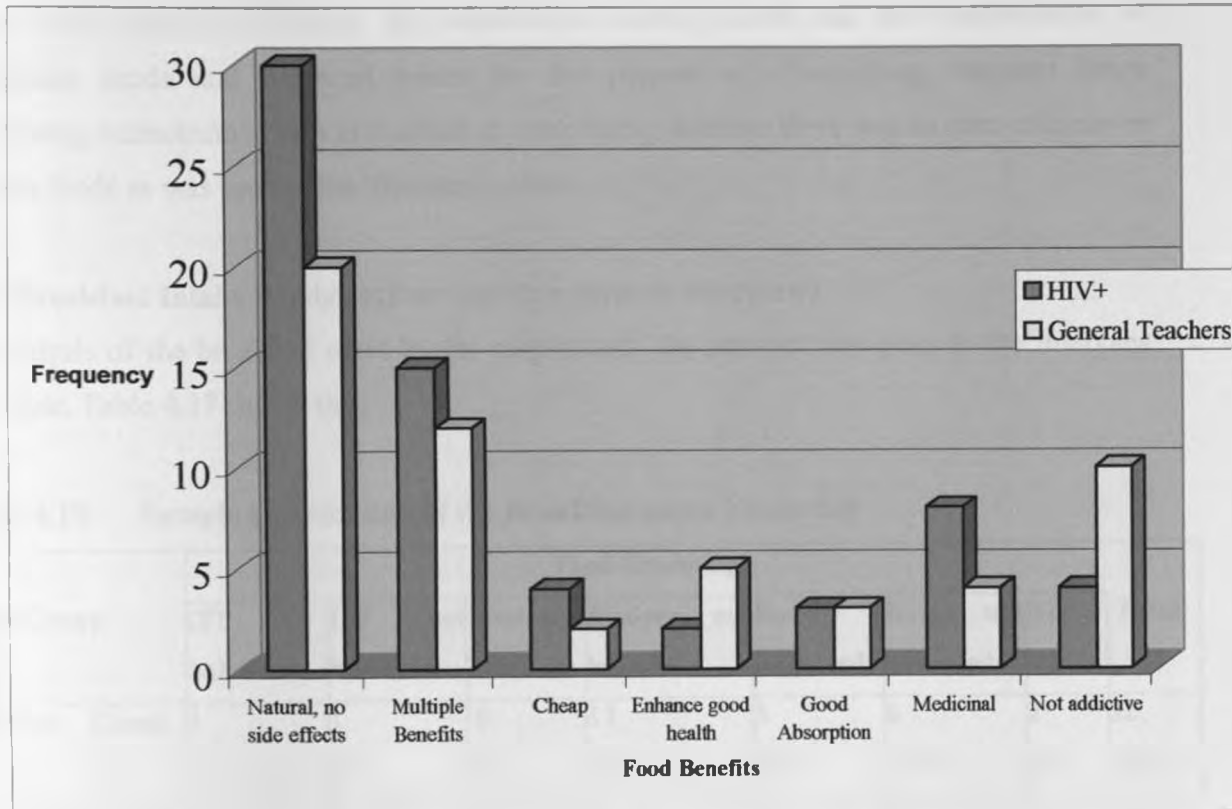
| Problems Experienced | HIV+ Sample | |
|---|-------------|--------------|
| | Frequency | Percent |
| Constipation and diarrhoea | 1 | 7.1 |
| Nausea | 2 | 14.4 |
| Lack of appetite | 1 | 7.1 |
| Irritability | 1 | 7.1 |
| Drug resistance /need for superior dose | 2 | 14.4 |
| Abnormal darkening | 2 | 14.4 |
| Muscle cramps | 1 | 7.1 |
| Abnormal fat distribution | 1 | 7.1 |
| Profuse bleeding | 1 | 7.1 |
| Allergies | 1 | 7.1 |
| Weakness and tiredness | 1 | 7.1 |
| Total | 14 | 100.0 |

Source: Field Data

From the table above, a myriad of problems are documented. This confirms the toxicity established in the literature review because medicine unlike food is not natural but synthetic chemicals. Further more most of the drugs the respondents were taking were generics because the originals are very expensive and out of the reach of teachers due to their meager salaries as

mentioned earlier. The respondents preferred a food-based approach to mitigating the disease as opposed to medicine. High frequencies were noted in both groups of HIV+ (n=29) and general teachers (n= 19) where food is perceived as natural, with no side effects and could be sustainable. According to the respondents food has many advantages over drugs. The figure below demonstrates this:

Figure II: Advantages of Food over Drugs



Source: Field Data

4.5 Studying the Feeding Habits of Respondents

Further data analysis is captured in this chapter. Teachers' responses to open ended questions during the exploration of the study's objectives were analyzed and summarized. The collected data was divided into several sub-headings; feeding habits, nutritious and medicinal IFPs, level of awareness of changing nutritional requirements and elements of dietary counselling that need to be promoted. In this chapter, the discussion that follows compares three groups of people; the experimental (the HIV+ and using IFPs), the control (the HIV+ using medication alone) and the general teachers.

4.5.1 Classification of Respondents in terms of what they Eat

The dietary intake of respondents was analyzed by a recall of the foods and drinks the teachers had eaten (24-hour recall) to check whether or not balanced meals were prioritized. Repeated 24-hour recalls or diet records are the most appropriate data collection tools because repeated daily intake information permits more reliable estimation of usual nutrient intake distribution in groups. The foods were categorized into modern and indigenous (IFP) or both (combination of modern and IFP). The categories were further sub-divided into balanced and not balanced meals. This aimed at studying the respondents feeding habits and their appreciation of indigenous foods and balanced meals for the purpose of diversifying nutrients hence eliminating malnutrition. This also aimed at establishing whether there was an over-reliance on modern foods as was seen in the literature review.

4.5.2 Breakfast Intake Analysis (Previous day prior to interview)

An analysis of the breakfast eaten by the respondents the previous day prior to the interview was done. Table 4.17 shows this:

Table 4.18: Sample Distribution of the Breakfast eaten Yesterday

| Sample Group | | Food Grouping | | | | | | | Total |
|------------------|-------|-----------------|---------------------|-------------------|-----------------------|------------------|----------------------|------|-------|
| | | IFP balanced | IFP not balanced | Modern balance | Modern not balance | Both balanced | Both not balanced | None | |
| General Teachers | Count | 1 | 1 | 0 | 17 | 5 | 6 | 2 | 32 |
| | % | 3.1 | 3.1 | 0 | 53.1 | 15.6 | 18.8 | 6.3 | 100.0 |
| Experimental | Count | 4 | 2 | 3 | 6 | 3 | 3 | 0 | 21 |
| | % | 19.0 | 9.5 | 14.3 | 28.6 | 14.3 | 14.3 | 0 | 100.0 |
| Control | Count | 0 | 1 | 2 | 5 | 1 | 1 | 0 | 10 |
| | % | 0 | 10.0 | 20.0 | 50.0 | 10.0 | 10.0 | 0 | 100.0 |
| Total | Count | 5 | 4 | 5 | 28 | 9 | 10 | 2 | 63 |
| | % | 8.0 | 6.3 | 8.0 | 44.4 | 14.2 | 15.9 | 3.2 | 100.0 |

Source: Field Data

The results from the above table show that modern not balanced meals, is a favorite for the sample respondents nearly half 28 (44.4%). More than half 17 (53.1%) of the general teachers, half 5 (50%) the control and over one quarter 6 (28.6%) of the experimental groups had

unbalanced modern foods. Indigenous foods intake was mostly observed in the experimental group in the balanced form with 4 (19%), and 2 (9.5%) having eaten IFPs but not in the balanced form. Very little of indigenous foods intake was observed in the general teachers with only 2 (6.2%) respondents. However, findings further show that there is a preference for combining 'both' IFP and modern foods in the balanced and not balanced form of meal by the experimental sample with 3 (14.3%) each. A similar trend was seen in the general teachers where 5 (15.6%) ate balanced IFPs and 6 (18.8%) ate them but not balanced. This supports the findings from the literature review that IFPs were fast declining.

