COMPLIANCE TO NUTRITION COUNSELING AMONG HIV POSITIVE SCHOOL CHILDREN ATTENDING MDH CTC IN DAR ES SALAAM.

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Master of Public Health Dissertation

Muhimbili University of Health and Allied Sciences

October, 2010

COMPLIANCE TO NUTRITION COUNSELING AMONG HIV POSITIVE SCHOOL CHILDREN ATTENDING MDH CTC IN DAR ES SALAAM.

By

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A Dissertation Submitted in Partial Fulfillment of the Requirement For The Degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences.

October, 2010

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Muhimbili University of health and Allied Sciences a dissertation titled Compliance **to Nutrition Counseling Among HIV Positive School Children Attending MDH CTC, in Dar es Salaam,** in fulfillment of the requirements for the Master of Public Health of Muhimbili University of Health and Allied Sciences.



Dr. Innocent Semali

(Supervisor)

Date: 21/10/2010

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I, **Laureta Luka,** declare that this dissertation is my original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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ACKNOWLEDGEMENTS

The culmination of my MPH program comes with a significant sense of indebtedness to a number of individuals that I would most sincerely like to acknowledge. First and foremost, I praise the lord for enabling me to pursue this course successfully. Second in line is my sponsor, Belgian Technical Cooperation, for allowing me to train in public health in MUHAS. Without them, I would not have completed my MPH studies and learned so much about global public health. I am very grateful to my research mentor, Dr. Innocent Semali for his continued technical guidance, may almighty God bless him. I wish to thank all academic staff of the School of Public Health and Socio studies, Muhimbili University of Health and Allied Sciences.

I am also grateful to MDH program for allowing me to attach my self as a field practical student at MDH nutrition unit.

I am also grateful to my entire colleagues MPH participants 2009/2010 for continues support, inputs and cooperation.

While attending this course, my husband Evarist Simon continued to take good care of our lovely kids, Suzan, Sostenes, Sarah and Sasha, with devotion, tolerance and commitment. I thank him for love, support, patience and prayers.

Lastly, but by no means the least, endless gratitude to my family, they made this academic adventure possible. Their love kept me tethered even in the longest and most solitary moments.

DEDICATION

To my parents Scholastica Antony Mashingo and Lucas Pius Mushi

Who sacrificed so much through my entire life, and made me who I am today.

ABSTRACT

Promotion of nutritional counseling is an important intervention to vulnerable populations that include HIV positive school going children who have significantly higher nutritional needs. The main objective of this study was to determine extent and factors associated with compliance to nutrition counseling among HIV positive school going children attending MDH care and treatment clinics in Dar es Salaam.

A descriptive cross-sectional study was conducted in Dar es Salaam region from June to July 2010 to assess compliance to nutrition counseling given to HIV positive primary school children attending MDH CTC. Complying to nutritional counseling was defined an HIV positive school going child aged 6-10 years who takes 1810 kilocalories per day or a child 10-15 years who takes 2500 kilocalories per day.

A random sample of 418 HIV positive school going children were selected for the study. Data was generated using structured interviews and standard anthropometric measurements. Overall, the dietary energy intake of a child ranged from (970 to 3050) kilocalories, with mean of 2100 kilocalories and standard deviation of 610 kilocalories. Compliance with nutrition counseling was found to be 50.8%.

Compliance to nutrition counseling was low (50.8%), children less likely to comply were young children $p\text{-}value < 0.01$, males $p\text{-}value < 0.01$, severe disease $p\text{-}value < 0.01$, those on ant-retroviral treatment $p\text{-}value = 0.04$ and with more than three siblings $p\text{-}value < 0.01$. Parents/caretakers factors contributed to child nutrition counseling compliance were education $p\text{-}value < 0.01$, occupation $p\text{-}value = 0.02$ and income $p\text{-}value < 0.05$.

The study therefore underlines the need for development of more nutrition interventions in MDH program focusing on HIV positive school children. The interventions should focus on HIV positive school children of young age, male children, those on ant retroviral treatment as well as those with more than three siblings, as the number of HIV positive school going children is growing every month.

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GLOSARIES

ART	-Ant Retro-viral Therapy
BMI	-Body Mass Index
FANTA	-Food and Nutrition Technical Assistant
MDH	-Muhimbili University of Health and Allied Sciences, Dar es Salaam City Council and Harvard school of public health.
MOHSW	-Ministry of Health and Social Welfare
MUAC	-Mid Upper Arm Circumference
NACP	-National AIDS Control Program
PLHA	-People Living With HIV/AIDS
RDA	-Recommended Daily Allowance
SES	-Socio Economic Status
TFNC	-Tanzania Food and Nutrition Centre
WHO	-World Health Organization

DEFINITIONS

Compliance to nutrition counseling in this study is defined as:

Complying to nutritional counseling was defined an HIV positive school going child aged 6-10 years who takes 1810 kilocalories per day or a child 10-15 years who takes 2500 kilocalories per day.

Asymptomatic stage -Without symptoms

Symptomatic stage -With symptoms

Malnutrition -An abnormal physiological condition caused by deficiencies, excesses or imbalance of energy and nutrients.

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CHAPTER ONE

1:0 Introduction

This chapter explains the background to the problem. I t also states the problem statement, research questions, broad and specific objectives as well as rationale for the study.

1.1 Background information

Human immunodeficiency virus (HIV) infection and the acquired immunodeficiency syndrome (AIDS) are pandemic and pose one of the greatest challenges to nutrition and public health. Many HIV/AIDS-related deaths are aggravated by poor nutrition, which contributes significantly to impaired immunity (MOHSW, 2009). Globally, 39.5 million people were living with HIV and AIDS of which 2.8 million die annually. Sub-Saharan Africa was the worst affected region having about 25.7 million living with HIV and AIDS. Among them there are 2 million children below 15 years living with HIV and AIDS (UNAIDS 2006). In Tanzania there are 1.4 million PLHA of which 110,000 are children below 15 years of age. (NACP, 2009). Consequently HIV/AIDS is a significant problem in Tanzania and access to ART, nutritional counseling and compliance is important.

Many of the conditions associated with HIV/AIDS affect food intake, digestion and absorption, while others influence the functions of the body (Babamento, 1997; Macallan, 1999; WHO, 2003). Nutrition supports for PLHA include nutrition counseling, nutrition education, fighting stigma and discrimination and monitoring of the nutritional status of the person (MOHSW, 2009).

Nutrition counseling is a process of dialogue and mutual interaction aimed at facilitating food and nutrition problem solving, understanding, motivation and decision-making. Also it empowers individuals, families and other specific groups to think and analyze systematically their own situations with regard to food and nutrition issues hence make informed choices and commitment to take actions which are appropriate to their own situation. Nutrition counseling

is of utmost importance to PLHA including children to help them make appropriate food choices and other social behaviors (UN, 2001; US-PEPFAR, 2006; WHO, 2006).

Nutrition counseling to PLHA varies contents depending on underlying nutrition situation like physiological status, age, stage of the infection, ARV use, specific condition of complications, social-economic situation of the household and the community to which one belongs.
In Tanzania nutrition counseling is also an integral part of the nutritional care and support of PLWHA, as it is well elaborated in national guideline for nutrition care and support to PLHA. Quality nutrition counseling and compliance can result in positive changes in nutrition related behavior and help improve the quality of life of PLHA (MOHSW, 2009)

In mitigation of the HIV/AIDS burden there is an ongoing rollout of care and support which include provision of ART and nutritional counseling. Recent mitigation to the HIV/AIDS in Sub-Saharan Africa (SSA) including Tanzania is the roll out of ART and nutritional counseling to PLHA .Maximization of these strategies will rely among others on the extent of compliance and efforts to ensure compliance. This study aims at establishing nutritional compliance among school age children attending CTC using MDH as a case study.

