

**CONSUMPTION LEVELS OF FRUITS AND VEGETABLES AND THEIR  
RELATIONSHIP TO HEALTH AND WELLBEING OF ELDERLY PEOPLE  
OF DIFFERENT SOCIO- ECONOMIC BACKGROUND IN ILALA  
DISTRICT, DAR ES SALAAM**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF  
REQUIREMENT FOR THE DEGREE OF MASTER OF ENVIRONMENT  
STUDIES (HEALTH) OF THE OPEN UNIVERSITY OF TANZANIA**

**2014**

**CERTIFICATION**

The undersigned certifies that, he has read and hereby recommends for acceptance by the Open University of Tanzania, a dissertation titled: “*Consumption Levels of Fruits And Vegetables and their Relationship to Health and Wellbeing of Elderly People of Different Socio- Economic Background in Ilala District, Dar es Salaam*”, in partial fulfilment of the requirements for the degree of Master of Environment Studies (Health) of the Open University of Tanzania.

.....

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.....

Date

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I, Frank Balegu, do hereby declare that this dissertation submitted is my own original work and that it has not been presented and will not be presented to any other university or higher institution of learning for a similar degree or any other degree award.

.....

Signature

.....

Date

**DEDICATION**

This dissertation is lovingly dedicated to my lovely wife Mollen Simule and my parents who have been my constant source of inspiration.

## ACKNOWLEDGEMENT

My God rules my life, I have seen Him. Thank you Abba Father. I wish to thank all people who assisted me to the successful completion of this research. More specific I wish to write my sincere gratitude to my family for this life promoting event as they have funded my school.

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However, I remain solely responsible and accountable for any lack of clarity and accuracy in this dissertation. None of the above named persons is associated with any short comings in this dissertation.

**ABSTRACT**

The purpose of this study was to determine the consumption levels of fruits and vegetables (fruits and vegetables) and their relationship to health and wellbeing of elderly people of different socio economic background in Ilala district, Dar es Salaam. The study was a cross-sectional descriptive research design with a convenient sample in purposively selected urban and semi-urban Ilala district, Dar es Salaam. Data collection included medical observation and physical examination for health status and questionnaires for assessment of well-being, levels of fruits vegetables intake per day and wealth status. A total of 165 people aged 60 to 95 elderly individuals participated in this study. The findings of this study reveal that fruits and vegetables intake among elderly individuals in Ilala District, Dar es salaam was lower ( $2.61 \pm 1.19$ ) than the recommended minimum of five daily servings varied greatly with economic status ( $p < 0.001$ ). In conclusion, the health and well being of Ilala, Dar es Salaam elderly is poor. They take insufficient levels of fruits and vegetables servings per day, less than WHO recommended servings of at least 400 g, or at least 5 servings of fruits and vegetables per day. Higher price and poverty is a major constrain of fruits and vegetables intake. Therefore raising awareness, improving perception benefits concerning fruits and vegetables consumption and developing public policies to make fruits and vegetables more affordable for low-income families should be encouraged.



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**LIST OF ABBREVIATION**

HBS	Household Budget Survey
24-H-RQ	24 Hours Recall Questionnaires
MAFS	Ministry of Agriculture, Food Security and Cooperation
MHSW	Ministry of Health and Social welfare
MYL	Ministry of youth and Labor
NSGRP	National Strategy for Growth and Reduction of Poverty
NCDs	Non Communicable Diseases
PMO	Prime Minister's Office
SES	Socio-economic Status
TFNC	Tanzania Food and Nutrition Centre
U R T	United Republic Tanzania
WHO	World health organization



## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 General Introduction

Fruit and vegetables are important components of a healthy diet, and their sufficient daily consumption could help prevent major diseases, such as cardiovascular diseases and certain cancers. The World Health Organization (WHO) recommends the consumption of at least 400 g, or at least 5 servings of fruits and vegetables a day (WHO, 2006; 2003). Many nutrition and dietary expert suggest eating from five to nine serving of fruits and vegetables every day. That is a total.

Tanzania, mostly produces fruit that is native to temperate and subtropical climates, but also produces significant volumes of bananas, pineapple, longan, litchi, mango and coconut and has smaller outputs of sugar-apple, jackfruit, sapodilla, star fruit, papaya, guava, wampee, myrobalan, wax apple, and dragon fruit (Kariakoo Masoko Corporation, 2014). Green vegetables which are grown in Dar es Salaam and marketed in various local markets are; (amaranth, Chinese cabbage, cowpea leaves, green pepper, leafy cabbage, lettuce, okra and pumpkin leaf (Mobofu, 2012).

Generally, most fruits and vegetable are perishable and are not available throughout the year. However, the technology of food preservation particularly on fruit and vegetable is low in most of developing countries including Tanzania (Ruel, 2005). Studies in Dar es Salaam show that NCDs related to insufficient intake of fruits and vegetables account for nearly 60% of deaths of those aged 60 and older (Tewodros, 2013). In addition to that, majority of Tanzanian elders are at high risk of getting

chronic diseases such as cardiovascular disease, strokes and diabetes due to poor life style and poor nutrition (National ageing policy, 2003; HelpAge international 2011).

Though consumption of fruits and vegetables in Tanzania is higher compared to other east African countries (Ruel, 2005), but little is known about the frequency, distribution, and determinants of fruits and vegetables consumption among older adults in Tanzania.

## **1.2 Statement of the Problem**

Dieticians' view vegetables and fruit as a source of vitamins, minerals and micronutrients. Several studies have shown that adequate consumption of fruit and vegetables is associated with a reduced risk of cancer and CHD (Colditzl, 1985; WHO, 2002). Furthermore, previous studies have shown strong negative relationships between fruits and vegetables intake and obesity, diabetes and hypertension (WHO, 2002; 2003).

Despite all these benefits, people do not properly follow the minimum recommended consumption of five servings of fruits and vegetables per day (WHO, 2002; 2003). Data on fruits and vegetables intake derived from 10 sub-Saharan Countries, Burundi, Ethiopia, Rwanda, Kenya, Tanzania, Mozambique, Malawi, Ghana, Guinea and Uganda) None of the countries reach the WHO/FAO recommended minimum level and with the exception of Kenya mean consumption, in most countries does not even reach half of the recommended level. According to WHO (2014), approximately 16.0 million (1.0%) disability adjusted life years (DALYs, a measure of the potential life lost due to premature mortality and the years of productive life

lost due to disability) and 1.7 million (2.8%) of deaths worldwide are attributable to low fruit and vegetable consumption. These diseases including; cardiovascular diseases, stroke, diabetes, hypertension, and cancer are the most common in terms of mortality (WHO, 2011). Despite of the mentioned importance of fruits and vegetables in elderly adults but little is known about amount and the typical fruit and vegetable intake of elderly adults' in Tanzania.

### **1.3 Objectives**

#### **1.3.1 General Research Objective**

The research aimed to investigate the effects of taking fruits and vegetables in the diet regularly on health and well being of elderly people aged sixty years and above.

#### **1.3.2 Specific Objectives**

In order to meet the general objective, the study specifically intended the following:

- (i) To estimate the average number of servings of fruits and vegetables per day among elderly adults'.
- (ii) To determine factor(s) influencing fruits and vegetables consumption among elderly adults'.
- (iii) To investigate the correlation of fruits and vegetables consumption and wealth status.
- (iv) To determine the correlation of fruits and vegetables consumption and frequencies of gums bleeding, incidence of opaque eyes and cardiovascular heart diseases.

## **1.4 Research Questions**

The study will answer the following questions,

- (i) What are major factors influencing fruit and vegetables consumption among elderly adults?
- (ii) What is the level of fruits and vegetables intake per day among elderly adults?
- (iii) Is there any statistical relationship between frequency of fruits and vegetable servings per day and wealth status?
- (iv) Is there any relationship between levels of fruits and vegetables consumption and frequencies of gums bleeding, incidence of opaque eyes and incidence of cardiovascular heat diseases?