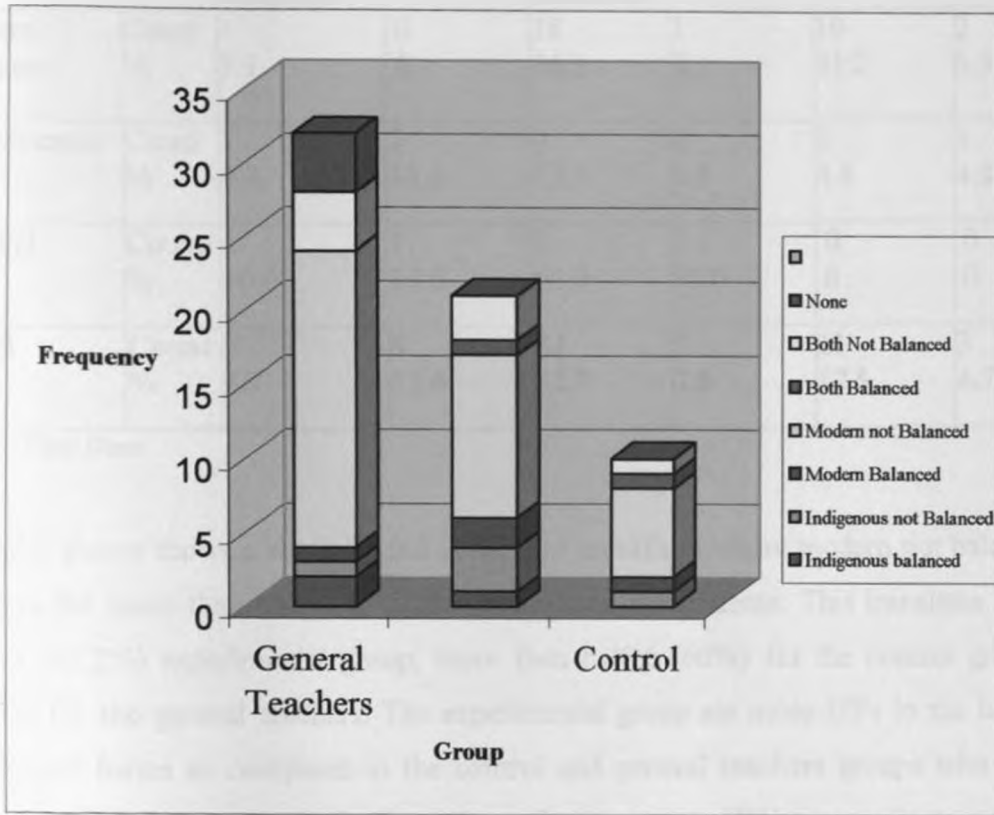
4.5.3 Today's Breakfast Intake Analysis

An analysis of breakfast eaten today (day of the interview) was done. The aim of comparing the two breakfasts was to establish whether there is any uniform or typical eating pattern among the respondents. This is because different days of the week were captured for all the respondents. Therefore, bias that would have been introduced if the same day of the week for all the respondents were chosen was controlled.

From the findings a typical eating pattern similar to the previous day's breakfast was seen, with the modern not balanced meals having the highest frequencies and remarkably higher than the previous days breakfast for all samples. The three groups recorded more than half of their respondents consuming modern foods with general teachers having the highest frequency of 20 (62.5%), 6 (60%) for the control and 11 (52.4%) for the experimental group. There was very minimal intake of indigenous meals by the sample. A sum total of the balanced and not balanced IFPs, showed the experimental group having the highest number with 4 (19.1%), the general teachers had 3 (9.4%) and the control had 1 (10%). This seems to be the trend so far where modern not balanced meals rank high.

Figure (III) shows this for clarity:

Figure III: Sample Distribution of Today's Breakfast Intake



Source: Field Data

4.5.4 Lunch Intake Analysis

An analysis of lunches eaten was done to compare for any significant relationships or possible trend. Table 4.19 below shows this:

Table 4.19: Sample Distribution of Lunch intake

| Sample Group | | Food Grouping | | | | | | Total |
|------------------|-------|-------------------------|-----------------|---------------------|---------------|-------------------|------|-------|
| | | Indigenous not balanced | Modern balanced | Modern not balanced | Both balanced | Both not balanced | None | |
| General Teachers | Count | 1 | 0 | 18 | 1 | 10 | 2 | 32 |
| | % | 3.1 | 0 | 56.3 | 3.1 | 31.2 | 6.3 | 100.0 |
| Experimental | Count | 1 | 7 | 9 | 2 | 1 | 1 | 21 |
| | % | 4.8 | 33.2 | 42.9 | 9.5 | 4.8 | 4.8 | 100.0 |
| Control | Count | 1 | 1 | 6 | 2 | 0 | 0 | 10 |
| | % | 10.0 | 10.0 | 60.0 | 20.0 | 0 | 0 | 100.0 |
| Total | Count | 3 | 8 | 33 | 5 | 11 | 3 | 63 |
| | % | 4.7 | 12.6 | 52.7 | 7.8 | 17.5 | 4.7 | 100.0 |

Source: Field Data

The table above shows a similar trend as the two breakfasts where modern not balanced meals accounts for more than half 33 (52.7%) of the total respondents. This translates to over one third 9 (42.2%) experimental group, more than half 6 (60%) for the control group and 18 (56.3%) for the general teachers. The experimental group ate more IFPs in the balanced and unbalanced forms as compared to the control and general teachers groups who both had 1 (10%) and 1 (3.1%) respectively. From these findings, more HIV+ respondents ate better than the general teachers. At least 2 (6.5%) HIV+ respondents ate balanced IFPs as compared to none in the general teachers category. Even when modern foods are eaten, it was observed that only 8 (25.8%) of the experimental and control group respondents ate them balanced and none in the general teachers category.

4.5.5 Dinner intake Analysis

An analysis of dinner intake was done. Table 4.20 and figure IV below shows this:

Table 4.20: Sample Respondents Dinner intake Distribution

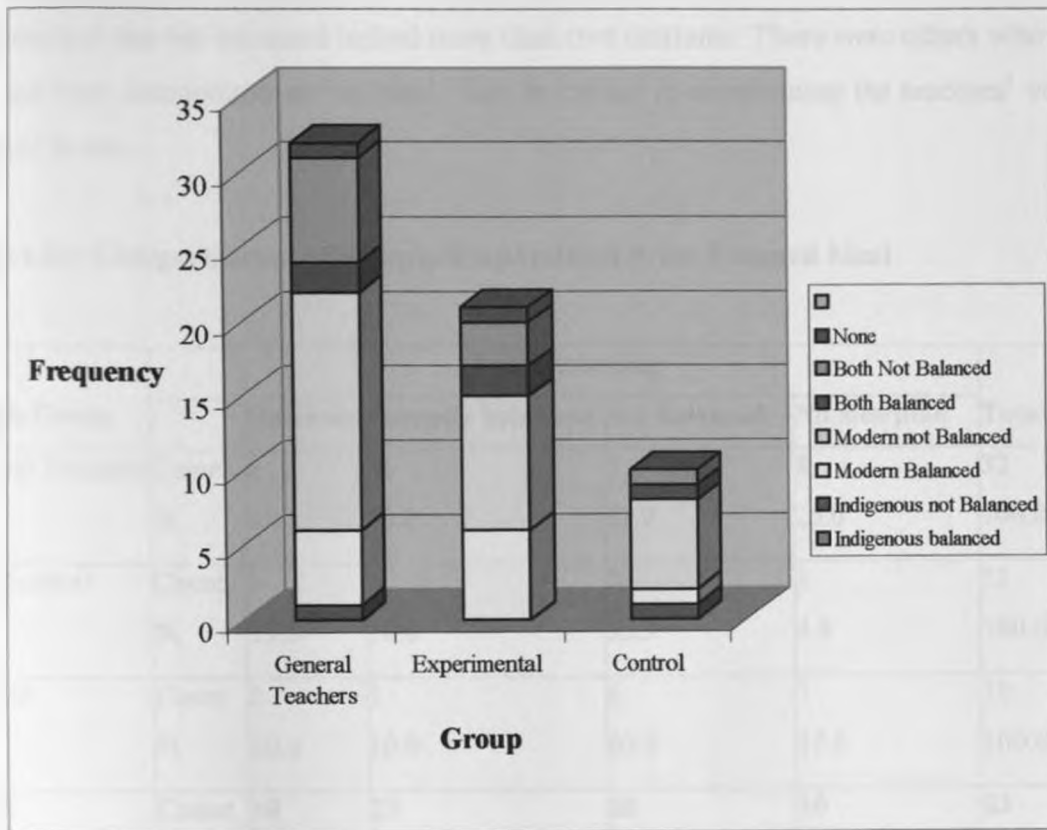
| Sample Group | | Food Grouping | | | | | None | Total |
|------------------|-------|-------------------------|-----------------|---------------------|---------------|-------------------|------|-------|
| | | Indigenous not balanced | Modern balanced | Modern not balanced | Both balanced | Both not balanced | | |
| General Teachers | Count | 1 | 5 | 16 | 2 | 7 | 1 | 32 |
| | % | 3.1 | 15.6 | 50.0 | 6.3 | 21.9 | 3.1 | 100.0 |
| Experimental | Count | 0 | 6 | 9 | 2 | 3 | 1 | 21 |
| | % | 0 | 28.6 | 42.8 | 9.5 | 14.3 | 4.8 | 100.0 |
| Control | Count | 1 | 1 | 6 | 1 | 1 | 0 | 10 |
| | % | 10.0 | 10.0 | 60.0 | 10.0 | 10.0 | 0 | 100.0 |
| Total | Count | 2 | 12 | 31 | 5 | 11 | 2 | 63 |
| | % | 3.2 | 19.0 | 49.2 | 7.9 | 17.5 | 3.2 | 100.0 |

Source: Field data

The table shows that, modern not balanced meal was the modal class for all the groups with nearly half 31 (49.2%) total respondents. Out of which 16 (50%) were general teachers, 9 (42.9%) experimental group and more than half 6 (60%) in the control group. Very interestingly is the fact that even for the experimental group, the consumption of IFP is high in the combined form, an indication of diversity of nutrients. Diversity has to do with combining various food types in order to reap maximum benefits. The table above confirms the same evidence as established for two breakfasts and lunch, that modern not balanced meals are eaten more as compared to IFPs.

Figure IV below shows a graphical representation to show the magnitude

Figure IV: Sample Distribution of Dinner Intake



Source: Field Data

A common trend in all the meals analyzed is that modern, not balanced, meals are the favourite of the respondents. In as much as the experimental group eats IFPs, they too have a high consumption of the modern not balanced meals. From the findings it was noted that the experimental group consciously and purposively made changes to their diets of IFP and natural grains on discovering their status, a clear indication that IFPs have some mitigating effect on the disease. The findings however are an indication of an ingrained culture where modernization is slowly replacing the Kenyan cuisine, hence loss of diversity.