1.2 Problem statement:

UNAIDS report, shows that 2 million children below 15 years of age were living with HIV as of 2006, in Sub-Saharan Africa. In Tanzania mainland it is estimated that 1.4 million (1,300,000 adults and 110,000 children) are living with HIV/AIDS. The social-economic and environmental impact of the pandemic is sorely felt as an estimated 140,000 Tanzanians die annually, leaving behind an estimated 2.5 million orphans and vulnerable children, representing approximately 10-12% of all Tanzanian children. (NACP, 2009).

Before the availability of anti retroviral therapy (ART), children born with HIV had very little chance of survival with two thirds dying before the age of three years and nearly ninety

percent dying by the age of ten especially in poor countries like Tanzania. The introduction of ART and nutritional counseling within the care and support for people including children living with HIV/AIDS is reversing such experience. However in Tanzania, only 11 percent of children less than 15 years in need of ART and nutritional counseling are receiving it (UNDP, 2006). Thus if number of HIV positive children accessing and complying with ART and nutritional counseling increases will enable them develop into healthy young adult and productive Tanzanians.

Nutrition counseling is an ongoing process in which a health professional, usually a nutritionist works with an individual to assess his or her usual dietary intake and identify areas where change is needed. The nutrition counselor provides information, educational materials, support and follow-up to help the individual make and maintain the needed dietary changes so as to promote healthier eating, to adopt a therapeutic diet or to avoid nutrient-drug interactions (Davis and Haughton, 2000).

Nutritional counseling is one of the important nutritional interventions to both HIV positive children and parents/guardians so as to adopt required changes and consumption pattern. Nutrition counseling and compliance has been shown to be effective in improving body weight and body cell mass in PLHA, (Dowling et al.1990; McKinley et al.1994; Rabenech et al.1998).
It also leads to improvement in HIV and AIDS-related morbidity like diarrhea, nausea, vomiting, anemia, oral thrush, loss of appetite and fever (FANTA, 2004).

Hence success of the ongoing roll out care and treatment program for HIV positive children depend on the compliance to the nutritional counseling, regular monitoring and appropriate response. Though factors associated with compliance in Tanzania are not properly documented there is a need to identify them and have in place strategies that facilitate the success of the ongoing roll-out of care and support for HIV positive children in Tanzanian using the MDH program as a case study.

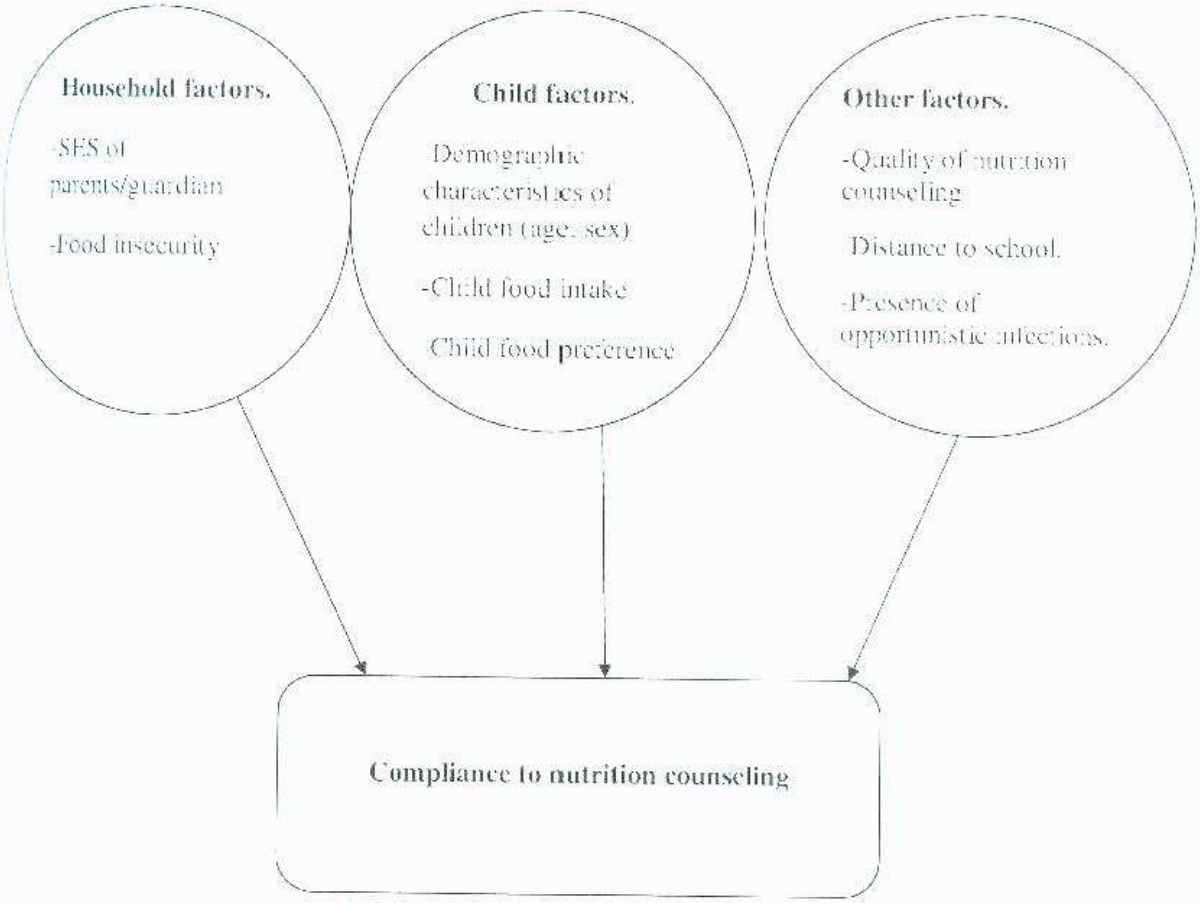
Non-compliance to nutritional counseling could vary between individual child, households and communities and health facilities. However reasons for non-compliance are not clear, but there are a number of limiting factors that may interfere with the success of nutrition counseling such as the intensity of the nutrition counseling intervention, external constraints like low food availability and local culture (Santos et al, 2001). Figure 1 presents the conceptual framework on the relationships of child, household and community factors and compliance to nutrition counseling. Household factors like income and education may potentially contribute to child compliance to nutrition counseling through increased capacity to purchase and process food. Households with better income will be able to purchase or produce more food thus increasing food security. In addition to food security households with better educated head/mother will observe balanced food intake as well as the feeding frequency. Other factors that will affect the food availability at household includes; the environment, political stability and social-cultural.

Compliance to nutritional counseling will also depend on household feeding habits and food preparation which is influenced by the education of parents/guardian. Thus it contributes to food choices, preparations and portion size to the individual child. Individual child that could influence compliance to nutritional counseling includes demographic characteristics like age and sex may contribute to compliance to nutrition counseling. Younger children are less likely to feed themselves compared to older one. Also girls are more likely to participate in food preparation roles which bring an opportunity to food access as compared to boys. Presence of opportunistic infections like prolonged diarrhea, oral thrush and many more reduce food intake and absorption hence low nutrients intake in the body. Also if school child travels long distance to school may interfere with food intake as well as quality of food eaten out of home may be affected.

1.3 CONCEPTUAL FRAMEWORK.

Fig. 1

Factors That May Contribute To Nutrition Counseling Compliance



There is shortage of information on the level of adherence to nutrition counseling and the determining factors among HIV positive school children within the ongoing Care and Treatment Centers in MDH program, Dar es Salaam.

A study which was done in Germany to evaluate the nutrition counseling in HIV-associated malnutrition explained that nutrition counseling may be an effective first-line intervention for malnourished HIV infected patients as more than half of patients gained weight without other nutritional treatment (Schwenk, 2004).

Compliance to nutrition counseling, among school children 6-15 years who are HIV positive in Dar es Salaam city has been either studied but not published or not studied at all as most of studies focus on under fives, adult and other special groups like pregnant mothers living with HIV/AIDS.

Hence common sense tell us that non compliance to nutrition counseling for HIV positive school children will results in poor health, particularly malnutrition and poor school performance. Though in other places there is substantial body of literature backing up this common sense, there has not been adequate research of the subject and adequate dissemination of the research in this part of the world.