## **1.5 Significance of the Study**

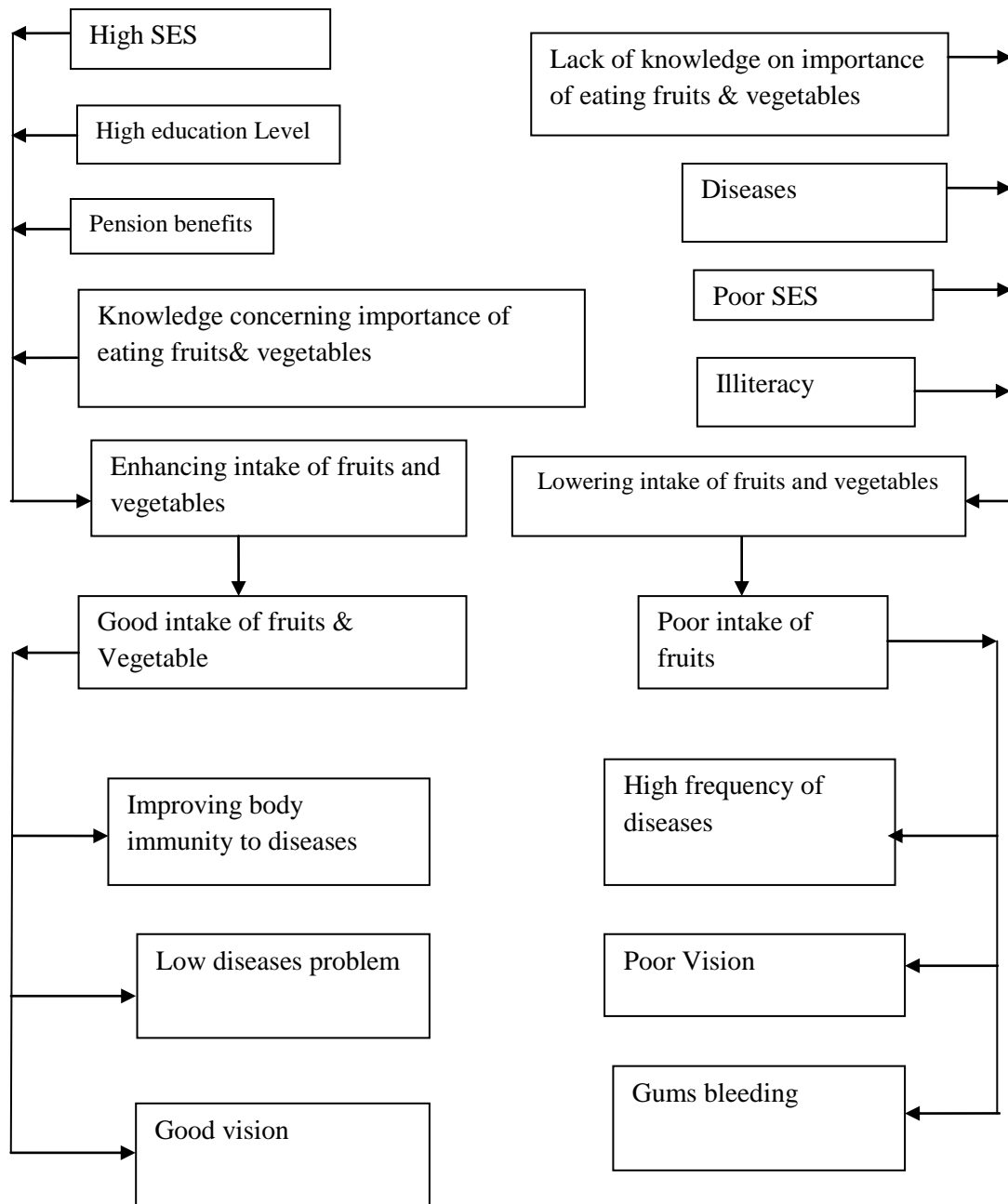
Increasing consumption of fruit and vegetables by one to two servings daily could cut cardiovascular risk by 30% (WHO, 2003). In addition to that, eating adequate fruits and vegetables provide diseases fighting benefits and is one of the best weight management strategies (WHO, 2002; 2003).

However, there is inadequate research conducted concerning levels of fruits and vegetables consumption among elderly adults in Africa including Tanzania (Karen, 2001). Therefore, little is known about the frequency, distribution, and determinants of fruits and vegetables consumption among older adults in Tanzania. The findings of this dissertation explored the vulnerability of elderly people to non-communicable diseases, health and well being due to inadequate micronutrient intake.

Therefore this dissertation will increase awareness to policy makers and all who are responsible for people's health on these influencing variables for fruits and vegetables intake. Hence, it will assist to formulate strategic plan for improving micronutrient intake through consumption of fruits and vegetables particularly among elderly people.

### **1.6 Conceptual Framework**

In order to determine levels and factors associated to fruits and vegetables intake. The main key concepts, fruits and vegetable consumption health and well being was linked with factors that either enhancing or hindering intake of micronutrients contents of fruit and vegetables. It is documented that, sufficient taking of fruits and vegetables provides body with defence against chronic diseases' hence a good health status. Poor social economic status (SES), unavailability, illiteracy, and low knowledge regarding fruits and vegetables are mentioned elsewhere as constraints for adequate uptake of fruits and vegetables. Insufficient intake of fruits and vegetables might lead to diseases particularly those associated with insufficient micronutrient intake, such as night blindness (Colditzl, 1985). Figure 1.1. Shows the conceptual framework for intake of fruits and vegetables.



**Figure 1.1: The Conceptual Framework for Intake of Fruits and Vegetables**

Source: Designed for this research (2014)

### 1.7 Definitions of Study Parameters

For the purpose of this research old people will be those aged 60 years and above.

Other study parameters are defined below.

### **1.7.1 Fruits and Vegetables (Fruits and Vegetables)**

Fruit is defined botanically as the ripened ovary of a seed bearing plant that contains seed (IARC 2003). By this definition Zucchini, tomatoes, peppers and even the seed of deciduous trees are fruits. Vegetables are broadly defined as the edible portions of a plant (excluding fruits and seed) such as roots, tubers, stems and leaves. The food and agriculture organization FAO defines fruits and vegetables to include nuts such as ground nuts, pulses such as lentils and beans, sugar crops such as sugar beets and sugar cane and starchy root crops such as tubers and corns.

However, this research focused on vitamins, essential micronutrients, fibre, vegetable proteins and biofunctional components content of fruits and vegetables. Therefore fruits and vegetables were defined to exclude nuts, pulses, sugar crops, potatoes and starchy root crops such as, cassava and yams (Holland et al, 1991; WHO, 2005). Sweet bananas were included but not cooking bananas, recognizing that any classification is somewhat arbitrary. Composite or processed foods were included provided they contained enough fruit or vegetables (Holland et al, 1991;WHO, 2005).

### **1.7.2 Number /Serving of Fruit and Vegetables Servings Per Day**

Fruits and vegetables assessment like other dietary methodologies may be broadly classified into two categories: those for the measurement of the intakes of groups or households and those for the assessment of individual intakes. Individual dietary assessment methodologies include the diet history, 24-hour recall (24-H-RQ), weighed and estimated food records and food frequency questionnaires. (Northwestern University, 2011; Schatzkin et al, 2003).

For the purposes of this study, the 24-hour recall method was used. One of the principal advantages of the 24-H-RQ is its speed and ease of administration. Additionally, the immediacy of the recall period means that respondents are usually able to recall most of their dietary intake of the previous day.

Participants were asked to estimate their daily servings of fruits and vegetables at breakfast, lunch, dinner, and between meals as snacks or deserts in accordance with a nutrition guideline card. The nutrition guideline card categorized one serving of vegetables into one of three following groups: (1) one cup of raw green leafy vegetables such as spinach or salad; (2) one-half cup of other vegetables cooked or chopped raw, such as tomatoes, carrots, pumpkin, corn, Chinese cabbage, beans, or onions; and (3) one-half cup of vegetable juice.

Schatzkin et al. (2003), have recommended specific procedures when using the 24-H-RQ method in order to ensure the collection of representative results in all surveys

- (i) The respondent should not be given advance warning of the interview (in order not to change dietary intake)
- (ii) Dietary aids, which assist in identifying portion sizes, should be used
- (iii) The interviews should be evenly distributed over the days of the week (for the sample as a whole), and
- (iv) The use of open-ended forms with pre-coded foods (fruits and vegetables) facilitates the Process and decreases errors in transcription.

All the above recommendations were complied in this study.



### **1.7.3 Health**

Having a dry skin, opaque eyes and poor vision at night and bleeding gums and frequency of hospital admission due to diabetes II and cardiovascular heart diseases were used to indicate poor health status. Dim light vision and opaque eyes were used because they indicate deficiencies of vitamin A. Observation, physical examination and questionnaire were used to assess the health status of respondent. On other hand pale (dry) skin was used since it associate with deficiencies of Vitamin B12 and C or prolonged diseases. Vitamin A, C and B12 are found in large quantity in fruits and vegetables (WHO, 2008; WHO, 2005).

### **1.7.4 Socio-economic Status**

Socioeconomic status is a measure of an individual's or family's economic and social position based on education, income, and occupation. It is such a strong predictor of health that an assessment of the health of Ilala elders individual would be incomplete without consideration of the socioeconomic status of its residents (WHO, 2013). Experts divide SES loosely into low, middle and high level.

Socioeconomic status was determined by looking at the two interrelated factors of economic status and education level of respondent. Economic status was determined by wealth status of the responder family, because most elderly are under family hands in addition to that wealth as a measure of economic status has several advantages; it represents a more permanent status than does either income or consumption (Neil Coffee and Tony Lockwood, 2012). In the form that it is used, wealth is more easily measured (with only a single respondent needed in most cases)

and requires far fewer questions than either consumption expenditures or income (Neil Coffee and Tony Lockwood 2012) .

The researcher used a total of sixteen items to assess' wealth status of study participants. The items included household assets, characteristics of the dwelling, number of meals per day, employment status of the head of the family, possession of water sources, electricity, and retirement benefits. Education level was determined by the highest formal education reached by respondent.

#### **1.7.5 Well-being (Quality of Life) Indicator**

The World Health Organization (WHO) postulates three components in its definition of health - the mental, the physical, and the social components. While the physical component features both subjective dimension and objectively measurable basis, the social, and especially the psychological components of health in the mentally healthy population are primarily accessible through subjective assessment of a person (Dzuka, J. & Dalbert, C. (2000) ).

Perceived well-being can give important information about elderly or handicapped persons or those who are impaired in other ways from expressing their problems explicitly (Jori Reijula et al 2009). For the purpose of this paper perceived well being was assessed by determining reported physical pain, socio-relationship. Extreme Physical pain prevents people to work hence lowering income gains. Ageing people are vulnerable to chronic diseases and they have low energy for work therefore requires a significant family support to ensure accessibility of treatment and food. The mentioned factors were assessed by questionnaire.

### **1.7.6 Knowledge Instrument Regarding Fruits and Vegetables Consumption**

The knowledge of participants was measured using six questions. Each question carried one mark. Correct responses were summed to create a total knowledge score of 0 (lowest) to 6 (highest). This method was found to be valid and a reliable among nutrition specialist in various countries (Salehi, 2010).