4.5.6 Prior Planning of Meals

The researcher tried to establish whether nutritious balanced meals are given preference by the respondents. This was done by analyzing their pre-planned meals which were categorized into four groups: balanced, partially balanced, not balanced and no idea. Balanced meals are those

that contained all the nutrients, the partially balanced are those that lacked either a fruit or vegetable and the not balanced lacked more than two nutrients. There were others who did not plan and were categorized as 'no idea'. This is critical in determining the teachers' value for balanced meals.

Table 4.21: Categorization of Sample Respondents Prior Planned Meal

| Sample Group | Food Grouping | | | | Total | |
|------------------|---------------|----------|--------------------|--------------|-------|--------------|
| | | Balanced | Partially balanced | Not balanced | | No idea/plan |
| General Teachers | Count | 1 | 16 | 7 | 8 | 32 |
| | % | 3.1 | 50.0 | 21.9 | 25.0 | 100.0 |
| Experimental | Count | 7 | 6 | 7 | 1 | 21 |
| | % | 33.3 | 28.6 | 33.3 | 4.8 | 100.0 |
| Control | Count | 2 | 1 | 6 | 1 | 10 |
| | % | 20.0 | 10.0 | 60.0 | 10.0 | 100.0 |
| Total | Count | 10 | 23 | 20 | 10 | 63 |
| | % | 15.9 | 36.5 | 31.7 | 15.9 | 100.0 |

Source: Field Data

From the table above, all but 10 (15.9%) respondents had pre-planned for the interview day's dinner. The experimental group had the highest numbers of balanced and partially balanced meals with 7 (33.3%) and 6 (28.6%) respectively as compared to 2 (20%) of the control group and only 1 (3.1%) of the general teachers. Over one quarter 20 (31.7%) of the total respondents had not planned balanced meals with more than half of the control group 6 (60%) leading with the highest frequencies. In comparison to the HIV+ respondents, the general teachers recorded high numbers of those who had no idea of what to prepare with 8 (25%). We can therefore deduce that the experimental group respondents planned their meals better than the other groups. The experimental respondents indicated that they had been sensitized on the importance of good feeding habits in seminars and food fairs and this made them more in control of their lives and subsequently tended to assume a more active role in their overall health management. It was also observed that all the sample respondents had very little varieties of food items to choose from, therefore their meals tended to be repetitive and lacked diversity. The very commonly cited food items were rice, ugali and chapatti in the refined form

and *irio*. The HIV+ cohort particularly the control group is at risk of developing malnutrition due to financial deprivation, lack of optimal treatment for the disease and lack of nutritional guidelines of what foods to eat as is deduced from the above analysis.

4.5.7 Respondents' Favourite Meals

The respondents' favourite meals were classified into modern, indigenous and 'both' (combination of modern and indigenous) meals and analyzed. Table 4.22 shows this:

Table 4.22: Classification of Respondents' Favourite Meals

| Sample group | | Food Grouping | | | Total |
|------------------|-------|---------------|------------|------|-------|
| | | Modern | Indigenous | Both | |
| General Teachers | Count | 15 | 9 | 8 | 32 |
| | % | 46.9 | 28.1 | 25.0 | 100.0 |
| Experimental | Count | 7 | 7 | 7 | 21 |
| | % | 33.3 | 33.3 | 33.3 | 100.0 |
| Control | Count | 6 | 1 | 3 | 10 |
| | % | 60.0 | 10.0 | 30.0 | 100.0 |
| Total | Count | 28 | 17 | 18 | 63 |
| | % | 44.4 | 27.0 | 28.6 | 100.0 |

Source: Field Data

From the table above, the favourite meal among all respondents is the modern type, representing 28 (44.4%) of the total. Of these, there were more than half 6 (60%) in the control group, nearly half 15 (46.9%) in the general teachers and over one quarter 7 (33.3%) in the experimental group. The IFPs intake in the groups was minimal and the experimental group had the highest frequency of 7 (33.3%), 9 (28.1%) for the general teachers and 1 (10%) for the control group. This still strongly supports the earlier evidence that IFPs usage is declining and modern foods have gained popularity over the latter.

4.6 Nutritious and Medicinal IFPs which are Appealing and Appropriate to PLWHAs

From the sample respondents, data were collected on known IFPs that were considered of importance to PLWHAs and as having mitigating effects on the disease. The table below shows this:

Table 4.23: Medicinal IFPs Cited by the Respondents

| IFP | General teachers | | HIV+ Teachers | | Total | |
|--------------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| <i>Mchicha</i> | 1 | 8.3 | 2 | 10.5 | 3 | 9.4 |
| <i>Miroo/mitoo</i> | 1 | 8.3 | 3 | 15.8 | 4 | 12.6 |
| Stinging nettle | 4 | 33.4 | 5 | 21.1 | 9 | 28.2 |
| <i>Managu</i> | 0 | 0 | 2 | 10.5 | 2 | 6.2 |
| Aloe-vera | 2 | 16.7 | 2 | 10.5 | 4 | 12.6 |
| Garlic | 1 | 8.3 | 1 | 5.3 | 2 | 6.2 |
| Modu-Health | 0 | 0 | 2 | 10.5 | 2 | 6.2 |
| <i>Sagaa</i> | 0 | 0 | 2 | 10.5 | 2 | 6.2 |
| <i>Kunde</i> | 0 | 0 | 1 | 5.3 | 1 | 3.1 |
| <i>Mwarobaine</i> | 1 | 8.3 | 0 | 0 | 1 | 3.1 |
| Water melon | 2 | 16.7 | 0 | 0 | 2 | 6.2 |
| Total | 12 | 100.0 | 20 | 100.0 | 32 | 100.0 |

Source: Field Data

Table 4.23 above is evidence that the sample respondents are not well grounded or knowledgeable on the area of medicinal IFPs. Only 12 of the general teachers cohort and 20 of the HIV+ respondents had an idea of medicinal IFPs. At least over one quarter 9 (28.2%) cited the stinging nettle, *mitoo/miroo* and Aloe-vera each had 4 (12.6%) respondents. This confirms the literature reviews findings that knowledge of IFPs was slowly disintegrating. If these opinion shapers in the society are not well informed, then these are indicators of a bad trend that will have serious repercussions in future. Another unfortunate observation is that the teachers' knowledge on IFPs was not factual, but based on hearsay as they claimed that they

ate the IFPs because they thought that they were useful. Factual and proper knowledge of IFPs importance is lacking as was noted and reliance on hearsay is wrong therefore information needs to be disseminated about the usefulness of IFPs. This argues the case for dietary counselling on IFPs and diet diversification so that people feed from an informed source and not from hearsay to ensure quality health.

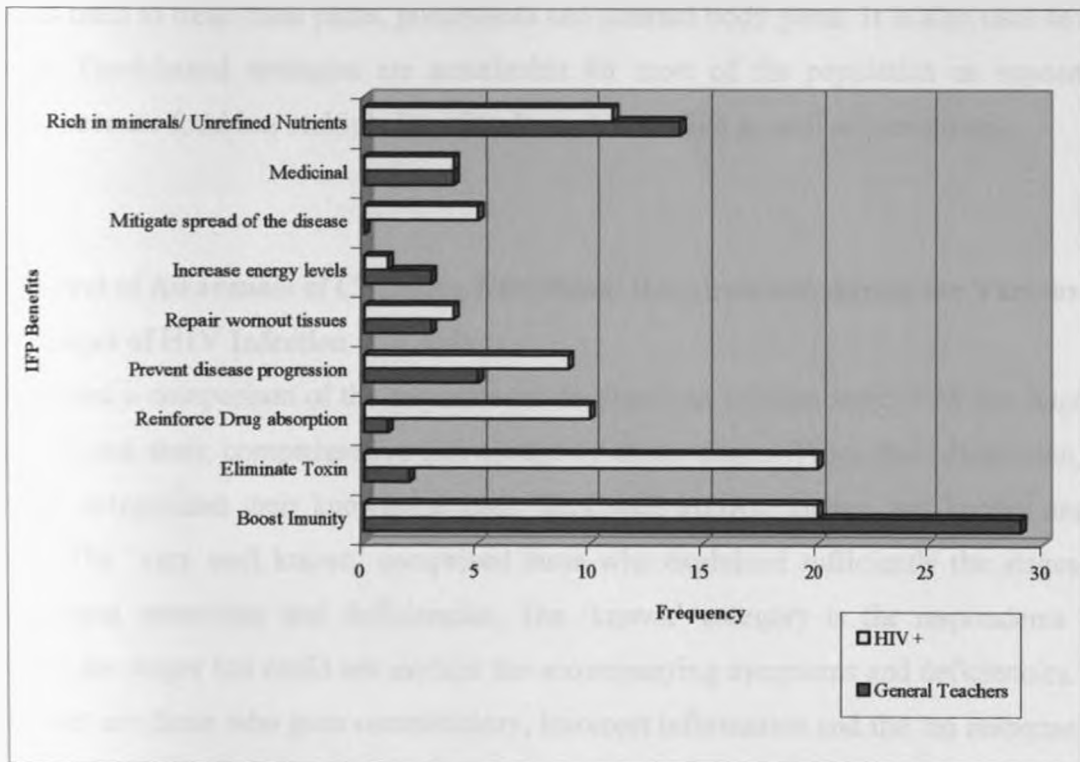
The key informants supplemented the data from the respondents and all except one 1 (8.3%) felt that IFPs had a critical role in the mitigation of the HIV virus. African leafy vegetables especially crotalaria, cowpeas, garlic, spider plant and wild fruits were commonly cited. Stinging nettle was cited as being a renown blood cleanser and anti bleeding agent. The aloe Vera plant is useful in increasing appetite, cleansing the colon and bowel movement therefore improving digestion. It is a skin and body cleanser, the reason why it is a base for many skin lotions therefore treats skin conditions. Garlic, ginger, fermented foods, carrot juice and beetroots were reported to cleanse the blood and increase the blood cell division hence increasing the body's immunity. Foods rich in zinc and selenium such as onion, garlic, tomatoes and wheat germ were reported to assist in curbing diarrhoea. *Mitoo* is known to be medicinal, Paw-paw is known to check constipation and hyperacidity and it enhances the heartbeat and blood coagulation. The paw-paw seeds eliminate worms and have enzymes that are good constituent remedies for cancer. *Sagaa*, *managu*, *sageti*, brazil nuts and guavas are known to reduce skin infections due to their high vitamin C content. Sour milk commonly known as *mala* was reported to boost the immune system. However the key informants were of the opinion that the IFPs do not treat the disease but help in boosting the body immunity thus lessening the effects of the disease.