National Aids Control Program (NACP) report on research priority areas of (2005) mentioned the group of school children aged (6-15) as a special group which need to be studied.

This research is aiming at finding out compliance to nutrition counseling and contributing factors among HIV positive school children enrolled at MDH program, care and treatment clinics.

1.4 Rationale of the study.

The thesis addresses an important issue of compliance to nutrition counseling among HIV positive school children attending care and treatment centers in Dar es Salaam. It also examines factors that may explain the variation in compliance among this population. This study provides important information that could be used to develop or improve nutrition interventions to mitigate nutritional deficiencies as well as slow down progression of HIV particularly among school children.

1.5 Research questions

1. What is the nutritional status of HIV positive primary school children attending MDH?
2. Are the HIV positive primary school children attending MDH care and treatment clinic complying with nutrition counseling given?
3. How are the parents/caretakers characteristics of HIV positive school children in Dar es Salaam contribute to nutrition counseling compliance?
4. What child factors are associated with nutrition counseling compliance?

1.6 Research objectives

General objective

To assess compliance to nutrition counseling and related factors among HIV positive primary school going children attending MDH CTC in Dar es Salaam.

Specific objectives.

1. To determine percentage of HIV positive primary school going children complying with nutrition counseling.
2. To identify factors contributing to compliance to nutrition counseling among HIV positive children.
3. To assess nutritional status of HIV positive school children attending CTC at MDH program, Dar es Salaam.

CHAPTER TWO

2.0 Literature review

2.1 Nutrition counseling

Current national and global response to HIV/AIDS epidemic includes establishment of care and treatment centers (CTC) in the country gradually. CTC provides holistic care to HIV/AIDS clients which incorporate access to ant-retroviral treatment (ART) and nutritional counseling.

Nutrition counseling is an ongoing process in which a health professional, usually registered dietitian works with an individual to assess his or her usual dietary intake and identify areas where change is needed. The nutrition counselor provides information, education materials, support and follow-up to help the individual make and maintain the needed dietary changes. Nutritional counseling alone can result in increased energy intake among patients with HIV/AIDS (Rabeneck et al, 1998).

Aims of nutrition counseling are to help person living with HIV/AIDS (PLWHA) make informed choices for improving their nutrition, identify and use locally available foods to meet their nutritional needs, understand and adopt practices that promote a healthier nutritional status and to understand how to use diet to manage common HIV/AIDS related symptoms (Kalanzi, 2008).

For the nutrition counseling to be successful, adequate time, adequate teaching materials and patient compliance, are needed. Nutrition counseling program should be structured to meet the requirement of the target population taking into consideration their education level and cultural differences (Raza et al, 2004).In addition nutrition counseling should be sensitive to which history of HIV/AIDS.

In the early stages of HIV infection, nutrition counseling emphasizes in-creasing protein and energy intake by 10%. In case the care giver lacks the physical strength or means to prepare calorie-dense meals, nutritional supplements could be helpful (Piwoz et al, 2000). Later stages of the natural history of HIV infection involve poor absorption of nutrients and energy demand increases. Nutrition counseling should aim to enhance digestion, absorption and increase energy intake by 30-50% (Leung, 1989).
Even after introduction of ART, nutrition counseling remains an important part of the care plan (Nerad et al, 2003).

A study has shown that there are good outcome of nutritional counseling to patients suffering from HIV. A study which was done in Australia found that there was significant increase in weight after nutrition counseling, (Marijka and Roger, 2001).
Another study was conducted in Germany to evaluate nutrition counseling to HIV/AIDS patients found that more than half of the participants gained weight as a result of compliance to nutrition counseling alone without any other intervention (Schwenk et al, 2004)

Studies on compliance to nutrition counseling by school children living with HIV were not found. However studies has been conducted to measure the outcome of nutrition counseling to infant feeding practices, outcome in cancer patients, impact on child growth by Kochler et al,2007; Ravasco et al,2005; and Santos et al,2001 and results were improved nutritional practices and nutritional status to more than half of the participants.

Nutritional counseling and compliance among school age PLWHA is important since as young and adolescents need proper nutritional care for good school performance and meet nutrients needed for both growth and HIV infection. Otherwise adequate nutrition which is best achieved through consumption of a balanced health diet is vital for health and survival for all individuals including school PLWHA (WHO, 2003).

Malnutrition, for instance, often results in considerable dysfunction and disability, reduced quality of life and in some instances increased morbidity and mortality. In HIV-infected children, acquired immunodeficiency syndrome (AIDS) is associated with an impaired nutritional status, growth failure and weight loss, as well as micronutrient deficiencies (Miller et al, 1993).

Weight and height growth of HIV-infected children lags behind that of uninfected children of similar age (Villamor *et al*, 2004)

A study which was conducted in South Africa found that approximately 25-30% of HIV infected children were underweight while 55-60% was stunted (Eley et al, 1999; Eley et al, 2002; Steenkamp et al, 2004).

Similar study on the nutritional status of under five and school going children which was conducted in Kenya showed that HIV and AIDS infections adversely affected school children (Ohiokpehai et al, 2007).Thus access to nutritional counseling and compliance is important in order to meet the nutritional needs of the age group.

Children with early infections (asymptomatic stage) require 10% more energy above the RDA of non-infected child of the same age and sex to maintain growth and development while children with symptoms of AIDS need 20% to 30% more energy above the RDA of non-infected child of the same age and sex (MOHSW,2009).

2.2 Factors contributing to nutrition counseling compliance

2.2.1 Household factors

Food security

Food security at the household level means that all people in the household including young children have access to adequate foods both in quantity and quality to satisfy their physiological needs throughout the year. Generally food security is comprised of availability,

access and utilization. Studies show that HIV and AIDS can reduce household food security rendering children more vulnerable to malnutrition and infections (UNAIDS/UNICEF/USAID, 2004). Thus an infected school going child might not be able to comply to counseling because of food insecurity at family level. Food insecurity at family level would be due to effect of HIV/AIDS epidemic or existing poverty.

Socio-economic status

HIV/AIDS epidemic has had a devastating impact on health, nutrition, food security and overall socio-economic development in countries that have been greatly affected by the disease. This results in poor productivity at family and country levels consequently making them poor. Because of poverty school children don't have access to adequate food that will make them compliant to nutritional counseling.

Food intake frequency

Food history is taken by use of a food frequency questionnaire (FFQ), and can sometimes provide a more accurate picture of a person's typical eating patterns. The nutrition counselor may ask the client how often he/she consumes certain food groups (Davis and Haughton, 2000).Food intake frequency is a result of access to food. Reasons of low access to food may be poverty, little knowledge and poor food storage.

2.2.2 Child factors

Child dietary habits/preference

Food is anything which is acceptable culturally and socially, which can be consumed to provide necessary nutrients which are required by the body for its normal physiology to remain health. Food should contain both macronutrient and micronutrient. The regularity with which food is consumed affects nutritional status. A consistent absence of food intake, lack of habitual pattern of eating, inability to obtain or prepare food daily, lack of social support are

all potential contributors to inadequate food intake and poor nutritional status. (Davis and Haughton, 2000).

Presence of opportunistic infections

HIV-related infections such as tuberculosis and diarrhea not only have nutritional status as a significant determinant of their incidence and severity, but they also have severe nutritional consequences that commonly results in appetite loss, weight loss and wasting. Timely diagnosis and treatment of these conditions including use of antiretroviral treatment (ART) when indicated, can contribute to improved nutrition and health, (WHO; 2003). Sick child will also not comply to counseling because of loss of appetite and energy to go for foods.

This study aims at determining the extent HIV positive school age children complies to nutritional counseling and which among them are factors contribute to compliance.

CHAPTER THREE.

3.0 Methodology.

3.1 Study design

It was a descriptive study implemented within the Muhimbili University of Health and Allied Sciences, Dar es Salaam City Council and the University of Harvard research program. The study was conducted from mid June to July 2010. A quantitative method was employed in the study. Such design was chosen to enable to meet the main objective of the study; first to determine proportion of HIV positive primary school children attending MDH CTC in Dar es Salaam Region who are complying to nutrition counseling given and secondly to establish factors that are associated with compliance to nutrition counseling provided.