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 The Definition of Elderly People in Tanzania

The twentieth century has witnessed an increase in the number of elderly people. The population of elderly adults is increasing because of reduced maternal death, fertility rate and modernised medical care (WHO, 2002; WHO, 2003). According to Population and Housing Census (PHC), (2012), Tanzania has a total population of about 44 million of whom 5.6% are aged 60 and above. It is also among the countries in sub-Saharan Africa with at least 1 million older people, and this proportion is projected to rise to 10% of the total population by 2050 (National Bureau of Statistics (NBS), 2006), the absolute number of people entering the older cohort is increasing (NBS, 2006).

The United Nations has agreed that 60+ years may be usually denoted as old age, and this is the first attempt at an international definition of old age (World Health Survey, 2014). However, for its study of old age in Africa, the World Health Organization (WHO) set 50 as the beginning of old age. At the same time, the WHO recognized that the developing world often defines old age, not by years, but by new roles, loss of previous roles, or inability to make active contribution to society. (World Health Survey, 2014) In Tanzania both the National Health Policy and the Public Service Act recognize 60 years as retirement age (National Ageing policy, 2003).

## **2.2 Health Status of Elderly People in Tanzania**

The World Health Organization promotes health and well-being throughout the life course; this includes the attainment of the highest possible level of health and quality of life for the largest number of older persons, who are defined as people over 60 years of age (WHO, 2002).

In order to make sure countries abide on what WHO is focusing on, WHO has developed a policy framework for elderly people which was introduced to all countries. Among other things it put more emphasis and requires countries to ensure protection, safety and dignity of ageing individuals (WHO, 2002). The majority of people in Tanzania become old with poor health due to poor life styles and poor nutrition during their childhood (Food and Nutrition Policy for Tanzania (FNPT), 1992). In addition to that, women heavy work load, and frequent pregnancies. Contribute to poor health at old age.

Additionally, health services are not easily accessible to the majority of older people besides they are expensive. Health care professionals on the other hand lack motivation and are not adequately trained to handle older peoples' illness. (National Health Policy, 2003). Moreover, many of the diseases suffered by older persons are the result of dietary factors, some of which have been operating since infancy (National Ageing Policy, 2003).

## **2.3 Non-communicable Diseases and Ageing**

In the 21st century, there is a challenge of fighting against a dramatic rise in non-communicable diseases (NCD). These diseases, includes diabetes, hypertension,

cancer, stroke and ischemic heart diseases are the most common in terms of mortality. In developing countries, the increasing burden of NCD threatens the already-stretched health services. In Tanzania, the Adult Morbidity and Mortality Project (AMMP) in three local areas: Dar es Salaam City, Hai District and Morogoro Rural District, demonstrated a high risk of dying from non-communicable diseases during adulthood (15-59 years) compared to developed countries (TFNC, 2005/2006).

Cardiovascular diseases, which include coronary heart disease (CHD), stroke, rheumatic heart disease, are the leading causes of death and an important factor contributing to disability among NCD (WHO, 2013). According to WHO (2002) hypertension is defined as a systolic blood pressure of 140 mmHg or greater and/or a diastolic blood pressure of 90 mmHg or greater in subjects who are not taking antihypertensive medication. Hypertension was once considered to be rare or nonexistent in indigenous Africans throughout sub-Saharan Africa. The prevalence of Hypertension in Tanzania varies from 2.6% in rural Mara Region to 10.4% in Dar es Salaam (Ochieng, 2010).

#### **2.4 Elders Nutrition Requirements**

Older persons are particularly vulnerable to malnutrition. Moreover, attempts to provide them with adequate nutrition encounter many practical problems. First, their nutritional requirements are not well defined. (WHO, 2013) Since both lean body mass and basal metabolic rate decline with age, an older person's energy requirement per kilogram of body weight is also reduced. The process of ageing also affects other nutrient needs. For example, while requirements for some nutrients may be reduced,

some data suggest that requirements for other essential nutrients may in fact rise in later life.

There is thus an urgent need to review current recommended daily nutrient allowances for this group. There is also an increasing demand worldwide for WHO guidelines which competent national authorities can use to address the nutritional needs of their growing elderly adults populations.

However, literature recognizes the importance of fruits and vegetables to older adults for maintenance and improving their health. For example greens are calcium rich food, essential for bones strength in ageing. A half cup of greens juice it contains 100mg of calcium. Thus, their quality of life can be improved and health care costs lowered through utilization of greens and vegetables.

However, there are several concern for utilization of greens and vegetables which are; health and disease states, lack of nutrition knowledge, limited food preferences, financial concerns, lack of food variety, food sanitation concerns, and limited food availability (Ruel, 2005; WHO, 2003).

Degenerative diseases such as cardiovascular and cerebrovascular disease, diabetes, osteoporosis and cancer, which are among the most common diseases affecting older persons, are all diet-affected. Increasingly in the diet/disease debate, the role that micronutrients play in promoting health and preventing non-communicable disease is receiving considerable attention. Micronutrient deficiencies are often common in elderly people due to a number of factors such as their reduced food intake and a lack

of variety in the foods they eat. Coronary heart disease (CHD), cancer and stroke are leading causes of death that are more prevalent among elderly individuals (WHO, 2013) and there is substantial evidence that low intake of fruit and vegetables (fruits and vegetables) is a major risk factor for such diseases (Colditz, 1985). Several studies have shown that adequate consumption of fruit and vegetables is associated with a reduced risk of cancer and CHD (WHO, 2003).

As in most African countries, the elderly adults in Tanzania depend on their family members for provision of food. The government generally does not provide for social security schemes or other support systems specifically targeting the elderly adults. They rather emphasize that families are responsible for the care of the elderly adults (National Ageing policy, 2003; Kimalando, 2011). Yet, in situations of extreme droughts, when households are faced with ‘too many mouths to feed’, this governmental strategy may place elderly adults’ people at serious risk. Literature sources suggest that the availability of community support systems, for instance through churches is crucial to elderly adults’ health and well-being. So far, in regions where traditional religions are of great influence, this support is not available. (Kimalando, 2011).

## **2.5 Types of Fruits and Vegetables Locally Available**

Fruits and vegetables around the Tanzania number in the thousands. These are categorized into different types or classes according to their shapes, textures, colour or flavour and genera and species (Miller, 2008). One of the best ways to classify fruits and veggies is by colour. (Taylor 2014). The color of fruit and vegetables provides unique health components that are essential to our health (Miller, 2008).



The following classification of fruits and vegetables based on the colour have been adopted from Miller, (2008) and Taylor, (2014).

**Green vegetables and fruit** – Such as leafy greens, peas, lettuce, limes and spinach. Green vegetables contain chlorophyll, fiber, lutein, zeaxanthin, calcium, folate, vitamin C, calcium, and Beta-carotene. The nutrients found in these vegetables reduce cancer risks, lower blood pressure and LDL cholesterol levels, normalize digestion time, support retinal health and vision, fight harmful free-radicals, and boost immune system activity.

**White fruits and vegetables** – Such as banana, brown peas, garlic, ginger and onions. Contain nutrients such as beta-glucans, EGCG, SDG, and lignans that provide powerful immune boosting activity. These nutrients also activate natural killer B and T cells, reduce the risk of colon, breast, and prostate cancers, and balance hormone levels, reducing the risk of hormone-related cancers.

**Blue and Purple fruits and vegetables** – Such as purple potatoes, purple grapes, blackberries and grapes. Contain nutrients which include lutein, zeaxanthin, resveratrol, vitamin C, fiber, flavonoids, ellagic acid, and quercetin.

Similar to the previous nutrients, these nutrients support retinal health, lower LDL cholesterol, boost immune system activity, support healthy digestion, improve calcium and other mineral absorption, fight inflammation, reduce tumor growth, act as anticarcinogens in the digestive tract, and limit the activity of cancer cells.

**Orange and Yellow fruits and vegetables** – This group includes, apricots, yellow pears, yellow potatoes, pineapples and pumpkin few of mention. Contain beta-carotene, zeaxanthin, flavonoids, lycopene, potassium, and vitamin C.

These nutrients reduce age-related macula degeneration and the risk of prostate cancer, lower LDL cholesterol and blood pressure, promote collagen formation and healthy joints, fight harmful free radicals, encourage alkaline balance, and work with magnesium and calcium to build healthy bones.

**Red fruits and vegetables** – Such as papaya, beets, guava, grape fruit, cherries and tomatoes. Contain nutrients such as lycopene, ellagic acid, quercetin, and hesperidin, to name a few. These nutrients reduce the risk of prostate cancer, lower blood pressure, reduce tumor growth and LDL cholesterol levels, scavenge harmful free-radicals, and support joint tissue in arthritis cases.

## **2.6 Domestic Levels of Fruits and Vegetables Consumption**

According to Ruel, (2005) vegetables consumption is almost universal among east African countries. However vegetables consumption is much less common and is more variable across countries.

In Ethiopia, Mozambique and Uganda for example only about one fifth of all households consume fruit, where approximately half do so in Burundi, Malawi, Rwanda, and Kenya, and three quarters of the households do so in Tanzania. The average consumption of fruits is higher than vegetables (Ruel, 2005).

Generally, 70% of Tanzanian household failed to meet the recommended five serving of fruits and vegetables consumption (Ruel, 2005). The percentages of the food budget spent on fruit and vegetables in Tanzania (11.8%) are generally small compared to other countries such as Rwanda that spent 15.6% (Ruel, 2005).

## **2.7 Factors Influencing Domestic Fruits and Vegetables Consumption**

The determinants influencing fruit and vegetables consumption does not affect all houses equally. However other factors such as consumer preference and knowledge on pattern and frequency of fruits and vegetables consumption appeared to be common in majority of household despite on socio economic difference. The following section review factors influencing fruits and vegetables intake among elderly people.