Apart from the ethno-botanists, the other key informants knowledge of IFPs was not clearly focused a sign of not being well versed with tangible information on exactly what is best for combating the opportunistic infections brought about by the HIV virus. This is a clear indication that more needs to be done to reverse this trend. Information needs to be availed and the respondents made to know its usefulness because that is the foundation for behavioural change. In this study the experimental participants who had received nutrition education were more in control of their lives and tended to assume a more active role in their overall health management.

4.6.1 Benefit of IFPs.

The graph below has summarized the respondents' perceived benefits of IFPs. The HIV+ cohort (n= 20) and the general teachers (n= 29) respondents both considered IFPs as immune boosters because it had more than half of the respondents. The HIV+ cohort reported to have had an increased CD4 Count after sustaining a diet with more IFPs. Over three quarter (n= 20) of the experimental group reported that IFPs eliminated toxins and for half (n=10) respondents, they helped reinforce drug (ARV) absorption. Both groups were in agreement that IFPs are very rich in minerals and unrefined nutrients with experimental group (n= 12) and the general teachers (n= 14). The experimental group (n= 20) reported that IFPs helped eliminate toxins when they sustained a diet of IFPs. This is an indication that IFPs have a role in the disease mitigation.

Figure V: Respondents' Perception of the effect of IFPs on Health



Source: Field Data

The ethno-botanists provided very useful insights on the importance of IFPs. For treatment of T.B and sore throat, among the Kamba, *mukenea* and the Luo's *roko* (*chalybeum*) is

recommended. Usually tea is made with the fruits of the tree or a bark or root decoction of the tree is drunk. *Asiokon* (*Salvadora persica*) and *toronwo* (*Grewia tenax*) among the Pokot's is eaten for the same. Numerous IFPs have been known to cure stomach pains or diarrhoea. Among them is the Luo's *kandhira* (*Brassica carinata*) when mixed with *akeyo* and *a lot-dek* (*Cleome gynandra*) which also treats constipation. Among the Luo, a root decoction of *powo* (*Grewia bicolor*) is used for diarrhoea. The Mbeere community boiled the bark of *mubaa* (*Pappea capensis*) to make a kind of a soup and is taken for stomach disorders and diarrhoea. For skin problems the fruits of *mukururu* (*Flueggea virosa*) among the Kamba are eaten whole and help cure itching skins as well as treating malaria. For coughs, colds and chest complaints, the root and bark infusion of the Giriama's *Mkayamba* (*Piliostigma*) is drunk. The Samburu's pound the stalks of *naiteteyai* (*Commelina Africana*), boil it and add milk to treat colds and coughs. Among the Kamba, the roots of *mukinyai* (*Euclea divinorum*) are boiled and the decoction used to treat chest pains, pneumonia and internal body pains. It is also used to treat diarrhoea. Food-based strategies are sustainable for most of the population as opposed to medicine because food has multiple benefits. It can be curative as well as preventive.

4.7 Level of Awareness of Changing Nutritional Requirements during the Various Stages of HIV Infection and Aids

This involved a comparison of the respondents' feedback on whether they knew the stages of HIV/AIDS and their comprehensive knowledge of those stages. From their discussion, the researcher categorized their knowledge into: Very well known, known, not known and no response. The 'very well known' comprised those who explained sufficiently the stages and accompanying symptoms and deficiencies. The 'known' category is the respondents who mentioned the stages but could not explain the accompanying symptoms and deficiencies. The 'not known' are those who gave contradictory, incorrect information and the 'no response' are those who did not mention any symptom. Table 4.24 below shows this:

Table 4.24: Sample Level of awareness of changing nutritional requirements

| Sample Responses | General teachers | | HIV+ teachers | | Total | |
|------------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| V. well known | 7 | 21.9 | 8 | 25.8 | 15 | 23.8 |
| Known | 4 | 12.5 | 7 | 22.6 | 11 | 17.5 |
| Not known | 9 | 28.1 | 3 | 9.7 | 12 | 19.0 |
| No response | 12 | 37.5 | 13 | 41.9 | 25 | 39.7 |
| Total | 32 | 100.0 | 31 | 100.0 | 63 | 100.0 |

Source: Field Data

From the table above, more than half 20 (62.5%) of the general teachers acknowledged knowing the stages of HIV/AIDS as compared to 18 (58.1) in the HIV+ cohort. On further assessment of how well versed the 20 general teachers were, less than a quarter 7 (21.9%) were well versed, 4 (12.5%) moderately knew and 9 (28.1%) did not know at all, the changing nutritional requirements of PLWHAs. In the HIV+ cohort (n=31), out of the 18 who responded in the affirmative, one quarter 8 (25.8%) knew the stages very well and less than a quarter 7 (22.6%) moderately knew. Less than one quarter 15 (23.8%) of the total sample knew the stages very well. There was no significant difference in the level of knowledge in the two groups. Knowledge of the nutritional needs of PLWHAs is very limited. The researcher noted that many people worked on assumptions that they know about the stages but never bothered finding out whether what they perceive to be right is valid. This explains why 3 (9.7%) HIV+ respondents and more than one quarter 9 (28.1%) general teachers answered in the affirmative and when they were asked to explain in detail, they had no idea.

4.7.1 Key Informants' Perception of Caregivers' Level of Awareness of the Changing of Nutritional Challenges of HIV/Aids Patients

The key informants' data supports the findings of the respondents, that not many people are knowledgeable on the changing nutritional requirements of PLWHAs. Only a quarter 3 (25%) of the key informants felt that the level of awareness was high as compared to 8 (66.7%) who felt that the awareness was low. Caregivers are not well informed about the nutritional needs. The key informants expressed concern that the community at large needs to be sensitized on the needs of the PLWHAs, if they are to help them successfully.

Figure VI below graphically demonstrates this:

Figure VI

Level of awareness of the changing of
nutritional challenges of HIV



Source: Field Data

4.8 Elements of Dietary Counselling needing Promotion

A variety of areas on nutritional education that the respondents felt would be beneficial to the majority of people in the community were cited. Table 4.25 shows this:

Table 4.25: Elements of Counselling Needed by the Sample Respondents

| Counselling Needed | General Teachers | | HIV+ Teachers | | Total | |
|-------------------------------|------------------|--------------|---------------|--------------|-----------|--------------|
| | Frequency | % | Frequency | % | Frequency | % |
| Balanced and diversified diet | 21 | 42.9 | 13 | 46.4 | 34 | 44.2 |
| Whole meal food consumption | 6 | 12.2 | 0 | 0 | 6 | 7.7 |
| Importance of IFP | 12 | 24.5 | 2 | 7.1 | 14 | 18.2 |
| Nutrient preservation | 5 | 10.3 | 2 | 7.1 | 7 | 9.1 |
| Nutrition and HIV/AIDS | 3 | 6.1 | 11 | 39.2 | 14 | 18.2 |
| Nutrition in pregnancy | 1 | 2.0 | 0 | 0 | 1 | 1.3 |
| Use of practical examples | 1 | 2.0 | 0 | 0 | 1 | 1.3 |
| Total | 49 | 100.0 | 28 | 100.0 | 77 | 100.0 |

Source: Field Data

From the above table nearly half of the respondents (n=34) listed balanced and diversified diet with 21 (42.9%) general teachers and 13 (46.4%) HIV+ teachers. Education on the importance of IFPs had nearly a quarter 12 (24.5%) of the general teachers as compared to only 2 (7.1%) HIV+ cohort. From the general teachers responses it is clear that a lot needs to be done to equip people on balancing meals so that quality and not quantity eating habits are promoted. This will reduce the malnutrition levels considerably. The area of nutrition and HIV/AIDS had more than a quarter 11 (35.5%) respondents from the HIV+ cohort. We can deduce that even those ailing with the disease, little information is present on the area of HIV/AIDS and nutrition and is probably responsible for the high death rates among the teachers. This needs to be reversed and further supports the Consumer Information Processing Theory (CIP) which postulates that information must not only be available but also believed to be useful to the consumer, and the consumer must have the time, energy, and level of comprehension to process the information. From the above findings, it is evident that the respondents are willing to embrace issues concerning IFPs and natural whole grains. The more the provider is able to relate the patient's health concerns to his or her diet and is confident that the patient understands and is able to use this information, the greater the likelihood that the patient will be motivated to make and maintain dietary changes. In this regard information on nutritive value of IFP and benefits of consumption of a diversified diet of natural grains should be provided.