3.2 Study site

The study was conducted in Dar es Salaam Region, capital city of Tanzania. Dar es Salaam is situated on the east coast of Tanzania, bordered by the Indian Ocean to the East and on all other sides by the Coast region. Dar es Salaam has three municipalities namely Ilala, Kinondoni and Temeke, it is at sea level with typical tropical climate, hot weather throughout the year, and temperature ranges between 26 to 35° C. Dar es Salaam is the largest city in Tanzania with 2.8 million people, with population increase of 4.39% annually (Mayor, 2010). Dar es Salaam was well suited for this study since it has HIV prevalence of 9.3% (THMS, 2008) with estimated number of PLWHA of 279,000 where 55,800 are eligible for ART. Thus ART needs are very high and efforts are underway to provide it within the MUHAS Harvard (MDH) care and treatment support program.

This study was conducted through MDH program which is collaboration between Muhimbili University of Health and allied Sciences, Dar es Salaam City and Harvard school of public health. The program is providing care, treatment support services since 2004 in twenty eight public health facilities which include among others district hospitals (Mwananyamala, Amana

and Temeke) health centers and dispensaries. Whereas the MDH program provides care and treatment (CTC) to PLHAs in twenty eight facilities, the facilities are grouped into those with nutritionist who provides state of the art counseling and monitoring and those without.

Facilities with nutritionist include the three districts hospitals, three health centers namely Sinza, Buguruni and Mbagala Rangi Tatu and three dispensaries namely Tandale, Mnazi Mmoja and Kigamboni. Also MDH provide care and treatment services at the Infectious Disease Clinic (IDC) which is located near the Central Police Station. IDC had a special service for youth. Nutrition counseling and support is an important component they provide to PLHAs including school age children. Currently numbers of school age children registered in facilities with nutritionist include 569 in Kinondoni Municipality, 948 in Ilala and 608 in Temeke.

3.3 Study population

Study population were school going children of 6-15 years of age who are HIV positive, living in three municipalities of Dar es Salaam, enrolled at MDH CTC clinics. The age range selection was based on the fact that they are young children and adolescents who need proper nutritional care for their school performance and extra nutrients for both growth and fighting HIV infection. There is also limited information on nutrition and compliance to nutrition counseling available for this vulnerable population.

3.3.1 Inclusion/exclusion criteria

Since age category was 6-15 years, the study included children born after June 1995 but not below six years currently depending on the date of interview. Children of the study population who were not going to school were not included as well as those who were less than one month in the program.

3.4 Sample size.

Minimum sample size (n) of children to be included in the study was determined using the following formula for population developed, by (Cochran, 1963).

$n = z^2 p(100-p) / \varepsilon^2$

z= normal standard deviate, normally set at 1.96 which corresponds to a 95% confidence level.

n = the required minimum sample size

p = expected proportion of children complying to nutrition counseling set at 50%, since the author couldn't obtain prior estimates, at the same time it will provide a maximum sample size.

ε = margin of error on p (set at 5%).

$$n = \frac{(1.96)^2 X50(100-50)}{(5)^2}$$

n = 384

The sample size was then multiplied by 110% to compensate for non-response making it 422 and it was rounded off to 450 as the minimum sample size to be studied. Therefore the minimum sample of school going HIV positive children attending MDH services to be included in the study was 450 to be selected from all three Dar es Salaam Municipalities.

3.5 Sampling procedure.

The study was conducted in the three Dar es Salaam Municipalities targeting the HIV positive school going children registered with the facilities participating in the MDH program. Registered children in each district were between 596 in Kinondoni district, Ilala 948 and Temeke 608. For the 450 children, number from each district was proportional to the total number of children attending the services in each respective district. Within each district number of children studied in each clinic was also proportional to the number of children

registered in each clinic i.e. clinics with higher number of children registered proportionally contributed higher number. Within clinics numbers of study participants were divided in three Fridays, where by on each day all study participants' identification numbers were listed and from the list files were randomly selected. That notwithstanding, children studied were 115 from Kinondoni, 187 from Ilala and 116 from Temeke making a total of 418 a high response rate.

3.6 Data collection instrument.

The study used quantitative methods in data collection. Data was collected using structured interview schedule with both closed and open ended questions and anthropometric measurements of weight and height. The tool (see appendix 1) was designed to collect information on socio demographic characteristics of both parents/caretaker and children, parents/care taker economic parameters, last child twenty four hour dietary recall, child eating habits and house hold food security. Questions were written in English; afterward translation was done to Kiswahili language prior so as to ensure that questions were clear and easily understood to the participants.

3.7 Selection and training of research assistants

Principle Investigator (PI) required assistance of ten researchers during field work.MDH nurse coordinator assisted in identifying experienced RA's on dietary assessment techniques.

Three hours orientation training was conducted at each district on the following: Objective of the study, overview on data collection process, selection criteria, interview skills, using the instrument, understanding questions, elaborating why and how it is asked, how responses are recorded and assuring confidentiality.

3.8 Pre-testing

The Kiswahili version of the interview schedule were produced and pre-tested in one of the facilities (AKC) which was not in the sample of facilities to be studied. It was administered to ten parents/caretakers with HIV positive school age children to determine its acceptance and

ability to elicit the expected data. PI and research assistants pre-tested the instrument and the findings were correct therefore the instrument did not require further editing.

3.9 Data collection procedure

3.9.1 Permission to proceed.

Data collection started after obtaining permission from Muhimbili University of Health and Allied Sciences which provided a letter to be able to carry the study in the region. Before carrying out the study permission was also obtained from MDH deputy country director, and from the three municipalities.

3.9.2 Data collection tasks.

Field work lasted for four weeks. During the field, Principal investigator and research assistants conducted interviews to the parents/guardian of the selected child in privacy but within the clinic setup. Children were not interviewed due to the nature of the clinic; it was a CTC with issues of confidentiality and disclosure, also children age varied from six to fifteen years which could lead to biases in responses. The interview schedule comprised of sections on the following:

- Demographic and socioeconomic characteristics of child and parents/guardian.
- Nutritional counseling compliance assessment.
- Nutritional status assessments (anthropometric measurements).
- Other factors.

Data collections for the each of the section were as follows:

3.9.3 Demographic and socio economic

This section generated child and parents/guardian demographic and socioeconomic factors that are associated with compliance to nutritional counseling. Child variables included age/ date of birth of the child, sex and distance they travel to rich school. Also parents/care takers age, religion, marital status, level of education, source of income and amount of income.

3.9.4 Child Nutritional status assessments

Anthropometric measurements of weight in kilogram and height in centimeter to establish nutritional status was done using weighing scale for measuring weight and height stadiometer with a movable headpiece for height. Weights in (kg) of the children were taken using calibrated scales available at MDH and heights in (cm) were taken using stadiometers available at MDH sites. Scales were calibrated using standard stones on daily basis. Height also was measured using standard stadiometers available at all MDH sites. Both measurements were recorded in one decimal place. Seca 120 model of scales were used as well as for height stadiometer.

Children were weighed in light clothes, without shoes as well as head cover, as per MDH SOP's. Children Body mass index (BMI) was assessed using statistical analysis software (SAS) program which MDH program is using for monitoring and evaluation. WHO reference for HIV positive children of 2007, was used for comparison where by all children who were from -2SD and below were undernourished, see appendix. 5).

3.9.5 24 hour dietary recall method.

Twenty four hour recall was chosen over other dietary recall as there are many advantages to the 24-hour recall, (Conway et al, 2004). An interviewer administers the tool and records the responses, so literacy of the respondent was not required. Also because of the immediacy of the recall period, respondents are generally able to recall most of their dietary intakes. Because there is relatively little burden on the respondents, those who agree to give 24-hour

dietary recalls are more likely to be representative of the population than those who agree to participate using other dietary assessments method. Thus, 24-hour dietary recall method is useful across a wide range of populations.