### **2.7.1 Availability**

Food availability relatively means ensuring sufficient food is available like production, country imports, food aid and borrowing. Food availability is an issue of concern for the government. The government has a mandate to ensure that food is available in shops and in government stocks. Countries have to control stock level, production and net trade. In Tanzania, the Ministry of Agriculture and Food security has the mandate to make sure food is available in the country.

In some years the country's food self sufficiency measured by the Self Sufficiency Ratio (SSR) is over 100. Although there are pockets of food shortage in some regions and districts even when SSR is over 100. In such years, the problem is mainly distribution within the country (Ministry of Agriculture and Food Security (MAFS), 2010).

However, the technology of food preservation particularly on fruit and vegetable is low in most of developing countries including Tanzania (Ruel, 2005). Therefore technology to extend harvest period as well as preservation such as solar drying is highly required for maximum availability of fruits and vegetables throughout the year. Major source of fruits and vegetables supply is from local farms and production.

The HIV and AIDS pandemic has also contributed to loss of labour for household agricultural production, since the infected and those caring for them cannot devote enough time and energy for agricultural production (Nombo, 2007). Other factors affecting food availability include high pre and post harvest losses due to pests, diseases and climatic conditions.

Pre harvest losses account for over 30% of all crop losses in the country. It is estimated that postharvest losses range from 40% - 80% for fresh vegetables and fruits. In inappropriate food management at household level diminishes food stocks available for consumption (MAFS, 2010).

### **2.7.2 Accessibility of Fruits and Vegetables**

Simply making food available is not enough; one must also be able to purchase it, especially the low-income households (Sen, 1981). Accessibility is a household issue of concern. When a household is poor or has low production mostly that household will be food insecure. In Tanzania, physical access to food is affected by inadequate infrastructure, mainly transportation network.

The spatial distribution of surplus food production areas is such that food production is mainly concentrated in the southern highland regions and peripheral areas of the country, while the traditional food deficit areas are located mostly in the central corridor and parts of northern areas. (MAFS, 2010). Given the fact that the country is vast and there are long distances between food producing and deficit areas with inadequate transportation network there are high costs of transportation involved. High cost of transportation lead to high distribution costs which in turn are reflected in high prices of food in deficit areas and therefore affecting access to food by low income rural as well as urban populations (MAFS, 2010).

Poverty is still a common phenomenon among rural communities and the urban poor, where inadequate employment and lack of income generating activities lead to low purchasing power and hence affect access to food. Therefore policies to reduce the market price of fruits and vegetables can have significant impact on fruits and vegetables consumption particularly for low income households (Minot, 2002).

### **2.7.3 Consumer Preference**

The factors described above, income, prices and availability determines which consumer is able to purchase or consume. On other hand, consumer preference is what consumer is willing to buy it is all about choice.

Generally, poor household have no choice of food before hunger satisfaction but to focus on cheap sources of energy such as grains and starches' staple. The selection of fruits and vegetables is after satisfying physiological needs of hunger. Therefore at this level knowledge concerning fruits and vegetables is important.

Fruit and vegetable consumption may reduce the risk of several chronic diseases, including cancers, cardiovascular disease, coronary heart disease, hypertension and stroke to 30 percent. (Colditz G.A, *et al.*, 1985; WHO, 2002). They are relatively cheap source of essential micronutrients as described elsewhere above. However, the majority of people even in developing countries are unaware of importance of fruits and vegetables to their health (Ruel, 2005). Rising inflation rates and worsening trade balance and demographic factors such as gender, age, education, income and non smoking are also associated with greater fruit and vegetables intake in elderly people (Saleh, 2010; Nayga, 1995).

Very little is known about how consumer preferences regarding fruit and vegetables affect consumption in low income countries. Taboos and cultural belief are likely to play a significant role in many especially for selected physiological or age groups such as age groups and lactating women. Mangoes for example, are believed to cause diarrhoea in young children in many cultures, and therefore, intake of this excellent source of vitamin A by young children-who are also at highest risk of vitamin A is often constrained (Ruel, 2005).

Generally, dietary changes seem to affect risk-factor levels throughout life and may have an even greater impact in older people. Relatively modest reductions in saturated fat and salt intake, which would reduce blood pressure and cholesterol concentrations, could have a substantial effect on reducing the burden of cardiovascular disease.

## CHAPTER THREE

### 3.0 METHODOLOGY

#### 3.1 Study Area

The present study was conducted in Ilala district, specifically in Majohe ward which is located in Ukonga constituency. Ilala district is among three district of Dar es Salaam City which is located in the eastern part of Tanzania mainland, between latitudes 60.36'S and 07°00S and longitudes 39.00°E and 33°.33'E, on the east it borders the Indian Ocean. Majohe ward is among 12 ward of Ukonga constituency with about 75,014 residents (Population and Housing census 2002).



**Figure 3.1: Map to show Location of Ilala District in Dar – es Salaam City**

Source: The urban ecology of Dar es Salaam (2014)

The ward has seven official streets and the selection of the ward was based on the socio-economic diversity of the population living in the area. The population comprises of individuals with mixed socio-economic classes. The major economic activities of inhabitants are mainly small scale business, employed and subsistence farmers involved in cultivations of vegetables.

### **3.2 Study Variables**

Dependent variables were fruit and vegetable consumption. Independent variables included social demographic, (age, sex, education level, occupation status, wealth status marital status). Health indicators such as chronic disease (cardiovascular heart diseases and type II diabetes), occurrences of pale skin and blurry vision, pension status, knowledge, and perceived benefits and barriers regarding fruits and vegetables were recorded as explanatory variables.

### **3.3 Sample and Sampling Procedures**

#### **3.3.1 Sample Size**

The sample was calculated using Kish Lislle formula as described by Kothari, (2004). According to Population and Housing Census 2012, Tanzania has a total population of 40 million of whom 5.6% are aged 60 and above. Therefore, taking the current proportional of elders (5.6%) and margins error of 0.02%, the minimum sample size was found to be 165 individuals

$$N = \frac{z^2 p(1-p)}{E^2}$$

Where by;-



N = the desired sample

Z =  $(1.96)^2$  at 95% confidence interval

E = Marginal error (0.02%)

P = 5.6 % of current proportion of elders

The information from that calculation provides a sample size (N) of 184 elderly individual.

### **3.3.2 Sampling Procedure**

The random sampling technique was used to select number of individual to participate in the study. Community health workers produced a list of all elderly individuals in their street. From that list, elderly individuals were given a specific identification numbers.

A random number generator was then employed to select the study participants with assistance of the statistician. Then, each household of the selected participant was visited and selected participants were asked to participate in the study.

### **3.3.3 Study Population, Inclusion and Exclusion Criteria**

The study included adult elderly residents aged 60 years and above, of either sex or living in the Majohe wards. Individuals were excluded from the study if they were mentally ill, critically sick or refused to give written informed consent.

### **3.3.4 Study Design**

This was a cross-sectional study which aimed to understand the uptake of vegetables and fruits among elderly individuals and their associated factors.

### **3.4 Data Collection**

#### **3.4.1 Questionnaires**

The designed questionnaire was given to ten selected people based on age, gender and socioeconomic status for pre-testing purpose. Improvement to the designed questionnaire was made in order to reach the objectives of the study. A pre-tested questionnaire was used to collect information required for this study. The questionnaire collected demographic information, socio-economic information, and number of fruits and vegetables consumptions per day, reported health problems, wellbeing of each participant.

#### **3.4.2 Observation and Physical Examination**

A qualified clinician was involved in the study and conducted clinical examination of the study participants. The examination focused on health indicators which are associated with fruits and vegetable consumptions. Particularly, the examination focused on examining the skin, eyes membrane, the oral cavity membranes and gums.

### **3.5 Data Management and Analysis**

#### **3.5.1 Data Analysis**

Collected data was checked and verified to make sure that the questions were reasonably answered and accurately filled in. Verified data were also organized and entered using excel. Data analysis was done using STATA version 12.0 (Stata Crop, Chicago). The prevalence of uptakes of vegetables and fruits and their 95% confidence interval were obtained by binomial logistic regression taking into account clustering by households.

Comparisons of prevalence by demographic factors for vegetables and fruits consumptions were tested for significance using ( $\chi^2$ ) Chi square or fisher exact test where appropriate. Pearson product correlation was used to assess the correlation between health indicators and mean intake of fruits and vegetables per day. Differences in mean uptakes of fruits in relation to demographic factors and health indicators were analyzed by t-tests or ANOVA where appropriate.

### **3.6 Permission to Conduct the Study**

Permission to conduct this study was received from Ilala Municipal Council, the District Health Departments under the District Medical Officer. Consent to participate in the study were obtained from all the study participants prior to recruitment and enrolment into the study.

## CHAPTER FOUR

### 4.0 RESULTS AND DISCUSSION

#### 4.1 Demographic Characteristics

Of 184 eligible elderly individuals, 12 did not agree to be interviewed. Thus, 172 individuals signed the consent form and entered in the study. A total of 7 questionnaires were excluded from analysis owing to incomplete answers. In total 165 elders individuals aged 60-95 years were included in the study. The mean age of participants was 65.07 (SD = 4.38) years, of these individuals 51.52% were female and 48.8% were males. Demographic characteristics of the study participants are shown in Table 4.1.