4.9 Key Informants Profiles

A total of 12 key informants were interviewed in this study. A brief description of their profile is analyzed below:

Table 4.26: Distribution of Key Informants Gender by profession

| Gender | Nutritionists | | Doctor | | Ethno botanist | | Total | |
|--------------|---------------|--------------|----------|--------------|----------------|--------------|-----------|--------------|
| | Count | % | Count | % | Count | % | Count | % |
| Female | 7 | 87.5 | 2 | 100.0 | 1 | 50.0 | 10 | 83.3 |
| Male | 1 | 12.5 | 0 | 0 | 1 | 50.0 | 2 | 16.7 |
| Total | 8 | 100.0 | 2 | 100.0 | 2 | 100.0 | 12 | 100.0 |

Source: Field Data

Of the key informants (n=12), 2 (16.7%) were male and over three quarters 10 (83.3%) female. The female-male ratio of the key informants 10:2 follows a similar observable trend just like for the respondents because the area of study from an African perspective has been perceived as a woman's domain. Therefore even in career pursuit nutritional issues were more inclined to women than men. This can explain the reason why there was only one male nutritionist 1 (12.5%) and over three quarters 10 (87.5%) female.

Age Distribution of key informants by Occupation

Table 4.27: Distribution of Key Informants Age

| Age | Nutritionists | | Doctors | | Ethno botanists | | Total | |
|--------------|---------------|--------------|----------|--------------|-----------------|--------------|-----------|--------------|
| | Count | % | Count | % | Count | % | Count | % |
| 20- 29 | 3 | 37.5 | 1 | 50.0 | 0 | 0 | 4 | 33.3 |
| 30- 39 | 5 | 62.2 | 1 | 50.0 | 1 | 50.0 | 7 | 58.3 |
| 40- 49 | 0 | 0 | 0 | 0 | 1 | 50.0 | 1 | 8.4 |
| Total | 8 | 100.0 | 2 | 100.0 | 2 | 100.0 | 12 | 100.0 |

Source: Field Data

The 30s age bracket is the modal class with more than half 7 (58.3%) of the key informants and over one quarter 4 (33.3%) in the 20s age bracket. Of the key informants (n= 12), more than half 8 (66.7%) were nutritionists, 2 (16.7%) doctors and 2 (16.7%) were ethno-botanists. We were therefore able to capture divergent information on nutritional issues.

Key Informants' Highest Level of Education

Table 4.28: Key Informants Level of Education

| Level of Education | Frequency | Percent |
|--------------------------------|-----------|--------------|
| Ordinary Diploma | 3 | 25.0 |
| Bachelors Degree | 5 | 41.7 |
| Post-graduate Degree (Masters) | 4 | 33.3 |
| Total | 12 | 100.0 |

Source: Field Data

Of the key informants (n= 12) more than one quarter 4 (33.3%) had a Post-graduate degree and nearly half 5 (41.1%) had a Bachelors degree. Only one quarter 3 (25%) had attained Ordinary diploma. Therefore the key informants were all knowledgeable people and well versed with the area under study.

The key informants concurred with the respondents' findings that malnutrition was rampant and aggravated the fast spread of HIV/AIDS. Some of the causes of malnutrition they cited were; infection by the HIV virus, loss of blood and under nutrition due to lack of food. The high junk food consumption and too much refined sugars and starches intake due to poor priorities among those in charge of health is leading to poor feeding habits by teenagers. Rampant poverty among the population and lack of proper information on nutritious foods is leading to ignorance and poor food intake.

According to the key informants several factors hinder the full exploitation of IFPs. These are: poor accessibility and non-availability of the IFPs coupled with lack of information or awareness/ ignorance on their value. Poor feeding habits especially due to the wide availability of cheap exotic foods that contain a lot of starch and fats such as chips and less nutrients such as cabbage is a major factor. IFPs preparation consumes too much time and according to the informants, people want the easier way out due to time constraints. IFPs are very costly in comparison to the exotic foods therefore, for cost effectiveness people prefer to use the cheaper option of exotic foods. Poor presentation of the IFPs in markets is sometimes off-putting to consumers. In the hospital (KNH), food is received by tender systems and there is no tender of IFPs except in the private wing due to cost and limited availability. Some consumers are afraid of IFPs being contaminated at the source if they are planted in sewage areas as this has been rampant from unscrupulous traders. Lack of knowledge of diet diversity by most people, together with a negative attitude adopted by others especially teenagers is widespread. This is supported by some of the respondents' claims that they were not able to sustain changes they had made to their diets of IFPs and natural grains due to refusal of the new foods and taste by the children.

The key informants have tried in their various capacities to create awareness on the importance of IFPs. Some of the ventures they have undertaken are; during clinic visits they advice patients especially those with anaemia to try out IFPs that are rich in vitamins and which are

sometimes affordable especially if purchased at the retail markets. Lectures, health talks and nutritional counselling is given to mothers in clinics. KNH usually hold nutritional awareness campaigns/ outreaches through which nutritional counselling of patients and the care-givers is done. They reach out to the community and tackle issues such as the importance of IFPs and hygienic food preparation. According to the ethno-botanists, they have held nutritional trade fairs (since 2003 they have held 6 food fairs) through Kenya Resource Centre for Indigenous Knowledge (KENRIK). Together with the National Museums of Kenya (NMK), they have had ethno-botanical publications through the Africa ethno-botany network and vegetable forums at the Museums where people are educated on IFPs importance. Groups from all the communities of Kenya exhibit the different IFPs and educate people on their uses and preparation.

The key informants except one were in agreement that nutritional counselling would have a lasting impression on the population. According to their observations, usually after acquiring knowledge especially counselling mothers and HIV+ patients, tremendous changes are usually noted. This assists in changing patients' perception of nutrition and assist patients to change their dietary habits. They therefore make proper choices concerning nutrition as they will have experienced improved immunity that prevents secondary infections and keeps malnutrition at bay. There was a general observation that most mothers do not know what comprises a balanced diet and tend to consume one or at most three food groups that do not meet all the nutritional requirements. Therefore, follow up and monitoring would make an impact. Patients have been seen to take seriously what nutritionists tell them so if they are well educated, a lasting impression can be created. Dietary counselling is the basis of nutrition care plan and can be used as a preventive and curative method of handling diseases or deficiencies. Most important are interventions where nutritionists use guides with pictorial evidence. However one key informant was of the opinion that nutrition education would not be lasting because we need to change people's ingrained attitudes first, because dietary changes take a long time to implement.

CHAPTER FIVE: INFERENCE ANALYSIS OF FIELD DATA

This chapter focuses on hypothesis testing from which statistical inferences are subsequently made. A hypothesis is a testable belief or opinion whereas hypothesis testing is the process by which the belief is tested by statistical means. Inferential statistics utilizes sample data to make estimates, decisions, predictions or other generalizations about a larger set of data (McClave, 2000:2).

5.1 Hypotheses Testing

This section seeks to find out whether the hypotheses of the study are accepted or rejected based on the findings of the research. Two types of hypotheses are used:

- 1) The null hypothesis which represents the status quo to the party performing the sampling experiment or the hypothesis that will be accepted unless the data provide convincing evidence that it is false,
- 2) The alternative, or research hypothesis, which will be accepted only if the data provide convincing evidence of its truth.

In testing hypothesis 1, the multiple linear regression model is adapted. This is because it has the potential of including more than one related independent variable that in turn has potentially important variables that have to be incorporated in order to make accurate predictions. It attempts to predict and explain the variation of a single dependent variable Y from a number of independent/predictor variables.

H₁: Increased consumption of IFP combined with a diversified diet enhances the efficacy of HIV/AIDS medication and supplementation, improving health status.

H₀: There is no significant relationship between increased consumption of IFPs combined with a diversified diet and the efficacy of HIV/AIDS medication and supplementation.

In testing hypothesis 1, the HIV+ respondents (n=31) who were divided into the experimental and control groups who were earlier discussed in chapter three were utilized. The 21 respondents made up the experimental group whereas the other 10 made up the control group.

The researcher wanted to establish whether any health benefits were noted from the 21 who are using IFPs. Hypothesis 1 had four independent variables. Therefore different variable indicators were used.

The indicator variables for health status are:

- (a) Quality of life enhanced and
- (b) Strengthened immunity.

The independent indicator variables were;

- (a) Consumption of IFP
- (b) Diversified diet (natural grain consumption)
- (c) Use of medication
- (d) Usage of supplementation

The values of the independent variables to be regressed had ordinal data (low levels of measurements) and regression assumes interval data. The ordinal categories were therefore transformed into sets of dichotomies, called dummy variables. They were created by converting a given level of qualitative variable into a binary variable; the presence was coded (1) and the absence (0) of the characteristic. In this study we have;

First dummy variable: Natural whole grain usage (1) vs. Non- natural whole grain usage (0)

Second dummy variable: IFP usage (1) vs. Non-IFP usage (0)

Third dummy variable: Supplements usage (1) vs. Non-supplements usage (0)

Fourth dummy variable: Use of medication (1) vs. Non- use of medication (0)

Thereafter the general multiple linear regression model formula was used:

$$Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \dots + \beta_k\chi_k + \varepsilon$$

Where

Y is the dependent variable

$\chi_1, \chi_2, \dots, \chi_k$ are the independent variables

$E(y) = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \dots + \beta_k\chi_k$ is the deterministic portion of the model

β_1 the constant coefficients determines the contribution of the independent variable χ_1

ε is the random error with mean 0 and variance of 1 (Mc Clave 2002: 578).

The summary output when all independent variables are included in the multiple regression equation leads to the Analysis Of Variance (ANOVA). The F-test associated with the ANOVA table is used to test the null hypothesis that the independent variables are significant to the model of analysis.