3.9.6 Nutritional counseling compliance assessments.

In this section parents/guardian of the child were asked to recall child food intake during the last 24-hour period. Interviewers had food models and utensils to help participants recall amount of food that was taken by a child, then interviewer recorded food taken, and amount in a standard format. Models and utensils which were used have been in the Harvard nutrition research for more than ten years and also have been used in developing Tanzania food composition table. All 24 hour recall data were collected on Friday, which is the day for pediatric visit at MDH program. Later foods and amount were coded by data coder specialist at MDH. Coded data were entered in Microsoft access and later SAS program was used to compute the amount of Kilocalories (kcal) an individual child consumed in that day (focusing on energy consumption only). Analysis of 24 hour was greatly assisted by specialist from Harvard project, using Tanzanian food composition table, (Lukmanji et al, 2008).

Definition of compliance was the child of age group 6-10 should at least have taken not less than 1810 kilo calories the day prior to interview, while those of age group 10+ were suppose to take not less than 2500 kilocalories per the day of the interview, (MOHSW, 2009).

3.9.7 Other assessments

This section asked questions to estimate distance which a child travel daily to school and number of child siblings. Also information on child WHO staging, whether a child was on antiretroviral drugs or not and years a child has stayed in the program were obtained from MDH child data base.

3.10 Data management

Supervision of questionnaire filling by PI was the main aspect of data quality control. The risk of research assistants recording wrong responses on accounts of having misunderstood

questions was minimized for that matter. Principal investigator collected the completed questionnaire everyday and checked each for inconsistencies and omissions. Corrections were done including revisiting an individual child database.

3.11 Data processing and analysis

Collected data were edited during and after colleting and coded. Data were entered by PI together with three data clerk into computer using Microsoft access 2007 and later cleaned. Analysis was done using statistical analysis software (SAS). Initial data analysis included producing lists, frequency tables and cross tabulation. Then a bivariate analysis was performed to examine the association of nutritional counseling compliance and individual factors. Statistical significance of association was assessed using X^2 test at a significant level of 0.05. Multivariate analysis was also performed to test for association between the dependent variable and a group of independent variables. For this analysis all child factors (sex, age, date of enrollment, WHO staging, ARV status and time spent to rich school), which show to be associated with child compliance to nutrition counseling were simultaneously entered in the model as predictor variable and compliance to nutrition counseling as an outcome variable.

3.12 Ethical consideration

Ethical clearance was sought from Muhimbili University of Health and Allied Science Research and publications ethical committee. Permission to do the study in the health facilities was granted from MDH and respective districts administrative authorities. Similarly permission was sought from each person in charge as well as the other workers in respective MDH sites.

Written informed consent was sought from the guardians of the study participants (see appendix 3, 4). Participants were informed verbally about the purpose, methodology and benefit of the study. The right of respondents to participate in the study or not were respected.

Only those who consented were interview, and were allowed to withdraw from the study at any point.

Study participants were assured of confidentiality and anonymity by assigning them with numbers instead of names.

3.13 Strength of the study

Random sampling method was used in this study therefore results can be generalized within population of HIV positive school going children in Dar es Salaam. Study was able to determine some factors which contribute to nutrition counseling compliance to HIV positive school going children; also it was an original study so it has contributed in covering knowledge gap in this area.

CHAPTER FOUR

4.0 Results

4.1 Socio-demographic characteristics of the sample study.

Of 418 children studied there were 212 (50.7%) males and most (52.6%) were in age group (6-9) years, see Table 1. Most children (40.7%) had been in the program for two to four years and 33.7% had been in the program for less than two years. Half of the children (51%) were in WHO stage three, while the rest 126 (30.1%) were in WHO stage two, 39 (9.3%) in WHO stage four and 37 (8.9%) in WHO stage one. Majority of children (85.9%) were on ARV's and more than (71.8%) used less than half hour to rich school. One third of the children had no siblings while the rest had one to more than three siblings.

Table 1: Demography and health characteristics of school children attending MDH CTC sites.

	Municipality			
Characteristics	Kinondoni n(%) N=115	Ilala n(%) N=187	Temeke n(%) N=116	Total n(%)
Sex of children				
Male	60 (52.2)	85 (45.5)	67 (57.8)	212 (50.7)
Female	55 (47.8)	102 (54.5)	49 (42.2)	206 (49.3)
Age group (yrs)				
6-9	68 (59.1)	87 (46.5)	65 (56.1)	220 (52.6)
10+	47 (40.9)	100 (53.5)	51 (43.9)	198 (47.4)
Date of enrollment				
< 2 yrs	42 (36.5)	48 (25.7)	51 (44.0)	141 (33.7)
2-4 yrs	44 (38.3)	92 (49.2)	34 (29.3)	170 (40.7)
> 4 yrs	29 (25.2)	47 (25.1)	31 (26.7)	107 (25.6)
WHO staging				
Stage one	9 (7.8)	21 (11.2)	7 (6.0)	37 (8.9)
Stage two	17 (14.8)	66 (35.3)	43 (37.1)	126 (30.1)
Stage three	76 (66.1)	86 (46.0)	54 (46.6)	216 (51.7)
Stage four	13 (11.3)	14 (7.5)	12 (10.3)	39 (9.3)

ARV status				
Yes	99 (86.1)	162 (86.3)	99 (85.3)	360 (86.1)
No	16 (13.9)	25 (13.7)	17 (14.7)	58 (13.9)
Child siblings				
No siblings	27 (23.5)	55 (29.4)	50 (43.1)	132 (31.6)
1 siblings	34 (29.6)	45 (24.1)	18 (15.5)	97 (23.2)
2 siblings	32 (27.8)	39 (20.9)	26 (22.4)	97 (23.2)
3+ siblings	22 (19.1)	48 (25.7)	22 (19.0)	92 (22.0)
Time spent to reach school				
Less than half hour	76 (66.1)	141 (21.9)	83 (71.5)	300 (71.8)
Half to one hour	35 (30.4)	41 (75.4)	30 (26.0)	106 (25.2)
More than one hour	4 (3.5)	5 (2.7)	3 (2.5)	12 (3.0)

Most participants (44%) were from Ilala district, (27%) in Temeke district and (27%) in Kinondoni. The study also interviewed all parents/guardian of whom majority 390 (93%) were females, see Table 2. The age of the parents/guardian varied from 17 to 58 years with mean age of 37 years. Of all study parents/guardian, 225 (54.8) were Christian and the rest were Muslims, married 215 (51.7%) and more than half 254 (60.8) were earning their living through informal and about 63% of parents/guardian had primary education. Small proportion of parents/guardian (17.5%) earned more than two hundred Tanzanian shillings. Among those who accompanied the children more than half (61%) were parents and the rest were grand parent (10%), other relatives like uncle and aunt (20.6%) and sister or brother (8.4%).

Table 2: Socio-demographic characteristics of the (parents/guardian), of the study participants.