**Table 4.1: General Demographic Factors of Study Participants**

Variable	N	Percentages (%)
Sex		
Female	85	51.52
Male	80	48.48
Age (Years)		
60 – 64	50	30.30
65 – 69	74	44.85
70 – 74	33	20.00
≥ 75	8	4.85
Education		
No Formal Education	88	53.33
Primary Education	50	30.30
Secondary Education	25	15.15
College Education	2	1.21
Marital status		
Married	95	57.58
Single	19	11.51
Widow	51	30.91

Source: Field Data (2014)

## **4.2 Number of Servings of Fruits and Vegetables Per Day Among Elderly**

### **Adults**

Overall, all study participants reported to be receiving fruits and vegetables. On average, these individuals are taking  $2.61 \pm 1.19$  serving of fruits and vegetables per day. Distribution of servings of fruits and vegetables by gender, shows that female had an average  $2.52 \pm 1.16$  of serving fruits and vegetable per day and the male individuals they an average  $2.7 \pm 1.24$  of serving fruit and vegetables per day. Married had an average  $2.67 \pm 1.16$  of serving fruits and vegetable per day and the single individuals they had an average  $2.32 \pm 0.95$  of serving fruit and vegetables per day. In addition to that elderly aged 60-64 had an average of  $2.71 \pm 1.17$  of serving fruits and vegetable per day and those aged 75 and above they had an average  $2.63 \pm 1.06$  of serving fruit and vegetables per day. Table 4.2 summarize the intake of fruits and vegetables in different groups.

This amount  $2.61 \pm 1.19$  of fruits and vegetables serving per day consumed by older Tanzanian is considerably lower than current WHO recommendation (daily intake of at least five serving, 400g (WHO 2002; 2003).

This results is similar to that reported by Ruel, (2005). The minimum intakes of fruits and vegetable in this research have been observed to be associated with high price of fruits and vegetables and poverty. However further research is needed to investigate relationship of poverty and knowledge of fruits and vegetables on levels of fruits and vegetables consumption.

Generally, Kivule and Zagaria and Kigezi and Kichangani were observed to have highest level of fruits and vegetables intake (2.7) while Nyeburu have had the lowest level of fruits and vegetable intake per day. Table 4.3 summarize fruits and vegetables intake in each street of the study area. Kichangani has the highest intake of fruits and vegetables and highest wealth quintile. Nyeburu has the lowest intake of fruits and vegetables and lowest wealth number of household items. This results is similar to 1993 household survey from Viet Nam show that the average number of distinct and vegetables consumed rises from 4.5 out of 10 in the lowest income quintile to 6.9 in the highest income quintile reported by Minot, 2002.

**Table 4.2: Mean Serving Number of Fruits and Vegetables Per Day**

<b>Variable</b>	<b>Mean serving of fruits and vegetables per day</b>
Sex	
Female	2.52 ± 1.16
Male	2.7 ± 1.24
Age ( In years)	
60 – 64	2.4 ± 1.26
65 - 69	2.73 ± 1.17
70 – 74	2.64 ± 1.19
≥ 75	2.63 ± 1.06
Educational level	
Literate ( primary to higher level)	2.71 ± 1.17
Illiterate ( no formal education)	2.51 ± 1.22
Marital status	
Married	2.67 ± 1.24
Single	2.32 ± 0.95
Widow	2.59. ± 1.20

Source: Field Data (2014)

**Table 4.3: Summary of Street By Number of Older People with Less Fruits and Vegetables Intake**

S/N	Street name	Number of participants	% of participants	Average household items (wealth status)*	Average number of fruits and vegetables servings per day
1	Kichangani	23	13.93	11	2.8
2	Kivule	24	14.54	9	2.7
3	Mji mpya	22	13.33	7	2.5
4	Zavaria	24	14.54	10	2.7
5	Kigezi	24	14.54	10	2.7
6	Mgeule	23	13.93	4	2.4
7	Nyeburu	25	15.15	3	2.1

Source: Field Data (2014)

#### Key

- \* Average household items out of sixteen selected valued items.

### 4.3 Assessment of Factors Influencing Intake of Fruits and Vegetables

This studies reveal that, fruit and vegetables consumption did not vary significantly by gender ( $P > 0.005$ ). It is speculated that this might be due to cultural differences among nations; or simply because most women in this study were housewives, one might argue that they had relatively adequate fruits and vegetables in their daily dietary intakes so males and females did not differ significantly.

Some studies have suggested that the differentials between men and women are due to the greater likelihood of elderly women than men living alone (Ledikwe J. et al, 2003). Living and eating alone are thought to influence diet quality in adults aged 50 years and above (Lock, P, et al, 2005). Another reason for the gender differential in nutrient intake is attributed to high prevalence of morbidity among women (Ledikwe J. et al, 2003). In addition to that, food preferences and economic status of males and

females might affect the level of fruits and vegetables intake in the study area (Ruel, 2005).

For example a study conducted on the Hazda, a tribe of human foragers living in Tanzania, also showed a sex differences in food preferences, with males preferring meat more and females preferring berries more (Berbesque, 2009). This notion is based on chemical components and physical properties of the food which are likely to have an impact on choice, via sensory perception. However, perceiving a sensory attribute in a food does not necessarily mean that a person will choose to consume that food. In addition to factors associated with the person and the food, there are also other many factors in the context within which the choice is made that can be important in food choice.

Many research studies have found that a higher level of educational attainment is a strong predictor of access to economic and healthcare resources (Mohamed N et al 2006; Baker A.H and Wardle J, 2003). In addition to that, educational attainment may contribute to the differences in access and utilization of health care among different social groups. However, this study found that fruits and vegetables serving is not significantly vary with educational level. Because fifty three percent of study participants did not get formal education, this might affect the result of assessment of the effect of educational level on fruits and vegetables intake.

In addition to that, the fact that elderly depends on their family members for provision of food, and shelter, it makes difficult to establish importance of education



level on the level of fruits and vegetables intake. Table 4.4 summarises servings of fruits and vegetables among various categories of elderly individuals.

**Table 4.4: Servings of Fruits and Vegetables Among Various Categories of Elderly Individuals**

Variable	Mean serving of fruits	P. values
Sex		
Female	2.52 ± 1.16	0.33*
Male	2.7 ± 1.24	
Age ( In years)		
60 – 64	2.4 ± 1.26	0.52**
65 - 69	2.73 ± 1.17	
70 – 74	2.64 ± 1.19	
≥ 75	2.63 ± 1.06	
Education level		
Literate	2.71 ± 1.17	0.28*
Illiterate	2.51 ± 1.22	
Marital status		
Married	2.67 ± 1.24	0.49**
Single	2.32 ± 0.95	
Widow	2.59. ± 1.20	
Wealth quintile		
Lowest	1.33 ± 0.63	P < 0.001
Lower	2.70 ± 0.62	
Moderate	3.29 ± 0.83	
High	4.57 ± 0.81	

Source: Field Data (2014)

Key = \* - t – test

\*\* - Anova

The knowledge concerning fruits and vegetables was assessed by using six items instruments. Data analysis indicated that 93% of participants (n = 153) did not know that the recommended intake is at least five servings of fruit and vegetables per day. Similarly, 91% (n = 150) did not know about the importance of fruits and vegetables color, and 86.3% (n = 142) did not know the recommended size of one serving.

However, 81.3% of participants (n = 134) acknowledged that fruits and vegetables are an important source of fiber, 82.3% (n = 135) correctly reported that vitamin pills were not as valuable as fruits and vegetables, and 84% (n = 139) were aware that boiling and evaporating are healthy methods of cooking vegetables. The mean scores of participants' knowledge were 2.36 (SD = 0.47) out of six.

The study reveals that, 73.9% (n=122) failed to eat fruit and vegetables due to high price. This result is similar to available literature (Ruel, 2005; WHO, 2002; 2003). Which illustrates that price is an important constraint of intake of fruits and vegetables among the poor. For example, study in Cambodia found that vegetables cost between 10 and 40 times more per kilocalories than rice and certain fruits up to 100 times more expensive than rice per unit (Ruel, 2005).

According to Claro R.M (2007), a one percent decrease in the price of fruits and vegetables would lead to a 2% increase in the participants' consumption of fruits and vegetables, and a 1% increase in family income would increase fruits and vegetables consumption up to 4%. However, further studies are needed to explore the

relationship between income, price, consumer preferences, and healthy diet (fruits and vegetables intake).

Four point eighty percent (n=8) of responder mentioned unavailability of fruits and vegetables as a constraint for intake of fruits and vegetables. This means about ninety five percent they did not notice availability of fruits and vegetables as constrain for intake of fruits and vegetables in the study area. This result revealed that fruits and vegetables are fairly available in the study area. This result is similar to available literature, which demonstrates high availability of food in cities and urban centres (Kennedy, G 2003). However, fruits and vegetables availability may not be evenly distributed throughout cities. Wholesale food markets as well as discount supermarket chains are most commonly located in the city outskirts (Kennedy G, 2003). These locations may not be accessible to the urban poor due to lack of own transportation, and inadequate municipal public transportation systems. The urban poor often are obliged to purchase fruits and vegetables in small neighborhoods shops, which are more expensive than wholesale or supermarket outlets (Kennedy, G, 2003).

Therefore, strategies to increase access and availability of fruits and vegetables should focus on promoting fruit and vegetable products that maintain the qualities of these foods that make them healthy. Consumption of fresh fruits and vegetables is an issue which spans the entire food security chain. Availability and access to fresh produce should be encouraged through designation of urban agricultural areas, improved urban-rural linkages and nutrition education programs.

Eleven point five percent (n=26) of respondent mentioned loss of appetite as a constraints for inadequate consumption of fruits and vegetables. Loss of appetite among old people may be due to fever and side effects from medication including nausea and vomiting. Other reasons include fatigue, mental and psychological depression, infections and illnesses (FNPT, 1992).. Table 4.5 summarize effects of selected factor for by percentage.