(a) Consumption of IFP and Diversified Diet Regression

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|----------------------------|
| 1 | .259 | .067 | -.037 | .96 |

a Predictors: (Constant), Usage of supplements, Sustaining a diet of IFP, Natural grain Usage
 b Dependent Variable: Comment on your health status in last 3 months

ANOVA

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|------|------|
| 1 | Regression | 1.795 | 3 | .598 | .647 | .592 |
| | Residual | 24.979 | 27 | .925 | | |
| | Total | 26.774 | 30 | | | |

a Predictors: (Constant), Usage of Supplements, Sustaining a diet of IFP, Natural Grain Usage
 b Dependent Variable: Comment on your health status in last 3 months

Coefficients

| | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|--------------------------|-----------------------------|------------|---------------------------|-------|------|
| | B | Std. Error | Beta | | |
| (Constant) | 1.623 | .773 | | 2.098 | .045 |
| Natural grain usage | .253 | .478 | .108 | .530 | .600 |
| Sustaining a diet of IFP | .509 | .400 | .256 | 1.271 | .214 |
| Usage of supplements | -.275 | .369 | -.142 | -.745 | .463 |

a Dependent Variable: Comment on your health status in last 3 months

Regression Equation:

$$\text{Health status (y)} = 1.623 + 0.253 (x_1) + 0.509 (x_2) + 0.275 (x_3) \pm \text{Error}$$

Overall, the three predictor variables considered for the multiple regression analysis explain 6.7% of the variation in health status in the last 3 months. The fourth independent variable that was use of medication could not be entered into the regression equation since all the respondents were using medication therefore could not provide any basis for comparison. From the ANOVA table above, the p-value = 0.592 > 0.05 level of significance. The critical value of F at 0.05 significance level with 3 and 27 degrees of freedom is at 2.96 which is more than the calculated F (0.647). With the R-value at 0.259 meaning that there is a positive but weak relationship between the variables. The beta weights show that sustaining a diet of IFP is the best predictor of health status at 25.6%. The partial regression coefficient shows that increasing the IFP consumption by 1 unit increases the health status by 0.509 units. We therefore accept the null hypothesis because the degree of confidence is low. From the ANOVA analysis we can conclude that there are other factors other than nutritious foods, usage of supplements and drugs that determine the health status.

H₂: Knowledge of the value of dietary diversification / improvement increases levels of consumption of IFP

H₀: There is no significant relationship between the knowledge of dietary diversification/improvement and the levels of consumption of IFP.

To test this hypothesis, all the 63 respondents were used in order to find out if those who had knowledge of IFPs from their area also ate them. This involved a cross tabulation of the two variables.

The chi-square, a non-parametric test of significance in the SPSS computer software was used to describe a set of scores and measurements. It was tested at a significance level of 0.05. The chi-square was preferred because it uses both quantitative and qualitative data. The chi-square test works by testing a distribution actually observed in the field, against some other distribution determined by the null hypothesis to evaluate whether the difference between the observed and expected frequencies under a set of theoretical assumptions is statistically significant. If a relationship were not dependent, then the distribution observed and expected would be even.

Table 40: Comparison of Knowledge and Consumption of IFP

| HIV Status | | | Knowledge of IFP | No Knowledge of IFP | No response | Total % |
|-------------------|---------|-----------|------------------|---------------------|-------------|---------|
| General Teachers | Sustain | Frequency | 15 | 1 | 0 | 16 |
| | | % | 93.8 | 6.3 | 0 | 100.0 |
| | Didn't | Frequency | 14 | 1 | 1 | 16 |
| | | % | 87.5 | 6.3 | 6.3 | 100.0 |
| | Total | Frequency | 29 | 2 | 1 | 32 |
| | | % | 90.6 | 6.3 | 3.1 | 100.0 |
| HIV+ Experimental | Sustain | Frequency | 16 | 5 | 0 | 21 |
| | | % | 76.2 | 23.8 | 0 | 100.0 |
| Control | Didn't | Frequency | 6 | 4 | 0 | 10 |
| | | % | 60.0 | 40.0 | 0 | 100.0 |
| | Total | Frequency | 22 | 9 | 0 | 31 |
| | | % | 71.0 | 29.0 | 0 | 100.0 |

Source: Field Data

Chi-Square Tests

| HIV Status | | Value | Df | p- value |
|------------------|--------------------|-------|----|----------|
| General Teachers | Pearson Chi-Square | 1.034 | 2 | .596 |
| HIV + | Pearson Chi-Square | .862 | 1 | .353 |

Source: Field Data

The general teachers p-value=0.596>0.05 whereas that of the HIV+ teachers = 0.353 implying that there's no significant difference between knowledge of IFP and their consumption for the two groups of teachers. Since the value of the chi-square is less than the significant value of the test 0.05, then the null hypothesis is accepted and the alternative is rejected. This means that there is no evidence of a significant relationship between the two variables; that is, the knowledge of IFP and their consumption. The two are independent.

Delving further into the analysis showed that the respondents' attitude/perception to IFPs was that of strong liking. However, there were factors that hindered their full exploitation. Some of

these factors include: problems in terms of accessing IFPs. The respondents knew about IFPs, like them but they are not readily available so they buy what is available. From the gathered data other hindrances to consuming IFPs are: when available they are very expensive as compared to exotic vegetables, they consume too much preparation time and most respondents had little knowledge on how to prepare them. This can explain why the hypothesis was rejected.

CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a summary of key findings obtained during the study. Conclusions have been drawn to explain the current status and recommendations for further research and policy concerns made. The main objective of this research was to establish the role of indigenous foods and nutritional intervention in mitigating HIV/AIDS among post-primary teachers.

This project aimed at improving knowledge and promoting practices on the nutritional requirements of PLWHA, by identifying a variety of affordable, indigenous and nutritious medicinal foods. They could be merged into a therapeutic nutrition recipe. Kenya is a low resource country and has fewer AIDS interventions that are affordable or available, thus this low cost nutritional therapy is of greater clinical significance and also sustainable.

The study focused on the post-primary teachers in Nairobi. They were with or without the HIV causing virus. Information from the field was collected by use of interview schedules and use of interview guides for the key informants. Data analysis was done using SPSS.

6.1 Summary of the Findings

This section highlights the extent to which the research objectives were answered based on the findings of this research. The following is a summary of the major findings:

(a) Feeding Habits and Appreciation of IFPs

The study findings indicate that the teachers strongly liked IFPs, yet their consumption was minimal. Modernization is deeply rooted among the teachers whose highest composition of meals was the modern and not balanced type of meals. The foods commonly cited as their favourites were the highly refined foods and exotic vegetables. This deviation from traditional foods to modern foods according to the teachers was the hallmark of modernity. The study findings indicate that Post-Primary Teachers in Nairobi are not well grounded in the importance of IFPs. According to the findings, the HIV+ teachers are appreciating and consuming more of IFPs. Infact, findings posit that they eat better than the general teachers. They have a higher consumption of grains in their natural form that enhances diversity of nutrients in their meals.

There are, however, certain constraints hindering the full exploitation of IFPs and whole grains by the two groups of teachers. Most cited was the lack of a ready market that sells fresh and diverse IFPs, that leads to limited availability. Unfortunately, when available, they are very expensive compared to exotic vegetables. This is the reason why there is preference for the exotic ones that are readily available and cheap. We can therefore deduce that the teachers eating habits are more geared towards quantity rather than quality.

There is not much consumption of natural grains from the findings. Very interestingly, a majority of the respondents know that unrefined grains are more nutritious, help in diversifying the diet and are immune boosters because they are nutrient packed, yet they consume the refined form more. Consumption of natural grains it was established is hindered by their lack of appeal and taste that many respondents said needed an improvement. This is so if the grains were to compete favourably with the highly refined grains in the market and which are quite appealing and tasty.

Most important, despite the teachers' positive attitude towards IFPs, a majority lack sufficient knowledge as to what value the IFPs adds to meals. They lack knowledge on the suitable cooking methods that enhance nutrient preservation. Many over-cook the vegetables, which lowers the nutritive value of the nutrients and deprives the body of vital nutrients. This can be reversed if dietary counselling was enhanced, promoted and information made readily available on IFPs for everyone in the community. There is need to advocate for quality and not quantity eating. This will have an impact on every sector of our economy because as the old adage stipulates 'health is wealth'.

(b) Nutritious and Medicinal Indigenous Foods

The respondents especially the general teachers cohort were not very knowledgeable about nutritious and medicinal foods that are appealing and appropriate to the health status of HIV carriers and AIDS patients or even to themselves. Nutritional education with an emphasis to IFP ought to be initiated.

(c) Elements of dietary counselling that need to be promoted

The teachers and key informants reported that education is a powerful tool in checking the lost diversity of IFPs. Education enables one to acquire knowledge, skills and attitudes that could result in behavioural change. Teachers, who are opinion shapers in the communities where they live, can be instrumental in preserving the indigenous knowledge. Kenya being a low-resource country, culturally and economically relevant nutritional education and dietary counselling would be a simple yet effective means of stabilizing or increasing body weight in HIV-infected patients. In poorer developing countries, unlike Western countries where effective prophylactic and antiretroviral therapies are available, cost-effective options to promote weight gain are extremely limited. Nutrition education should entail principles of healthy eating (regular meals; foods from all of the basic food groups, energy- and nutrient-dense food), socio-economics of nutrition (practical advice for healthy economic eating) and food safety (to decrease the risk of food-borne infections). Patients should be given individualized dietary guidelines according to identified problems and symptoms (for example, anorexia, weight loss, diarrhoea, nausea, vomiting, oral pain and dry mouth).