	Municipality			
Characteristics	Kinondoni n(%) N=115	Hala n(%) N=187	Temeke n(%) N=116	Total n(%) N=418
Sex				
Male	4 (3.5)	10 (5.4)	14 (12.1)	28 (7.0)
Female	111 (96.5)	177 (94.6)	102 (87.9)	390 (93.0)
Age				
<35	50 (43.3)	76 (40.6)	38 (32.8)	164 (39.2)
35-44	51 (44.4)	78 (41.7)	50 (43.1)	179 (42.8)
45+	14 (12.1)	33 (17.7)	28 (24.1)	75 (18.0)
Religion				
Christian	58 (51.0)	104 (55.1)	65 (56.0)	225 (54.8)
Moslems	57 (49.0)	83 (44.9)	51 (44.0)	190 (45.2)
Marital status				
Single	24 (21.0)	43 (23.0)	18 (15.5)	85 (20.3)
Married/Cohabiting	70 (61.0)	85 (45.5)	61 (52.7)	215 (51.7)
Separated/divorced	6 (5.0)	26 (14.0)	22 (18.9)	54 (12.9)
Widowed	15 (13.0)	33 (17.5)	15 (12.9)	63 (15.1)
Education status				
No formal education	19 (16.5)	18 (9.6)	30 (25.9)	67 (16.0)

Primary	72 (62.6)	125 (67.0)	68 (58.6)	265 (63.4)
Secondary +	24 (20.9)	44 (23.4)	18 (15.5)	86 (20.6)
Occupation				
Peasant	5 (4.4)	23 (12.3)	2 (1.7)	30 (7.2)
Formal employment	61 (53.0)	38 (20.3)	35 (30.2)	134 (32.0)
Informal employment	49 (42.6)	126 (67.4)	79 (68.1)	254 (60.8)
Income in Tsh.				
< 60,000	41 (35.7)	59 (31.5)	41 (35.3)	140 (33.5)
60,000-99,999	26 (22.6)	47 (25.0)	17 (14.7)	90 (21.5)
100,000-199,999	25 (21.7)	50 (27.0)	40 (34.5)	115 (27.5)
200,000+	23 (20.0)	31 (16.5)	18 (15.5)	72 (17.5)
Relationship with child				
Parent	78 (67.8)	104 (55.6)	73 (63.0)	255 (61.0)
Grand parent	9 (8.0)	20 (10.7)	13 (11.2)	42 (10.0)
Sister/brother	6 (5.2)	21 (11.2)	8 (6.8)	35 (8.4)
Other	22 (19.0)	42 (22.5)	22 (19.0)	86 (20.6)

4.2 Compliance to nutrition counseling

Out of 418 children who were given nutrition counseling for HIV positive children, half of them 213 (50.84%) were complying with nutritional counseling.

Female children were slightly more (54.4%) compliant to nutrition counseling than males (47.4%), see Table 3. Proportion complying with nutritional counseling increased with age of

the child from (38.6%) in age group (6-9) years to (64.3%) percent in age 10 years or more. The variation was statistically significant ($X^2 = 27.58$, P value = < 0.01).

About half (50.4%) of those enrolled less than two years complied, while those enrolled two to four years it was (52.4%) and 49.1% among those enrolled more than four years. There was no significant variation in compliance to nutrition counseling by duration since; ($X^2 = 0.3$, P value =0.86).

Out of 216 children who were in WHO stage three, 134 (61.7%) were complying with nutrition counseling, 40 (31.7%) out of 126 in stage two, 26 (66.7%) out of 39 in stage four and 13 (36.1%) out of 37 in stage one. Variation in nutrition counseling compliance by WHO staging was statistically significant ($X^2 = 3$ 6.78, P value = < 0.01). Among those on ARV's 192 (53.3%) were complying with nutrition counseling, while those not on ARV's a lower percentage complied (34.5%). Variation in compliance by ARV's status of children was statistically significant ($X^2 = 8.07$, P value = 0.02).

Just below half (44.4%) of children who had no siblings were complying with nutrition counseling, while it was 54.6% for children with one sibling, those with two siblings (61.9%) and among those with three or more sibling it was 55.4%. The variation in nutritional counseling with sibling size was statistically significant, ($X^2 = 8.95$, P value = 0.03).

Table 3: Children compliance to nutrition counseling and children selected characteristics.

Variables	Compliance			
	Yes (%)	No (%)	X^2	p-value
Sex of children				
Male	101 (47.4)	112 (52.6)	2.02	0.15
Female	112 (54.4)	94 (45.6)		
Age group (yrs)				
6-9	85 (38.6)	135 (61.4)	27.58	< 0.01
10+	128 (64.3)	71 (35.7)		
Date of enrollment				
< 2 yrs	71 (50.4)	70 (49.6)	0.30	0.86
2-4 yrs	89 (52.4)	81 (47.6)		
> 4 yrs	53 (49.1)	55 (50.9)		
WHO staging				
Stage one	13 (36.1)	23 (63.9)	36.78	< 0.01
Stage two	40 (31.7)	86 (68.3)		
Stage three	134 (61.7)	83 (38.3)		
Stage four	26 (66.7)	13 (33.3)		
ARV status				
Yes	192 (53.3)	168 (46.7)	8.07	0.02
No	20 (34.5)	38 (65.5)		

Child siblings				
No siblings	59 (44.4)	74 (55.6)	8.95	0.03
1 siblings	53 (54.6)	44 (45.4)		
2 siblings	60 (61.9)	37 (38.1)		
3+ siblings	41 (44.6)	51 (55.4)		
Time spent to reach school				
Less than half hour	154 (51.3)	146 (48.7)	1.75	0.44
Half to one hour	51 (47.6)	56 (52.3)		
More than one hour	8 (66.7)	4 (33.3)		

4.3 Children nutrition counseling compliance in relation to the demography and socioeconomic characteristics of the parents/guardian.

Among children accompanied by a male parent/guardian compliance was slightly higher (57.1%) while those brought by a female it was 50.4% (197), see Table 4.

Children whose parents/guardian were Muslims had higher proportion complying (52.4%) compared to (49.3%) among Christians. Those children whose parents/guardian were separated, a small proportion (45.5%) complied while it was higher among married couples (50.2). However this difference was not statistically significant (X^2 =6.2, P value = 0.18).

Children whose parents/guardian had no formal education had the lowest compliance (33.8%) followed by (55.9%) among those with primary education and highest (58.8%) among those with more than primary school education (X^2 = 11.68, P value = 0.01).

Out of 134 parents/guardian who were working in formal sector 52.2 % of their children complied with nutrition counseling, while it was 51.4% among those in informal sector and 40% among peasants. Variation in nutrition counseling compliance in relation to occupation was statistically significant ($X^2 = 10.13$, P value = 0.02)

Compliance also varied by the level of income of the parents/guardian, which was highest (58.9%) among those earning more than two hundred thousands shillings per month and was least (40.9%) among those earning between one hundred thousands shillings and two hundred thousands shillings. Variation in income was statistically significant ($X^2 = 9.21$, P value =0.05). Among those accompanied to the clinic by parent a high proportion (52.6%) complied and it was last (34.5%) among those brought in by an elder sibling.

Table 4: Nutrition counseling compliance in relation to the demographic and socio-economic characteristics of the parents/guardian.

Characteristics	Compliance to nutrition counseling			
	Yes (%)	No (%)	X^2	p-value
Sex of parent/guardian				
Male	16 (57.1)	12 (42.9)	0.47	0.49
Female	197 (50.4)	294 (47.6)		
Age				
<35	84 (51.2)	80 (48.8)	0.04	0.98
35-44	90 (50.3)	89 (49.7)		
45+	39 (51.3)	37 (48.7)		
Religion				
Christian	111 (49.3)	114 (50.7)	0.68	0.71
Moslems	100 (52.4)	91 (47.64		
Marital status				
Single	40 (47.1)	45 (52.9)	6.23	0.1829
Married/Cohabiting	108 (50.2)	107 (49.8)		
Separated/divorced	25 (45.5)	30 (54.5)		
Widowed	40 (63.5)	23 (36.5)		
Education status				
No formal education	23 (33.8)	45 (66.2)		

Primary	148 (55.9)	117 (44.1)	11.68	0.01
Secondary +	42 (58.8)	44 (51.2)		
Occupation				
Peasant	12 (40.0)	18 (60.0)		
Formal employment	70 (52.2)	64 (47.8)	10.13	0.02
Informal employment	131 (51.4)	124 (48.6)		
Income in Tsh.				
< 60,000	70 (50.0)	70 (50.0)		
60,000-99,999	52 (57.8)	38 (42.2)		
100,000-199,999	47 (40.9)	68 (59.1)	9.21	0.05
200,000+	43 (58.9)	30 (41.1)		
Relationship with a child				
Parent	134 (52.6)	121 (47.4)		
Grand parent	18 (41.9)	25 (58.1)		
Sister/brother	12 (34.3)	23 (65.7)	6.82	0.08
Other	49 (60.6)	37 (39.4)		

4.4 Multivariate analysis

4.4.1 Compliance to nutrition counseling and child associated factors.

A multiple logistic analysis was performed to examine the extent to which predictor variables contributed to (outcome variable) compliance to nutrition counseling among school children. Results from Table 5 shows that child sex, age, date of enrollment, WHO staging and ARV

status were independently associated with child compliance to nutrition counseling. Thus male children compared to female were less likely to comply with nutrition counseling [OR = 0.76, CI 0.5-0.3]. Children of 6-9 years compared to those 10 years and more were less likely to comply to nutrition counseling [OR = 0.28, CI 0.2-0.4].