**Table 4.5: Factors Affecting Fruits and Vegetables Intake in Percentage by Number of Older People with Less Fruits and Vegetables Intake**

<b>Factor</b>	<b>Number of people affected (Frequency)</b>	<b>Percentage %</b>
Failed due to higher price	122	73.9
Loss of Appetite	26	11.5
Low knowledge of fruits and vegetables	148	89.7
Availability	8	4.8

Source: Field Data (2014)

#### **4.4 Relationship Between Wealth Status and of Fruits and Vegetables Intake**

##### **4.4.1 Wealth Status of Study Participants**

The result revealed that most of household fall under low wealth quintile, with the average score of  $7.33 \pm 3.62$  out of sixteen valued items. This result correlates with available literatures which rank Tanzania among the worst country to become older. This is because most people work in the informal sector where jobs are precarious and they do not have access to formal pension schemes. (National ageing policy,

2003). In addition to that, according to the report of, three large national schemes, the Parastatal Pensions Fund (PPF), the Local Authorities Provident Fund (LAPF) and the National Social Security Fund (NSSF), only cover about 3% of the salaried workers, leaving the majority unprotected (Regional Workshop of National and Ageing poverty , 2006).

The current research revealed that, countries that have introduced social pensions have been able to rapidly increase pension coverage, with transformative impacts not only on older people but also on their families and communities (Global AgeWatch Index ,2014). The Global AgeWatch Index (2014), ranks 96 countries according to the social and economic wellbeing of older people.).Tanzania ranked 92, despite that the government has committed to a social pension for older people but has yet to implement it, has an income security ranking of 94 out of 96 (Global AgeWatch Index 2014). The poverty situations among participants not only limit the ability to meet recommended number of fruits and vegetables per day but might also affect recommended intake of energy per day Table 4.6. Summarize results of wealth status of study participants.

**Table 4.6: General Results for Wealth Status of Study Participants**

<b>Wealth quintile</b>	<b>Number of items*</b>	<b>Number of elderly individuals</b>	<b>Average number of Fruits and vegetables per day</b>
High	12-16	9	4.57±1.23
Moderate	9-12	38	3.29±0.83
Low	5-8	79	2.70±0.62
Lowest	0-4	39	1.33±1.63

Source: Field Data (2014)

#### 4.4.2 Correlation of Fruits and Vegetables Intake and Wealth Status

The results reveal that there is a strong correlation between fruits and vegetables intakes and wealth status of an individual. ( $r^2=0.826$ ,  $p < 0.001$ ). Table 4.7 show model summarize for correlation of fruits and vegetables intakes and wealth status. This result is similar to that reported by Ruel et al 2005 and world health report 2003. This implies that at low income levels, the demand of fruits and vegetables is small.

This is due to the fact that low income household must prioritize their fulfilment of basic energy requirement, to avoid hunger and that fruit and vegetables are an expensive source. This where household income is near substance level, large quantities of grains and starch staples and few fruits and vegetables consumed (Ruel, 2005).

**Table 4.7: Model Summary For Correlation of Fruits and Vegetables Intakes and Wealth Status**

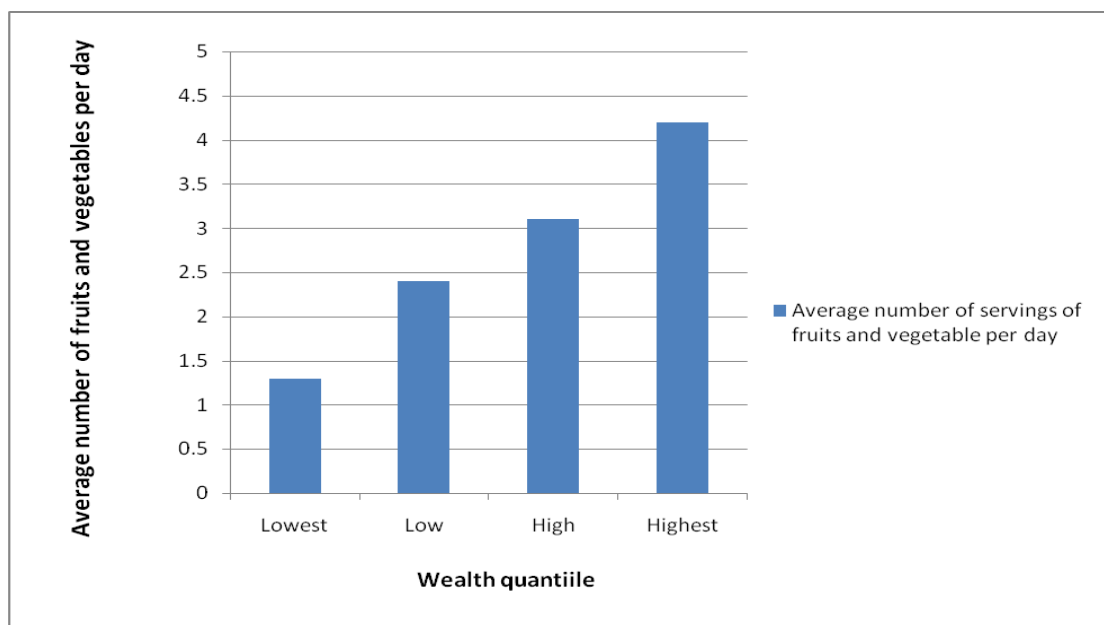
		Wealth status	Average number of servings of fruits and vegetable per day
Wealth status	Pearson Correlation	1	.826 <sup>**</sup>
	Sig. (2-tailed)		.000
	N	165	165
Average number of servings of fruits and vegetable per day	Pearson Correlation	.826 <sup>**</sup>	1
	Sig. (2-tailed)	.000	
	N	165	165

Source: Field Data (2014)

<sup>\*\*</sup>. Correlation is significant at the 0.01 level (2-tailed).

For example, the poor in cambodia must allocate half of their budgets to low quality rice just to reach the recommended energy intake of 2200 kcal per person per day

(Ruel, 2005). Further research indicates that, higher income is associated not only with an increase in the volume of fruits and vegetables consumed, but also with an increase in the diversity of fruits and vegetables, for example 1993 households survey the average number of distinct fruits and vegetable consumed rises from 45 out of 10 in the lowest income quartile to 6 up to 9 in the highest income quintile (Minot 2002).



**Figure 4.1: Number of Servings of Fruits and Vegetables Per Day With Corresponding Wealth Quintile**

Source: Field Data (2014)

#### **4.5 Clinical Information of the Study Participants (Health Indicators)**

Data analysis indicated that participants were having a gum bleeding problem were (57% n=94) and suffering from night blindness (62% (n=103). Reported chronic disease results showed that, 29 % (n= 47) and 19% (n = 31) were suffering from blood pressure and diabetes II mellitus respectively.

**Table 4.8: Summary the Clinical Information of Study Participants**

Variable	N	Percentages
Blood pressures ( Reported)		
Not having blood pressure	118	71.52
Having blood pressure	47	28.48
Reported admission frequencies due to blood pressure problems frequency ( n=44)		
Once	16	36.36
Twice	16	36.36
Thrice	12	27.27
Reported diabetic mellitus		
Not having diabetic mellitus	134	81.21
Having diabetic mellitus	31	18.79
Reported frequency of admission due to Diabetic mellitus		
Once	8	24.24
Twice	10	30.30
Thrice	10	30.30
≥ 3	5	15.15
Chewing problem		
Not having chewing problem	146	88.48
Having chewing problem	19	11.52
Opaque eyes		
Having an opaque eyes	105	63.64
Not having an opaque Yes	60	36.36
Night blindness		
Having a night blindness	112	67.87
Not having a night blindness	62	37.58
Dry Skin conditions		
Having a dry skin	94	56.97
Not having a dry skin	71	43.03
Gum bleeding		
Not having a gum bleeding	71	43.03
Having a gum bleeding	94	56.97

Source: Field Data (2014)

Though 49% of participants were reported to have a physical pain that hindered their daily works only 26% were reported to have chewing difficulties. In addition to that most of participants were observed to have dry/pale skin (57% n=94) and opaque eyes 64% n=105). Table 4.8 Summarize the clinical information of study participants.



#### 4.5.1 Correlation of Fruits and Vegetables Servings and Frequencies of Gums

##### Bleeding

The determination of correlation of fruits and vegetables servings and frequencies of gums bleeding by Karl Pearson coefficient of correlation reveals that, there is strong correlation ( $r^2 = 0.778$ ,  $p < 0.001$ ) between number of fruits and vegetables consumption and presence of gums bleeding. This study is correlating with literature which reveals the importance of Vitamin C (ascorbic acid) for collagen formation and helps to maintain the integrity of connective tissue, bone and dentine.

**Table 4.9: Model Summary for Correlation of Gums Bleeding and Fruits and Vegetables Intake**

		Average number of servings of fruits and vegetable per day	Frequencies of gums bleeding in the last four weeks
Average number of servings of fruits and vegetable per day	Pearson Correlation	1	-.778
	Sig. (2-tailed)		.000
	N	165	165
Frequencies of gums bleeding in the last four weeks	Pearson Correlation	-.778	1
	Sig. (2-tailed)	.000	
	N	165	165

Source: Field Data (2014)

\*\*, Correlation is significant at the 0.01 level (2-tailed).

It is essential for wound healing and facilitates recovery from burns (Mafullul, 2002). Vitamin C also facilitates the absorption of iron. Severe deficiency results in scurvy, which is characterised by haemorrhages and abnormal bone and dentin formation (Rivers 1987). In order to prevent Vitamin C deficiency the diet shall include plenty of fresh fruits and vegetables. Table 4.9 shows computed results for correlation of fruits and vegetables servings and frequencies of gums bleeding.