6.2 Conclusions

Whereas evidence suggests that morbidity is high, this research has made suggestions that might improve the existing health status by clearly outlining the value of indigenous foods. There is need for a shift from the misguided preference for expensive exotic foods.

Dietary counselling with therapeutic nutrition will help in the mitigation of numerous opportunistic AIDS infections. Counselling leads to behaviour change and counsellors use different theoretical approaches. Counselling is a means of mobilizing the psychological, social and material resources of PLWHAS and of their close associates as well as of the health workers and others concerned with their care and support. It offers psycho-socio support, assists in modifying risk behaviour and seeks to maintain HIV infected persons as functioning members of their community. It aims at minimizing psychological and physical disability and preventing further transmission, thus complementing and reducing the need for medical care (WHO, 1998: 76).

Nutritional support with an emphasis on IFPs and unrefined grains can play an important role in the management of HIV-infected patients. It can prevent severe malnutrition, boost immune responses, enhance medication effectiveness and optimize quality of life and consequently delay progression of disease and improve survival. Effective nutritional support should be directed at the prevention or cause of malnutrition; it should be available, affordable and practical. It should ideally be started as early as possible not necessarily when one is sick. The timing of nutritional support is a very important factor in the effectiveness of dietary management. It should begin at conception to childhood and adulthood. This is a sure way of checking the rampant degenerative illnesses plaguing the country today as evidenced in the literature review. Nutritional education and dietary counselling with an emphasis on IFP and whole grains are simple yet effective means of ensuring good nutritional status with or without illnesses if started early in life.

Nutritional and dietary counselling empowers individuals with important nutritional knowledge, and helps them realize the importance of nutrition in their lives. Such knowledge makes patients capable of making more informed decisions regarding eating, according to their personal financial circumstances and the availability of food (example eating healthier while saving money). In this study, persons who received nutrition education (the HIV+ cohort) felt more in control of their lives, and subsequently tended to assume a more active role in their overall health management unlike the general teachers cohort.

From the findings it is clear that teachers are greatly affected by HIV/AIDS. To replace a teacher would require a suitably trained person, which is sometimes very hard and takes a long time before the new replacement picks up classes. This shortage causes lost opportunities for schooling and larger class sizes, hence lowering the level of education (KEMRI, 2003: 20). It is imperative that teachers be better equipped with current information on nutrition with a great emphasis on what is locally available which would ensure good nutritional status as well as delay the progression of disease for the ailing.

The findings of this study are a pointer to the poor feeding habits that are witnessed today. This is a confirmation in support of a statement made by Thabo Mbeki that "*Malnutrition and not AIDS is responsible for the deaths in the African Continent.*" Poor feeding leads to the

weakening of the immune system and the Aids causing virus fights the already weakened immune system, rendering one very weak. Since prevention is better than cure, good nutrition should be emphasized early in life instead of resulting to immune boosters later in life that have a cost implication. In life we learn through experiences but we do not have to wait to experience to be able to learn. If we were to learn from other people's experiences then probably some behavioural changes would be observed. This is supported by a very unfortunate comment from one of the HIV+ respondents who is quoted as saying *"at the clinics once your status and CD₄ count is established, they immediately put you on ARVs. Had I been told about their disadvantages, I would never have started on them in the first place. They have brought me more ills than good. This is because to take ARVs one needs to have taken very good meals/ diet. Then after taking them your body gets some abnormal strength and heat and makes your sexual urges uncontrollable which has resulted in multiple partners to satisfy my urges. If I had known I would have taken herbal treatments and a very good diet"*. This respondents view is not medically validated but it points up to fruitful further lines of investigation. It is important for clinics to discuss with the patients the limitations of ARVs in order for them to make informed decisions on whether to start ARVs doses which are a life time or to seek alternative remedial measures.

Therefore, if nutritional education and dietary counselling were advocated, these would alleviate the situation and mitigate HIV/AIDS through dietary diversification with an emphasis on IFPS.

6.3 Recommendations

This research can inform policy that relates to teachers. TSC has raised concern about its teachers' productivity. This is compounded by the reduction in number and effectiveness of teachers due to AIDS and by the free primary education, which have increased the workload for the healthy ones (UNESCO, 2003: 7). Due to the central role of teachers, there is a need for a nutritional therapy that will increase productivity levels and continued integration of HIV infected teachers. To introduce dietary counselling among Post Primary teachers in Nairobi with an emphasis to micronutrient packed IFP and unrefined cereals as part of a major advocacy campaign to promote good nutritional values is paramount. More counselling inputs need to be incorporated. Traditionally emphasis was placed on corrective counselling and not much on passing on knowledge that can change people's attitude. There is need to embrace this

either by use of group or individual counselling. Not many counsellors are grounded on the importance of IFP, they too need to change before advocating for these changes.

With the phasing out of technically oriented subjects in schools, home science is affected. The Ministry of Education should take the initiative of retraining these Home Science teachers on nutritional issues which they could educate people on to eradicate malnutrition which weakens the immune system.

It is important that communities be sensitized on the role of IFPs and natural grains to avoid further discarding of these vital foods in a scramble for modernity. Parents, especially in urban areas, ought to be sensitized and play a more active role in guiding children on good nutrition by integrating IFPs and whole grains in the children's meals. This way, the children grow up appreciating the indigenous foods and are able to proudly identify with them.

Organizations ought to set up data banks where all the IFPs from various ethnic groups can be available all the year round to consumers. These foods especially the vegetables can be stored in their dried form and well packaged to preserve their nutrients and enhance their availability. The government needs to put measures to control/check the types of food stuffs being imported into the country as well as encourage the growing of IFPs

The mass media need to develop programmes that have a positive influence on feeding habits. Cultural shifts that embrace modernity result from identifying with trends in the west. The major causative influencing factors are the mass media and especially television. There must be policies among our local media houses to develop messages that 'glorify' and encourage consumption of IFP.

6.4 Areas for Further Research

Because these data were based on a small number of respondents, further exploration beyond this pilot study is necessary. This study covered only one school from each of the eight administrative divisions of Nairobi province. More studies to cover rural areas, as well as other districts and provinces should be done to ensure very good representation for generalization. The study covered only public secondary schools', similar studies should be done in private schools and also in primary schools for effective evaluation.

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APPENDIX 1

ARUNGA PAMELA KAWIRA

P.O BOX 9202-00100

NAIROBI.

.....November, 2004

Dear Sir/Madam,

REF: LETTER OF INTRODUCTION

My name is Pamela Kawira Arunga. I am a Master of Arts (Counselling) student at the University of Nairobi, Sociology Department. I am conducting a study on indigenous foods intake and dietary diversification among post-primary teachers in Nairobi. The purpose of the Frequency Food Questionnaire (FFQ) and the 24-hour food recall is to gather data about the foods you eat and to analyze this data for important nutrients. By completing this questionnaire carefully and thoughtfully, you will be contributing to research that is important to your health as well as the health of others.

Your institution is among those selected for this study. I would be very grateful for your assistance. Any information given to me will be treated with the utmost confidentiality and your co-operation will be highly appreciated.

Yours faithfully,

.....

Pamela Kawira Arunga.

a) Day of the week recalled (Choose only one, begin with today's date and go 24 hours back from the time of interview).

| | | | | | | |
|-----|-----|-----|------|-----|-----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mon | Tue | Wed | Thur | Fri | Sat | Sun |

b) Were the last 24 hours routine/typical for you?

| | |
|-----|----|
| A | B |
| Yes | No |

c) If not why?

.....

.....

.....

d) Recall of the food and drinks taken in the last 24 hours

| TIME | DETAILS OF FOOD AND DRINKS TAKEN | QUANTITY EATEN* |
|-----------------------|----------------------------------|-----------------|
| Breakfast (yesterday) | | |
| In-between snack | | |
| Lunch | | |
| In-between snack | | |
| Dinner | | |
| After dinner | | |

| | | |
|------------------|--|--|
| Breakfast today | | |
| In between snack | | |
| Lunch | | |

*For quantity eaten, measure drinks in cups, food in plateful (main dish), or small portion (side dish).

e) What are you planning to have for supper today?

.....

.....

f) What is your favourite meal?

.....

.....

11. Food Frequency Questions (FFQ)

Think about your most recent eating habits in the last 3 months and how often you ate each of the following foods.

NB:

For the type of vegetables you are not sure of, there are colour photographs showing the actual look. For the very seasonal fruits such as strawberries, please establish your usage per week when the fruit is in season.

Please put a tick on every line. If you do not eat a particular food, mark "NEVER" in the frequency section.

b). Has this period deviated significantly from the 3 months prior to it?

A. Yes..... B. No.....

c). If yes, explain the full deviation.

.....

d). If no, for how long have such eating habits been maintained?

.....

| | | | | | | | | | | |
|----------------------------|--|--|--|--|--|--|--|--|--|--|
| Stinging nettle | | | | | | | | | | |
| Spinach | | | | | | | | | | |
| Kale/sukuma wiki | | | | | | | | | | |
| Cabbage/mboga | | | | | | | | | | |
| Lettuce | | | | | | | | | | |
| Sweet potatoes | | | | | | | | | | |
| Yams | | | | | | | | | | |
| Arrow roots | | | | | | | | | | |
| Pumpkin | | | | | | | | | | |
| Water melon | | | | | | | | | | |
| Guavas | | | | | | | | | | |
| Pawpaw | | | | | | | | | | |
| Berries | | | | | | | | | | |
| Plums | | | | | | | | | | |
| Avocado | | | | | | | | | | |
| Apples | | | | | | | | | | |
| Passion fruits | | | | | | | | | | |
| Bananas | | | | | | | | | | |
| Grapes | | | | | | | | | | |
| Pears | | | | | | | | | | |
| White meat (chicken, fish) | | | | | | | | | | |
| Red meat (beef, mutton) | | | | | | | | | | |
| Ndengu/ beans/ peas | | | | | | | | | | |
| Cashewnuts/groundnuts | | | | | | | | | | |
| Coconuts | | | | | | | | | | |
| Pizza/cakes/burgers | | | | | | | | | | |
| Others not included | | | | | | | | | | |
| | | | | | | | | | | |

NB:

For very seasonal fruits such as strawberries, please establish your usage when the fruit is in season.