Children who had been in the program for less than two years compared with those been there for two years and or more were less likely to comply to nutrition counseling [OR = 1.49, CI 1.8-2.5]. Also those in WHO stage three compared to stage four were less likely to comply to nutrition counseling [OR = 0.85, CI 0.4-0.8], while children on ARV's compared to those not on ARV's were also less likely to comply with nutrition counseling [OR = 0.8, CI 0.4-0.6]. Children with less than three siblings compared to those with three and more were more likely to comply; [OR= 2.42, CI 1.3-4.6], while children who spent less than half an hour to reach school compared to those who used half hour and more were more likely to comply.

Table 5: Nutrition counseling compliance adjusted for sex, age, date of enrollment, WHO staging, ARV status, child's siblings and the time spent by a child to rich school.

Variable	Crude			Adjusted		
	OR	95 % CI	p-value	OR	95% CI	p-value
Sex of children						
Male	0.84	(0.5 1.1)	0.15	0.76	(0.5 - 0.3)	< 0.01
Female	Reference					
Age group (yrs)						
6-9	0.35	(0.2 - 0.5)	< 0.01	0.28	(0.2 - 0.4)	< 0.01
10+	Reference					
Date of enrollment						
< 2 yrs	1.05	(0.6 - 1.7)	0.84	1.49	(0.8 - 2.5)	0.28
2-4 yrs	1.14	(0.7- 1.8)	0.59	1.57	(0.8 - 2.7)	0.25
> 4 yrs	Reference					
WHO staging						
Stage one	0.28	(0.1 - 0.7)	< 0.01	0.25	(0.1 - 0.7)	< 0.01
Stage two	0.23	(0.1 - 0.4)	<0.01	0.22	(0.2 - 0.5)	0.04
Stage three	0.81	(0.4 - 1.7)	0.56	0.85	(0.4 - 1.8)	0.97
Stage four	Reference					
ARV status						

Yes	2.2	(0.2 - 3.9)	0.03	0.8	(0.4 - 0.6)	0.04
No	Reference					
Child siblings						
No siblings	0.99	(0.6 - 1.7)	0.98	1.09	(0.6 - 1.9)	0.09
1 siblings	1.49	(0.8 - 2.7)	0.17	1.69	(0.9 - 3.2)	0.43
2 siblings	2.01	(1.1 - 3.60)	0.02	2.42	(1.3 - 4.6)	0.01
3+ siblings	Reference					
Time spent to reach school						
Less than half hour	0.52	(0.2 - 1.8)	0.30	0.58	(0.2 - 2.2)	0.71
Half to one hour	0.45	(0.1 - 1.6)	0.22	0.45	(0.1 - 1.8)	0.19
More than one hour	Reference					

4.4.2 Child nutrition counseling compliance with parents/guardian associated factors.

Table 6 presents results of multivariate analysis of compliance to parents/guardian characteristic. Characteristics that revealed significant association were marital status, income and relationship with child.

Children of single parents/guardian compared to widow parents were less likely to comply [OR = 0.45, 95%.CI 0.2-0.9]. Married/cohabiting parents/guardian compared to separated were more likely to comply, [OR = 0.43, 95% CI 0.2-0.8].

Income also was associated with counseling compliance as those children whose parents/guardian earned between one hundred thousands and two hundred thousands

Tanzanian shillings were less likely to comply to nutrition counseling compared to those children who there parents/guardian were having high income [OR = 0.46,CI 0.2_0.9].

Table 6: Nutrition counseling compliance adjusted for demographic and socio-economic characteristics of the parents/caretaker.

Characteristics	Crude			Adjusted		
	OR	95%CI	p-value	OR	95%CI	p-value
Sex /parents/caretaker						
Male	1.31	(0.6 - 2.8)	0.49	1.33	(0.5 - 3.1)	0.50
Female	Reference					
Age						
<35	0.99	(0.6 - 1.7)	0.98	1.90	(0.4 - 1.8)	0.49
35-44	0.95	(0.6 - 1.6)	0.87	0.86	(0.4 - 1.5)	0.65
45+	Reference					
Religion						
Christian	0.89	(0.6 - 1.3)	0.63	0.90	(0.6 - 1.4)	0.61
Moslems	Reference					
Marital status						
Single	0.51	(0.2 - 0.9)	0.04	0.45	(0.2 - 0.9)	0.01
Married/Cohabiting	0.58	(0.3 - 2.5)	0.06	0.43	(0.2 - 0.8)	0.02
Separated/divorced	0.47	0.2 - 0.4)	0.05	0.41	(0.2 - 0.9)	0.01

Widowed	Reference					
Education status						
No formal education	1.32	(0.8 - 2.8)	0.26	1.27	(0.7- 2.1)	0.39
Primary	0.54	(0.2 - 1.3)	0.06	0.53	(0.2 - 1.1)	0.92
Secondary+	Reference					
Occupation						
Peasant	0.63	(0.3 - 1.4)	0.24	0.65	(0.3 - 1.6)	0.34
Formal employment	1.04	(0.7 - 1.6)	0.87	0.94	(0.6 - 1.6)	0.79
Informal employment	Reference					
Income in Tsh.						
< 60,000	0.69	(0.4 - 1.2)	0.09	0.67	(0.3 - 1.3)	0.26
60,000-99,999	0.48	(0.5 - 1.8)	0.84	0.92	(0.4 - 1.9)	0.83
100,000-199,999	0.95	(0.3 - 0.9)	0.01	0.46	(0.2 - 0.9)	0.02
200,000+	Reference					
Relationship / child						
Parent	0.84	(0.5 - 1.4)	0.48	0.74	(0.4 - 1.3)	0.27
Grand parent	0.54	(0.2 - 1.1)	0.10	0.44	(0.2 - 1.1)	0.07
Sister/brother	0.39	(0.2 - 0.9)	0.03	0.33	(0.1 - 0.8)	0.02
Other	**Reference**					

4.5 Children nutritional status using Body Mass Index (BMI) according to demographic and selected child characteristics.

Out of 418 children 364 (86.8%) had normal (healthy) nutrition according to the body mass index, see Table 7.

More than four fifth (87.3%) of male children had normal nutritional status, and female had similar proportion (86.4%). Children 6-9 years had more than four fifths (88.2%) with normal nutritional status while those with ten years or more it was (85.4%).

Table 7: Relationship between normal Body Mass Index (BMI) of the children with selected child characteristics.

Characteristics	Body Mass Index			
	Normal (BMI)	Below normal (BMI)	X^2	p-value
Sex of children				
Male	186 (87.3)	27 (12.7)	0.07	0.78
Female	178 (86.4)	28 (13.6)		
Age group (yrs)				
6-9	194 (88.2)	26 (11.8)	0.69	0.40
10+	170 (85.4)	29 (14.6)		
Date of enrollment				
< 2 yrs	121 (85.8)	20 (14.2)	0.54	0.76
2-4 yrs	147 (86.5)	23 (13.5)		
> 4 yrs	96 (88.9)	12 (11.1)		
WHO staging				
Stage one	32 (88.9)	4 (11.1)	3.86	0.42
Stage two	111 (88.1)	15 (11.9)		
Stage three	183 (84.3)	34 (15.6)		
Stage four	37 (94.9)	2 (5.1)		
ARV status				
Yes	311 (86.4)	49 (13.6)		

No	52 (89.7)	6 (10.3)	0.62	0.73
Child siblings				
No siblings	114 (85.7)	19 (14.3)	4.69	0.19
1 siblings	83 (85.6)	14 (14.4)		
2-3 siblings	138 (90.8)	14 (9.2)		
More than three siblings	29 (78.4)	8 (21.6)		
Time spent to reach school				
Less than half hour	265 (88.3)	35 (11.7)	2.81	0.24
Half to one hour	88 (82.2)	19 (17.8)		
More than one hour	11 (91.7)	1 (8.3)		
No of meals per day				
< 3	40 (81.6)	9 (18.4)	1.34	0.31
3+	324 (87.6)	46 (12.4)		

Results in Table 8 shows the relationship between children body mass index in relation socio-demographic characteristics of the parents/guardian.