#### 4.5.2 Correlation of Fruits and Vegetables Servings and Opaque Eyes

##### Incidence

This study reveal that, fruit and vegetables consumption vary significantly ( $p < 0.001$ ) between those having and not having opaque eyes. However, there is low correlation ( $r^2 = 0.27$ ) between number of fruits and vegetables intake and opaque eyes. This result is similar to the available literatures, which recognise nyctalopia (night blindness) as one of the first signs of vitamin A deficiency (VAD) (Ismail, 1999).

Literature suggests that fruits like apricots, cantaloupe, cherries, mango, papaya, peaches and watermelon are rich in Vitamin A. In addition to that vegetables such as asparagus, broccoli, brussels sprouts, carrots, kale, lettuce, pumpkin, red cabbage and spinach.

**Table 4.10: Model Summary for Correlations of Opaque Eyes and Fruits and Vegetables Intake**

		Average number of servings of fruits and vegetable per day	Having opaque eyes
Average number of servings of fruits and vegetable per day	Pearson Correlation	1	-.270
	Sig. (2-tailed)		.000
	N	165	165
Having opaque eyes	Pearson Correlation	-.270	1
	Sig. (2-tailed)	.000	
	N	165	165

Source: Field Data (2014)

\*\*. Correlation is significant at the 0.01 level (2-tailed).

Vitamin A is essential for visual adaptation and a deficiency of this vitamin results in night blindness. Nyctalopia (night blindness) is one of the first signs of Vitamin A deficiency (VAD). Table 4.10 shows model summary for the correlation between fruits and vegetables intake and opaque eyes incidence.

#### **4.5.3 Correlation of Fruits and Vegetables Servings and Incidence of Having Cardiovascular Heart Diseases**

This studies reveal that, there is no correlation fruits and vegetables consumption and incidence of cardiovascular heart diseases and fruits and vegetables intake did not vary significantly ( $r^2 = 0.107$ ,  $p > 0.005$ ) between those having and not having cardiovascular heart disease. Table 4.11 shows model summary for Correlations between fruits and vegetables intake and cardiovascular heart diseases (blood pressure).

This result is stipulated to be caused by inclusion of both at high risk and those at low risk of getting cardiovascular heart diseases (Ramos, 2013). Since, most of research who determine the preventive action of fruits and vegetables to cardiovascular heart diseases were focused to those at high cardiovascular risk, that is they have at least three of the following major risk factors: smoking, hypertension, elevated low-density lipoprotein cholesterol levels, low high-density lipoprotein cholesterol levels, overweight or obesity, or a family history of premature coronary heart disease, whether the results can be generalized to persons at lower risk or to other settings it requires further research (Ramos, 2013).

In addition to that, reveals that the problem of cardiovascular heart diseases observed may be associated with a number of factors. Therefore prevention shall consider a

number of preventive measures, such factors includes: age, gender, high blood pressure, hyperlipidemia, diabetes mellitus, tobacco smoking, processed meat consumption, excessive alcohol consumption, sugar consumption, family history, obesity, lack of physical activity and psychosocial factors .

**Table 4.11: Model Summary for Correlations Between Fruits and Vegetables Intake and Cardiovascular Diseases (Blood Pressure)**

		Average number of servings of fruits and vegetable per day	Blood pressure
Average number of servings of fruits and vegetable per day	Pearson Correlation	1	-.107
	Sig. (2-tailed)		.171
	N	165	165
Blood pressure	Pearson Correlation	-.107	1
	Sig. (2-tailed)	.171	
	N	165	165

Source: Field Data (2014)

#### 4.6 Well-being

Well being was assessed by using the modified WHO-Quality of Life Questionnaire (WHO, 1997). The WHO-Quality of Life Questionnaire was adopted with minor modifications to meet the objectives of research and norms and taboos of the area, modifications included omission of question of gender and sexual abilities activities. The questions suit research questions such as getting support from others especially on purchasing of food particularly fruits and vegetables, health and illness related to

micronutrient deficiencies, social relationship and physical pain which might lower his/her work ability.

#### **4.6.1 Life Satisfaction**

This is the way a person evaluates his or her life and how he or she feels about where it is going in the future. Older people involved in this study were asked about how they are satisfied with the life. A majority of the elders said they were dissatisfied 44.9%, 13% said they are very dissatisfied and 41.2% were neither satisfied nor dissatisfied (moderate). Only 13.2% were satisfied with life. The poor conditions of life, poverty and illness may have resulted to such great numbers of elderly reporting about having unsatisfactory life.

Though 78% of participants receive potential assistants from their relatives, but only 15% of participants were reported to be satisfied with the level of assistants/support they receive from their relatives. The World Health Organization promotes health and well-being throughout the life course; this includes the attainment of the highest possible level of health and quality of life for the largest number of older persons, who are defined as people over 60 years of age (WHO, 2002; 2003). However the results showed that most participants were not in a well being status. The result of this study is correlating with available literature, which alerting that majority of older people are not unsatisfied with their life because they are living in poverty and uncertainty (HelpAge international, 2011).

According to National ageing policy (2003), this situation is caused by many factors which include poverty, inadequate health services and lack of participation in

important decisions affecting national development. In addition to that, the weakening of traditional ties has greatly affected the lives of the majority of older people.

The report of the Regional Workshop of National and Ageing poverty 2006, about 7% of the economically active elderly (60+) are considered to be unemployed. In addition to that various groups of the older people, such as farmers, livestock keepers, fishermen and those with no employment are not covered by any kind of social security fund (social softness).

This explains their vulnerability in their old age due to non-existence of the security fund, which would have otherwise supported them when they can no longer undertake any kind of economic activity. Those who worked as civil servants and are covered by a pension fund, not only do they get meager benefits but also face bureaucracy in getting their rights.

#### **4.6.2 Body Pain**

Old age comes with physical depreciation and body pain. Older people involved in this study were asked about how physical pain affects their day to day life. 43 % said they are affected very much while only 11 % of all who were interviewed said it does not at all affect their life. This large number is speculated to be associated with poor conditions of life, poverty and illness.

Though, older people are more at risk of pain than other sections of the population but less likely than younger people to experience good pain management (Arun. K and Nick . A, 2008). In addition to that, pain in older people is highly prevalent and

widely accepted as something to be expected and regarded as normal' in later life. Hence, suffering associated with persistent pain in older people often occurs without the appropriate assessment and treatment (Arun K and Nick A, 2008), this is awful because it increases the rate of dependency from other people.

**Table 4.12: Wellbeing Status of Study Participants**

<b>Factor</b>	<b>Items</b>	<b>n</b>	<b>%</b>	<b>Average number of fruits and vegetables per day</b>
Satisfied with quality of life	Highly satisfied	22	13.33	2.6
	Moderately satisfied	69	41.82	2.4
	Dissatisfied	74	44.85	1.7
Level of physical pain that prevents work	High	71	43.04	2.1
	Moderate	43	26.06	2.3
	Not at all	51	30.90	2.6
Support level from the family	Good support	128	77.57	2.7
	Moderate support	125	15.29	2.3
	No support	12	7.14	1.9
Satisfied with the support from the family	Highly Satisfied	21	12.73	2.8
	Moderately satisfied	133	80.61	2.4
	Not satisfied	11	6.67	2.1

Source: Field data (2014)

Though, ministry of health and social welfare, WHO and all other health allies are concentrating to make older peoples' life healthy, meaningful and independent. The current health care offered to older people is problematic, although statistics to support this are limited. Access to health services is limited, especially to older people, whose ability to pay for these services is limited. As mentioned before, exemption mechanisms for health care services do exist, but their effectiveness is limited. In addition to that, without an understanding of the basic principles of pain in older people correct assessment and management cannot be ensured.

For example, physical pain prevented 43% of elderly from work and only 6.8% of all interviewed elderly people reported to be satisfied with their life, meaning about 90 % of all 165 elderly interviewed are not satisfied with life. Though only 15% of those who participated said they do not receive support from anyone but only 36% said they are satisfied with the support they received from their family. As the world is expecting an increase of elderly population with increased maternal care, it is good to prepare and plan well so that elderly can live a safe, enjoyable, and healthy life (WHO, 2013). Table 4.12 summarise wellbeing status of study participants.



## CHAPTER FIVE

### 5.0 CONCLUSION AND RECOMMENDATION

#### 5.1 Conclusion

Most of elderly people who participated in this study, belong to low wealth quintile, take insufficient levels of fruits and vegetables servings per day, less than WHO recommended servings of at least 400 g, or at least 5 servings of fruits and vegetables per day. In addition to that they have physical pain which interfere with their day to day activities and they are dissatisfied with their life condition. However, participants had good knowledge concerning the various health benefits, most of participants didn't know about the daily amount of fruits and vegetables consumption or the correct size of an fruits and vegetables serving as recommended by WHO. The major constrains for low intake of fruits and vegetable are higher price and low income.

Generally, the following shall put into considerations, that all respondents of this study were household's members. Therefore the findings of this study might not be generalized to elders living in elderly centres. These elderly might differ from institutionalized elderly in terms of socioeconomic status, family cohesiveness, social support, and availability and access to fruits and vegetables (Saleh, 2010).

However, since fruits and vegetables availability is mainly a function of food production and supply. Both production and supply systems are different in rural and urban contexts. Therefore, further studies are needed to examine the mediating factors affecting fruits and vegetables consumption in a larger and more diverse group of elderly in Tanzania (rural and urban).