(Miroo) Miroo/Mitoo



(Jute) Mrenda/Murere



(Malenge) Malenge/Lisebebe



(Amaranth) Mchicha/Terere



(Mnavu) Mnavu/Osuga



(Spiderplant) Mwangani/Saget

12. Comment on your health status in the last 3 months.

- A. Excellent B. Good C. Fair D. Can be better E. Bad

13. Rate your current diet based on the following (put a tick on every line).

| | A. Excellent | B. Good | C. Fair | D. Can be better |
|------------------------|-----------------|---------|---------|------------------|
| Taste | | | | |
| Effect on health | | | | |
| Cost | | | | |
| Diversity of nutrients | | | | |

14a) Do you have any diet-related problems?

- A. Yes..... B. No.....

b) If yes, explain

.....
.....

15a) Have you (ever) thought about making changes in your diet?

- A. Yes..... B. No.....

b). If yes, what would you like to change about your diet now?

.....
.....

c). Why would you like to change your diet now?

.....
.....

16a) What is your current diet mainly composed of?

| A | B |
|----------------|-----------------------|
| Refined grains | Natural, whole grains |

b) Specify above.

.....

c). Rate your perception and knowledge of whole grains in terms of:

| | A. Excellent | B. Good | C. Fair | D. Need for improvement |
|-------------------|--------------|---------|---------|-------------------------|
| Appeal | | | | |
| Taste | | | | |
| Nutritious | | | | |
| Effect on health | | | | |
| Improved immunity | | | | |
| Diversifies diets | | | | |

17a). Do you have any hindrances to changing your diet now?

A. Yes..... B. No.....

Explain

.....

b). If no, what reasons might you have to want to maintain your current diet?

.....

.....

18a). Have you ever made changes in your diet?

- A. Yes..... B. No.....

b). If yes, indicate the changes, show when and explain why.

Changes.....
When.....
Why.....
.....

c). Have you maintained these changes till now?

- A. Yes..... B. No.....

d). If so, explain why

.....
.....

e). If not, how long did you maintain the change and why?

.....
.....

f) What difficulties did you encounter? How did you handle them?

.....
.....

19. What concerns do you have about your diet?

.....
.....

20a). Do you keep track on your diet?

- A. Yes..... B. No.....

b). If yes, what kinds of things have you done to enable this? Tick any or all if relevant.

| A | B | C | D | E (Other) |
|--------------------------------------|----------------------|-----------------------------------|----------|-----------|
| Presence of a homemenu/ guideline | Keeping a food diary | Assigning each day a certain food | Chancing | |

c). Are there criteria that you use in choosing your meals?

A. Yes..... B. No.....

d). If so, what guides your choice of meals?

.....
.....

21a). When you eat out in hotels, what is your favourite meal/meals?

.....
.....

b) What guides your choice of the meal?

.....
.....

c). Do you prepare such a meal in your house?

A. Yes..... B. No.....

d). If no, explain

.....
.....

22a). What is your attitude (like or dislike) towards IFPs?

.....

b). Do you know of any IFP from your home area?

A. Yes..... B. No.....

c). If yes which ones?

.....
.....

23a) Has there been a time when you sustained a diet of IFP over a period of time?

A. Yes..... B. No.....

b). If yes when and what kind of IFP?

.....
.....

c).Did you notice any health benefits?

A. Yes..... B. No.....

d). If yes, explain the benefits

.....
.....

e). Do you maintain that feeding regimen?

- A. Yes..... B. No.....

24. What is the major hindrance in preparing African dishes?

.....
.....

25 a).Where do you purchase IFP? Choose all that apply.

- A. A nearby market B. Have it brought from my rural area
C. Very difficult to obtain D. From my home garden

b). Do you have a problem in accessing IFPs?

- A. Yes..... B. No.....

c). If yes, explain

.....
.....

26a). Do you have a medical condition that calls for a special diet?

- A. Yes..... B. No.....

b). If yes, what diet?

.....
.....

27 a) Have you cared to know your HIV status?

- A. Yes..... B. No.....

b). Why is this the case?

.....
.....

28a). If positive, are you on any medication?

- A. Yes..... B. No.....

b). Please explain which ones and the time you began taking

.....
.....

29a) For those who are not positive or status unknown. You probably have had an encounter with an HIV patient, either a relative friend or spouse, do you know the various stages of HIV/AIDS development?

- A. Yes..... B. No.....

b). If yes which are they?

.....
.....
.....

c). Are these people on any special diet?

- A. Yes..... B. No.....

d). If yes, explain

.....
.....

30a) (All questions below to be answered by everyone)

What nutritional advice would you give to such a person?

.....
.....

b) Which foods are they advised to eat and by whom?

.....
.....

c) Do you see nutritious foods having a role in mitigating the disease?

- A. Yes..... B. No.....

d). If yes explain how diet relieves the effects of the disease?

.....
.....

e) Do you think IFPs have any particular impact/effect on the disease?

- A. Yes..... B. No.....

f). Explain

.....
.....

31 a) Do you use supplements for health reasons?

- A. Yes..... B. No.....

c) If yes, which ones?

.....
.....

d) Who advised you to take supplements?

.....
.....

32a). If you (or your relative) are on medication, how long have you (they) used it?

.....
.....

b).What are the directions for taking the medication?

.....
.....

c). Are there problems arising from taking the drugs over a long duration of time?

A. Yes..... B. No.....

d). If yes, what problems?

.....
.....
.....

e). How do you (or your friend) counter this?

.....
.....
.....

33a) Given a chance, would you/or your friend prefer to take medicine or foods that would have almost similar effects as the medicine?

.....

b). Explain why.

.....
.....

34a). Do you know any medicinal IFP that are appealing and appropriate to HIV/AIDS patients?

A. Yes..... B. No.....

b). If yes, explain

.....
.....
.....

c). Do you or your relative take them

A. Yes..... B. No.....

d) What are the health benefits?

.....
.....

35a). Respond to this statement. Think over it very carefully before answering.

Malnutrition is the major cause of HIV/AIDS deaths in Kenya and not the disease itself.

A. True..... B. False.....

b). If true, explain

.....
.....

36 a) Have you ever visited a nutritionist for dietary guidance?

A. Yes..... B. No.....

b). If yes, why did you go to her/she?

.....
.....

c) What areas of dietary counselling do you feel the community at large could benefit from?

.....
.....

d). With reasons, whom do you feel is best suited to sensitize people on nutrition issues in the community?

.....
.....

APPENDIX 3

INTERVIEW GUIDE FOR KEY INFORMANTS

SECTION A

1. **Sex:** A. Male..... B. Female.....
2. **Age:**.....
3. **Religion:** A. Christian..... B. Muslim C. Other (Specify)
.....
4. **Marital status:** A. Single..... B. Married.....
C. Divorced/separated..... D. Widowed.....
5. **Occupation:** A. Nutritionist..... B. Doctor..... C. Ethno-
botanist.....
D. Other (specify)
6. **Highest level of education completed:** A. Ordinary DiplomaB. Bachelors
Degree..... C. Post-graduate Degree (Masters).....D. Post-graduate
Diploma..... E. PhD.....
7. **Home district:**.....

SECTION B

8 a). What are the major nutritional deficiencies you encounter?

.....
.....

b). Are the deficiencies rampant?

.....
.....

c). What age group is most affected by the deficiencies?

.....
.....

d). What causes the deficiencies?

.....
.....
.....

e). How many patients with nutritional deficiencies do you attend to daily?

.....
.....

9 a). How is the consumption of IFPs in this area?

.....
.....

b). What hinders the full exploitation and consumption of IFPs?

.....
.....

c). Have you made any efforts to create awareness on the importance of IFPs ? If yes, explain.

.....
.....

d). If no, why not?

.....
.....

10. Would nutritional education and dietary counselling have any lasting impression on your patients? Explain

.....
.....

11. What is the level of awareness of the changing nutritional challenges of HIV/AIDS patients amongst the care-givers?

.....
.....

12. What nutritional advice do you give them?

.....
.....
.....

13. In your opinion, what is the most effective way of giving nutritional education to everyone?

.....
.....

14a) Would post-primary teachers have any effect in shaping peoples' eating habits? Explain.

.....
.....

b). Who is best suited in changing the feeding habits?

.....
.....

15. What areas of nutritional education would be most relevant to caregivers of HIV/AIDS patients?

.....
.....

16. Would teachers have any role to play in Home Based Care (HBC)?

.....
.....

17. Are there medicinal foods known to you that HIV/AIDS patients can take to enhance their health status? Explain

.....
.....
.....

18 (a) Would it be useful for even the HIV negative people to be strict on their diet?

.....
.....

b) Why?

.....
.....

19. In your opinion, from a nutrition angle what is aggravating the fast spread of HIV/AIDS in our society?

.....
.....

20. What can be done?

.....
.....

21. Is it true that the consumption of IFP is lessening with the passing of generations?

If true, what can be done to salvage this precedence?

.....

.....

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