Children who were accompanied to the clinic by a male parent/guardian had slightly lower proportion (82.1%) with normal nutritional status compared to female (87.21%). see Table 8. Among parent/guardian of young age (less than thirty five) a high proportion had normal nutritional status (89.6%) and least (76.3%) among those in forty five years or more.

Children of parents with secondary school education had the highest nutritional status (89.5%) followed by those with primary education (89.4%) and last was among those without education (76.5%) ($X2 = 18.21$, $P = < 0.01$).

Table 8: Nutritional status of children in relation to the demographic and socio-economic characteristics of the parents/guardian.

Characteristics	Nutritional status		X^2	p-value
	Normal weight	underweight		
Sex				
Male	23 (82.1)	5 (17.9)	0.58	0.44
Female	341 (87.2)	50 (12.8)		
Age				
<35	147 (89.6)	17 (10.4)	9.12	0.01
35-44	159 (88.8)	20 (11.2)		
45+	58 (76.3)	18 (23.7)		
Religion				
Christian	202 (89.8)	23 (10.2)	4.35	0.11
Moslems	160 (83.8)	31 (16.2)		
Marital status				
Single	75 (88.2)	10 (11.8)		
Married/Cohabiting	189 (87.9)	26 (12.1)		

Separated/divorced	44 (80.0)	11 (20.0)	2.78	0.59
Widowed	55 (87.3)	8 (12.7)		
Education status				
No formal education	50 (73.5)	18 (26.5)		
Primary	237 (89.4)	28 (10.6)	18.21	< 0.01
Secondary +	77 (89.5)	9 (10.5)		
Occupation				
Peasant	28 (93.3)	2 (6.7)		
Formal employment	120 (89.5)	14 (10.5)		
Informal employment	216 (84.7)	39 (15.3)	4.78	0.19
Income in Tsh.				
< 60,000	121 (86.4)	19 (13.6)		
60,000-99,999	79 (87.8)	11 (12.2)		
100,000-199,999	98 (85.2)	17 (14.8)	0.82	0.93
200,000+	65 (89.0)	8 (11.0)		
Relationship with a child				
Parent	225 (88.2)	30 (11.8)		
Grand parent	34 (79.1)	9 (20.9)		
Sister/brother	28 (80.0)	7 (20.0)	5.16	0.27
Other	60 (90.9)	6 (9.1)		

CHAPTER FIVE

5.0 Discussion

5.1 Children Compliance to Nutrition Counseling.

The study findings revealed that (49.2%) of HIV positive school children attending the MDH program did not comply with the nutritional counseling. Compliance was significantly ($p < 0.05$) lower among male children, less than 10 years old.

5.2 Characteristics of children in relation to nutritional counseling compliance.

The study included data on characteristics namely age, sex, date of enrollment, WHO staging, ARV status, child siblings, and time spent to reach school and how they affect nutrition counseling compliance. Analysis revealed that there was a significant ($p < 0.05$) relationship between child age and compliance to nutrition counseling. Children of younger age group were complying less than the older group. Some of the explanation could be that older children could find food for themselves; also they were informed and hence could follow instruction better.

Also sex of a child was found to be associated with compliance to nutrition counseling where by female children complied more than male children. An explanation could be female children had more access to food given food preparation roles in the families.

The study also revealed that there was relationship between WHO staging and compliance to nutrition counseling. Those in earlier stages had low compliance compared to advanced WHO stages. Possibly children in advanced stages were also sick which could attract better care from parents/guardian. Relationship with taking ARV could also attract intensified care from parents/guardian in response to the morbidity.

Also study found that nutrition counseling compliance of a HIV positive school child was related to number of siblings a child has.

5.3 Characteristics of parents in relation to children compliance.

Present study analyzed eight parents/guardian characteristics, namely age, sex, religion, education level, marital status, occupation income, relationship with a child and how they affect child compliance to nutrition counseling, which was statistically significant ($p < 0.05$) related with nutrition counseling was high parent/guardian education. Literature also revealed that educated parents has better socioeconomic status, better actions and choices which have large impact on child rearing and hence better nutritional practice. (Frongillo et al.1997). Also (Dunbar, 1990) reported that factors that appear to significantly influence compliance include patient knowledge, confidence and ability to follow instructions, perception of health and benefits of therapy and availability of socio support. However it is also noted that, if compliance is not continually reinforced over time, the behavior is not maintained.

Study also found that parent/guardian marital status is associated with child compliance to nutrition counseling. Children living with widowed parents were more likely to comply with nutritional counseling. Widowed parent/guardian could be more likely to attract sympathy from community hence more nutritional support to children in such household. Also widows could be more likely get the support of non governmental organizations as they often target widows and orphans for their support.

Also the study found that child compliance was related to parent/guardian occupation, as well as income. Income and high education reflects higher capacity to provide care and better nutrition at household and therefore compliance to counseling.

5.4 Study limitations

Despite of our findings our results should be interpreted as following:

- Results were based on parents/guardian self reports, which might lead to under or over reporting, children dietary issues are concern which might limit parent/guardian honest reporting. However research assistant were trained and had counseling skills which enabled them to collect required information.
- Recall bias are always acknowledged in dietary intake studies. Participants might have forgotten some of meal taken by a child. However participants were probed to recall activities performed on the day prior to interview which helped them to remember about meals taken by a child.
- The study was carried out in care and treatment centers, by involving 418 HIV positive school children, hence making the research participants very selective.
- With inherited weaknesses of cross sectional study it is difficult to conclude if the observed factors contributing to child nutrition counseling were causal.

CHAPTER SIX

6.0 Conclusions and recommendations

6.1 Conclusion

Study findings indicate that nutrition counseling compliance as measured by 24 hour recall is low among HIV positive school going children attending MDH care and treatment clinics.

Compliance to nutrition counseling was low in younger children, six to ten years of age also to male children. Also children in severe disease stages, those on ant-retroviral drugs and children with more than three siblings were less likely to comply to nutrition counseling. Parents/caretakers factors contributed to child nutrition counseling compliance were education occupation *and* income.

The study therefore underlines the need for development of more nutrition interventions in MDH program focusing on HIV positive school children. The interventions should focus on HIV positive school children of young age, male children, those on ant retroviral treatment as well as those with more than three siblings, as the number of HIV positive school going children is growing every month.

The study therefore underlines the need for development of more nutrition interventions in MDH program focusing on HIV positive school children as the number of HIV positive school going children is growing every month.

6.2 Recommendations.

This study provides baseline information of the nutrition counseling compliance among HIV positive school going children, attending MDH care and treatment clinic. We therefore recommend the following to MDH program, the local health policymakers, donors and stakeholders involved in HIV programs, research institutions, ministry of education and ministry of health:

- Although initiatives to tackle non compliance to nutrition counseling in MDH CTC are underway, which comprise employing more nutritionist, lounging food for prescription program and referral for socio-support where there is a need, it will be good for the program to focus more to the HIV positive children of younger age six to ten years, male children, and those children on advanced disease stages. Also more focuses are needed to children on ant retroviral drugs and those with more than three siblings.

- More nutrition health education interventions are needed to parents/guardian of HIV positive school children of younger age, those on advanced stages and male children focusing on the importance of enough nutrients intake to their children.

- More nutrition interventions focusing on parents/guardian who are married/cohabiting are needed as children from those families were less likely to comply to nutrition counseling compared to those from parents/guardian of other marital status.

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