In addition, it should be noted that this findings on fruits and vegetables intake were based on self-reported information and thus might be associated with measurement errors. Seasonal aspects were not investigated in this study, since season might influence the availability of fruits and vegetables, it is recommended that this to be considered in future studies. Since elderly were found to have deficiency of vitamin A , B12 and C which are present in other foods such as eggs and fish, a research to determine types food and its content eaten mostly by elderly people is highly important.

## **5.2 Recommendations**

- 5.2.1. Although this study showed that most participants had good knowledge regarding the different health benefits of fruits and vegetables and also believed that vitamin pills are not real substitutes for fresh fruits and vegetables, very few participants knew about the daily amount of fruits and vegetables consumption or the correct size of an fruits and vegetables serving as recommended by WHO. Therefore, it is recommended that public education concerning daily amount of fruits and vegetables consumption and campaigns on adequate consumption of fruits and vegetableness should be promoted.
  
- 5.2.2. Since pain has a highly detrimental impact on quality of life and is severely disabling. Therefore ageist and discriminatory attitudes toward older people in pain must be challenged and ended. Pain in older people needs to be seen as a priority. It is not a normal part of ageing.

5.2.3. The current results provide extra support to studies indicating that fruits and vegetables prices are a barrier to consumption by low-income consumers, so developing public policies to make fruits and vegetables more affordable for low-income families should be encouraged.

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**APPENDICES**

**Appendix 1: Informed Consent Form**

Consent form

ID NO. \_\_\_\_\_

Consent to participate in study:

Hello, my name is ....., doing research titled consumption levels of fruits and vegetables and their relationship to health and wellbeing of elderly people of different socio- economic background in ilala district, Dar es salaam research

Aim of the Study

To determine levels, frequency and factors for fruits and vegetables intake among elderly adults.

What participation Involves

If you agree to participate in this study, you will be required to answer a series of question that have been prepared for the study through interview in order to obtain the intended information. You will be interviewed for 20 – 30 minutes.

Confidentiality

All information that will be collected will be kept in private and will be used only for this study. The form will not bear your name.

Rights to Withdraw and Alternatives

Participating in this study is completely voluntary. You can choose not to participate in this study and even if you have already participated in the study you can refrain from the study at any time as you wish. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits.

Who to contact

If you ever have questions about this study, you should contact the study Coordinator or the Principal Investigator Frank Balegu, from Open University of Tanzania, P.O. Box 75825, Dar es Salaam, Mobile Phone 0753-705036.

If you have questions which need further clarification, as a participant you have a right to call, call Prof. Aboud M. Chairman of the College Research and Publications Committee, P.O. Box 65001, Dar es Salaam, Tel: 2150302 and Dr. A.A. RUKANTABULA (0784 559 601) who is the supervisor of this study.

Do you agree?

Yes, I agree to participate in this study .....Signature:

.....

I have read/hear the contents read for me the contents in this form.

Signature of Participant \_\_\_\_\_

Date of signed consent \_\_\_\_\_

## Appendix 2: Fomu ya Ridhaa (Kiswahili Version)

Namba ya utambulisho: \_\_\_\_\_

Ridhaa ya kushiriki kwenye utafiti

Habari? Naitwa ....., ninakusanya takwimu kwa ajili ya utafiti kuhusu viwango na visababishi vya kulaji wa matunda na mboga mboga miongoni mwa wazee.

Madhumuni ya Utafiti

Utafiti huu ni kutaka kuainisha kiwango cha ulaji wa matunda na mboga mboga ni sababu zipi au vikwazo vipi hasa zinasababisha ulaji mdogo wa matunda na mboga mboga miongoni mwa wazee.

Nini kinahitajika ili kushiriki

Endapo utakubali kushiriki katika utafiti huu inabidi ujibu maswali toka kwenye muongozo wa maswali yaliyotungwa kwa ajili ya utafiti huu. Zoezi hili litachukua takribani dakika 20 hadi 30.

Usiri

Taarifa zitakazokusanywa kupitia dodoso hili zitakuwa ni za siri na hakuna mtu yeyote atakayeambiwa ulichosema. Fomu hii haitahitaji jina lako.

Haki ya kushiriki au kujitoa au vinginevyo.

Ushiriki katika utafiti huu niwa hiari. Kutoshiriki au kujitoa kutoka kwenye utafiti hakutakuwa na adhabu yeyote na hutapoteza stahili zako, endapo utaona ni vema kufanya hivyo.

Nani wa kuwasiliana naye

Endapo utakuwa na maswali kuhusiana na utafiti huu, unaweza kuwasiliana na Mtafiti mkuu wa utafiti huu Frank Balegu wa Chuo Kikuu Huria cha Tanzania. SLP 75825, Dar es Salaam, simu ya kiganjani 0753-705036. Kama una swali kuhusu staili zako kama mshiriki unaweza kumpigia Prof. Aboud M. Mwenyekiti wa Kamati ya Utafiti na Uchapishaji, S.L.P 65001, Dar es Salaam, Simu 215032-6 na msimamizi wa huu utafiti Dr. A.A Rukantabula wa Chuo Kikuu Huria Tanzania.

Simu Namba (0784 559 601)

Sahihi:

Je umekubali?

Mshiriki amekubali .....Mshiriki hajakubali .....

Mimi \_\_\_\_\_nimesoma maelezo ya fomu hii.

Maswali yangu yamejibiwa. Nakubali kushiriki katika utafiti huu

Sahihi ya mshiriki. ....

Sahihi ya shahidi (Kama Mshiriki hawezi kusoma/kuandika)

Sahihi ya mtafiti msaidizi .....

Tarehe ya kutia sahihi ya Kushiriki .....

Sahihi ya Mtafiti ..... Tarehe .....

### Appendix 3: Questionnaires

Please select the answer and put tick (√) mark in the box

Appendix. 1: The following questions asses socioeconomic factors

1. What is your gender?  Male  Female
  
2. Age of the responder.....
   
  
 60-64,       65-69                       70-74       75 and 75 +
  
3. Current employment .....
   
  
 Self employment       Part time employment       Employed in informal sector       Unemployed
  
4. Level of education.....
   
  
 No formal education       Primary       Secondary       Tertiary
   
  
 Higher (degree) education
  
5. Marital status.....
   
  
 Married, (mono)       Married ( poly )       Single,       Separated,       Widower

Appendix .2. The following questions asses' factors influencing fruits and vegetables intake.

1. Did the fruits and vegetables intake decrease over the past 2 weeks due to lack of appetite.  
 Yes  No
2. Have you failed to buy fruits and vegetables over the past 2 weeks due to high price?  
 Yes  No
3. Have you failed to get fruits and vegetables of your choice due to unavailability?  
 Yes  No
4. Knowledge regarding fruits and vegetables consumption
  - (i) What is the recommended number of servings for fruits and vegetables consumption per day?  
 1  2-3  '5 or more
  - (ii) Would you say that a single serving of beans is 'more,' 'less,' or 'about as much' as can fit in the palm of your hand?  
 Yes  No  I don't know
  - (iii) Are fruits and vegetables good source of fibber?  
 Yes  No  I don't know
  - (iv) Does the colour of fruits and vegetables predict its nutrients content?  
 Yes  No  I don't know
  - (v) If you take vitamin pills you do not have to eat a lot of fruits and vegetables?

Yes  No  I don't know

(vi) Boiling and evaporation is the best method to cook vegetables?

Yes  No  I don't know

Appendix 3. The following questions assess the quality of life (well being).

1. Are you satisfied with your ability to perform daily living activities?

Yes  No

2. Are you satisfied with your personal relationships?  Yes  No

3. Are you satisfied with the support you get from your family?  Yes  No

4. Are you satisfied with the conditions of your living place?  Yes  No

5. Are you satisfied with your access to health services?  Yes  No

6. Are you satisfied with the implementation of free health policy to elderly people?

Yes  No

7. Are you satisfied with the accessibility of the information that you need in your day-to-day life?  Yes  No

8. To what extent do you feel that physical pain obstruct your daily activities? (  
 High  Moderate  Low

Appendix 4. The following questions assess the health status of the responder.

1. Is the responder having opaque eyes?  Yes  No

2. Is the responder having a bleeding gum?  Yes  No

3. Is the responder having dry skin?  Yes  No



4. Based on your observation is the responder significantly needs to increase the level of fruits and vegetable for his/ her health  
 Not at all  A little  moderately  Mostly  completely
5. Are you able to see in low light intensity?  Yes  No
6. (a). Do you suffer from any of the following disease  
 Cardiovascular heart diseases such as high blood pressure  Diabetes II  
 (b). If yes how many times have you admitted in the hospital in the last year due to that disease  
 one times  two times  three times  More than three times
7. How many times have you suffered from flue in the last month  
 Zero  One  Two  More than Three

Appendix 5. The following questions determine wealth status of the responder

1. Current employment of the head of the family .....
- Self employment /Employed in informal sector  
 Government employment  Unemployed
2. Is this house where you live....?  
 Owned by you (or someone in the household)  Rented  
 Other specify.....
3. Are they having block fence?  Yes or  No
4. Are they having television  Yes  No
5. Are they having a decoder?  Yes  No

6. Are they having a modern floor? ( ) Yes ( ) No
7. Is the head of the family own car(s)? ( ) Yes ( ) No
8. Are they having a source of water? ( ) Yes ( ) No
9. Are they having electricity? ( ) Yes ( ) No
10. Are they having electric cooker? ( ) Yes ( ) No
11. Are they having fridge/freezer? ( ) Yes ( ) No
12. Are they having sing board? ( ) Yes ( ) No
13. Is the responder getting a pension? ( ) Yes ( ) No
14. Are they having a house servant? ( ) Yes ( ) No
15. Are they having a radio? ( ) Yes ( ) No
16. Are they having a modern roof? ( ) Yes ( ) No